Marriage Timing, Gender Context, and Early Family Formation

Kerry L.D. MacQuarrie

A dissertation

submitted in partial fulfillment of the

requirements for the degree of

Doctor of Philosophy

University of Washington

2016

Reading Committee:

Stewart Tolnay, Chair

Aimée Dechter

Charles Hirschman

Program Authorized to Offer Degree:

Sociology

University of Washington

Abstract

Marriage, Gender Context, and Early Family Formation

Kerry L.D. MacQuarrie

Chair of the Supervisory Committee:
Stewart Tolnay
Department of Sociology

This dissertation explores marriage timing, the gender context, and early family formation in Asia through three separate but related studies. The first study uses trends, bivariate regression, and survival analysis to investigate trends in marriage age and the first birth interval over time in seven countries—four in South Asia and three in Southeast Asia. Specifically, it examines the association of gender context and socio-demographic characteristics with (1) marriage age and (2) the first birth interval, along with shifts in these associations over time. Data from Demographic and Health Surveys (DHS) are used from two points in time over approximately a 10-year period to examine changes in these dynamics over time in Bangladesh, India, Nepal, Pakistan, Cambodia, Indonesia, and the Philippines. Marriage age increased and the first birth interval decreased (except in Cambodia) significantly, albeit at varying rates. Varying rates of

change over time contribute greater disparities in marriage age and greater homogeneity in duration of the first birth interval across a range of socio-demographic characteristics. Most gender context measures and socio-demographic characteristics are associated with both outcomes at both points in time.

This second study uses multivariate hazard and multivariate decomposition models to investigate the influence of marriage age and the gender context on the first and second birth intervals over time. It uses DHS data from the same South and Southeast Asian countries. Later marriage is associated with shorter first birth intervals but longer second birth intervals. Marriage age remains the most consistent influence on the first birth interval after controlling for birth cohort, gender context, and women's and husbands' characteristics. Compositional shifts toward later marriage contribute substantially (38%-89%) to shortened first birth intervals in Bangladesh, India, Nepal, Pakistan, Indonesia, and the Philippines, while the effect of marriage age has changed in India and Nepal. Marriage age continues to influence the second birth interval, after controlling for the first birth interval and other covariates.

The third study is a qualitative inquiry into the social context of early childbearing in Bangladesh. This study conducted in-depth interviews with 30 women age 15-22 who had married before age 18 in Khulna division, Bangladesh. The study was motivated to investigate why young, married women bear a first child at a young age. The study finds that women enter into marriage suddenly and without knowledge of contraception. Young women want to delay a first pregnancy, but still want a birth within adolescence. Spousal communication and women's decision-making are low and young women defer decisions on childbearing and contraception to others. Women's fertility desires are frequently discordant with those of their husbands, their in-

law family, or both. Women, their husbands, and their family members are all concerned with the health consequences of early childbearing. However, concerns about the health effects of contraception discourage long term use and promote early pregnancies. Thus, women's abilities to meet their fertility aspirations are challenged by discordant childbearing aims, limited options for contraceptive methods, and discontinuation of contraception due to side effects and concerns about infertility.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

The author extends their gratitude to numerous people who contributed to the production of this dissertation in various capacities: Stewart Tolnay, University of Washington, for providing motivation, support, technical guidance, and criticism; dissertation supervisory committee members Stewart Tolnay, Charles Hirschman, Aimée Dechter, Sara Curran, and Darryl Holman, University of Washington, for encouragement and feedback on the study proposal and multiple early drafts; and most importantly, Scott MacQuarrie, Tarquin, and Kenna for their unwavering love, encouragement, tolerance, and support.

For their inputs benefiting the studies that underlie chapters one and two, the author extends their appreciation to: Margaret Greene of GreeneWorks for her thoughtful review of an earlier draft; Tom Pullum, ICF, for technical and programming guidance on managing birth histories data; Daniel Powers, University of Texas, for suggestions for the multivariate decomposition models; and Amy Finnegan, Duke University, for assistance organizing relevant literature.

For their contributions to the qualitative study that is the basis of chapter three, the author extends their appreciation to: Quamrun Nahar and Rasheda Khan, icddr,b, for supervising data collection and Quamrun Nahar for collaboration on the study protocol; the field research team lead, Marzia Sultana, icddr,b, and interviewers Syeda Nurunnahar, Sharmin Islam, Fatama Khuatun, Meghla Islam, and assistant Salim Prodhania, icddr,b, for their tireless efforts to collect high quality data under sometimes difficult circumstances; Kanta Jamil, USAID, who spearheaded support the study

idea; Erica Nybro, JHU/CCP, for assistance with data visualization; and Laurie Liskin, JHU/CCP, and Abigail Weitzman, University of Michigan, for comments on early drafts. Finally, the author is indebted to the 30 young women who so generously shared their time and personal stories.

The statistical analyses of Demographic and Health Surveys data presented in results chapters one and two of the dissertation were funded in part with support provided by the United States Agency for International Development (USAID) through The DHS Program (#AID-OAA-C-13-00095) and by the National Science Foundation under grant #DGE-0718124 to the author. This research uses secondary datasets predetermined by the University of Washington Human Subjects Division not to require Institutional Review Board approval or exemption. The data collection protocols received ethical clearance from the Institutional Review Boards at ICF and in host countries.

The qualitative study presented in results chapter three of the dissertation was carried out with support provided by USAID through The DHS Program (#AID-OAA-C-13-00095). This study received ethical clearance from the Institutional Review Board of ICF and the Ethical Review Committee of the International Center for Diarrhoeal Disease Research, Bangladesh (icddr,b). The views expressed are those of the author and do not necessarily reflect the views of USAID, National Science Foundation, the University of Washington, or the United States Government.

DEDICATION

I dedicate this dissertation to my family, Scott MacQuarrie, Tarquin, and Kenna, and to my parents, Andy Douma and Elizabeth Wiley.

INTRODUCTION

South and Southeast Asia has experienced changes in the timing of marriage, first birth, and birth spacing, albeit with variation in levels and rates of change. There is broad consensus that nuptiality patterns effect certain fertility dynamics, specifically the initiation of childbearing, birth spacing, and total fertility. However, less known is whether marriage age or other factors exert more influence on the first birth interval, and to what extent compositional shifts contribute to changes in the first birth interval and the relative importance of marriage age to birth spacing beyond the first birth interval. Furthermore, the underlying social norms and gender context that may drive both the timing of marriage and onset of childbearing within marriage have seldom been explored in cross-national perspective.

Three separate but related papers on the topic of marriage timing, gender context, and timing of births early in women's reproductive careers comprise this dissertation. The three papers are titled:

1. Trends and Factors Associated with Marriage Timing and the First Birth Interval;

2. The Association of Marriage Age and Gender Context with Fertility Timing in Asia; and

3. The Social Context of Early Marriage, Contraception, and Childbearing among Young Women in Khulna, Bangladesh.

The first paper is a quantitative analysis of two aspects of the family formation process: nuptiality timing and the initiation of childbearing (timing of the first birth). The study uses Demographic and Health Surveys (DHS) data from seven countries in Asia: Bangladesh, India, Nepal, and

Pakistan in South Asia and Cambodia, Indonesia, and the Philippines in Southeast Asia. Each of these countries has experienced a statistically significant change in the age at marriage or at first birth or both, while maintaining a norm of universal marriage. This study examines trends in marriage age and the first birth interval over time in these countries, using DHS surveys at two points in time, approximately a decade apart. Furthermore, it applies bivariate regression and survival analysis to assess the association of gender and women's and husband's characteristics with (1) marriage age and (2) the first birth interval, along with shifts in these associations over time.

One of the contributions of this study is its rich description of time trends disaggregated by numerous characteristics so as to determine if there is growing disparities or convergence in the changing experience of marriage and initiation of childbearing. A further benefit of this study is the ability to make side-by-side comparisons in the trends and factors associated with both outcomes—marriage timing and onset of childbearing—rather than just one outcome, and to do so cross-nationally rather than in a single country. Much prior work suggests that timing of marriage and of first birth are not independent events, but that these are related to one another. However, the extent to which the timing of these events have the same or different correlates has been underexplored. Additionally, aspects of the gender context or gender power dynamics have been invoked in several explanations of the observed relationship between timing of marriage or in explanations of, separately, either marriage age or onset of childbearing. Therefore, this study assesses the possible association with multiple dimensions of the gender context for both outcomes. Finally, by investigating bivariate associations with these outcomes at two points of time, the study is able to determine if the gender context or certain socio-demographic

characteristics have become more salient explanatory factors of either marriage or first birth timing over time.

The second paper is also a quantitative study using the same DHS data from the same seven countries as the first paper. Having established the trends and factors associated with marriage age and the first birth interval in bivariate analysis in the first paper, this study investigates the relationship between marriage age and two aspects of the family formation process: the initiation of childbearing (timing of the first birth) and subsequent birth spacing (the transition from the first to the second birth). Secondarily, it assesses the influence of the gender context on the onset of childbearing and birth spacing. The study assesses the influence of age at marriage and gender context on the first birth interval through a multivariate hazard model. Subsequently, it decomposes the change in the first birth interval over time into shifts in composition (marriage age, gender context, and other factors) and changes in effects upon the first birth interval. Finally, the study estimates a second hazard model to determine the independent influence of these factors on the second birth interval.

This study builds on prior research documenting a relationship between later marriage (among individuals, over time, or across cohorts) and shorter birth intervals, as well as findings from the first paper identifying multiple common factors associated with both age at marriage and the first birth interval. It questions whether marriage age maintains a significant association with the first birth interval with multivariate controls and whether gender and socio-demographic factors with bivariate associations with the first birth interval are attenuated by marriage age. That is to say, this study furthers our understanding as to whether gender and socio-demographic factors operate

through marriage age or if the observed relationship between marriage age and the first birth is, in fact, the product of having the same set of correlates.

A second contribution of this study is the ability to examine the influence of marriage age and gender context not just on the first birth but on subsequent birth spacing (namely the second birth interval) as well. This improves our understanding of whether the first birth is unique among births and whether influential factors on the first birth are diminished or sustained over stages of women's life course. Finally, the second paper extends the analysis of disaggregated trends in the first paper to elucidate whether changes in the first birth interval are due to changes in the composition of the population or the effect of correlates—and identifies which factors are predominantly responsible for change in timing of the first birth.

The third paper is a qualitative study on the social context of early childbearing in Bangladesh. It adopted a nested design and drew its sample from among respondents to the 2014 Bangladesh Demographic and Health Survey (BDHS). This study conducted in-depth interviews with 30 women age 15-22 who had married before age 18 in Khulna division, Bangladesh. Bangladesh continues to have the lowest age at marriage for women among countries in the study and, within Bangladesh, Khulna's age at marriage falls below the national average. Consequently, young women experience their first pregnancy and birth at a young age as well. This study supplements the quantitative survey data with a qualitative investigation into the social context that shapes young women's fertility intentions, decisions, and contraceptive and fertility behavior in Khulna division of Bangladesh. Specifically, the study is motivated to investigate why women who marry at a young age go on to bear a first child so soon after marriage.

The study furthers our understanding of the dynamics between entry into marriage and onset of childbearing because it examines the gender norms and familial versus individual control over the marriage process. It explores how women formulate and communicate their fertility desires upon marriage, compares what motivates their desired timing for early family formation among husbands and elder women (e.g. in-laws), and how women navigate through conflicts or discordance in fertility desires. It describes the social context circumscribing young, married women's options and how decisions are made about whether, when, and what method of contraception to use. Finally, it compares and contrasts women's experiences with contraception and pregnancy leading up to the first pregnancy with that of the second pregnancy.

The three papers comprising this dissertation combine to elucidate marriage, gender, and childbearing dynamics over time, cross-nationally, and in-depth in one country. Together, the three papers shed light on how the timing of marriage and marriage process and gender context shape women's experiences with early family formation.

Chapter 1. TRENDS AND FACTORS ASSOCIATED WITH MARRIAGE TIMING AND THE FIRST BIRTH INTERVAL

1.1 BACKGROUND

Marriage and the initiation of childbearing are two significant milestones that mark a transition from childhood or adolescence to adulthood. Marriage continues to be near universal with more than 95% of women marrying by age 40 in each of the South and Southeast Asian countries, while rates of singlehood have increased appreciably in some East Asian countries (Jones 2009; Lloyd 2005; Retherford, Ogawa, and Matsukura 2001). The previous several decades have seen a general, steady rise in the age at marriage for women around the world (Lloyd 2005). Marriage delay is a common feature of the Asian demographic landscape, although different regions of Asia experience variation in average ages at marriage and rates of increase (e.g. Jones 2007, 2009).

Early marriage (usually understood as marriage before the age of 18) is associated with a range of adverse social outcomes (Singh 1998), including lower educational attainment (Field and Ambrus 2008; Kim and Stinner 1980; Lloyd and Mensch 1999; Lloyd and Mensch 2008; Nguyen and Wodon 2012, 2015; Tian 2013; Vogelstein 2013; Wodon, Nguyen, and Tsimpo 2016), greater poverty and economic insecurity (UNICEF 2005), disempowerment of women (Klugman et al. 2014; MacQuarrie 2009; Malhotra et al. 2011; Wodon, Nguyen, and Tsimpo 2016), and gender-based violence (Raj 2010; Speizer and Pearson 2011; UNICEF 2005). In countries where marriage age is traditionally low, gender equality advocates herald marriage delay for its potential to improve girls' education, agency, and life options.

Marriage at young ages is also associated with "too early" pregnancy and poor reproductive outcomes (Bongaarts and Cohen 1998; Chandra-Mouli, Camacho, and Michaud 2013; Godha, Hotchkiss, and Gage 2013; Santhya et al. 2010), including maternal mortality and morbidity (Loaiza Sr. and Wong 2012; Murphy and Carr 2009) as well as infant mortality (Amin and Bajracharya 2011a; Wachs 2008), low birth weight and child stunting (Lloyd and Mensch 2008; Raj et al. 2010). These public health concerns form the impetus for policy and programmatic actions to delay marriage among girls, particularly where non-marital childbearing is rare, which have burgeoned in recent years (Chandra-Mouli, Camacho, and Michaud 2013; Chandra-Mouli, Lane, and Wong 2015; Hindin et al. 2016; Kalamar, Lee-Rife, and Hindin 2016; Lee-Rife et al. 2012).

That prevailing nuptiality patterns and fertility are closely associated is well acknowledged in demographic literature, as evidenced by the inclusion of marriage age as one of four proximate determinants of fertility (Bongaarts 1978, 2015). With the initiation of childbearing, empirical evidence typically observes that increases in the age at childbirth are smaller than increases in age at marriage (Bloom and Reddy 1986; Lloyd 2005; Mason and Entwisle 1985; Mensch, Bruce, and Greene 1998). That is, declining marital birth intervals accompany increasing age at marriage (Christensen 1939; Christensen and Bowden 1952; Dyson and Moore 1983; Feng and Quanhe 1996; Hirschman and Rindfuss 1982; Rindfuss and Morgan 1983; Trussell and Reinis 1989; Tsui 1982). Trussell and colleagues suggest that the first birth interval changes curviliearly with marriage age (Trussell, Menken, and Coale 1979).

This pattern implies that increasing age at marriage and changes in the timing of the first birth are not independent trends. There is not, however, a clear consensus on the nature of the relationship

between trends in these two outcomes. One explanation is that trends in the first birth interval are likely to be driven by changes in marriage age. On the other hand, each of these trends may be influenced by a common set of individual characteristics and social forces that act on both marriage timing and the initiation of childbearing.

The observed association between increasing marriage age and declining first birth intervals has been attributed alternately to biological factors as marriage moves from women's sub-fecund period in the early adolescent years to peak fecund years in the 20's (Amin and Bajracharya 2011b; Kallan and Udry 1986; Trussell and Reinis 1989); motivations for couples marrying at older ages to compensate for their "late start" (a form of "catch-up" fertility) (Basu 1993), or greater coital frequency in choice marriages or marriages to a familiar partner as opposed to arranged marriages that may coincide with a later age at marriage (Feng and Quanhe 1996; Fricke and Teachman 1993; Mensch, Bruce, and Greene 1998; Rindfuss and Morgan 1983).

While the available explanations support empirical evidence of a shorter first birth interval coinciding with increasing marriage age, they are inadequate in explaining variation across populations. For example, biological explanations of fecundity would lead us to expect shorter birth intervals at higher ages of marriage (at least during the adolescent years) (Wood 1994), and to expect birth intervals of similar duration among settings with similarly higher marriage ages. Instead, there is great variation in the duration of the first birth interval given an equivalent average age at marriage (Amin and Bajracharya 2011b). While all countries in which the median age at marriage was below 17 years, the first birth interval was consistently longer than 24 months. However, the birth interval in countries with higher median ages at marriage varies considerably.

This variation indicates that there remains much we do not know about trends in marriage timing and timing of the first birth. Little research has focused on this topic since the mid-80s. More recent research has examined biological factors or trends in marriage age or first birth independently of one another. The sociological mechanisms that underlie this pattern remain under-explored.

The few sociological explanations suggest that trends toward later age at marriage may be accompanied by other changes—erosion of arranged marriage (Feng and Quanhe 1996; Ghimire 2017; Ghimire and Axinn 2013; Rindfuss and Morgan 1983), changes in spousal familiarity and coital frequency (Basu 1993; Fricke and Teachman 1993; Lavely 2007; Rindfuss and Morgan 1983), changing expectations about women's education and employment (Field and Ambrus 2008; Hirschman 1985; Hirschman and Rindfuss 1980; Kim and Stinner 1980), and shifts toward greater women's empowerment and a more equitable gender context (Desai and Andrist 2010; Dyson and Moore 1983; Malhotra and Tsui 1996; Mensch, Singh, and Casterline 2005; Shrestha 1998). These may also contribute to changes in the first birth interval directly or indirectly through their interaction with marriage age. For example, women who marry at older ages are more likely to participate in the selection of their marriage partner and have greater decision-making capacity upon marriage (Banerji and Vanneman 2011; Hong 2006; Jensen and Thornton 2003; Singh and Becker 2012). Whether an increase in marriage age is the only change or whether it is accompanied by other significant social changes and for whom may determine the degree of the marriage age's influence on the first birth interval.

Underexplored questions include (1) for whom marriages occur later and births earlier; that is, are each of these changes experienced universally by all women or are they concentrated among select

social groups? It has been documented that marriage age varies across socio-economic and socio-cultural factors with, for example, women from wealthier families marrying at younger ages and those with more education marrying at older ages (Aryal 2007; Jensen and Thornton 2003; Kim and Stinner 1980). Work by Coale and colleagues suggests that the age pattern of marriage follows a predictable normal distribution in settings where the age of marriageability is low, although as the mean marriage age rises, so does the degree of heterogeneity (Coale 1971; Coale and McNeil 1972). It is possible that the increasing heterogeneity in the distribution of marriage ages could account for some of the observed variation in first birth intervals at older mean marriage ages (Amin and Bajracharya 2011b), particularly if increases in marriage age are unevenly distributed, for example, across educational or wealth subgroups. Also underexplore are (2) whether trends in marriage timing and the first birth interval are driven by the same set of factors or different factors and (3) whether the same factors are associated with these two outcomes across all study countries or are country-specific.

This study examines two aspects of the family formation process: nuptiality timing and the initiation of childbearing (timing of the first birth). To do so, the study uses Demographic and Health Surveys (DHS) data from seven countries in Asia: Bangladesh, India, Nepal, and Pakistan in South Asia and Cambodia, Indonesia, and the Philippines in Southeast Asia. Each of these countries has experienced a statistically significant change in the age at marriage or at first birth or both, while maintaining a norm of universal marriage. This study examines trends in marriage age and the first birth interval over time in these countries. Furthermore, it examines association of gender, women's, and husband's characteristics with (1) marriage age and (2) the first birth interval, along with shifts in these associations over time.

1.2 METHODS AND DATA

1.2.1 Country and Survey Selection

This study uses data from seven countries in Asia: Bangladesh, India[1], Nepal, and Pakistan in South Asia and Cambodia, Indonesia, and the Philippines in Southeast Asia. Countries are included in the study if (1) marriage is or approaches being universal (≥95% women married by age 40); (2) the majority of childbearing occurs within marriage; (3) there has been a statistically significant change in either the age at marriage or at first birth or both; (4) there are two or more standard DHS surveys available over a span of more than 5 years; and (5) these surveys include the variables of interest.

DHS surveys are nationally representative, population-based household surveys that produce a broad range of demographic and health indicators. The surveys are generally large and enjoy response rates in excess of 90%. Standard DHS surveys routinely collect data on women's birth histories and on the timing of marriage; this makes these data well suited to the analysis of a variety of marriage and fertility dynamics. The surveys also collect data on a broad range of individual background characteristics and gender and women's empowerment relevant to the analysis of such dynamics. The surveys employ standardized questionnaires and modules for household, women's, and men's interviews (ICF International 2015). As such, they produce indicators that are comparable across countries and within countries over time.

Since The DHS Program began in 1984, it has conducted more than 300 surveys in 90 countries. Standard DHS surveys are implemented at intervals of about 5 years to allow for comparisons over

[1] India DHS surveys are also referred to as the National Family and Health Surveys (NFHS).

time. Thirty-three surveys have been conducted in the countries selected for this study. This study uses the individual woman's survey, conducted among women of reproductive age (15-49).

Table 1.1 Sample parameters for surveys included in the analysis

Region and Country	Year of survey	Sample type	Age range	# of women interviewed (unweighted)	Eligible woman response rate
South Asia					
Bangladesh	**2014**	**Ever married women**	**15-49**	**17,863**	**97.9**
	2011	Ever married women	12-49	17,842	97.9
	2007	Ever married women	15-49	10,996	98.4
	2004	**Ever married women**	**10-49**	**11,440**	**98.6**
	1999-2000	Ever married women	10-49	10,544	96.9
	1996-97	Ever married women	10-49	9,127	97.8
	1993-94	Ever married women	10-49	9,640	97.4
India	**2005-06**	**All women**	**15-49**	**124,385**	**94.5**
	1998-99	**Ever married women**	**15-49**	**90,303**	**95.5**
	1992-93	Ever married women	13-49	89,777	96.1
Nepal	**2011**	**All women**	**15-49**	**12,674**	**98.1**
	2006	All women	15-49	10,793	98.4
	2001	**Ever married women**	**15-49**	**8,726**	**98.2**
	1996	Ever married women	15-49	8,429	98.2
Pakistan	**2012-13**	**Ever married women**	**15-49**	**13,558**	**93.1**
	2006-07	**Ever married women**	**15-49**	**10,023**	**94.5**
	1990-91	Ever married women	15-49	6,611	96.3
Southeast Asia					
Cambodia	**2014**	**All women**	**15-49**	**17,578**	**97.6**
	2010	All women	15-49	18,764	97.5
	2005	**All women**	**15-49**	**16,823**	**97.5**
	2000	All women	15-49	15,341	98.7
Indonesia	**2012**	**All women**	**15-49**	**45,067**	**95.9**
	2007	Ever married women	15-49	32,895	96.1
	2002-03	**Ever married women**	**15-49**	**29,483**	**98.3**
	1997	Ever married women	15-49	28,810	98.3
	1994	Ever married women	15-49	28,168	97.8
	1991	Ever married women	15-49	22,909	97.6
	1987	Ever married women	15-49	11,884	98.5
Philippines	**2013**	**All women**	**15-49**	**16,155**	**98.3**
	2008	All women	15-49	13,594	98.3
	2003	**All women**	**15-49**	**13,633**	**97.8**
	1998	All women	15-49	13,983	97.2
	1993	All women	15-49	15,029	98.0

Note: Analysis is restricted to ever-married women age 25-49.

It uses each survey conducted in study countries to describe overall trends in the timing of marriage and first birth. However, the majority of the analysis uses either the most recent survey or the most recent survey paired with a survey that was conducted approximately 10 years prior ("priority

surveys"). Sample parameters, including sample sizes and response rates, for the study's surveys can be found in Table 1.1. Priority surveys are indicated in bold.

1.2.2 Sampling and Sample Weighting

The surveys employ multistage, clustered area sampling techniques. In the first sampling stage, the country is stratified into major subnational regions from which census-based enumeration areas are selected with probability proportional to size. The major regions may or may not coincide with administrative units (as in the Philippines) and consist of states (India), provinces or groups of provinces (Cambodia, Indonesia, Pakistan), divisions (Bangladesh), or ecological zones (Nepal). Urban areas and less populous areas are typically oversampled in the first sampling stage to produce reliable regional estimates and rural-urban comparisons of health indicators. A mapping and household listing exercise is then conducted in each selected enumeration area. In the second sampling stage, households are randomly selected from the household list within each enumeration area.

Pre-calculated sampling weights are applied; these account for both sampling probability and non-response. In addition, the study uses the complex survey (svy) commands available within Stata 14.1 to account for the clustered sampling design and to estimate robust standard errors as the basis for 95% confidence intervals reported in the following sections.

1.2.3 Sample Restriction

This study's analysis is restricted to ever-married women age 25-49. This age restriction is imposed because the median age at marriage and first birth have not been reached by the start of the preceding age group, age 20-24, in all study countries; the median ages at these events have

been reached by the start of the 25+ age groups. This restriction reduces the selection bias that would be present if early-marrying women were over-represented in the data.

Table 1.2 shows the attrition in sample size from excluding never-married women. As indicated, the proportion of women who are never-married at the most recent survey is sizable in Cambodia and the Philippines. Elsewhere, it does not exceed 5% of all women age 25-49.

While experiencing a birth is not a precondition for inclusion in the analytical sample, the analysis is restricted to women who marry prior to their first birth. That is, women who experience a negative first birth interval because their first birth occurred prior to marriage are excluded from all analyses. This demographically convenient life order sequence facilitates a valid and meaningful measure of the interval between marriage and first birth. The proportion of women experiencing a negative birth interval is small—less than 3%—in all study countries with the exception of the Philippines (7%), also as seen in Table 1.2. Analysis of the second birth interval is necessarily limited to women who have already experienced a first birth.

Table 1.2. Proportion of women age 25-49 excluded from analysis due to never being married or experiencing a negative first birth interval

	Never married		Negative first birth interval	
	%	# (unweighted)	%	# (unweighted)
South Asia				
Bangladesh 2014	0.00	0	1.24	165
India 2005-06	2.44	3,623	1.68	1,307
Nepal 2011	3.06	232	1.50	113
Pakistan 2012-13	0.00	0	1.58	166
Southeast Asia				
Cambodia 2014	7.99	974	2.34	276
Indonesia 2012	4.66	1,850	2.62	1,006
Philippines 2013	11.98	1,118	7.01	615

1.2.4 Measures

Century month codes

In DHS datasets, the dates of several key events are recorded in century month codes (Rutstein and Rojas 2006). A century month code (CMC) is the number of months elapsed between an event and January 1900. For example, the CMC corresponding to June 2012 is 1350. Century month codes are used to record and calculate intervals between the respondent's date of birth, date of first union, date of birth for each of the respondent's children, and date of interview. The DHS invests significant effort to ensure that dates of these events are accurately reported through multiple data checks and procedures for reconciling discrepant reports and imputing missing information.

Age at marriage

Age at marriage refers to women's *first* marriage and is one of two outcomes analyzed in this chapter. This is calculated as the difference between the CMC of the respondent's date of first union and date of birth. This difference, expressed in months, is then divided by 12. Date of first union refers to the time that the respondent first began living with her husband. Cohabitation is a better measure of the initiation of marital sexual exposure—and thus of the starting point for the

period of risk for the first birth interval—than date of formal marriage in settings where ceremonial marriages, spousal separation prior to menarche, or return marriage characterize the marriage process (Basu 1993; Bhattacharya et al. 1989; Choe, Thapa, and Mishra 2005; Rodriguez and Trussell 1980). Unions include both formal, legally recognized marriages as well as non-formal unions in which women are living together with a man as if married.

First birth interval

The first birth interval is the interval between marriage and the first birth. The length of the first birth interval is calculated as the difference between the century month codes for date of first union and date of first birth as expressed in months. Negative birth intervals (premarital births) are excluded from the analysis. First birth intervals of less than 8 months, which may possibly indicate premarital conceptions followed by a marriage and then birth, are retained in the analysis.

Gender context

Women's decision-making

Women's decision-making is one of three variables used to describe the gender context. The indicator is calculated as a simple (unweighted) additive index of the sum of the number of household decisions in which women participate. Component items are participation in decisions about:

1. Healthcare for herself
2. Major household purchases
3. Visits to her family or relatives

This index ranges from 0 to 3 in six of the seven study countries. In the Philippines, it ranges from 0-4 with an additional item about participation in decisions about purchases for daily household needs. Data on women's decision-making are included in the most recent survey for all countries in this study. However, these data were omitted from some earlier surveys in India and Pakistan. Therefore, this measure is excluded from analyses of change over time in these countries.

Attitudes toward wife beating

Women's attitudes toward wife beating, the second measure that describes the gender context, are assessed by responses to question that ask if respondents think a husband is justified in hitting or beating his wife in the following situations:

4. If she goes out without telling him
5. If she neglects the children
6. If she argues with him
7. If she refuses to have sex with him
8. If she burns the food

A dichotomous measure is calculated and set to 0 if the respondent reports wife beating to be acceptable in at least one of these scenarios and 1 if she rejects wife beating in all of these scenarios.

In the Nepal 2011 DHS survey but not the 2001 survey, a filter question was inserted. Respondents answering "no" when asked, "In your opinion, should a husband hit or beat his wife for any reason at all?" were not asked if wife beating was justified in specific scenarios. This questionnaire change

may result in a measurement change (decrease) in the prevalence of attitudes accepting of wife beating as well as in detecting any associations with this variable.

Data on women's attitudes toward wife beating were not collected in Bangladesh DHS surveys. In addition, these data were omitted from some earlier surveys in India and Pakistan. Therefore, this measure is excluded from the analyses of change over time in these countries. Data on women's attitudes toward wife beating were collected consistently in the three Southeast Asian countries in this study.

Spousal age difference

Spousal age difference is the third variable that describes the gender context. This measure is calculated as the difference, in whole years, between women's completed age and that of her husband. In situations where women are the same age as or are older than their husbands, this indicator is set to 0. Therefore, this measure can be interpreted as the number of years by which husbands' age exceeds the woman's age.

Socio-demographic characteristics

Women's education

Women's education at the time of the survey is categorized into no education, primary, secondary, and higher education. No education is the reference category.

Women's occupation

Women's occupation is an indicator that captures whether women worked in the 12 months preceding the interview and, if so, in what occupation. Not working serves as the reference category. Occupational categories are:

1. Agricultural
2. Professional/technical/managerial (hereafter referred to as "professional")
3. Clerical
4. Sales
5. Services
6. Skilled manual labor
7. Unskilled manual labor
8. Other

No data on women's occupation is available in the Bangladesh DHS. In India, there is no differentiation between skilled and unskilled manual labor. In Nepal, there is no separate category for women working in sales. These respondents are grouped with those working in "other" occupations.

Household wealth quintile

This study uses household wealth quintile as a measure of relative wealth. This measure is calculated based on ownership of a range of assets and housing materials. The construction of this measure, now standard in DHS surveys, is described in detail elsewhere (Rutstein 2008; Rutstein and Johnson 2004). The poorest wealth quintile serves as the reference category.

Religion

Women's religious affiliation is a variable with country-specific response options. As a result, the reference religion is country-specific. The reference group is the largest religious group in each country. Muslim, Christian, Hindu, and Buddhist are common religious classifications found in

the study countries. No data on religious affiliation is available in the Pakistan or Indonesia DHS surveys.

Place of residence

Place of residence captures whether the respondent resides in a rural or an urban area at the time of the survey, based on a priori classification of primary sampling units selected for the survey. Rural is the reference category.

Husband's education

Husband's education is taken from women's reports of their husband's level of educational attainment. This measure is also categorized as no education, primary, secondary, and higher education. There is a fifth category that does not exist for women's education: don't know. No education is the reference category.

Husband's occupation

Husband's occupation, also taken from women's reports, is categorized in the same manner as women's occupation:

1. Agricultural
2. Professional/technical/managerial (hereafter referred to as "professional")
3. Clerical
4. Sales
5. Services
6. Skilled manual labor
7. Unskilled manual labor

8. Other
9. Not working

Whereas “not working” is the reference category for women’s occupation, agricultural occupation is the reference category for husband’s occupation. Agricultural occupation is a category in every survey with data on husband’s occupation and is frequently the most prevalent occupation. Indonesia 2012 DHS, Cambodia 2014 DHS, and Philippines 2013 DHS do not collect data on husband’s current employment status, but categorizes husband’s occupation regardless of current employment status. India 2005-06 DHS (NFHS-3) and Indonesia 2012 DHS capture husband's current employment status as a separate occupational category and categorize husband's occupation only for husbands who are currently working. As with women’s occupation, no data on the husband’s occupation are available in the Bangladesh DHS. In India, there is no differentiation between skilled and unskilled manual labor. In Nepal, there is no separate category for husbands working in sales. These respondents are combined with those working in “other” occupations.

Subnational region

Subnational region is the second country-specific indicator in the analyses. Subnational regions in this variable are those used in the first sampling stratum, along with urban/rural place of residence. These are divisions in Bangladesh; states in India (26); provinces or small groupings of provinces in Cambodia (19), Indonesia (6), and Pakistan (4); ecological zones in Nepal (3); and administrative regions in the Philippines (17). Although Bangladesh currently has 7 divisions, Rangpur and Rajshahi divisions were sampled as a single region in 2004 and not separately.

Therefore, these two divisions were combined to ensure compatibility in the analyses of change over time.

Several pairs of states from the India 2005-06 dataset—Bihar and Jharkhand, Madhya Pradesh and Chattisgarh, Uttar Pradesh and Uttaranchal—were combined to be comparable to sampled states in the 1998-99 dataset. Similar changes and exclusions were made in Indonesia to account for territorial changes. In every country, the most populous region serves as the reference group. These are Dhaka, Bangladesh; Uttar Pradesh (including Uttaranchal), India; the Terai, Nepal; Punjab, Pakistan; Phnom Penh, Cambodia; Sumatera, Indonesia; and the National Capital administrative region, the Philippines.

1.2.5 Scope of the Analysis and Analytic Strategy

In the following sections, this study describes overall trends in the age at marriage and first birth. This depiction of trends uses the median ages at marriage and first birth, as completed age in years, using every DHS survey as a data point. Although medians are a more stable measure of central tendency for distributions with right-hand skew, they are a more crude measure of the age of these events because they are calculated from age in completed years, rather than months (Rutstein and Rojas 2006). The purpose of this section is to provide an overview of trends over time in the age at marriage, age at first birth, and the interval between marriage and the first birth, as well as to discern any regional patterns in these events.

Different population subgroups may exhibit distinctive patterns in the timing of the first birth. These differences may be due, in part, to distinctive patterns in marriage age. In the subsequent two sections, therefore, the study extends its analysis of trends over time by initiating an

examination into the compositional shifts, first in marriage age and secondly, in the first birth interval. This study specifically investigates the distribution across background characteristics in the mean age at marriage and mean length of the first birth interval, respectively. These two sections present data at two points of time: the most recent DHS survey (Survey 2) and a DHS survey approximately one decade earlier (Survey 1). This time point is selected for Survey 1 so that it includes as many variables that describe the gender context as possible; earlier surveys often exclude these measures.

Two statistical tests are shown. The first is a test for the significance of the difference in means between surveys, disaggregated by each background characteristic. The test detects if change in marriage and first birth patterns is occurring in a common manner for all groups of the population, whether changing trends are concentrated within certain segments of the population, or whether there are divergent trends in opposing directions for the different groups.

The second statistical test is a test of independence to determine to what extent each background characteristic may be associated alternately with marriage age and the first birth interval. Because the test is repeated at both Survey 1 and Survey 2, changes in the association of background characteristics with these outcomes can also be detected. Sample sizes on which marriage age patterns and trends are analyzed are presented in Appendix Table 1.

With the principal outcome—the first birth interval—the time to event is of interest. Therefore, this is analyzed in a survival analysis framework. Namely, Kaplan-Meyer survival curves are estimated (Box-Steffensmeier and Jones 2004; Cleves et al. 2010; Kaplan and Meier 1958). This approach allows us to use data on all respondents, whether or not they have experienced the failure event (first birth) in question, while accounting for right censoring beyond the observation period.

Therefore, in this section, the means in the survival experience are reported. Specifically, an extended mean is computed to account for any underestimation in the restricted mean that would occur because the last observed analysis time is censored for those women who have not experienced a first birth by the time they were interviewed (Barker 2012; Cleves et al. 2010). Differences in means are assessed with a Tarone-Ware test for the equality of survivor functions across groups and survey years (Tarone and Ware 1977). Similar to the Wilcoxon test, the Tarone-Ware test is appropriate when hazard functions may vary non-proportionally across groups. The Tarone-Ware test gives greater weight than the Wilcoxon test to earlier failure times, when more cases are at risk (Cleves et al. 2010; Tarone and Ware 1977). Sample sizes, including the number of cases who experience failure (had a first birth) and the total person-months of observation contributed by the sample, are presented in Appendix Table 1.2. Survival time terciles are presented in Appendix Table 1.3.

1.3 TRENDS IN MEDIAN AGE AT MARRIAGE AND FIRST BIRTH

Figure 1.1 in this section displays the median completed age at marriage and first birth among women age 25-49 for the seven countries in this study. In addition to data from the most recent survey, this section draws upon data from all DHS surveys conducted in study countries to describe trends. The presented trends data cover approximately 15-20 years[2]. Figure 1.1 reflects two separate regional patterns in marriage age and first birth. Subsequent sections will present results with study countries grouped regionally.

1.3.1 Marriage Age and the First Birth in South Asia

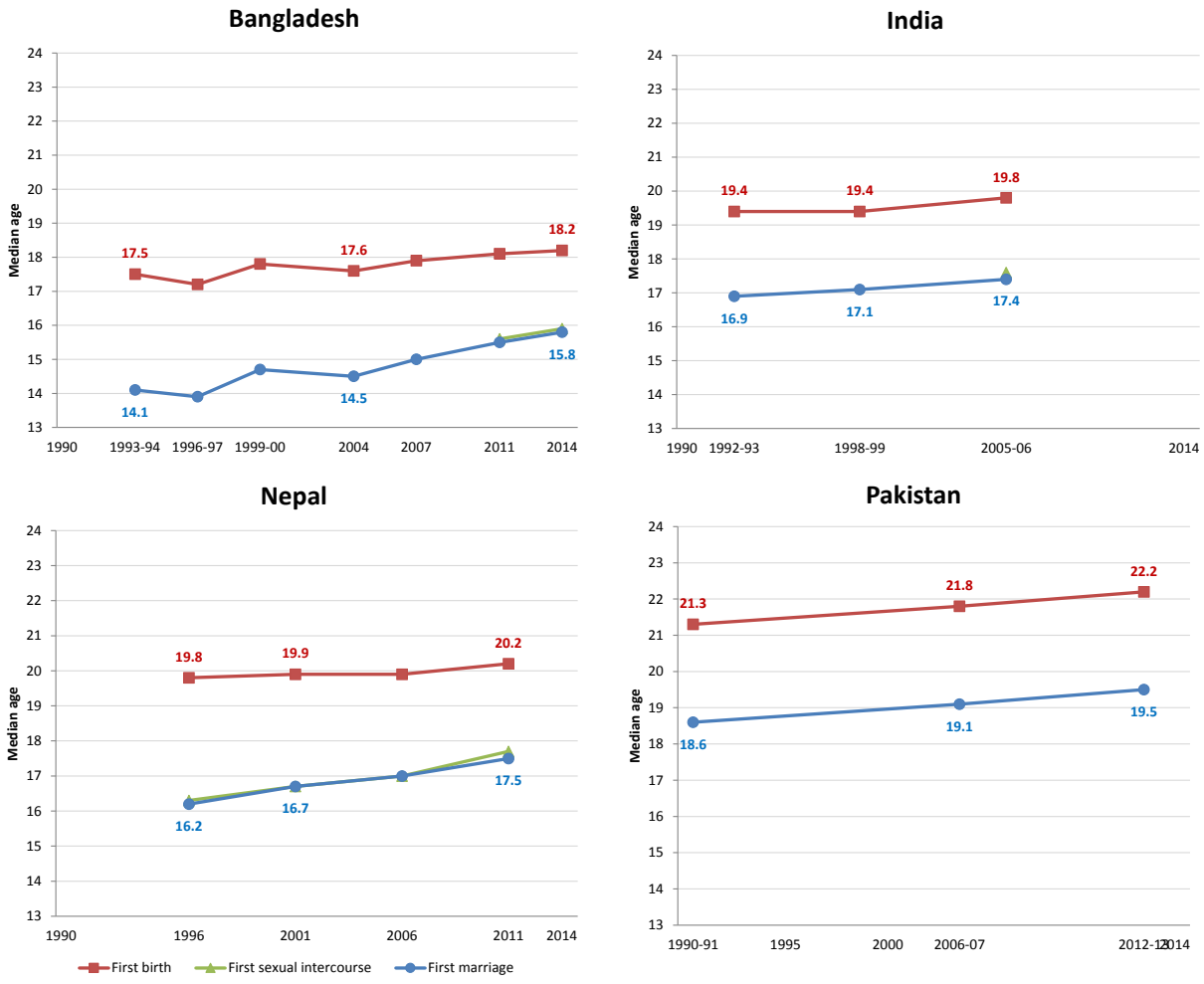
The data for Bangladesh, India, Nepal, and Pakistan indicate that marriage in a phenomenon of adolescence. In these South Asian countries, the median completed age at marriage ranges from age 15.8 in Bangladesh to age 19.5 in Pakistan. India and Nepal are similar to one another with a median age at marriage of about age 17.5.

The median completed age at marriage has increased most rapidly in Nepal and Bangladesh, and has increased the least—by just 6 months over 13 years—in India. In Bangladesh, the median completed age at marriage has increased from age 14.1 in 1993-94 to age 15.8 in 2014, with most of that increase occurring in the last 10 years.

The onset of childbearing is an event that occurs during adolescence for more than half of women in Bangladesh and India. However, the median completed age at first birth is in the early 20s in

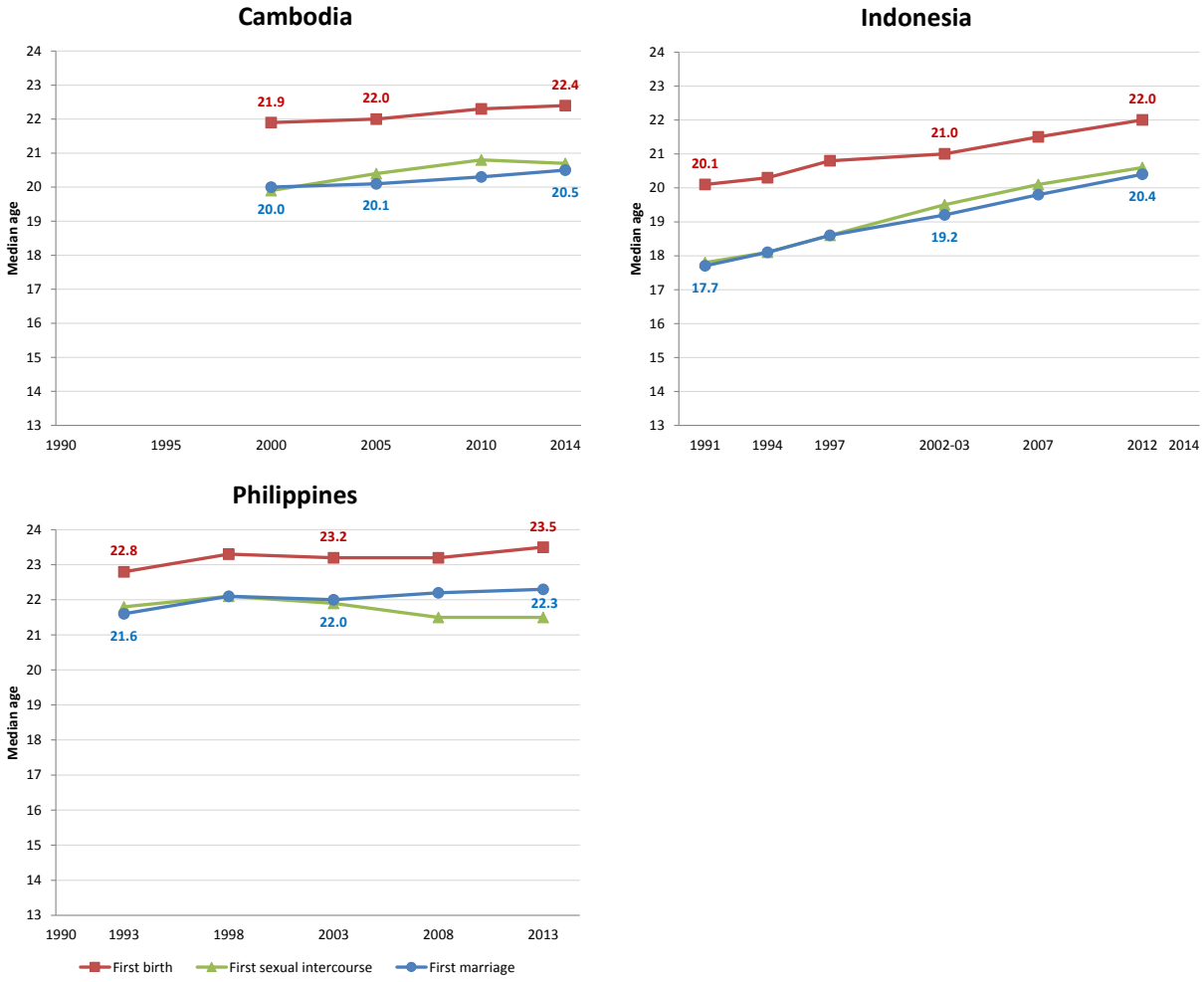
[2] A standard DHS has not been conducted in Cambodia prior to 2000; therefore, one decade of data is presented for Cambodia.

Figure 1.1a. Trends in the median completed age at key events among women age 25-49 in four South Asian countries



Nepal and Pakistan. Until the most recent survey, the median completed age at first birth was less than age 20 in Nepal as well. Like the median completed age at marriage, the median completed age at first birth has also increased over time although it has increased more slowly than marriage age. The rate of increase has been slowest in Nepal, which experienced the most rapid increase in marriage age. Here, the median completed age at first birth increased by nearly 5 months over the 15 years. In contrast, the median completed age at first birth increased by nearly 11 months over 12 years in Pakistan, keeping pace with the increase in age at marriage there. The increase in the

Figure 1.1b. Trends in the median completed age at key events among women age 25-49 in three Southeast Asian countries



median completed age at first birth in Bangladesh and India are similar to one another and are between that of Nepal and Pakistan. However, the pace of change has increased in Bangladesh between 2004 and 2014; this nearly approaches the pace of change in Pakistan.

The interval between the median completed age at marriage and first birth has narrowed over time (except in Pakistan) because the age at marriage has increased more quickly than age at first birth. There is little variation across the four South Asian countries in the difference between the median

completed ages at first birth and marriage. The difference is 2.4 years in Bangladesh and India, and 2.7 years in Nepal and Pakistan.

1.3.2 Marriage Age and First Birth in Southeast Asia

In contrast to the four South Asian countries in this study, the median completed age at marriage is older than the adolescent years in the three Southeast Asian countries studied here, with ranges from age 20.4 in Indonesia to age 22.3 in the Philippines. For two countries—Cambodia and the Philippines—the median completed age at marriage has been in the 20s for all survey data points. In Indonesia, the median completed age at marriage did not cross this threshold until the most recent survey in 2012.

Indonesia shows the most rapid increase in median completed age at marriage, not just among the three Southeast Asian countries, but among all seven countries. The age has increased from age 17.7 in 1991 to 20.4 in 2012. The pace of change in Cambodia and the Philippines resembles that seen in India.

The median completed age at first birth ranges from age 22 in Indonesia to age 23.5 in the Philippines. The fastest pace of change of all study countries has also occurred in Indonesia, with the median completed age at first birth rising approximately two years between 1991 and 2012. In Cambodia and the Philippines, the rate of change has been more modest and has kept pace with the increase in marriage age.

The difference in median completed ages at first birth and marriage among the Southeast Asian countries ranges from 1.2 years in the Philippines, where age at marriage is the highest, to 1.9 years in Cambodia. This stands in contrast to the difference found in South Asia, which is two

and a half years or more. The difference between median completed ages at first birth and marriage has remained steady in Cambodia and the Philippines. In Indonesia, the slower increase in the median completed age at first birth compared to that in the median completed age at marriage results in a narrowing of their difference over time. In 1991, the median completed age at these events was separated by 2.4 years, which is similar to the difference currently observed among the South Asian countries in the study. In 2012, as marriage age transitioned from the adolescent years to the 20s, it has narrowed to 1.6 years; this resembles the difference observed among the other two Southeast Asian countries studied here.

1.3.3 Age at First Sex

This study does not focus on the timing of first sex in its examination of the dynamics of marriage age and the first birth interval. Nonetheless, it may be of interest to examine to what degree marriage coincides with sexual exposure. The median completed age at first sex, where available[3], is also displayed (in green) in Figures 1.1a and 1.1b. These data indicate that, overall, the median completed age at first sex tracks very closely with the median completed age at marriage. These ages are almost identical in Bangladesh, India, and Nepal, while there has sometimes been a slight difference between these ages in Cambodia and Indonesia. In the Philippines, the median completed age at first sex and at marriage have coincided up through 2003. However, the median completed age at first sex has been younger than that at marriage since 2008. First sex and marriage are separated by nearly 10 months at the most recent survey.

[3] Data on age at first sex were not collected in some early DHS surveys in Bangladesh and India; no data on age at first sex have been collected in any Pakistan DHS.

1.4 CHARACTERISTICS ASSOCIATED WITH AGE AT MARRIAGE

Tables 4-14 in this section show the distribution across background characteristics of the mean age at marriage among ever-married women age 20-49 and the results of tests of significance of the association between each background characteristic and the age at marriage. These tables show the means and associations with background characteristics at two time points for each study country: the most recent DHS survey (Survey 2) and a DHS survey approximately 10 years prior[4] (Survey 1). These tables also show the positive (increasing age at marriage) or negative difference (declining age at marriage) for each background characteristic and results that test the statistical significance of the change. Sample sizes are shown in Appendix Table 1.

Table 1.3. Change in the mean age at first marriage among ever-married women age 25-49

	Survey 1			Survey 2			Difference survey 1-survey 2	p-value[1]
Country	Mean	CI		Mean	CI			
South Asia								
Bangladesh	15.28	**2004** 15.16	15.41	16.21	**2014** 16.09	16.33	0.93	***
India	17.39	**1998-99** 17.32	17.46	17.76	**2005-06** 17.70	17.82	0.4	***
Nepal	17.16	**2001** 16.99	17.32	17.93	**2011** 17.73	18.14	0.78	***
Pakistan	19.20	**2006-07** 19.05	19.35	19.69	**2012-13** 19.49	19.89	0.49	***
Southeast Asia								
Cambodia	20.33	**2005** 20.22	20.44	20.64	**2014** 20.52	20.77	0.31	***
Indonesia	19.24	**2002-03** 19.08	19.39	20.49	**2012** 20.34	20.64	1.25	***
Philippines	21.76	**2003** 21.63	21.89	22.00	**2013** 21.86	22.14	0.24	*

[1] p-value of significance test for the difference in means between surveys.

p-values *≤0.05, **≤0.01, ***≤0.001, ns=not significant (p>0.05)

[4] Surveys in India and Pakistan, which are approximately 6 years apart, are the exception.

Table 1.3 shows the total change in the mean age at first marriage in the seven study countries. The change in the mean age at marriage has been statistically significant in all seven study countries, in South Asia and Southeast Asia alike. Among the South Asian countries, mean age at marriage has increased by 0.4 to 0.9 year between surveys (p=0.000). In Southeast Asia, the increase between surveys has been more modest in Cambodia (0.3, p=0.000) and the Philippines (0.2, p=0.013). However, the largest increase is in the Philippines, where the mean age at marriage rose by 1.25 years between 2003 and 2013 (p=0.000).

1.4.1 Marriage Age and Gender Context

Three variables describe the gender context and its possible association with age at marriage. These are the number of decisions in which women are involved, attitudes toward wife beating, and spousal age difference. Data that show the mean age at marriage according to each of these variables, respectively, are found in Tables 4-6. India and Pakistan surveys did not collect data on women's decision-making and wife beating attitudes at Survey 1 and, in Bangladesh, neither survey collected data on wife beating attitudes. Thus, change in marriage age according to these characteristics cannot be assessed for these countries.

Table 1.4. Mean age at first marriage among ever-married women age 25-49, by women's decision-making

Country	Number of decisions	Survey 1 Mean	Survey 1 CI		Survey 1 p-value[1]	Survey 2 Mean	Survey 2 CI		Survey 2 p-value[1]	Difference survey 1-survey 2	Difference p-value[2]
South Asia											
			2004		***		**2014**		***		
	0	15.07	14.88	15.26		16.11	15.96	16.26		1.04	***
Bangladesh	1	15.15	14.94	15.35		16.01	15.78	16.25		0.87	***
	2	15.45	15.24	15.66		15.98	15.79	16.18		0.54	***
	3	15.38	15.24	15.53		16.45	16.31	16.59		1.07	***
	Total	15.28	15.16	15.41		16.21	16.09	16.33		0.93	***
			1998-99				**2005-06**		***		
	0	na	na	na		17.37	17.26	17.47		--	--
India	1	na	na	na		17.75	17.64	17.86		--	--
	2	na	na	na		17.73	17.64	17.83		--	--
	3	na	na	na		18.04	17.96	18.13		--	--
	Total	17.39	17.32	17.46		17.76	17.70	17.82		0.4	***
			2001		ns		**2011**		ns		
	0	17.20	17.02	17.38		17.88	17.55	18.21		0.68	***
Nepal	1	17.08	16.83	17.34		18.08	17.76	18.41		1.00	***
	2	17.18	16.95	17.42		17.94	17.65	18.23		0.76	***
	3	17.13	16.93	17.32		17.93	17.72	18.15		0.80	***
	Total	17.16	16.99	17.32		17.93	17.73	18.14		0.78	***
			2006-07				**2012-13**		**		
	0	na	na	na		19.95	19.68	20.22		--	--
Pakistan	1	na	na	na		20.02	19.62	20.42		--	--
	2	na	na	na		19.60	19.27	19.93		--	--
	3	na	na	na		19.52	19.30	19.74		--	--
	Total	19.20	19.05	19.35		19.69	19.49	19.89		0.49	***
Southeast Asia											
			2005		ns		**2014**		ns		
	0	s	s	s		20.39	19.48	21.31		2.33	*
Cambodia	1	20.62	19.42	21.82		21.67	20.73	22.61		1.05	ns
	2	20.33	19.85	20.81		20.66	20.32	20.99		0.32	ns
	3	20.51	20.30	20.72		20.59	20.45	20.72		0.08	ns
	Total	20.33	20.22	20.44		20.64	20.52	20.77		0.31	***
			2002-03		***		**2012**		***		
	0	18.84	18.14	19.54		19.88	19.53	20.23		1.04	**
Indonesia	1	18.69	18.35	19.02		20.06	19.73	20.38		1.37	***
	2	18.93	18.69	19.17		20.11	19.88	20.33		1.17	***
	3	19.39	19.24	19.55		20.73	20.58	20.88		1.34	***
	Total	19.24	19.08	19.39		20.49	20.34	20.64		1.25	***

Continued

Table 1.4—*Continued*

Country	Number of decisions	Survey 1 Mean	Survey 1 CI		Survey 1 p-value[1]	Survey 2 Mean	Survey 2 CI		Survey 2 p-value[1]	Difference survey 1-survey 2	p-value[2]
		2003			ns	2013			ns		
Philippines	0	22.36	20.95	23.77		*22.69*	*21.22*	*24.16*		0.33	ns
	1	21.85	21.35	22.36		21.62	20.52	22.72		-0.23	ns
	2	21.82	21.38	22.25		22.35	21.79	22.91		0.53	ns
	3	21.64	21.34	21.94		21.86	21.58	22.14		0.22	ns
	4	21.76	21.61	21.91		22.06	21.91	22.21		0.30	**
	Total	21.76	21.63	21.89		22.00	21.86	22.14		0.24	*

Notes:
p-values *≤0.05, **≤0.01, ***≤0.001, ns=not significant (p>0.05)
[1] p-value of association test within each year.
[2] p-value of significance test for the difference in means between surveys.
na indicates indicator is not available for the survey. No data on women's decision-making were collected in the 1998-99 India DHS (NFHS-2) or the 2006-07 Pakistan DHS.
s indicates that the indicator is suppressed because it is based on fewer than 25 unweighted cases.
indicators in italics are based on fewer than 50 unweighted cases and should be interpreted with caution.

1.4.1.1 Decision-Making

The number of decisions in which women participate is significantly associated with marriage age in 4 of 7 study countries: Bangladesh, India, Pakistan, and Indonesia. There is no such relationship in Nepal, Cambodia, or the Philippines. The salience of women's decision-making to marriage age has remained static over time: there was also no association between these variables in Survey 1 in Nepal, Cambodia, and Philippines, while the association is detected in both survey waves in Bangladesh and Indonesia[5].

In general, marriage age rises with participation in more decisions, although this increase is not straightforwardly monotonic. In Pakistan 2012-13, the mean age at marriage is highest among women who participate in one decision, and slightly lower among women who participate in 2 or 3 decisions.

[5] Change in the association over time cannot be assessed in India or Pakistan since these data were not collected in Survey 1.

Marriage age has increased over time across all levels of decision-making in Bangladesh, Nepal, and Indonesia. Significant increases are seen only among women who make four decisions in the Philippines (p=0.007). While the average age at marriage rose by about one third of a year (p=0.000) between 2005 and 2014 in Cambodia, the average age at marriage rose by 2.3 years (p=0.032) among women who participate in no decisions here—the largest decadal increase in the study. Observed increases among women with more decision-making capability are not statistically significant. While women of all decision-making capabilities experienced sizable increases in marriage age in Indonesia, the increases among women participating in some (1-3) decisions outpaced that among women making no decisions. Indonesia shows the largest increases in marriage age, after the increase among women making no decisions in Cambodia.

1.4.1.2 Attitudes toward Wife Beating

Attitudes toward wife beating are significantly associated with marriage age in five of the six countries[6] for which it could be assessed at the most recent survey. Only in Nepal[7] is no association detected. Wife beating attitudes have become more salient over time in Cambodia; no association with marriage age was detected in 2005.

[6] Data on attitudes toward wife beating were not collected in Bangladesh DHS surveys.

[7] In the Nepal 2011 survey, but not the 2001 survey, a filter question was inserted and respondents answering "no" when asked, "In your opinion, should a husband hit or beat his wife for any reason at all?" were not asked if wife beating was justified in specific scenarios. This questionnaire change may result in a measurement change (decrease) in the prevalence of attitudes accepting of wife beating as well as in detecting any associations with this variable.

Table 1.5. Mean age at first marriage among ever-married women age 25-49, by attitudes toward wife beating

Country	Wife beating attitudes	Survey 1 Mean	Survey 1 CI		Survey 1 p-value[1]	Survey 2 Mean	Survey 2 CI		Survey 2 p-value[1]	Difference survey 1-survey 2	p-value[2]
South Asia											
			1998-99				**2005-06**				
									***		
India	Acceptable in at least one scenario	na	na	na		17.26	17.20	17.33		--	--
	Rejects in all scenarios	na	na	na		18.26	18.17	18.34		--	--
	Total	17.39	17.32	17.46		17.76	17.70	17.82		0.4	***
			2001				**2011**				
					ns				ns		
Nepal	Acceptable in at least one scenario	17.11	16.88	17.34		17.05	15.30	18.80		-0.06	ns
	Rejects in all scenarios	17.17	17.02	17.33		17.94	17.76	18.12		0.77	***
	Total	17.16	16.99	17.32		17.93	17.73	18.14		0.78	***
			2006-07				**2012-13**				
									***		
Pakistan	Acceptable in at least one scenario	na	na	na		19.12	18.92	19.31		--	--
	Rejects in all scenarios	na	na	na		20.13	19.90	20.36		--	--
	Total	19.20	19.05	19.35		19.69	19.49	19.89		0.49	***
Southeast Asia											
			2005				**2014**				
					ns				**		
Cambodia	Acceptable in at least one scenario	20.40	20.18	20.62		20.52	20.36	20.67		0.12	ns
	Rejects in all scenarios	20.58	20.22	20.94		20.79	20.63	20.96		0.22	ns
	Total	20.33	20.22	20.44		20.64	20.52	20.77		0.31	***
			2002				**2012**				
					*				***		
Indonesia	Acceptable in at least one scenario	19.03	18.82	19.24		20.01	19.84	20.17		0.98	***
	Rejects in all scenarios	19.32	19.15	19.48		20.73	20.57	20.89		1.42	***
	Total	19.24	19.08	19.39		20.49	20.34	20.64		1.25	***
			2003				**2013**				
					***				***		
Philippines	Acceptable in at least one scenario	20.80	20.59	21.01		20.98	20.70	21.26		0.18	ns
	Rejects in all scenarios	22.11	21.96	22.26		22.16	22.02	22.31		0.06	ns
	Total	21.76	21.63	21.89		22.00	21.86	22.14		0.24	*

Notes:
p-values *≤0.05, **≤0.01, ***≤0.001, ns=not significant (p>0.05)
[1] p-value of association test within each year.
[2] p-value of significance test for the difference in means between surveys.
na indicates indicator is not available for the survey. No data on women's decision-making was collected in the 1998-99 India DHS (NFHS-2) nor the 2006-07 Pakistan DHS.
In the Nepal 2011 survey, but not the 2001 survey, a filter question was inserted and respondents answering “no” when asked, “In your opinion, should a husband hit or beat his wife for any reason at all?” were not asked if wife beating was justified in specific scenarios. This questionnaire change may result in a measurement change (decrease) in the prevalence of attitudes accepting of wife beating as well as in detecting any associations with this variable.

The largest differences are found in Indonesia where women rejecting wife beating married 1.2 years older (p=0.000) and in India and Pakistan where women rejecting wife beating married about 1 year older (p=0.000) than did their counterparts who find wife beating acceptable. In Indonesia, marriage age rose from 2002-03 to 2012 among all women, but the increase is particularly pronounced for women who reject wife beating (1.4 years, p=0.000).

1.4.1.3 Spousal Age Difference

Table 1.6 shows the mean age at marriage according to spousal age difference. Spousal age difference refers to the number of years by which the husband is older than the wife. Spousal age difference is significantly associated with marriage age in all 7 study countries and this association has been equally significant at both points in time.

The universal pattern is a negative association between spousal age difference and marriage age (p=0.000). With larger differences between spousal ages, mean age at marriage decreases monotonically. The differences in marriage age between those with the largest and smallest spousal age gap are generally larger in the Southeast Asian than in South Asian countries. These groups are separated by 4.4 years in Indonesia and 2.8 years in the Philippines. Cambodia exhibits a pattern similar to the South Asian countries in the study, where the marriage age is 1.2 to 2.8 years younger among women with largest spousal age difference. The South Asian countries also generally have a higher proportion of women in marriages characterized by a larger spousal age difference as compared to Southeast Asian countries where a greater proportion of women have smaller age differences with their spouse (data not shown).

Table 1.6. Mean age at first marriage among ever-married women age 25-49, by spousal age difference

Country	Spousal age difference	Survey 1 Mean	Survey 1 CI		Survey 1 p-value[1]	Survey 2 Mean	Survey 2 CI		Survey 2 p-value[1]	Difference survey 1-survey 2	p-value[2]
South Asia											
			2004		***		**2014**		***		
Bangladesh	0-2 years	17.71	17.13	18.28		18.12	17.73	18.50		0.41	ns
	3-5 years	15.88	15.64	16.13		16.81	16.59	17.02		0.93	***
	6-10 years	15.24	15.11	15.38		16.16	16.01	16.31		0.91	***
	More than 10 years	14.82	14.69	14.95		15.57	15.46	15.69		0.76	***
	Total	15.28	15.16	15.41		16.21	16.09	16.33		0.93	***
			1998-99		***		**2005-06**		***		
India	0-2 years	18.43	18.33	18.53		18.92	18.82	19.02		0.49	***
	3-5 years	17.68	17.60	17.75		17.85	17.78	17.93		0.18	**
	6-10 years	17.09	17.02	17.17		17.39	17.31	17.47		0.30	***
	More than 10 years	16.40	16.30	16.49		16.74	16.64	16.85		0.35	***
	Total	17.39	17.32	17.46		17.76	17.70	17.82		0.4	***
			2001		***		**2011**		***		
Nepal	0-2 years	17.87	17.67	18.07		18.68	18.45	18.92		0.81	***
	3-5 years	16.75	16.57	16.93		17.62	17.37	17.86		0.87	***
	6-10 years	16.70	16.54	16.87		17.33	17.09	17.57		0.63	***
	More than 10 years	17.09	16.75	17.42		17.47	17.00	17.93		0.38	ns
	Total	17.16	16.99	17.32		17.93	17.73	18.14		0.78	***
			2006-07		***		**2012-13**		***		
Pakistan	0-2 years	20.39	20.14	20.65		20.99	20.68	21.31		0.60	**
	3-5 years	19.28	19.04	19.51		19.61	19.40	19.82		0.33	*
	6-10 years	18.61	18.40	18.81		19.07	18.83	19.31		0.46	**
	More than 10 years	17.96	17.64	18.28		18.18	17.89	18.47		0.22	ns
	Total	19.20	19.05	19.35		19.69	19.49	19.89		0.49	***

Continued

A significant increase in marriage age over time has been more universal across all levels of spousal age difference in the South Asian countries than in the Southeast Asian countries in the study. In Bangladesh, India, Nepal, and Pakistan, marriage age has increased among all women except those with 0-2 spousal age gap in Bangladesh and those with more than 10 years age difference in Nepal and Pakistan. Within this group, the largest absolute differences occur among women with less than 10 years age difference in Nepal and more than 2 years age difference in Bangladesh.

Table 1.6—*Continued*

Country	Spousal age difference	Survey 1 Mean	Survey 1 CI		Survey 1 p-value[1]	Survey 2 Mean	Survey 2 CI		Survey 2 p-value[1]	Difference survey 1-survey 2	p-value[2]
Southeast Asia											
			2005		***		**2014**		***		
Cambodia	0-2 years	21.08	20.93	21.22		21.50	21.32	21.67		0.42	***
	3-5 years	19.17	18.99	19.35		19.63	19.42	19.85		0.47	***
	6-10 years	19.15	18.88	19.42		19.40	19.10	19.70		0.25	ns
	More than 10 years	20.05	19.55	20.55		20.14	19.62	20.66		0.08	ns
	Total	20.33	20.22	20.44		20.64	20.52	20.77		0.31	***
			2002-03		***		**2012**		***		
Indonesia	0-2 years	21.01	20.80	21.21		22.58	22.40	22.77		1.58	***
	3-5 years	18.98	18.78	19.17		20.09	19.92	20.25		1.11	***
	6-10 years	18.05	17.87	18.24		18.97	18.80	19.14		0.92	***
	More than 10 years	17.57	17.30	17.84		18.22	17.95	18.49		0.65	***
	Total	19.24	19.08	19.39		20.49	20.34	20.64		1.25	***
			2003				**2013**				
		7,377			***	8,290			***		
Philippines	0-2 years	23.01	22.83	23.18		23.16	22.99	23.34		0.16	ns
	3-5 years	20.64	20.43	20.85		20.94	20.72	21.16		0.31	ns
	6-10 years	20.14	19.85	20.42		20.69	20.44	20.95		0.56	**
	More than 10 years	20.50	20.03	20.97		20.40	20.04	20.76		-0.10	ns
	Total	21.76	21.63	21.89		22.00	21.86	22.14		0.24	*

Notes:
p-values *≤0.05, **≤0.01, ***≤0.001, ns=not significant (p>0.05)
[1] p-value of association test within each year.
[2] p-value of significance test for the difference in means between surveys.

However, after correcting for the shorter inter-survey time period in India and Pakistan, women with 0-2 years spousal age difference have seen increases in marriage age of the same size as in Bangladesh and Nepal. In general, the increase in marriage age is more pronounced among women with less spousal age gap in these four countries.

Like the South Asian countries in the study, Indonesia has seen significant increases in marriage age among women of all spousal age differences. These increases are more pronounced among women with age differences of 0-2 or 3-5 years than among women with 6-10 or more than 10 years. Here, marriage age increased by 1.6 years between 2002-03 and 2012 among women with 0-2 years spousal age difference—the largest increase in the study. However, the increase in

marriage age is concentrated among certain groups in Cambodia and the Philippines. In Cambodia, marriage age increased for women having 0-2 or 3-5 years spousal age difference, but not among women with larger spousal age gaps. In the Philippines, only women with a spouse 6-10 years their elder experienced an increase in average marriage age (p=0.004). The observed increase of nearly one-third of a year between 2003 and 2013 among women with a spousal age difference of 3-5 years is nearly significant (p=0.052).

1.4.2 Marriage Age and Socio-Demographic Characteristics

1.4.2.1 Marriage Age and Women's Education

Table 1.7 shows the mean age at marriage according to level of education in a similar format to the tables in the previous section. The data show that education is associated with marriage age at a significance level of p=0.000 at both survey points in all 7 study countries.

In all study countries, there is a monotonically positive relationship between education and marriage age. The largest disparities by education are in Indonesia where women with higher education married when they were, on average, 7.7 years older than did those with no education in 2012 and in India, where women with higher education married 6.7 years older than those with no education in 2005-06. This is followed by Bangladesh and the Philippines where the disparity between education groups approaches 6 years at Survey 2.

Table 1.7. Mean age at first marriage among ever-married women age 25-49, by level of education

Country	Education	Survey 1 Mean	Survey 1 CI		Survey 1 p-value[1]	Survey 2 Mean	Survey 2 CI		Survey 2 p-value[1]	Difference survey 1-survey 2	p-value[2]
South Asia											
			2004		***		**2014**		***		
	No education	14.65	14.53	14.76		15.16	15.01	15.31		0.52	***
Bangladesh	Primary	15.01	14.86	15.17		15.54	15.41	15.67		0.53	***
	Secondary	16.22	16.03	16.41		16.77	16.61	16.93		0.55	***
	Higher	20.97	20.46	21.48		21.04	20.75	21.33		0.07	ns
	Total	15.28	15.16	15.41		16.21	16.09	16.33		0.93	***
			1998-99				**2005-06**				
	No education	16.19	16.14	16.23		16.43	16.38	16.48		0.24	***
India	Primary	17.14	17.05	17.22		17.22	17.13	17.31		0.08	ns
	Secondary	18.98	18.89	19.07		19.15	19.07	19.24		0.17	**
	Higher	22.11	21.98	22.24		23.14	23.00	23.29		1.03	***
	Total	17.39	17.32	17.46		17.76	17.70	17.82		0.37	***
			2001		***		**2011**		***		
	No education	16.88	16.72	17.03		17.05	16.86	17.24		0.17	ns
Nepal	Primary	17.52	17.27	17.77		17.62	17.36	17.88		0.10	ns
	Secondary	18.70	18.37	19.04		19.32	19.07	19.56		0.61	*
	Higher	21.63	20.81	22.44		22.55	22.14	22.95		0.92	*
	Total	17.16	16.99	17.32		17.93	17.73	18.14		0.78	***
			2006-07		***		**2012-13**		***		
	No education	18.54	18.37	18.71		18.66	18.46	18.87		0.12	ns
Pakistan	Primary	19.37	19.05	19.68		19.46	19.19	19.73		0.09	ns
	Secondary	20.40	20.06	20.74		21.06	20.76	21.35		0.66	**
	Higher	22.76	22.35	23.16		23.86	23.56	24.16		1.11	***
	Total	19.20	19.05	19.35		19.69	19.49	19.89		0.49	***

Continued

Table 1.7—*Continued*

Country	Education	Survey 1 Mean	Survey 1 CI		Survey 1 p-value[1]	Survey 2 Mean	Survey 2 CI		Survey 2 p-value[1]	Difference survey 1-survey 2	p-value[2]
Southeast Asia											
			2005		***		**2014**		***		
	No education	20.19	20.00	20.39		19.96	19.66	20.26		-0.23	ns
Cambodia	Primary	20.19	20.05	20.32		20.41	20.26	20.56		0.22	*
	Secondary	20.97	20.75	21.18		21.32	21.12	21.52		0.35	*
	Higher	***24.10***	***22.54***	***25.66***		23.97	23.49	24.46		-0.13	ns
	Total	20.33	20.22	20.44		20.64	20.52	20.77		0.31	***
			2002-03		***		**2012**		***		
	No education	17.30	16.98	17.61		17.58	17.08	18.07		0.28	ns
Indonesia	Primary	17.89	17.75	18.03		18.41	18.27	18.54		0.51	***
	Secondary	21.17	21.03	21.31		21.55	21.43	21.67		0.38	***
	Higher	24.90	24.61	25.19		25.31	25.07	25.54		0.41	*
	Total	19.24	19.08	19.39		20.49	20.34	20.64		1.25	***
			2003		***		**2013**		***		
		7,377				8,290					
	No education	18.21	17.47	18.94		18.58	17.84	19.32		0.37	ns
Philippines	Primary	19.95	19.75	20.16		19.79	19.56	20.02		-0.16	ns
	Secondary	21.32	21.14	21.49		21.46	21.31	21.61		0.15	ns
	Higher	24.38	24.19	24.57		24.40	24.21	24.59		0.02	ns
	Total	21.76	21.63	21.89		22.00	21.86	22.14		0.24	*

Notes:
p-values *≤0.05, **≤0.01, ***≤0.001, ns=not significant (p>0.05)
[1] p-value of association test within each year.
[2] p-value of significance test for the difference in means between surveys.
s indicates that the indicator is suppressed because it is based on fewer than 25 unweighted cases.
indicators in italics are based on fewer than 50 unweighted cases and should be interpreted with caution.

There have been significant increases in average marriage age over time in multiple education categories—usually in the more educated groups of women—in six of seven study countries. In Bangladesh, however, marriage age has increased among all educational categories except women with higher education. In India, marriage age has increased among women with no education alongside women with secondary or higher education (but not primary education) while in Cambodia, increases are seen only among women with primary or secondary education. There have been no significant changes in marriage age in any educational category in the Philippines.

The biggest increase over time is seen among women with higher education in India, whose mean age at marriage increased from age 22.1 in 1998-99 to age 23.1 in 2005-06 (p=0.000). The

increases in marriage age concentrated among women with secondary or higher education or the increases among women in these groups that have outpaced increases among women with lower education means that the disparities in marriage age across educational groups have widened over time in several countries. The widening disparities are most notable in India, Nepal, and Pakistan. The growing disparities are more modest in Cambodia and Indonesia, while the disparities have narrowed slightly in the Philippines and Bangladesh.

1.4.2.2 Marriage Age and Women's Occupation

As shown in Table 1.8, women's occupation is associated with marriage age in all study countries[8] but Cambodia at the time of the most recent survey. In Indonesia, occupation has become salient over time; there was no significant association with marriage age in 2002-03, but by 2012, this association was statistically significant (p=0.000).

[8] Women's occupation is not available in the Bangladesh DHS surveys included in this study.

Table 1.8. Mean age at first marriage among ever-married women age 25-49, by respondent's occupation

Country	Occupation	Survey 1 Mean	Survey 1 CI		Survey 1 p-value[1]	Survey 2 Mean	Survey 2 CI		Survey 2 p-value[1]	Difference survey 1-survey 2	p-value[2]
South Asia											
			1998-99		***		**2005-06**		***		
	Not working	17.83	17.77	17.90		18.24	18.17	18.32		0.41	***
	Agricultural	16.10	16.02	16.17		16.48	16.40	16.55		0.38	***
	Professional/technical/ managerial	21.51	21.25	21.78		22.39	22.12	22.67		0.88	***
India	Clerical	22.31	21.77	22.85		21.27	20.79	21.74		-1.04	**
	Sales	17.36	17.09	17.63		17.93	17.68	18.18		0.57	***
	Services	17.37	16.96	17.77		17.39	17.21	17.57		0.02	ns
	Skilled/unskilled manual	17.01	16.88	17.15		17.44	17.31	17.58		0.43	***
	Other	16.73	16.04	17.43		19.47	18.53	20.41		2.74	***
	Total	17.39	17.32	17.46		17.76	17.70	17.82		0.4	***
			2001		**		**2011**		**		
	Not working	17.36	17.03	17.69		18.58	18.17	19.00		1.23	***
	Agricultural	17.04	16.88	17.21		17.43	17.24	17.61		0.39	**
	Professional/technical/ managerial	19.29	18.52	20.07		21.38	20.86	21.89		2.09	***
Nepal	Clerical	s	s	s		19.37	18.00	20.73		3.37	**
	Services	s	s	s		18.63	18.26	19.01		2.87	***
	Skilled manual	18.66	17.98	19.34		18.21	17.73	18.70		-0.45	ns
	Unskilled manual	*16.24*	*15.45*	*17.03*		17.15	16.57	17.72		0.91	ns
	Other	17.59	17.14	18.05		s	s	s		3.11	*
	Total	17.16	16.99	17.32		17.93	17.73	18.14		0.78	***
			2006-07		***		**2012-13**		***		
	Not working	19.52	19.35	19.69		20.00	19.82	20.17		0.47	***
	Agricultural	17.78	17.40	18.16		18.33	17.78	18.88		0.56	ns
	Professional/technical/ managerial	21.85	21.09	22.60		22.88	22.07	23.69		1.03	ns
Pakistan	Clerical	s	s	s		s	s	s		4.82	ns
	Sales	18.13	17.28	18.97		18.47	17.49	19.46		0.35	ns
	Services	18.50	18.19	18.82		19.15	18.77	19.54		0.65	**
	Skilled manual	18.65	17.88	19.43		18.38	17.79	18.96		-0.28	ns
	Unskilled manual	18.22	17.73	18.71		18.58	18.20	18.95		0.35	ns
	Total	19.20	19.05	19.35		19.69	19.49	19.89		0.49	***

Continued

Table 1.8—*Continued*

Country	Occupation	Survey 1 Mean	Survey 1 CI		Survey 1 p-value[1]	Survey 2 Mean	Survey 2 CI		Survey 2 p-value[1]	Difference survey 1-survey 2	p-value[2]
Southeast Asia											
			2005				**2014**				
					ns				ns		
	Not working	19.57	18.41	20.73		20.95	20.69	21.21		1.38	*
	Agricultural	20.19	20.04	20.34		20.18	19.99	20.37		-0.01	ns
	Professional/technical/ managerial	22.49	21.77	23.21		22.57	22.10	23.03		0.07	ns
Cambodia	Clerical	22.95	21.48	24.41		22.35	21.13	23.57		-0.60	ns
	Sales	20.36	20.15	20.57		20.59	20.37	20.81		0.23	ns
	Services	20.56	19.63	21.49		20.84	20.35	21.33		0.28	ns
	Skilled manual	20.09	19.39	20.79		20.94	20.61	21.28		0.85	*
	Unskilled manual	20.44	20.23	20.64		21.00	20.01	21.98		0.56	ns
	Other	20.65	19.64	21.66		*20.57*	19.21	21.92		-0.08	ns
	Total	20.33	20.22	20.44		20.64	20.52	20.77		0.31	***
			2002-03				**2012**				
					ns				***		
	Not working	19.38	19.20	19.57		20.57	20.40	20.74		1.18	***
	Agricultural	17.98	17.77	18.18		18.80	18.58	19.02		0.82	***
	Professional/technical/ managerial	24.04	23.64	24.45		24.39	24.12	24.66		0.35	ns
Indonesia	Clerical	24.68	24.05	25.32		25.16	24.55	25.77		0.47	ns
	Sales	18.83	18.58	19.09		20.28	20.07	20.49		1.45	***
	Services	19.63	19.20	20.07		20.39	20.03	20.74		0.75	**
	Skilled manual	19.58	19.15	20.00		19.78	19.56	20.00		0.20	ns
	Unskilled manual	s	s	s		19.86	19.23	20.49		-1.37	ns
	Other	s	s	s		s	s	s		5.16	*
	Total	19.24	19.08	19.39		20.49	20.34	20.64		1.25	***
			2003				**2013**				
					**				***		
	Not working	21.64	21.46	21.82		21.85	21.66	22.04		0.21	ns
	Agricultural	19.41	19.02	19.80		19.90	19.60	20.20		0.49	*
	Professional/technical/ managerial	23.29	22.99	23.60		23.66	23.41	23.91		0.36	ns
Philippines	Clerical	24.23	23.69	24.77		23.99	23.53	24.45		-0.24	ns
	Sales	21.05	20.78	21.31		22.55	22.10	23.00		1.51	***
	Services	21.99	21.35	22.63		21.46	20.95	21.98		-0.53	ns
	Skilled manual	21.62	21.07	22.17		21.24	20.73	21.75		-0.38	ns
	Unskilled manual	20.58	20.12	21.04		21.21	20.96	21.45		0.63	*
	Other	s	s	s		s	s	s		-1.55	ns
	Total	21.76	21.63	21.89		22.00	21.86	22.14		0.24	*

Notes:
p-values *≤0.05, **≤0.01, ***≤0.001, ns=not significant (p>0.05)
[1] p-value of association test within each year.
[2] p-value of significance test for the difference in means between surveys.
na indicates indicator is not available for the survey.
India DHS (NFHS-2 and NFHS-3) do not distinguish between skilled manual and unskilled manual.
Nepal and Pakistan DHS do not include a separate category for sales; women in these occupations are included in "other" occupations.
s indicates that the indicator is suppressed because it is based on fewer than 25 unweighted cases.
indicators in italics are based on fewer than 50 unweighted cases and should be interpreted with caution.

In general, women who employed in professional or clerical occupations and, in some countries in sales occupations, marry at older ages than women who are not working. This is also true of women who work in sales in the Philippines and in other occupational categories in India, Nepal, and Indonesia. In all study countries, women who work in agricultural occupations marry at younger ages than women who are not working. The pattern of older marriage age among professionals and younger marriage age among agricultural workers relative to unemployed women has been consistent at both survey points. However, women working in clerical positions did not marry at older ages in some countries at Survey 1 as they did at Survey 2.

Changes in marriage age over time have been widespread across most or all occupational categories in India and Nepal. In contrast, such changes have been clustered in two or three occupational groups in Pakistan, Cambodia, Indonesia, and the Philippines. Across all study countries and occupational categories where there have been significant changes in marriage age, marriage age has increased over time with one exception. Women working in clerical occupations in India married at an age that is one year younger in 2005-06 than did their counterparts in 1998-99 ($p=0.003$).

Marriage age has increased among women in all other occupational categories in India, except those working in services. The largest increases appear among women working in other occupations. In Nepal, marriage age increased in all occupational categories except skilled and unskilled manual labor. Women working in professional, clerical, services, or other occupational categories had average marriage ages that increased by 2 to 3.4 years between 2001 and 2011.

In Pakistan, significant increases in marriage age in the 6 years between surveys are restricted to two occupational groups and were larger among women working in service occupations (0.7 year,

p=0.01) than among women who were not working (0.5 year, p=0.000). Although occupation is not associated with marriage age in Cambodia, marriage age increased between 2005 and 2014 among Cambodian women who are not working (1.4 years, p=0.022) and those working as skilled manual laborers (0.9 year, p=0.033). Marriage age increased over the decade between surveys among Indonesian women in sales (1.4 years, p=0.000), those who are not working (1.2 years, p=0.000), and those working in services (0.8 year, p=0.008). In the Philippines, increases in marriage age are restricted to women in sales (1.5 years, p=0.000) and in unskilled manual labor (0.6 year, p=0.019).

1.4.2.3 Marriage Age and Wealth

Household wealth quintile is significantly associated with marriage age in all seven study countries. Wealth has increased in salience with regard to marriage age over time in Cambodia, the only country in which wealth had not been significantly associated with marriage age at Survey 1. As seen in Table 1.9, wealth has a consistently positive association with marriage age in South Asian and Southeast Asian countries alike: marriage age rises monotonically with wealth in most countries. In Cambodia, however, marriage increase appears to decline slightly over the first two or three wealth quintiles before increasing among the richer and richest wealth quintiles, although these differences are small.

Table 1.9. Mean age at first marriage among ever-married women age 25-49, by household wealth quintile

		Survey 1				Survey 2				Difference survey 1-survey 2	
Country	Wealth	Mean	CI		p-value[1]	Mean	CI		p-value[1]		p-value[2]
South Asia											
			2004				**2014**				
					***				***		
Bangladesh	Poorest	14.83	14.65	15.01		15.39	15.20	15.57		0.56	***
	Poorer	14.74	14.59	14.88		15.65	15.47	15.82		0.91	***
	Middle	14.99	14.82	15.17		15.82	15.67	15.97		0.83	***
	Richer	15.32	15.13	15.51		16.18	16.01	16.35		0.86	***
	Richest	16.49	16.21	16.77		17.78	17.55	18.01		1.29	***
	Total	15.32	15.13	15.51		16.18	16.01	16.35		0.86	***
			1998-99				**2005-06**				
					***				***		
India	Poorest	16.13	16.05	16.21		16.43	16.34	16.51		0.30	***
	Poorer	16.30	16.22	16.37		16.66	16.58	16.74		0.37	***
	Middle	16.80	16.72	16.88		17.15	17.06	17.24		0.35	***
	Richer	17.75	17.66	17.84		18.07	17.98	18.17		0.32	***
	Richest	19.55	19.43	19.67		19.92	19.80	20.03		0.37	***
	Total	17.39	17.32	17.46		17.76	17.70	17.82		0.37	***
			2001				**2011**				
					***				***		
Nepal	Poorest	16.92	16.68	17.15		17.38	17.09	17.67		0.47	*
	Poorer	16.79	16.55	17.03		17.34	17.05	17.63		0.55	**
	Middle	16.90	16.63	17.17		17.35	17.07	17.63		0.45	*
	Richer	17.21	16.96	17.47		17.89	17.58	18.20		0.68	***
	Richest	17.93	17.65	18.21		19.35	19.11	19.59		1.43	***
	Total	17.16	16.99	17.32		17.93	17.73	18.14		0.78	***
			2006-07				**2012-13**				
					***				***		
Pakistan	Poorest	18.07	17.76	18.38		18.14	17.78	18.51		0.07	ns
	Poorer	18.87	18.58	19.16		18.95	18.67	19.23		0.08	ns
	Middle	19.01	18.73	19.29		19.29	19.06	19.51		0.28	ns
	Richer	19.37	19.12	19.62		20.17	19.87	20.46		0.79	***
	Richest	20.44	20.16	20.73		21.43	21.20	21.67		0.99	***
	Total	19.20	19.05	19.35		19.69	19.49	19.89		0.49	***

Table 1.9—*Continued*

Country	Wealth	Survey 1 Mean	Survey 1 CI		Survey 1 p-value[1]	Survey 2 Mean	Survey 2 CI		Survey 2 p-value[1]	Difference survey 1-survey 2	p-value[2]
Southeast Asia											
			2005				**2014**				
					ns				***		
Cambodia	Poorest	20.56	20.32	20.79		20.57	20.28	20.86		0.01	ns
	Poorer	20.40	20.18	20.62		20.28	20.03	20.52		-0.13	ns
	Middle	20.17	19.97	20.38		20.49	20.20	20.78		0.32	ns
	Richer	19.99	19.76	20.21		20.50	20.27	20.73		0.52	***
	Richest	20.52	20.29	20.76		21.31	21.11	21.51		0.78	***
	Total	20.33	20.22	20.44		20.64	20.52	20.77		0.31	***
			2002-03				**2012**				
					***				***		
Indonesia	Poorest	18.56	18.32	18.79		19.33	19.12	19.54		0.78	***
	Poorer	18.22	18.00	18.44		19.63	19.44	19.82		1.41	***
	Middle	18.73	18.49	18.97		19.95	19.76	20.14		1.22	***
	Richer	19.32	19.07	19.56		20.76	20.55	20.97		1.44	***
	Richest	21.15	20.88	21.42		22.36	22.11	22.61		1.21	***
	Total	19.24	19.08	19.39		20.49	20.34	20.64		1.25	***
			2003				**2013**				
					***				***		
Philippines	Poorest	19.97	19.70	20.23		19.94	19.71	20.17		-0.03	ns
	Poorer	20.97	20.74	21.19		21.13	20.90	21.36		0.16	ns
	Middle	21.55	21.32	21.79		21.72	21.48	21.95		0.16	ns
	Richer	22.42	22.15	22.68		22.89	22.64	23.13		0.47	**
	Richest	23.55	23.30	23.79		23.88	23.61	24.14		0.33	ns
	Total	21.76	21.63	21.89		22.00	21.86	22.14		0.24	*

Notes:
p-values *≤0.05, **≤0.01, ***≤0.001, ns=not significant (p>0.05)
[1] p-value of association test within each year.
[2] p-value of significance test for the difference in means between surveys.

The largest inter-quintile differences occur between the richer and richest wealth quintiles in all countries, except the Philippines. In Indonesia, this difference grows with each successive quintile before doubling to 1.6 years difference between the richer and richest wealth quintiles in 2012. In Nepal, the mean age at marriage is almost identical among the poorest three wealth quintiles before increasing among the richer and richest wealth quintiles. The largest disparity (3.5 years, p=0.000) is observed in India; women in the poorest wealth quintile in 2005-06 married at an average age of 16.4 compared to age 19.9 among the women in the richest wealth quintile.

Mean age at marriage has increased over time in every wealth quintile in all South Asian countries except Pakistan, where there are significant increases seen only among women in the richer and richest quintiles. Marriage age has also increased among all wealth quintiles in Indonesia. However, significant increases are restricted to women in the richer wealth quintile in the Philippines and the richer and richest quintiles in Cambodia. The biggest increases occur among the richest wealth quintile in Nepal and among all but the poorest wealth quintile in Indonesia. Disparities in marriage age between women in the richest and poorest wealth quintiles have grown in all countries, most prominently in Nepal and Pakistan, where the gap is larger by almost 1 year at Survey 2 than at Survey 1.

1.4.2.4 Marriage Age and Religion

Table 1.10 shows that religion is significantly associated with marriage age in all three South Asian countries for which there is data and in Cambodia—but not the Philippines—in Southeast Asia[9]. Muslim women in Bangladesh and Nepal married at younger ages than did women of other religions, although in India they marry at similar ages as Hindu and Buddhist women. Hindu women married at younger ages than Christian, Sikh, and Jain women in India, Buddhist and Kirat women in Nepal, and women of "other" faiths in both countries. The differences among religious groups are smaller, but nonetheless significant in Cambodia. Here, Buddhist and Christian women marry at older ages than do Muslim women. While there is approximately four years that separate the average marriage age of Muslim women and the religious group with the oldest marriage age elsewhere, these groups are separated by less than a year in Cambodia.

[9] Data on religious affiliation are not available in DHS surveys for Pakistan and Indonesia.

Table 1.10. Mean age at first marriage among ever-married women age 25-49, by religion

		Survey 1				Survey 2				Difference survey 1-survey 2	
Country	Religion	Mean	CI		p-value[1]	Mean	CI		p-value[1]		p-value[2]
South Asia											
			2004				**2014**				
					***				***		
	Muslim	15.14	15.03	15.26		16.08	15.96	16.19		0.93	***
Bangladesh	Christian	***16.23***	***15.08***	***17.38***		***20.25***	***18.28***	***22.22***		4.02	*
	Buddhist	s	s	s		18.53	17.79	19.27		0.94	ns
	Hindu	16.45	16.04	16.86		17.04	16.70	17.39		0.59	*
	Total	15.32	15.13	15.51		16.18	16.01	16.35		0.86	***
			1998-99				**2005-06**				
					***				***		
	Muslim	16.96	16.84	17.08		17.31	17.17	17.45		0.34	***
	Christian	20.12	19.75	20.49		20.51	20.13	20.88		0.39	ns
	Buddhist	17.29	16.63	17.95		17.38	16.88	17.89		0.09	ns
India	Hindu	17.29	17.23	17.36		17.69	17.62	17.75		0.40	***
	Other	17.51	16.77	18.26		18.10	17.70	18.50		0.58	ns
	Sikh	20.00	19.75	20.24		19.80	19.56	20.03		-0.20	ns
	Jain	19.08	18.44	19.71		20.41	19.87	20.95		1.33	***
	Total	17.39	17.32	17.46		17.76	17.70	17.82		0.37	***
			2001				**2011**				
					***				***		
	Muslim	15.97	15.66	16.27		16.86	15.51	18.22		0.90	ns
	Buddhist	18.47	18.04	18.90		18.84	18.43	19.26		0.37	ns
Nepal	Hindu	17.02	16.87	17.17		17.84	17.65	18.02		0.81	***
	Other	20.03	19.18	20.88		20.60	19.80	21.41		0.57	ns
	Kirat	***16.96***	***16.00***	***17.93***		18.08	17.37	18.78		1.11	Ns
	Total	17.16	16.99	17.32		17.93	17.73	18.14		0.78	***
Southeast Asia											
			2005				**2014**				
					***				***		
	Muslim	18.67	17.97	19.38		19.88	19.13	20.63		0.36	*
Cambodia	Christian	19.99	18.50	21.49		20.35	19.14	21.56		0.31	ns
	Buddhist	20.38	20.28	20.48		20.68	20.56	20.81		1.21	***
	Other	18.11	17.52	18.69		18.39	17.63	19.15		0.29	ns
	Total	20.33	20.22	20.44		20.64	20.52	20.77		0.31	***
			2003				**2013**				
					ns				ns		
	Muslim	19.86	19.42	20.30		20.23	19.73	20.73		0.37	ns
	Other	21.71	21.15	22.26		21.67	21.24	22.11		-0.03	ns
Philippines	Roman Catholic	21.87	21.73	22.01		22.14	22.00	22.28		0.27	**
	Protestant	21.55	21.02	22.07		21.95	21.41	22.49		0.40	ns
	Iglesia Ni Kristo	21.62	21.06	22.17		22.27	21.64	22.90		0.66	ns
	Aglipay	22.18	21.37	22.99		22.02	20.68	23.36		-0.17	ns
	Total	21.76	21.63	21.89		22.00	21.86	22.14		0.24	*

Notes:
p-values *≤0.05, **≤0.01, ***≤0.001, ns=not significant (p>0.05)
[1] p-value of association test within each year.
[2] p-value of significance test for the difference in means between surveys.
na indicates indicator is not available for the survey. No data on religion was collected in the Pakistan or Indonesia DHS.
s indicates that the indicator is suppressed because it is based on fewer than 25 unweighted cases.
indicators in italics are based on fewer than 50 unweighted cases and should be interpreted with caution.

In contrast to other socio-demographic characteristics, marriage age has not increased consistently across religious groups in study countries. Rather, the trend toward older age at marriage is concentrated in selected groups. In Bangladesh, marriage age has increased from 2004 to 2014 among all religious groups (Muslims, Christians, and Hindus) except Buddhists. The most striking increase—of 4 years among Christian women—should be viewed with caution because of their small numbers in the sample. In contrast to Bangladesh, marriage age did increase significantly among Buddhist women in Cambodia (1.2 years, p=0.000). The marriage age increased among Muslim women in India and Cambodia. The mean age at marriage increased significantly among the Hindu majorities in India and Nepal, as well as among Jain and women of other faiths in India. In the Philippines, only Roman Catholics, the majority religious group, experienced an increase in the average age at marriage.

1.4.2.5 Marriage Age and Residence

In the bivariate analysis presented in Table 1.11, place of residence is associated with marriage age at both time points in all seven study countries (p=0.000). In South Asian and Southeast Asian countries alike, marriage age is higher on average among urban residents than among rural residents. The difference between these groups of women exceeds one year in Bangladesh, India, and Pakistan and approaches a year in Nepal and the Philippines. The largest difference occurs in Indonesia, where urban women married at 2.1 years older than their rural counterparts. Even in Cambodia, where the difference is the smallest, urban women married when they are nearly three-quarters of a year older than do rural women.

Table 1.11. Mean age at first marriage among ever-married women age 25-49, by place of residence

		Survey 1				Survey 2				Difference survey 1-survey 2	
Country	Residence	Mean	CI		p-value[1]	Mean	CI		p-value[1]		p-value[2]
South Asia											
			2004				**2014**				
					***				***		***
Bangladesh	Rural	15.07	14.94	15.20		15.88	15.77	15.99	15.88	0.81	***
	Urban	15.97	15.68	16.27		17.02	16.78	17.27	17.02	1.05	
	Total									0.00	
			1998-99				**2005-06**				
					***				***		
India	Rural	16.9	16.79	16.91		17.2	17.10	17.22			***
	Urban	18.7	18.61	18.88		19.0	18.85	19.09			0.018
	Total	17.39	17.32	17.46		17.76	17.70	17.82			***
			2001				**2011**				
					***				***		
Nepal	Rural	17.07	16.91	17.23		17.80	17.59	18.01		0.73	***
	Urban	17.92	17.47	18.38		18.75	18.41	19.09		0.83	**
	Total	17.16	16.99	17.32		17.93	17.73	18.14		0.78	***
			2006-07				**2012-13**				
					***				***		
Pakistan	Rural	18.97	18.78	19.16		19.19	18.96	19.43		0.22	ns
	Urban	19.62	19.39	19.85		20.59	20.35	20.83		0.97	***
	Total	19.20	19.05	19.35		19.69	19.49	19.89		0.49	***
Southeast Asia											
			2005				**2014**				
					**				***		
Cambodia	Rural	20.26	20.15	20.38		20.51	20.38	20.65		0.25	**
	Urban	20.70	20.44	20.96		21.28	21.08	21.49		0.58	***
	Total	20.33	20.22	20.44		20.64	20.52	20.77		0.31	***
			2002-03				**2012**				
					***				***		
Indonesia	Rural	18.45	18.29	18.61		19.43	19.27	19.58		0.98	***
	Urban	20.12	19.87	20.37		21.50	21.29	21.71		1.38	***
	Total	19.24	19.08	19.39		20.49	20.34	20.64		1.25	***
			2003				**2013**				
					***				***		
Philippines	Rural	21.06	20.88	21.25		21.55	21.37	21.73		0.48	***
	Urban	22.34	22.17	22.51		22.45	22.25	22.65		0.11	ns
	Total	21.76	21.63	21.89		22.00	21.86	22.14		0.24	*

Notes:
p-values *≤0.05, **≤0.01, ***≤0.001, ns=not significant (p>0.05)
[1] p-value of association test within each year.
[2] p-value of significance test for the difference in means between surveys.

Age at marriage has increased among both rural and urban women in Bangladesh, India, Nepal, Cambodia, and Indonesia, with the largest increases observed among urban women in Bangladesh and Indonesia. However, age at marriage has risen only among urban women in Pakistan and only among rural women in the Philippines. Because marriage age is lower among rural women than urban women, this means that the disparity has narrowed over time in the Philippines but widened in Pakistan. The rural-urban disparity has also widened in Bangladesh, Cambodia, and Indonesia and narrowed somewhat in India.

1.4.2.6 Marriage Age and Subnational Region

There are regional differences in marriage age in all seven countries, although this was not previously the case in Bangladesh and Indonesia. Age at marriage is higher than average in Sylhet and lower than average in Khulna, Rajshahi, and Rangpur[10] in Bangladesh. In India 2005-06, the most populous state pair, Uttar Pradesh and Uttaranchal[11], have an age at marriage close to the national average, with the state of Andhra Pradesh in the Southeast having the youngest marriage age (16.2 years) and Goa in the Southwest having the oldest (23 years). Other Southern states (e.g. Kerala, Karnataka, and Tamil Nadu) also have older ages at marriage, as do Manipur and Mizoram in the Northeast.

[10] Although Rangpur and Rajshahi are now separate divisions, they were sampled as a single region in 2004. The two divisions are combined in 2014 so that regional trends between the two survey points can be compared.
[11] Although separate states in the 2005-06 DHS (NFHS-3), the state pairs of Uttar Pradesh and Uttaranchal, Madhya Pradesh and Chattisgarh, and Bihar and Jharkhand were sampled as single states in 1998-99 and are combined so that regional trends between the two survey points can be compared.

Table 1.12. Mean age at first marriage among ever-married women age 25-49, by subnational region

Country	Region	Survey 1 Mean	Survey 1 CI		Survey 1 p-value[1]	Survey 2 Mean	Survey 2 CI		Survey 2 p-value[1]	Difference survey 1-survey 2	p-value[2]
South Asia											
Bangladesh			**2004**				**2014**				
					ns				*		
	Dhaka	15.32	15.07	15.57		16.37	16.12	16.61		1.05	***
	Barisal	15.27	15.03	15.51		16.08	15.81	16.34		0.80	***
	Chittagong	15.87	15.51	16.24		16.70	16.42	16.99		0.83	***
	Khulna	14.91	14.69	15.14		15.68	15.48	15.88		0.77	***
	Rajshahi & Rangpur	14.79	14.61	14.97		15.57	15.43	15.71		0.78	***
	Sylhet	16.20	15.81	16.59		17.33	16.97	17.70		1.13	***
	Total	15.32	15.13	15.51		16.18	16.01	16.35		0.86	***
India			**1998-99**				**2005-06**				
					***				***		
	Uttar Pradesh & Uttaranchal	16.54	16.40	16.67		17.27	17.13	17.40		0.73	***
	Andhra Pradesh	18.86	18.39	19.34		16.22	16.03	16.40		-2.65	***
	Arunachal Pradesh	15.83	15.64	16.02		18.38	17.94	18.82		2.55	***
	Assam	18.39	18.09	18.68		19.00	18.61	19.40		0.62	*
	Bihar & Jharkhand	16.74	16.60	16.87		16.59	16.42	16.75		-0.15	ns
	Delhi	19.47	19.06	19.88		19.43	19.06	19.79		-0.05	ns
	Goa	22.08	21.60	22.56		22.99	22.56	23.42		0.91	**
	Gujarat	18.22	17.92	18.51		18.43	18.15	18.71		0.22	ns
	Haryana	18.21	17.96	18.47		17.87	17.60	18.15		-0.34	ns
	Himachal Pradesh	18.99	18.76	19.21		19.37	19.09	19.65		0.39	*
	Jammu & Kashmir	18.33	18.10	18.57		19.53	19.26	19.81		1.20	***
	Karnataka	17.48	17.15	17.82		18.29	17.99	18.59		0.81	***
	Kerala	20.29	19.93	20.65		20.85	20.46	21.24		0.56	*
	Madhya Pradesh	16.34	16.14	16.53		16.92	16.76	17.07		0.58	***
	Maharashtra	17.12	16.87	17.38		18.02	17.80	18.24		0.90	***
	Manipur	21.19	20.52	21.86		21.59	21.25	21.93		0.40	ns
	Meghalaya	19.24	18.83	19.64		19.92	19.60	20.25		0.69	**
	Mizoram	21.18	20.83	21.54		20.77	20.42	21.11		-0.42	ns
	Nagaland	20.05	19.64	20.46		19.97	19.70	20.24		-0.08	ns
	Orissa	17.66	17.45	17.87		18.08	17.83	18.33		0.42	*
	Punjab	20.01	19.82	20.20		19.42	19.17	19.67		-0.59	***
	Rajasthan	16.73	16.60	16.86		16.87	16.64	17.10		0.13	ns
	Sikkim	19.53	19.14	19.92		19.79	19.41	20.17		0.26	ns
	Tamil Nadu	18.80	18.54	19.05		19.17	18.93	19.40		0.37	*
	Tripura	18.52	18.10	18.94		18.57	18.10	19.05		0.05	ns
	West Bengal	17.34	17.11	17.58		17.57	17.33	17.81		0.23	ns
	Total	17.39	17.32	17.46		17.76	17.70	17.82		0.37	***
Nepal			**2001**				**2011**				
					***				***		
	Terai	16.66	16.44	16.88		17.64	17.34	17.94		0.98	***
	Mountain	17.57	17.17	17.97		17.69	17.41	17.96		0.12	ns
	Hill	17.69	17.47	17.92		18.36	18.12	18.60		0.67	***
	Total	17.16	16.99	17.32		17.93	17.73	18.14		0.78	***
Pakistan			**2006-07**				**2012-13**				
					***				***		
	Punjab	19.64	19.43	19.85		20.07	19.79	20.36		0.43	*
	Sindh	18.34	18.08	18.61		19.29	19.03	19.55		0.94	***
	Khyber Pakhtunkwa	18.62	18.30	18.94		19.07	18.72	19.42		0.45	ns
	Balochistan	19.38	18.98	19.77		18.53	18.15	18.91		-0.85	**
	Total	19.20	19.05	19.35		19.69	19.49	19.89		0.49	***

Continued

Table 1.12—*Continued*

Country	Region	Survey 1 Mean	Survey 1 CI		Survey 1 p-value[1]	Survey 2 Mean	Survey 2 CI		Survey 2 p-value[1]	Difference survey 1-survey 2	p-value[2]
Southeast Asia											
Cambodia			**2005**		***		**2014**		***		
	Phnom Penh	20.61	20.18	21.03		21.41	21.12	21.70		0.80	**
	Banteay Mean Chey	20.02	19.53	20.51		20.73	20.22	21.24		0.70	ns
	Kampong Cham	20.69	20.28	21.10		20.81	20.29	21.34		0.12	ns
	Kampong Chhnang	21.10	20.70	21.50		20.84	20.35	21.34		-0.25	ns
	Kampong Speu	19.88	19.64	20.13		20.30	19.78	20.81		0.41	ns
	Kampong Thom	20.47	19.94	20.99		20.73	20.32	21.14		0.26	ns
	Kandal	20.32	20.03	20.60		21.37	20.93	21.80		1.05	***
	Kratie	20.50	20.06	20.94		20.20	19.67	20.73		-0.31	ns
	Prey Veng	20.03	19.67	20.39		20.07	19.68	20.46		0.04	ns
	Pursat	19.83	19.43	20.24		20.74	19.89	21.60		0.91	ns
	Siem Reap	20.97	20.66	21.28		20.59	20.04	21.15		-0.37	ns
	Svay Rieng	20.09	19.68	20.50		20.27	19.79	20.75		0.18	ns
	Takeo	20.41	20.09	20.74		20.63	20.24	21.01		0.21	ns
	Otdar Mean Chey	19.60	19.31	19.89		20.05	19.62	20.48		0.45	ns
	Battambang & Pailin	20.16	19.68	20.64		20.86	20.33	21.39		0.70	ns
	Kampot & Kep	20.09	19.72	20.47		20.06	19.64	20.47		-0.04	ns
	Preah Sihanouk & Kaoh	20.32	19.73	20.92		20.35	20.03	20.68		0.03	ns
	Preah Vihear & Steung	19.40	19.05	19.75		19.93	19.45	20.42		0.54	ns
	Mondol Kiri & Rattanak	18.72	18.20	19.24		19.46	18.88	20.04		0.74	ns
	Total	20.33	20.22	20.44		20.64	20.52	20.77		0.31	***
Indonesia			**2002-03**		ns		**2012**		***		
	Sumatera	20.00	19.76	20.24		20.93	20.77	21.08		0.93	***
	Java	18.81	18.61	19.02		20.33	20.12	20.55		1.52	***
	Bali & Tenggara	20.31	20.04	20.58		21.13	20.82	21.44		0.82	***
	Kalimantan	19.13	18.86	19.41		19.86	19.59	20.13		0.73	***
	Sulawesi, Maluku, Papua	20.02	19.76	20.28		20.54	20.34	20.75		0.52	**
	Total	19.24	19.08	19.39		20.49	20.34	20.64		1.25	***
Philippines			**2003**				**2013**				
		7,377			***	8,290			***		
	National Capital	22.74	22.42	23.06		22.54	22.15	22.93		-0.20	ns
	Cordillera	21.37	20.60	22.14		22.44	21.86	23.01		1.07	*
	I - Ilocos	22.33	21.65	23.02		22.79	22.35	23.23		0.46	ns
	II - Cagayan Valley	21.45	20.86	22.04		21.06	20.48	21.63		-0.39	ns
	III - Central Luzon	21.88	21.47	22.29		22.18	21.79	22.57		0.30	ns
	IVA - Calabarzon	22.26	21.89	22.62		22.83	22.40	23.26		0.57	ns
	IVB - Mimaropa	20.89	20.26	21.53		20.69	20.03	21.36		-0.20	ns
	V - Bicol	21.41	20.93	21.89		21.94	21.41	22.46		0.53	ns
	VI - Western Visayas	22.00	21.48	22.52		22.25	21.80	22.71		0.26	ns
	VII - Central Visayas	21.68	21.23	22.13		22.60	22.05	23.15		0.92	*
	VIII - Eastern Visayas	20.67	20.10	21.25		21.70	21.09	22.31		1.03	*
	IX - Zamboanga	21.16	20.55	21.76		20.84	20.38	21.29		-0.32	ns
	X - Northern Mindanao	21.60	21.05	22.14		21.33	20.52	22.15		-0.26	ns
	XI - Davao	21.32	20.82	21.82		21.46	20.88	22.04		0.14	ns
	XII - Soccskargen	20.90	20.10	21.69		20.85	20.20	21.49		-0.05	ns
	XIII - Caraga	21.01	20.50	21.52		21.25	20.60	21.90		0.24	ns
	ARMM	19.95	19.43	20.46		20.08	19.65	20.50		0.13	ns
	Total	21.76	21.63	21.89		22.00	21.86	22.14		0.24	*

Notes:
p-values *≤0.05, **≤0.01, ***≤0.001, ns=not significant (p>0.05)
[1] p-value of association test within each year.
[2] p-value of significance test for the difference in means between surveys.

In Nepal, women in the hill region have an older marriage age; women in the terai and mountain region tend to marry at similar ages. In Pakistan, the age at marriage ranges from 18.5 years in Balochistan to 20.1 years in Punjab. Marriage age in Phnom Penh is the highest in Cambodia, about 0.8 year higher than the national average. Marriage age exceeds 20 years of age in all regions except Preah Vihear and Steung Treng (19.9 years) and Mondol Kiri and Rattanak Kiri (19.5 years). Indonesia and the Philippines exhibit a similar pattern of generally high ages at marriage across regions. Marriage age ranges from 19.9 years in Kalimantan to 21.1 years in Bali and Tenggara in Indonesia, and from 20.1 years in the Autonomous Region in Muslim Mindanao (ARMM) to 22.8 years in Calabarzon in the Philippines.

However, there has been little change in marriage over time in most regions in the Philippines and Cambodia. In contrast, Indonesia has seen shifts in marriage age across all regions. Similarly, increases in marriage age have been more regionally widespread in Bangladesh, Nepal, and Pakistan. India presents more mixed trends. Significant increases in marriage age have occurred since 1998-99 in approximately half of the states. The largest increase (2.6 years, p=0.000) is observed in Arunachal Pradesh. Countering the broad trend toward higher age at marriage, there is a significant—and sizable—decline in the age at marriage in Andhra Pradesh (-2.7 years, p=0.000) and by a lesser margin in the Indian state of Punjab (-0.6 year, p=0.000). Marriage age also declined in Balochistan, Pakistan (-0.85 years, p=0.003).

1.4.2.7 Marriage Age and Husbands' Education

Two variables that describe husbands' characteristics—education and occupation—and may be related to marriage age or the first birth interval are presented in this section. Data on marriage

age according to husbands' education is presented in Table 1.13 and on the husbands' occupation in Table 1.14.

Husband's education is significantly associated with marriage age in all seven study countries at a significance level of p=0.000, although in Cambodia, the association only became detectable in the most recent survey (2014). As with women's own education, marriage age exhibits the same monotonic increase with increasing levels of husband's education, except in Cambodia. Here, as was found with women's education, marriage age first declines slightly among women married to husbands with primary education as compared to no education, and then rises with increasing levels of husband's education.

The disparity in marriage age between those married to men with the least education and with the most education ranges from a difference of 2.3 years in Cambodia to 5.8 years in Indonesia. The education disparity in South Asian countries ranges from 2.9 years (Pakistan) to 3.6 years (Bangladesh). Women who do not know their husband's level of education tend to have married at ages in the middle of the range between those married to men with the no education and higher education.

Table 1.13. Mean age at first marriage among ever-married women age 25-49, by husband's education

Country	Education	Survey 1 Mean	Survey 1 CI		Survey 1 p-value[1]	Survey 2 Mean	Survey 2 CI		Survey 2 p-value[1]	Difference survey 1-survey 2	p-value[2]
South Asia											
			2004		***		**2014**		***		
Bangladesh	No education	14.64	14.53	14.76		15.27	15.13	15.41		0.62	***
	Primary	15.04	14.89	15.18		15.80	15.64	15.96		0.76	***
	Secondary	15.46	15.30	15.63		16.34	16.19	16.49		0.88	***
	Higher	17.92	17.50	18.35		18.91	18.65	19.18		0.99	***
	Don't know	na	na	na		na	na	na		--	--
	Total	15.32	15.13	15.51		16.18	16.01	16.35		0.86	***
			1998-99		***		**2005-06**		***		
India	No education	16.12	16.06	16.17		16.42	16.35	16.49		0.30	***
	Primary	16.72	16.65	16.80		16.92	16.84	17.01		0.20	***
	Secondary	17.71	17.64	17.78		18.13	18.06	18.20		0.42	***
	Higher	19.68	19.56	19.81		20.78	20.63	20.92		1.09	***
	Don't know	na	na	na		17.28	16.95	17.62		--	--
	Total	17.39	17.32	17.46		17.76	17.70	17.82		0.37	***
			2001		***		**2011**		***		
Nepal	No education	16.69	16.49	16.89		16.84	16.57	17.11		0.15	ns
	Primary	17.21	17.02	17.41		17.37	17.14	17.60		0.16	ns
	Secondary	17.50	17.29	17.72		18.19	17.99	18.38		0.68	***
	Higher	18.61	18.25	18.97		20.45	20.03	20.87		1.84	***
	Don't know	16.58	16.09	17.07		*17.43*	*16.17*	*18.68*		0.85	ns
	Total	17.16	16.99	17.32		17.93	17.73	18.14		0.78	***
			2006-07		***		**2012-13**		***		
Pakistan	No education	18.38	18.17	18.58		18.64	18.40	18.88		0.26	ns
	Primary	18.81	18.52	19.10		19.07	18.80	19.35		0.26	ns
	Secondary	19.73	19.49	19.97		20.01	19.78	20.24		0.28	ns
	Higher	20.48	20.20	20.76		21.56	21.27	21.84		1.08	***
	Don't know	s	s	s		***21.79***	***19.56***	***24.02***		2.40	ns
	Total	19.20	19.05	19.35		19.69	19.49	19.89		0.49	***

Continued

Table 1.13—*Continued*

Country	Education	Survey 1 Mean	Survey 1 CI		Survey 1 p-value[1]	Survey 2 Mean	Survey 2 CI		Survey 2 p-value[1]	Difference survey 1-survey 2	p-value[2]
Southeast Asia											
			2005		ns		**2014**		***		
Cambodia	No education	20.57	20.30	20.85		20.49	20.15	20.83		-0.08	ns
	Primary	20.15	19.99	20.31		20.26	20.07	20.45		0.10	ns
	Secondary	20.36	20.19	20.53		20.81	20.65	20.97		0.45	***
	Higher	21.57	20.95	22.19		22.80	22.43	23.18		1.23	***
	Don't know	20.84	20.17	21.50		21.86	20.21	23.51		1.02	ns
	Total	20.33	20.22	20.44		20.64	20.52	20.77		0.31	***
			2002-03		***		**2012**		***		
Indonesia	No education	17.47	17.09	17.85		18.26	17.64	18.89		0.79	*
	Primary	17.87	17.73	18.00		18.62	18.48	18.76		0.75	***
	Secondary	20.62	20.47	20.77		21.37	21.23	21.50		0.75	***
	Higher	23.35	22.99	23.71		24.10	23.86	24.33		0.75	***
	Don't know	18.70	17.64	19.75		19.67	18.31	21.04		0.98	ns
	Total	19.24	19.08	19.39		20.49	20.34	20.64		1.25	***
			2003		***		**2013**		***		
Philippines	No education	19.56	18.86	20.27		18.68	17.92	19.44		-0.88	ns
	Primary	20.16	19.97	20.35		20.18	19.97	20.38		0.02	ns
	Secondary	21.77	21.57	21.96		21.89	21.72	22.06		0.12	ns
	Higher	23.62	23.42	23.82		23.86	23.66	24.06		0.24	ns
	Don't know	s	s	s		s	s	s		-3.96	ns
	Total	21.76	21.63	21.89		22.00	21.86	22.14		0.24	*

Notes:
p-values *≤0.05, **≤0.01, ***≤0.001, ns=not significant (p>0.05)
[1] p-value of association test within each year.
[2] p-value of significance test for the difference in means between surveys.
na indicates indicator is not available for the survey.
s indicates that the indicator is suppressed because it is based on fewer than 25 unweighted cases.
indicators in italics are based on fewer than 50 unweighted cases and should be interpreted with caution.

Marriage age has increased over time among all categories of husband's education in Bangladesh, India, and Indonesia. However, later marriage age is concentrated only among secondary and higher education groups in Nepal and Cambodia and the higher education group only in Pakistan. The largest increase occurred among women married to men with higher education in Nepal (1.8 years increase from 2001 to 2011, p=0.000). Even among countries in which the marriage age increased across all educational groups, they did so at different rates, so that the disparity by husband's education has widened in all four South Asian countries and in Cambodia and the

Philippines. Only in Indonesia has the disparity remained steady, although it is the largest among the study countries.

1.4.2.8 Marriage Age and Husbands' Occupation

Husband's occupation is significantly associated with marriage age, although somewhat less strongly so, in 6 of 7 study countries. There is no detectable association in Nepal in 2011, though there had been one in 2001. There had been no detectable association between husband's occupation and marriage age in Survey 1 in Bangladesh or Indonesia. As with women's own occupation, women married to men in professional occupations tend to have married at older ages and those married to men in agricultural occupations at younger ages. Women whose husbands are in clerical and sales occupations often tend to marry at older ages and those married to husbands in unskilled manual labor at younger ages, although these differentials usually are not as large.

The differential between women married to men in professional and agricultural occupations—the categories with the youngest and oldest age at marriage—exhibit no clear pattern across South and Southeast Asian countries. The disparity exceeds 3 years in India, Indonesia, and the Philippines but ranges between 1.2 and 2.2 in Nepal, Pakistan, and Cambodia. This disparity, however, has widened over time among all countries.

Age at marriage has increased among women married to men in most occupational groups in South Asian countries and Indonesia. Where increases in marriage age have been widespread in South Asia, they have nonetheless not occurred among women married to men in agricultural and unskilled labor positions. Indonesia has seen increasing marriage age in these and all other occupational groups, with the exception of husbands employed in "other" occupations.

In contrast to this widespread delay in marriage, increases in marriage age are concentrated in just a few occupation groups in Cambodia and the Philippines. Compared to a decade earlier, marriage occurs later for Cambodian women married to men in professional occupations and those who are not working, and for Indonesian women married to husbands in sales and skilled manual labor occupations.

Table 1.14. Mean age at first marriage among ever-married women age 25-49, by husband's occupation

		Survey 1				Survey 2				Difference survey 1-survey 2	
Country	Occupation	Mean	CI		p-value[1]	Mean	CI		p-value[1]		p-value[2]
South Asia											
			1998-99				2005-06				
					ns				*		
	Agricultural	16.54	16.48	16.60		16.85	16.77	16.92		0.30	***
	Professional/technical/ managerial	19.51	19.35	19.67		20.25	20.09	20.42		0.75	***
India	Clerical	19.15	18.94	19.35		19.21	19.00	19.41		0.06	ns
	Sales	18.24	18.11	18.36		18.67	18.54	18.79		0.43	***
	Services	18.01	17.85	18.18		18.02	17.87	18.18		0.01	ns
	Skilled/unskilled manual	17.32	17.24	17.40		17.53	17.46	17.61		0.21	***
	Other	17.88	17.53	18.23		17.21	16.72	17.70		-0.67	*
	Not working	17.06	16.86	17.26		17.40	17.12	17.67		0.34	*
	Total	17.39	17.32	17.46		17.76	17.70	17.82		0.37	***
			2001				2011				
					**				ns		
	Agricultural	16.94	16.76	17.13		17.55	17.32	17.79		0.61	***
	Professional/technical/ managerial	17.92	17.57	18.28		19.71	19.30	20.12		1.79	***
	Clerical	17.11	16.85	17.38		17.80	17.32	18.28		0.68	*
Nepal	Services	17.86	17.40	18.31		18.44	18.22	18.66		0.59	*
	Skilled manual	17.30	16.94	17.67		17.33	17.06	17.61		0.03	ns
	Unskilled manual	17.15	16.87	17.44		17.29	17.03	17.55		0.14	ns
	Other	17.45	17.11	17.79		18.55	17.67	19.42		1.10	*
	Not working	na	na	na		na	na	na		--	--
	Total	17.16	16.99	17.32		17.93	17.73	18.14		0.78	***
			2006-07				2012-13				
					*				*		
	Agricultural	18.83	18.54	19.12		18.93	18.50	19.37		0.10	ns
	Professional/technical/ managerial	20.33	19.94	20.73		21.08	20.69	21.48		0.75	**
	Clerical	19.22	18.67	19.77		20.73	20.01	21.45		1.51	***
Pakistan	Sales	19.41	19.10	19.72		20.47	20.18	20.77		1.06	***
	Services	19.17	18.78	19.57		19.93	19.59	20.28		0.76	**
	Skilled manual	19.36	19.06	19.65		19.98	19.66	20.29		0.62	**
	Unskilled manual	18.96	18.72	19.20		19.07	18.82	19.31		0.11	ns
	Other	s	s	s		s	s	s		--	--
	Not working	18.53	17.91	19.15		19.19	18.50	19.88		0.66	ns
	Total	19.20	19.05	19.35		19.69	19.49	19.89		0.49	***

Continued

Table 1.14—*Continued*

Country	Occupation	Survey 1 Mean	Survey 1 CI		Survey 1 p-value[1]	Survey 2 Mean	Survey 2 CI		Survey 2 p-value[1]	Difference survey 1-survey 2	Difference p-value[2]
Southeast Asia											
		2005			*	**2014**			*		
Cambodia	Agricultural	20.26	20.12	20.40		20.28	20.11	20.46		0.02	ns
	Professional/technical/managerial	20.65	20.29	21.00		21.47	21.13	21.82		0.83	***
	Clerical	20.95	20.32	21.58		21.57	20.65	22.50		0.62	ns
	Sales	20.36	19.96	20.77		20.91	20.46	21.36		0.55	ns
	Services	20.42	20.05	20.78		20.69	20.37	21.02		0.27	ns
	Skilled manual	20.40	20.13	20.68		20.88	20.65	21.11		0.48	**
	Unskilled manual	20.47	20.08	20.85		21.21	19.94	22.47		0.74	ns
	Other	19.52	18.91	20.14		21.23	20.20	22.25		1.71	**
	Not working	na	na	na		na	na	na		--	--
	Total	20.33	20.22	20.44		20.64	20.52	20.77		0.31	***
		2002-03			ns	**2012**			*		
Indonesia	Agricultural	18.08	17.91	18.24		19.09	18.91	19.28		1.02	***
	Professional/technical/managerial	21.51	21.15	21.87		22.97	22.70	23.25		1.47	***
	Clerical	21.67	21.31	22.03		23.24	22.86	23.62		1.57	***
	Sales	19.80	19.50	20.10		20.67	20.38	20.96		0.87	***
	Services	19.60	19.34	19.85		20.79	20.48	21.10		1.19	***
	Skilled manual	19.70	19.34	20.05		20.21	20.04	20.38		0.51	*
	Unskilled manual	19.12	18.83	19.42		22.36	21.77	22.96		3.24	*
	Other	*20.64*	*18.20*	*23.08*		*21.44*	*19.27*	*23.60*		0.79	ns
	Not working	18.55	18.05	19.04		19.73	19.15	20.31		1.18	**
	Total	19.24	19.08	19.39		20.49	20.34	20.64		1.25	***
		2003			***	**2013**			***		
Philippines	Agricultural	20.47	20.25	20.68		20.40	20.21	20.59		-0.07	ns
	Professional/technical/managerial	23.29	22.98	23.60		23.66	23.34	23.98		0.37	ns
	Clerical	22.97	22.21	23.73		23.40	22.80	24.01		0.43	ns
	Sales	21.97	21.54	22.41		22.96	22.18	23.75		0.99	*
	Services	22.61	22.11	23.10		23.13	22.68	23.58		0.52	ns
	Skilled manual	21.45	21.15	21.74		22.21	22.00	22.42		0.76	***
	Unskilled manual	21.99	21.76	22.22		21.80	21.53	22.07		-0.19	ns
	Other	22.68	21.97	23.40		22.74	21.99	23.49		0.06	ns
	Not working	na	na	na		na	na	na		--	--
	Total	21.76	21.63	21.89		22.00	21.86	22.14		0.24	*

Notes:
p-values *≤0.05, **≤0.01, ***≤0.001, ns=not significant (p>0.05)
[1] p-value of association test within each year.
[2] p-value of significance test for the difference in means between surveys.
na indicates indicator is not available for the survey.
Indonesia, Cambodia, and Philippines DHS do not collect data on husband's current employment status, but categorizes husband's occupation regardless of current employment status.
India DHS (NFHS) and Indonesia DHS captures husband's current employment status as a separate occupational category and categorizes husband's occupation only for husbands who are currently working.
India DHS (NFHS) do not distinguish between skilled manual and unskilled manual.
Nepal and Pakistan DHS do not include a separate category for sales; women in these occupations are included in "other" occupations.
s indicates that the indicator is suppressed because it is based on fewer than 25 unweighted cases.
indicators in italics are based on fewer than 50 unweighted cases and should be interpreted with caution.

1.5 CHARACTERISTICS ASSOCIATED WITH THE FIRST BIRTH INTERVAL

In a similar format to the tables in the previous section, Table 1.15 demonstrates the overall change in the mean duration of the first birth interval. Tables 16-26 display the distribution across background characteristics of the duration of the first birth interval among ever-married women age 20-49 and the results of tests of significance of the association between each background characteristic and the first birth interval. The duration of the first birth interval is measured in months and calculated as the extended mean, an exponential extension of the survival curve, to account for right hand censoring of some observations. These tables show the means and associations with background characteristics at two time points for each study country and the negative difference (shortened first birth interval) or positive (lengthened first birth interval) for each background characteristic and results testing the statistical significance of that change. Associations are tested with a Tarone-Ware test of equality of the survival curve.

Table 1.15 shows that the change in the first birth interval between Survey 1 and Survey 2 is statistically significant in six of seven study countries; Cambodia is the exception (p=0.343). However, the direction of the change is not consistent across countries or within regions. While age at marriage increased in all study countries, the first birth interval became shorter in four countries: Bangladesh, Nepal, Pakistan, and Indonesia. The amount of the decrease between surveys ranges from 0.5 months shorter (Indonesia, p=0.001) to 6.5 months shorter (Bangladesh, p=0.000). In India and the Philippines, the first birth interval lengthened with increasing ages at marriage by 0.6 months (p=0.000) and 2.8 months (p=0.001), respectively. Survival time terciles at Survey 2 are presented in Appendix Table 1.3.

Table 1.15. Change in the mean[1] marriage to first birth interval (in months) among ever-married women age 25-49

Country	Survey 1 Mean	Survey 2 Mean	Difference survey 1-survey 2	p-value[2]
South Asia				
Bangladesh	**2004** 44.76	**2014** 38.29	-6.47	***
India	**1998-99** 39.53	**2005-06** 40.13	0.60	***
Nepal	**2001** 44.57	**2011** 39.08	-5.49	***
Pakistan	**2006-07** 45.25	**2012-13** 44.12	-1.13	***
Southeast Asia				
Cambodia	**2005** 33.02	**2014** 31.91	-1.11	ns
Indonesia	**2002-03** 34.58	**2012** 34.04	-0.54	***
Philippines	**2003** 27.82	**2013** 30.61	2.78	***

p-values *≤0.05, **≤0.01, ***≤0.001, ns=not significant (p>0.05)
[1] An extended mean is computed to account for any underestimation in the restricted mean that would occur because the last observed analysis time is censored.
[2] p-value of significance of Tarone-Ware test for the equality of survivor functions across survey years.

1.5.1 First Birth Interval and Gender Context

This study uses the same three variables to describe the gender context and its possible association with the first birth interval: the number of decisions in which women are involved, attitudes toward wife beating, and spousal age difference. The mean first birth interval according to each of these variables, respectively, are found in Tables 16-18. India and Pakistan surveys did not collect data on women's decision-making and wife beating attitudes at Survey 1 and, in Bangladesh, neither survey collected data on wife beating attitudes; thus, change in the first birth interval according to these characteristics cannot be assessed for these countries.

1.5.1.1 Decision-Making

At the most recent survey, the number of decisions in which women participate is significantly associated with the first birth interval in all four South Asian countries in the study and in Cambodia, but neither in Indonesia nor the Philippines. As shown in Table 1.16, the association (and lack of association) in Survey 2 remains unchanged from Survey 1.

Table 1.16. Mean[1] marriage to first birth interval (in months) among ever-married women age 25-49, by women's decision-making

		Survey 1		Survey 2		Difference survey 1-survey 2	
Country	**Number of decisions**	**Mean**	**p-value[2]**	**Mean**	**p-value[2]**		**p-value[3]**
South Asia							
		2004		**2014**			
			**		*		
	0	48.99		36.67		-12.31	***
Bangladesh	1	45.72		37.84		-7.88	***
	2	41.87		34.79		-7.09	***
	3	43.26		36.74		-6.52	***
	Total	44.76		38.29		-6.47	***
		1998-99		**2005-06**			
					***		
	0	na		37.92		--	--
India	1	na		37.39		--	--
	2	na		37.60		--	--
	3	na		35.79		--	--
	Total	39.53		40.13		0.60	***
		2001		**2011**			
			***		***		
	0	47.80		40.82		-6.98	***
Nepal	1	42.08		38.65		-3.43	***
	2	39.01		36.17		-2.84	*
	3	43.17		35.72		-7.45	***
	Total	44.57		39.08		-5.49	***
		2006-07		**2012-13**			
					***		
	0	na		48.15		--	--
Pakistan	1	na		37.92		--	--
	2	na		36.63		--	--
	3	na		38.24		--	--
	Total	45.25		44.12		-1.13	***

Continued

Table 1.16—*Continued*

Country	Number of decisions	Survey 1 Mean	Survey 1 p-value[1]	Survey 2 Mean	Survey 2 p-value[1]	Difference survey 1-survey 2	p-value[2]
Southeast Asia							
		2005	*	**2014**	*		
Cambodia	0	s	[4]	40.40			
	1	22.09	[4]	27.76		5.68	**
	2	29.32		30.66		1.34	ns
	3	33.18		29.51		-3.67	ns
	Total	33.02		31.91		-1.11	ns
		2002-03	ns	**2012**	ns		
Indonesia	0	36.16		30.57		-5.59	ns
	1	35.71		29.30		-6.41	ns
	2	34.83		30.76		-4.07	ns
	3	34.14		32.41		-1.73	***
	Total	34.58		34.04		-0.54	***
		2003	ns	**2013**	ns		
Philippines	0	30.57		*26.58*	[4]	-3.99	ns
	1	24.00	[4]	33.25		9.26	ns
	2	31.18		26.25		-4.93	ns
	3	31.78		33.96		2.18	ns
	4	26.62		29.07		2.46	**
	Total	27.82		30.61		2.78	***

Notes:
p-values *≤0.05, **≤0.01, ***≤0.001, ns=not significant (p>0.05)
[1] An extended mean is computed to account for any underestimation in the restricted mean that would occur because the last observed analysis time is censored.
[2] p-value of significance of Tarone-Ware test for the equality of survivor functions across groups within each survey.
[3] p-value of significance of Tarone-Ware test for the equality of survivor functions across survey years.
[4] Extended mean is unnecessary because all failures are observed.
No data on women's decision-making were collected in the 1998-99 India DHS (NFHS-2) nor the 2006-07 Pakistan DHS.
s indicates that the indicator is suppressed because it is based on fewer than 25 unweighted cases.
indicators in italics are based on fewer than 50 unweighted cases and should be interpreted with caution.

Although marriage age rose with greater decision-making, in general, women with greater decision-making capacity have shorter first birth intervals. However, this relationship is not monotonic. In several countries, the first birth interval lengthens among women participating in the most decisions. The largest differences by decision-making capacity are found in Cambodia, where women who participate in one decision have first birth intervals that are, on average, 12.5 months shorter than women who participate in no decisions (p=0.012). The differences are smallest in India where women who participate in all three listed decisions have first birth intervals that are only about 2 months shorter than do those who make no decisions (p=0.000).

In both South Asian countries in which trends can be assessed—Bangladesh and Nepal—the first birth interval has become shorter across all levels of decision-making over the decade between surveys. The decrease is most substantial among women making no decisions. Among these women, the first birth has become shorter by one year in Bangladesh (p=0.000) and 7 months in Nepal (p=0.000).

In contrast, change in Southeast Asia in the first birth interval has not been widespread across women of different decision-making capacity. In Cambodia, the first birth interval appears to have lengthened over time for most women; however, this change is only statistically significant among women who make 1 decision (6 months, p=0.003). The first birth interval has shortened by close to 2 months for women making 3 decisions in Indonesia (p=0.000) and increased by 2.5 months among women making 4 decisions in the Philippines (p=0.005).

In Bangladesh and Nepal, the first birth interval has changed between surveys in such a way that the disparity across decision-making has narrowed by roughly 4 months. This same narrowing of the disparity in mean duration of the first birth interval according to level of decision-making is not seen in the Southeast Asian countries in the study.

1.5.1.2 Attitudes toward Wife Beating

Although attitudes toward wife beating are significantly associated with marriage age (except in Nepal), wife beating attitudes are generally not associated with the first birth interval. Only two countries—Pakistan and Indonesia—show such an association at the most recent survey; none did at Survey 1[12]. The first birth interval is significantly longer among women who think wife beating

[12] Wife beating attitudes were not assessed at Survey 1 in Pakistan and India.

is not acceptable in any of the scenarios described (44.7 months versus 42.5 months, p=0.000) in Pakistan, but in Indonesia, they are slightly shorter among these women (33.8 months versus 34.1 months, p=0.001).

Change in the first birth interval has been isolated only to women who reject wife beating in Nepal and Indonesia, among whom the first birth interval shortened by 5.7 months and 0.8 months, respectively (p=0.000). In the Philippines, the first birth interval lengthened among women who reject wife beating (4 months, p=0.007) and shortened among women who accept wife beating (2.9 months, p=0.030). With the shortening of the first birth interval limited to women rejecting wife beating in Nepal and Indonesia and changing in divergent directions in the Philippines, the disparity in the first birth interval has widened over time in these countries, although these differences are nonetheless not statistically significant in Nepal and the Philippines.

Table 1.17. Mean[1] marriage to first birth interval (in months) among ever-married women age 25-49, by attitudes toward wife beating

		Survey 1		Survey 2		Difference survey 1-survey 2	
Country	**Wife beating attitudes**	**Mean**	**p-value[2]**	**Mean**	**p-value[2]**		**p-value[3]**
South Asia							
		1998-99		**2005-06**			
					ns		
India	Acceptable in at least one scenario	na		39.47		--	--
	Rejects in all scenarios	na		40.16		--	--
	Total	39.53		40.13		0.60	***
		2001		**2011**			
			ns		ns		
Nepal	Acceptable in at least one scenario	42.80		*37.35*	[4]	-5.45	ns
	Rejects in all scenarios	44.75		39.06		-5.68	***
	Total	44.57		39.08		-5.49	***

Continued

Table 1.17—*Continued*

Country	Wife beating attitudes	Survey 1 Mean	Survey 1 p-value[2]	Survey 2 Mean	Survey 2 p-value[2]	Difference survey 1-survey 2	p-value[3]
		2006-07		**2012-13**			
					***		
Pakistan	Acceptable in at least one scenario	na		42.48		--	--
	Rejects in all scenarios	na		44.74		--	--
	Total	45.25		44.12		-1.13	***
Southeast Asia							
		2005		**2014**			
			ns		ns		
Cambodia	Acceptable in at least one scenario	31.89		31.92		0.03	ns
	Rejects in all scenarios	30.73		31.46		0.73	ns
	Total	33.02		31.91		-1.11	ns
		2002-03		**2012**			
			ns		***		
Indonesia	Acceptable in at least one scenario	34.32		34.07		-0.25	ns
	Rejects in all scenarios	34.62		33.84		-0.77	***
	Total	34.58		34.04		-0.54	***
		2003		**2013**			
			ns		ns		
Philippines	Acceptable in at least one scenario	27.29		24.41		-2.89	*
	Rejects in all scenarios	27.91		31.87		3.96	**
	Total	27.82		30.61		2.78	***

Notes:
p-values *≤0.05, **≤0.01, ***≤0.001, ns=not significant (p>0.05)
[1] An extended mean is computed to account for any underestimation in the restricted mean that would occur because the last observed analysis time is censored.
[2] p-value of significance of Tarone-Ware test for the equality of survivor functions across groups within each survey.
[3] p-value of significance of Tarone-Ware test for the equality of survivor functions across survey years.
[4] Extended mean is unnecessary because all failures are observed.
No data on attitudes toward wife beating were collected in the 1998-99 India DHS (NFHS-2) nor the 2006-07 Pakistan DHS.
In the Nepal 2011 survey, but not the 2001 survey, a filter question was inserted and respondents answering "no" when asked, "In your opinion, should a husband hit or beat his wife for any reason at all?" were not asked if wife beating was justified in specific scenarios. This questionnaire change may result in a measurement change (decrease) in the prevalence of attitudes accepting of wife beating as well as in detecting any associations with this variable.
s indicates that the indicator is suppressed because it is based on fewer than 25 unweighted cases.
indicators in italics are based on fewer than 50 unweighted cases and should be interpreted with caution.

1.5.1.3 Spousal Age Difference

Table 1.18 indicates that spousal age difference is strongly associated with the first birth interval in all seven study countries, and has remained so at both survey points. This pattern resembles the pattern found with marriage age.

Table 1.18. Mean[1] marriage to first birth interval (in months) among ever-married women age 25-49, by spousal age difference

Country	Spousal age difference	Survey 1 Mean	Survey 1 p-value[2]	Survey 2 Mean	Survey 2 p-value[2]	Difference survey 1-survey 2	p-value[3]
South Asia							
		2004	***	**2014**	***		
Bangladesh	0-2 years	51.82		40.31		-11.51	*
	3-5 years	43.37		36.93		-6.44	***
	6-10 years	38.17		34.07		-4.10	***
	More than 10 years	42.53		38.10		-4.43	***
	Total	44.76		38.29		-6.47	***
		1998-99	***	**2005-06**	***		
India	0-2 years	37.15		36.57		-0.57	ns
	3-5 years	36.58		35.59		-0.99	ns
	6-10 years	33.50		36.86		3.36	***
	More than 10 years	41.58		40.21		-1.38	ns
	Total	39.53		40.13		0.60	***
		2001	*	**2011**	**		
Nepal	0-2 years	39.67		36.15		-3.52	***
	3-5 years	44.07		34.45		-9.62	***
	6-10 years	42.70		36.57		-6.13	***
	More than 10 years	46.23		51.73		5.51	ns
	Total	44.57		39.08		-5.49	***
		2006-07	*	**2012-13**	**		
Pakistan	0-2 years	42.03		42.18		0.15	**
	3-5 years	41.65		40.21		-1.43	***
	6-10 years	43.20		40.23		-2.97	**
	More than 10 years	43.16		45.81		2.65	ns
	Total	45.25		44.12		-1.13	***

Continued

Table 1.18—*Continued*

Country	Spousal age difference	Survey 1 Mean	Survey 1 p-value[2]	Survey 2 Mean	Survey 2 p-value[2]	Difference survey 1-survey 2	p-value[3]
Southeast Asia							
		2005	***	**2014**	*		
Cambodia	0-2 years	29.35		29.25		-0.10	ns
	3-5 years	27.03		28.33		1.29	ns
	6-10 years	30.36		29.55		-0.81	ns
	More than 10 years	49.10		38.68		-10.42	ns
	Total	33.02		31.91		-1.11	ns
		2002-03	***	**2012**	***		
Indonesia	0-2 years	32.02		31.40		-0.62	ns
	3-5 years	30.89		29.74		-1.15	ns
	6-10 years	31.10		30.28		-0.82	**
	More than 10 years	40.91		43.98		3.08	ns
	Total	34.58		34.04		-0.54	***
		2003	***	**2013**	***		
Philippines	0-2 years	25.70		30.59		4.89	ns
	3-5 years	23.70		25.67		1.97	***
	6-10 years	27.49		31.60		4.11	ns
	More than 10 years	33.92		33.77		-0.15	ns
	Total	27.82		30.61		2.78	***

Notes:
p-values *≤0.05, **≤0.01, ***≤0.001, ns=not significant (p>0.05)
[1] An extended mean is computed to account for any underestimation in the restricted mean that would occur because the last observed analysis time is censored.
[2] p-value of significance of Tarone-Ware test for the equality of survivor functions across groups within each survey.
[3] p-value of significance of Tarone-Ware test for the equality of survivor functions across survey years.
[4] Extended mean is unnecessary because all failures are observed.
s indicates that the indicator is suppressed because it is based on fewer than 25 unweighted cases.
indicators in italics are based on fewer than 50 unweighted cases and should be interpreted with caution.

The general pattern is one of initially decreasing first birth intervals as the spousal age gap increases, before it lengthens again among those with even greater spousal age gaps. In most countries, the shortest first birth interval is among women with 3-5 years age difference with their husbands. In Bangladesh, however, it is women with a 6-10 year age difference who have the shortest birth interval. Here, the longest first birth interval appears among women with 0-2 years age difference with their husbands; this pattern is observed in both Survey 1 and 2. In all other countries, the longest birth interval appears among women with more than 10 years age difference.

The largest disparity by spousal age gap in the length of the first birth interval (17.3 months) is observed in Nepal, followed by Indonesia and Cambodia. In contrast, 4.6 months separates the first birth interval of women with more than 10 years age difference and women with 3-5 years age difference.

Change in the first birth interval has been widespread in Bangladesh, where all groups of women have experienced a shortened birth interval, and in Nepal and Pakistan, where the birth interval has changed for all but women with the largest spousal age difference. Pakistani women who are closest in age to their husbands (0-2 years difference) in Survey 2 experienced a very slight increase in the first birth interval compared to their counterparts in Survey 1 (0.15 months, $p=0.010$). Meanwhile, women in other age groups experienced a shortening of the birth interval.

In India, the first birth interval changed only for women with the 6-10 age difference with their spouse. These women experienced a first birth interval that was 3.4 months longer at Survey 2 than among their counterparts at Survey 1 ($p\leq0.001$). Change in the first birth interval is similarly limited to a single group of women in Indonesia and the Philippines. The first birth interval shortened by less than a month for Indonesian women with 6-10 spousal age difference ($p=0.010$), whereas it lengthened by 2 months among Philippine women with 3-5 years age difference ($p=0.001$). These data highlight that direction and rates of change have not been consistent across age groups outside of Bangladesh, Nepal, and Pakistan.

The pattern—of shorter first birth intervals among those with 3-5 years age difference and longer among those with more than 10 years difference—has been consistent at both surveys. The disparity across groups of spousal age difference has declined over time in four study countries, most dramatically in Cambodia (from about 22.1 months separating those with the longest and

shortest first birth interval to about 10.4 months,) and Bangladesh (from about 13.6 to 6.2 months difference) but also in India and the Philippines. However, this disparity has increased somewhat (from 10 months to 14.2 months) in Indonesia and more than doubled in Nepal (6.6 months to 17.3 months) and Pakistan (1.5 months to 5.6 months).

1.5.2 First Birth Interval and Socio-Demographic Characteristics

1.5.2.1 First Birth Interval and Women's Education

The first birth interval differs significantly by women's education in all seven study countries. In all countries but Cambodia, this association was observed in Survey 1 as well. There is a negative relationship between education and the first birth interval, although the birth interval is not always monotonically shorter among women with increasing levels of education. In Bangladesh, the first birth interval decreases substantially between women with no education and those with primary education before increasing somewhat with increasing levels of education. The largest differential in the first birth interval by educational level is in Indonesia, where 18 months separates women with no education from women with secondary education. Differentials are also sizable—in excess of 10 months—in Pakistan (14 months), Nepal (11 months), and the Philippines (11.5 months).

Table 1.19. Mean[1] marriage to first birth interval (in months) among ever-married women age 25-49, by level of education

Country	Education	Survey 1 Mean	Survey 1 p-value[2]	Survey 2 Mean	Survey 2 p-value[2]	Difference survey 1-survey 2	p-value[3]
South Asia							
		2004	***	**2014**	***		
Bangladesh	No education	49.17		42.01		-7.16	***
	Primary	40.89		35.07		-5.82	***
	Secondary	37.81		36.39		-1.42	*
	Higher	38.70		38.80		0.10	*
	Total	44.76		38.29		-6.47	***
		1998-99	***	**2005-06**	***		
India	No education	43.82		41.63		-2.18	
	Primary	37.68		41.70		4.02	***
	Secondary	34.11		36.00		1.89	***
	Higher	30.56		36.23		5.67	***
	Total	39.53		40.13		0.60	***
		2001	***	**2011**	***		
Nepal	No education	46.98		43.15		-3.83	***
	Primary	37.95		34.72		-3.23	*
	Secondary	31.18		31.98		0.80	ns
	Higher	26.30		41.86		15.55	ns
	Total	44.57		39.08		-5.49	***
		2006-07	***	**2012-13**	***		
Pakistan	No education	48.46		48.27		-0.20	ns
	Primary	39.20		41.23		2.03	*
	Secondary	33.43		37.75		4.32	ns
	Higher	35.38		34.25		-1.13	ns
	Total	45.25		44.12		-1.13	***

Continued

Table 1.19—*Continued*

Country	Education	Survey 1 Mean	Survey 1 p-value[2]	Survey 2 Mean	Survey 2 p-value[2]	Difference survey 1-survey 2	Difference p-value[3]
Southeast Asia							
		2005		**2014**			
			ns		***		
	No education	32.36		30.33		-2.02	ns
Cambodia	Primary	32.80		31.60		-1.20	ns
	Secondary	33.83		32.65		-1.18	ns
	Higher	***34.75***	[4]	35.52		0.77	ns
	Total	33.02		31.91		-1.11	ns
		2002-03		**2012**			
			***		***		
	No education	47.22		48.78		1.56	ns
Indonesia	Primary	36.10		35.52		-0.58	*
	Secondary	27.44		30.81		3.36	ns
	Higher	32.22		32.84		0.62	ns
	Total	34.58		34.04		-0.54	***
		2003		**2013**			
			***		***		
	No education	36.27	[4]	37.92		1.65	ns
Philippines	Primary	27.35		28.05		0.70	**
	Secondary	26.63		26.37		-0.26	ns
	Higher	28.77	[4]	37.92		9.15	**
	Total	27.82		30.61		2.78	***

Notes:
p-values *≤0.05, **≤0.01, ***≤0.001, ns=not significant (p>0.05)
[1] An extended mean is computed to account for any underestimation in the restricted mean that would occur because the last observed analysis time is censored.
[2] p-value of significance of Tarone-Ware test for the equality of survivor functions across groups within each survey.
[3] p-value of significance of Tarone-Ware test for the equality of survivor functions across survey years.
[4] Extended mean is unnecessary because all failures are observed.
s indicates that the indicator is suppressed because it is based on fewer than 25 unweighted cases,
indicators in italics are based on fewer than 50 unweighted cases and should be interpreted with caution.

The first birth interval has become shorter over time among most educational groups in Bangladesh, but lengthened over time in India. In contrast to this widespread change, change has been concentrated among selected educational groups in Nepal (shorter among women with no or primary education), Pakistan (longer among women with primary education), and the Philippines (longer among women with primary and with higher education). In summary, trends in the first birth interval by education have been neither widespread nor consistent in direction across study countries.

1.5.2.2 First Birth Interval and Women's Occupation

As shown in Table 1.20, women's occupation is associated with the first birth interval in all six study countries[13]. In the Philippines, occupation has become salient over time; there was no significant association with the first birth interval in 2003. In Cambodia, the level of significance has weakened over time.

Table 1.20. Mean[1] marriage to first birth interval (in months) among ever-married women age 25-49, by occupation

		Survey 1		Survey 2		Difference survey 1-survey 2	
Country	**Occupation**	**Mean**	**p-value[2]**	**Mean**	**p-value[2]**		**p-value[3]**
South Asia							
		1998-99	***	**2005-06**	***		
India	Not working	36.86		37.69		0.83	***
	Agricultural	43.00		40.88		-2.12	***
	Professional	39.32		44.73		5.41	***
	Clerical	33.70		47.72		14.02	***
	Sales	35.66		38.12		2.46	ns
	Services	48.82		41.17		-7.64	ns
	Skilled/unskilled manual	45.98		43.09		-2.89	***
	Other	46.95		30.14	[4]	-16.81	ns
	Total	39.53		40.13		0.60	***
		2001	***	**2011**	***		
Nepal	Not working	41.75		39.09		-2.66	***
	Agricultural	45.16		39.79		-5.37	***
	Professional	33.70		41.67		7.97	ns
	Clerical	s	[4]	25.85	[4]	-2.93	ns
	Sales	na		na		--	--
	Services	52.87		35.26		-17.61	ns
	Skilled manual	s		35.19			ns
	Unskilled manual	40.57	[4]	33.10		-7.47	ns
	Other	s		102.71		66.28	ns
	Total	44.57		39.08		-5.49	***
		2006-07	***	**2012-13**	***		
Pakistan	Not working	43.86		42.37		-1.49	***
	Agricultural	51.33		51.88		0.55	ns
	Professional	32.02		43.72		11.70	ns
	Clerical	s	[4]	s		57.99	ns
	Sales	41.05		46.67		5.62	ns
	Services	47.10		41.28		-5.82	ns
	Skilled manual	53.82		46.32	[4]	-7.50	ns
	Unskilled manual	39.13	[4]	47.04		7.91	ns
	Other	na		na		--	--
	Total	45.25		44.12		-1.13	***

Continued

[13] Women's occupation is not available in the Bangladesh DHS surveys included in this study.

Table 1.20—*Continued*

Country	Occupation	Survey 1 Mean	Survey 1 p-value[2]	Survey 2 Mean	Survey 2 p-value[2]	Difference survey 1-survey 2	p-value[3]
Southeast Asia							
		2005	***	**2014**	*		
Cambodia	Not working	54.64		28.96		-25.68	ns
	Agricultural	31.95		29.60		-2.35	ns
	Professional	45.03		31.20		-13.83	ns
	Clerical	53.63		48.50		-5.14	ns
	Sales	34.77		32.15		-2.62	*
	Services	37.24	[4]	34.21		-3.03	ns
	Skilled manual	25.36	[4]	35.01		9.65	ns
	Unskilled manual	29.48		27.81		-1.67	ns
	Other	*30.67*	[4]	*41.49*		10.82	ns
	Total	33.02		31.91		-1.11	ns
		2002-03	***	**2012**	***		
Indonesia	Not working	31.49		30.24		-1.25	**
	Agricultural	36.65		34.75		-1.90	ns
	Professional	33.21		41.13		7.91	ns
	Clerical	31.35		35.75		4.40	ns
	Sales	33.94		34.20		0.26	ns
	Services	45.39		33.32		-12.07	ns
	Skilled manual	39.16		36.09		-3.08	ns
	Unskilled manual	s	[4]	25.38		8.09	ns
	Other	s		s	[4]	22.56	ns
	Total	34.58		34.04		-0.54	***
		2003	0.140	**2013**	***		
Philippines	Not working	25.24	[4]	27.60		2.35	***
	Agricultural	26.24		27.25		1.01	ns
	Professional	33.30		37.40		4.10	ns
	Clerical	30.11		35.62		5.50	ns
	Sales	28.76		33.15		4.40	ns
	Services	18.31		31.36		13.05	ns
	Skilled manual	27.61		31.56		3.95	ns
	Unskilled manual	26.42		26.68		0.27	ns
	Other	s	[4]	s	[4]	-2.38	ns
	Total	27.82		30.61		2.78	***

Notes:
p-values *≤0.05, **≤0.01, ***≤0.001, ns=not significant (p>0.05)
[1] An extended mean is computed to account for any underestimation in the restricted mean that would occur because the last observed analysis time is censored.
[2] p-value of significance of Tarone-Ware test for the equality of survivor functions across groups within each survey.
[3] p-value of significance of Tarone-Ware test for the equality of survivor functions across survey years.
[4] Extended mean is unnecessary because all failures are observed.
na indicates indicator is not available for the survey.
Indonesia, Cambodia, and Philippines DHS do not collect data on husband's current employment status, but categorizes husband's occupation regardless of current employment status.
India DHS (NFHS) and Indonesia DHS captures husband's current employment status as a separate occupational category and categorizes husband's occupation only for husbands who are currently working.
India DHS (NFHS) do not distinguish between skilled manual and unskilled manual.
Nepal and Pakistan DHS do not include a separate category for sales; women in these occupations are included in "other" occupations.
s indicates that the indicator is suppressed because it is based on fewer than 25 unweighted cases
indicators in italics are based on fewer than 50 unweighted cases and should be interpreted with caution.
s indicates that the indicator is suppressed because it is based on fewer than 25 unweighted cases.
indicators in italics are based on fewer than 50 unweighted cases and should be interpreted with caution.

Overall, women who are not working or who work in agricultural or unskilled manual labor positions have shorter first birth intervals while women employed in professional or clerical occupations have longer first birth intervals. The pattern is slightly different in Pakistan, where women employed in professional occupations have first birth intervals similar in duration to those among women who are not working. Women engaged in agricultural occupations have longer birth intervals.

Outside of India, where the first birth interval has changed significantly for 5 of 8 occupational groups, change has not been widespread but concentrated in selected occupations. The first birth interval has become significantly shorter over time among women who are not working in Nepal, Pakistan, and Indonesia, and nearly significantly so in Cambodia (p=0.052). However, there was a lengthening of the first birth interval among non-working women in India and the Philippines. The first birth interval became shorter for Indian and Nepali women working in agriculture, and became longer for Indian women working in professional and clerical occupations.

1.5.2.3 First Birth Interval and Wealth

Household wealth quintile is salient to the first birth interval in all study countries but Cambodia. These associations have been consistent over both survey times, as seen in Table 1.21. However, the pattern of the association is not consistent across study countries or across South and Southeast Asian regions. There is a monotonic negative relationship between household wealth quintile and the first birth interval in India, Nepal, and Pakistan. In Indonesia, first birth intervals become shorter with increasing wealth, but not monotonically. On the other hand, there is a positive (non-monotonic) relationship in Bangladesh and the Philippines. In Cambodia, the first birth interval

is shorter among women in the poorest and the richer wealth quintile and longer among women in the middle and richest quintiles, although these differences are not significant.

Table 1.21. Mean[1] marriage to first birth interval (in months) among ever-married women age 25-49, by household wealth quintile

Country	Wealth	Survey 1		Survey 2		Difference survey 1-survey 2	p-value[3]
		Mean	p-value[2]	Mean	p-value[2]		
South Asia							
		2004	***	**2014**	***		
Bangladesh	Poorest	52.69		37.47		-15.22	***
	Poorer	41.39		36.97		-4.43	***
	Middle	43.93		37.79		-6.14	***
	Richer	44.49		38.43		-6.07	***
	Richest	42.09		39.54		-2.54	ns
	Total	44.76		38.29		-6.47	***
		1998-99	***	**2005-06**	***		
India	Poorest	46.90		43.79		-3.10	***
	Poorer	43.48		43.08		-0.40	ns
	Middle	38.60		38.86		0.25	ns
	Richer	37.82		38.10		0.28	ns
	Richest	35.11		36.43		1.32	***
	Total	39.53		40.13		0.60	***
		2001	***	**2011**	***		
Nepal	Poorest	45.50		40.37		-5.13	***
	Poorer	48.64		40.32		-8.32	***
	Middle	42.55		39.78		-2.77	***
	Richer	42.11		36.88		-5.23	***
	Richest	41.28		36.89		-4.39	***
	Total	44.57		39.08		-5.49	***
		2006-07	***	**2012-13**	***		
Pakistan	Poorest	52.84		50.22		4.72	ns
	Poorer	46.09		48.22		-0.42	ns
	Middle	47.61		43.29		0.74	***
	Richer	45.05		41.49		-0.62	***
	Richest	34.33		39.01		-2.26	ns
	Total	45.25		44.12		-1.13	***

Continued

Table 1.21—*Continued*

Country	Wealth	Survey 1 Mean	Survey 1 p-value[2]	Survey 2 Mean	Survey 2 p-value[2]	Difference survey 1-survey 2	p-value[3]
		2001	***	**2011**	***		
Nepal	Poorest	45.50		40.37		-5.13	***
	Poorer	48.64		40.32		-8.32	***
	Middle	42.55		39.78		-2.77	***
	Richer	42.11		36.88		-5.23	***
	Richest	41.28		36.89		-4.39	***
	Total	44.57		39.08		-5.49	***
		2006-07	***	**2012-13**	***		
Pakistan	Poorest	52.84		50.22		4.72	ns
	Poorer	46.09		48.22		-0.42	ns
	Middle	47.61		43.29		0.74	***
	Richer	45.05		41.49		-0.62	***
	Richest	34.33		39.01		-2.26	ns
	Total	45.25		44.12		-1.13	***
Southeast Asia							
		2005	ns	**2014**	ns		
Cambodia	Poorest	30.88		29.93		-0.95	ns
	Poorer	30.73		30.24		-0.49	ns
	Middle	34.81		32.32		-2.49	ns
	Richer	29.77		29.41		-0.36	ns
	Richest	35.62		33.53		-2.09	ns
	Total	33.02		31.91		-1.11	ns
		2002-03	***	**2012**	***		
Indonesia	Poorest	36.68		35.91		-0.77	ns
	Poorer	35.01		34.88		-0.13	ns
	Middle	35.59		31.77		-3.83	***
	Richer	31.79		31.28		-0.51	ns
	Richest	30.54		33.49		2.95	ns
	Total	34.58		34.04		-0.54	***
		2003	***	**2013**	***		
Philippines	Poorest	26.19		25.05		-1.14	ns
	Poorer	25.42		24.33		-1.09	ns
	Middle	27.31		32.61		5.29	ns
	Richer	30.14		32.67		2.53	ns
	Richest	29.17		36.47		7.30	*
	Total	27.82		30.61		2.78	***

Notes:
p-values *≤0.05, **≤0.01, ***≤0.001, ns=not significant (p>0.05)
[1] An extended mean is computed to account for any underestimation in the restricted mean that would occur because the last observed analysis time is censored.
[2] p-value of significance of Tarone-Ware test for the equality of survivor functions across groups within each survey.
[3] p-value of significance of Tarone-Ware test for the equality of survivor functions across survey years.
[4] Extended mean is unnecessary because all failures are observed.
s indicates that the indicator is suppressed because it is based on fewer than 25 unweighted cases.
indicators in italics are based on fewer than 50 unweighted cases and should be interpreted with caution.

The largest differentials between richest and poorest wealth quintiles are observed in the Philippines, where women in the richest households have first birth intervals that are 11.4 months *longer* than women in the poorest households, and in Pakistan, where women in the richest households have first birth intervals that are 11.2 months *shorter* than women in the poorest households.

The first birth interval has become significantly shorter for women of all wealth levels in Bangladesh and Nepal. Elsewhere, change has been more concentrated and inconsistent in direction. The first birth interval has become shorter among the poorest Indian women and longer among the richest Indian women. In Pakistan, change has been significant among the middle and richer quintiles, and approaching significance ($p=0.052$) among women in the richest quintile. However, the first birth interval lengthened for the former group and shortened for the latter two groups of women. The first birth interval shortened only among the middle wealth quintile in Indonesia and lengthened only among the richest wealth quintile in the Philippines.

In spite of the variation in time trends, the absolute differential between richest and poorest wealth quintiles narrowed over time in six of seven countries. In Bangladesh, the differential even reversed direction. While women in the richest households had first birth intervals that were 10.6 months shorter, on average, than women in the poorest households in 2004, women in the richest quintile had first birth intervals that were 2.1 months longer, on average, than women in the poorest households by 2014. However, the differential widened in the Philippines, with women in richest households having first birth intervals that were 3 months longer than poorest women in 2003 compared to 11.4 months longer in 2013.

1.5.2.4 First Birth Interval and Religion

Table 1.22 indicates that religion is significantly associated with the first birth interval only in India, Nepal, and the Philippines. There is no association in Bangladesh and Cambodia, while an association could not be assessed in Pakistan and Indonesia[14].

The pattern across religious groups also varies across countries. In Nepal, Muslim women have longer first birth intervals than do the Hindu majority or any other faith group. In India, it is the reverse. Hindu women have the longest first birth intervals and Muslim women have shorter first birth intervals, although not as short as Sikh and Jain women. In the Philippines, Roman Catholic and Protestant women have the longest first birth intervals while Aglipay women have the shortest birth intervals. Muslim women in the Philippines have neither the longest nor the shortest first birth intervals, and approach the national average.

The first birth interval has changed in duration only among certain religious groups; these birth intervals have become significantly longer among Buddhist, Sikh, and (by a small amount) Hindu women in India and Roman Catholic women in the Philippines. The first birth interval has also become significantly shorter among Muslim and Hindu women in both Bangladesh and Nepal.

[14] Data on religious affiliation are not available in DHS surveys for Pakistan and Indonesia.

Table 1.22. Mean[1] marriage to first birth interval (in months) among ever-married women age 25-49, by religion

Country	Religion	Survey 1 Mean	Survey 1 p-value[2]	Survey 2 Mean	Survey 2 p-value[2]	Difference survey 1-survey 2	p-value[3]
South Asia							
		2004	ns	**2014**	ns		
Bangladesh	Muslim	45.19		38.34		-6.85	***
	Christian	***53.19***		***27.04***		-26.15	ns
	Buddhist	s		26.52	[4]	-47.49	ns
	Hindu	40.15		36.98		-3.17	*
	Total	44.76		38.29		-6.47	***
		1998-99	***	**2005-06**	***		
India	Muslim	37.48		37.15		-0.33	ns
	Christian	30.36		30.74		0.38	ns
	Buddhist	30.28		35.05		4.77	***
	Hindu	41.10		41.64		0.55	***
	Other	34.63		31.73		-2.90	ns
	Sikh	26.62		29.91	[4]	3.29	***
	Jain	33.09		28.88	[4]	-4.22	ns
	Total	39.53		40.13		0.60	***
		2001	***	**2011**	**		
Nepal	Muslim	52.76		40.33		-12.42	***
	Buddhist	38.84		37.87		-0.98	ns
	Hindu	44.72		38.93		-5.79	***
	Other	33.95		34.11		0.16	ns
	Kirat	***45.40***		36.65		-8.76	ns
	Total	44.57		39.08		-5.49	***
Southeast Asia							
		2005	ns	**2014**	ns		
Cambodia	Muslim	31.94		33.22		1.28	ns
	Christian	28.98		38.85		9.87	ns
	Buddhist	33.12		31.63		-1.49	ns
	Other	31.35		32.98		1.63	ns
	Total	33.02		31.91		-1.11	ns
		2003	***	**2013**	***		
Philippines	Muslim	31.24		28.77		-2.47	ns
	Other	27.02		28.64		1.62	ns
	Roman Catholic	27.45		30.50		3.04	*
	Protestant	22.33	[4]	36.03		13.70	ns
	Iglesia Ni Kristo	32.98		28.26		-4.72	ns
	Aglipay	29.25		25.27		-3.98	ns
	Total	27.82		30.61		2.78	***

Notes:
p-values *≤0.05, **≤0.01, ***≤0.001, ns=not significant (p>0.05)
[1] An extended mean is computed to account for any underestimation in the restricted mean that would occur because the last observed analysis time is censored.
[2] p-value of significance of Tarone-Ware test for the equality of survivor functions across groups within each survey.
[3] p-value of significance of Tarone-Ware test for the equality of survivor functions across survey years.
[4] Extended mean is unnecessary because all failures are observed.
Pakistan and Indonesia DHS do not collect data on religion.
s indicates that the indicator is suppressed because it is based on fewer than 25 unweighted cases.
indicators in italics are based on fewer than 50 unweighted cases and should be interpreted with caution.

1.5.2.5 First Birth Interval and Residence

Place of residence is associated with the first birth interval in five of seven study countries. Urban/rural differences appear to be more salient in South Asia than in Southeast Asia, with Indonesia the only Southeast Asian countries of the three in the study to manifest a statistical relationship between residence and the first birth interval. The observed patterns of association have remained the same at both time points in all seven study countries.

First birth intervals are longer among women living in urban areas in Bangladesh and Indonesia (p=0.000), although the differences are small in Indonesia. They are shorter among women living in urban areas in India, Nepal, and Pakistan (p=0.000). In Pakistan, women in rural areas have first birth intervals that are, on average, nearly 7 months longer than women living in urban areas.

Table 1.23. Mean[1] marriage to first birth interval (in months) among ever-married women age 25-49, by place of residence

		Survey 1		Survey 2		Difference survey 1-survey 2	
Country	Residence	Mean	p-value[2]	Mean	p-value[2]		p-value[3]
South Asia							
		2004	*	**2014**	***		
Bangladesh	Rural	44.53		37.09		-7.44	***
	Urban	45.03		40.50		-4.53	***
	Total	44.76		38.29		-6.47	***
		1998-99	***	**2005-06**	***		
India	Rural	40.70		41.04		0.34	ns
	Urban	37.30		38.16		0.86	***
	Total	39.53		40.13		0.60	***
		2001	***	**2011**	***		
Nepal	Rural	45.10		39.77		-5.33	***
	Urban	39.82		36.67		-3.15	ns
	Total	44.57		39.08		-5.49	***
		2006-07	***	**2012-13**	***		
Pakistan	Rural	48.11		47.00		-1.12	*
	Urban	40.29		40.74		0.44	***
	Total	45.25		44.12		-1.13	***

Continued

Table 1.23—*Continued*

Country	Residence	Survey 1 Mean	Survey 1 p-value[2]	Survey 2 Mean	Survey 2 p-value[2]	Difference survey 1-survey 2	p-value[3]
Southeast Asia							
		2005		**2014**			
			ns		ns		
Cambodia	Rural	32.69		30.18		-2.51	ns
	Urban	32.51		34.43		1.92	ns
	Total	33.02		31.91		-1.11	ns
		2002-03		**2012**			
			***		***		
Indonesia	Rural	35.74		34.00		-1.74	*
	Urban	32.11		34.20		2.10	ns
	Total	34.58		34.04		-0.54	***
		2003		**2013**			
			ns		ns		
Philippines	Rural	25.88		30.16		4.27	*
	Urban	29.40		30.82		1.42	*
	Total	27.82		30.61		2.78	***

Notes:
p-values *≤0.05, **≤0.01, ***≤0.001, ns=not significant (p>0.05)
[1] An extended mean is computed to account for any underestimation in the restricted mean that would occur because the last observed analysis time is censored.
[2] p-value of significance of Tarone-Ware test for the equality of survivor functions across groups within each survey.
[3] p-value of significance of Tarone-Ware test for the equality of survivor functions across survey years.
[4] Extended mean is unnecessary because all failures are observed.
s indicates that the indicator is suppressed because it is based on fewer than 25 unweighted cases.
indicators in italics are based on fewer than 50 unweighted cases and should be interpreted with caution.

The first birth interval has become significantly shorter among both rural and urban residents in Bangladesh ($p \leq 0.001$), but has become shorter only among rural residents in Nepal, Pakistan, and Indonesia. It has become significantly longer among urban residents in India, Pakistan, and Indonesia, and among both rural and urban residents in the Philippines. The urban-rural differential has increased between Survey 1 and Survey 2 in Bangladesh, but has diminished in India, Nepal, Pakistan, and Indonesia.

1.5.2.6 First Birth Interval and Region

Regional differences characterize the mean first birth interval throughout most of the study countries. Regional differences are most notable in India where 22.6 months separate women in the state with the longest first birth interval (Andhra Pradesh) and those in the state with the shortest first birth interval (Nagaland). The differential is smallest in neighboring Nepal, where women in the mountain region have first birth intervals that are 3.8 months longer than women in the hill region.

Changes in the first birth interval have been widespread across regions of Bangladesh (all 7 divisions), Pakistan (3 of 4 regions), and Indonesia (3 of 5 province groups). The first birth interval has changed in duration in 12 of 26 states or state pairs in India. However, change has been restricted to just a few regions in Cambodia (6 of 19 regions) and the Philippines (2 of 17 regions).

Table 1.24. Mean[1] marriage to first birth interval (in months) among ever-married women age 25-49, by subnational region

Country	Region	Survey 1 Mean	Survey 1 p-value[2]	Survey 2 Mean	Survey 2 p-value[2]	Difference survey 1-survey 2	p-value[3]
South Asia							
		2004	***	**2014**	***		
Bangladesh	Dhaka	44.85		38.03		-6.81	***
	Barisal	42.10		34.27		-7.83	***
	Chittagong	39.71		32.55		-7.16	***
	Khulna	43.75		41.29		-2.45	*
	Rajshahi & Rangpur	48.08		40.21		-7.87	***
	Sylhet	47.68		39.24		-8.45	***
	Total	44.76		38.29		-6.47	***
		1998-99	***	**2005-06**	***		
India	Uttar Pradesh & Uttaranchal	43.82		36.76		-7.1	***
	Andhra Pradesh	25.59		49.18		23.6	***
	Arunachal Pradesh	51.71		30.38		-21.3	***
	Assam	33.03		35.26		2.2	***
	Bihar & Jharkhand	43.41		45.58		2.2	ns
	Delhi	29.84		35.33		5.5	***
	Goa	43.20		47.85		4.6	ns
	Gujarat	39.58		40.05		0.5	ns
	Haryana	31.61		35.23		3.6	***
	Himachal Pradesh	29.81		30.84		1.0	ns
	Jammu & Kashmir	31.10		30.35		-0.8	ns
	Karnataka	39.48		39.75		0.3	ns
	Kerala	35.26		39.09		3.8	***
	Madhya Pradesh	44.09		42.94		-1.1	ns
	Maharashtra	44.65		40.71		-3.9	ns
	Manipur	22.14		28.65		6.5	***
	Meghalaya	20.20	[4]	29.56		9.4	***
	Mizoram	23.96		26.79		2.8	ns
	Nagaland	19.96		26.57		6.6	ns
	Orissa	45.95		37.35		-8.6	ns
	Punjab	26.05		30.60		4.5	***
	Rajasthan	45.14		46.25		1.1	ns
	Sikkim	25.09		33.23		8.1	***
	Tamil Nadu	43.74		42.16		-1.6	ns
	Tripura	32.53		38.55		6.0	***
	West Bengal	42.73		40.06		-2.7	ns
	Total	39.53		40.13		0.60	***
		2001	***	**2011**	***		
Nepal	Terai	44.90		39.52		-5.4	***
	Mountain	46.05		41.24		-4.8	***
	Hill	42.05		37.41		-4.6	***
	Total	44.57		39.08		-5.49	***
		2006-07	***	**2012-13**	***		
Pakistan	Punjab	43.72		44.31		0.6	***
	Sindh	47.63		39.85		-7.8	***
	Khyber Pakhtunkwa	41.24		43.75		2.5	ns
	Balochistan	51.64		46.95		-4.7	***
	Total	45.25		44.12		-1.13	***

Continued

Table 1.24—*Continued*

Country	Region	Survey 1 Mean	Survey 1 p-value[2]	Survey 2 Mean	Survey 2 p-value[2]	Difference survey 1-survey 2	p-value[3]
Southeast Asia							
		2005	***	**2014**	***		
	Phnom Penh	34.62		34.26		-0.4	ns
	Banteay Mean Chey	31.53		28.15		-3.4	ns
	Kampong Cham	35.88		32.87		-3.0	*
	Kampong Chhnang	36.56		28.72		-7.8	ns
	Kampong Speu	36.38		32.58		-3.8	***
	Kampong Thom	34.36		24.06	[4]	-10.3	*
	Kandal	26.60		31.45		4.9	ns
	Kratie	30.63		35.43		4.8	***
	Prey Veng	35.32		30.92	[4]	-4.4	ns
	Pursat	28.15		25.69		-2.5	ns
Cambodia	Siem Reap	30.56		26.58		-4.0	ns
	Svay Rieng	35.21		29.00		-6.2	ns
	Takeo	29.92		36.51		6.6	*
	Otdar Mean Chey	21.61		26.81	[4]	5.2	***
	Battambang & Pailin	32.79		26.65		-6.1	ns
	Kampot & Kep	32.63		33.15		0.5	ns
	Preah Sihanouk & Kaoh Kong	30.21		33.39		3.2	ns
	Preah Vihear & Steung Treng	27.83		33.06		5.2	ns
	Mondol Kiri & Rattanak Kiri	33.46		29.53		-3.9	*
	Total	33.02		31.91		-1.11	ns
		2002-03	***	**2012**	***		
	Sumatera	30.61		27.87		-2.7	***
	Java	37.98		35.60		-2.4	***
Indonesia	Bali & Tenggara	33.53		29.90		-3.6	***
	Kalimantan	29.25		32.83		3.6	ns
	Sulawesi, Maluku & Papua	39.31		38.84		-0.5	ns
	Total	34.58		34.04		-0.54	***

Continued

Table 1.24—*Continued*

Country	Region	Survey 1 Mean	Survey 1 p-value[2]	Survey 2 Mean	Survey 2 p-value[2]	Difference survey 1-survey 2	p-value[3]
		2003	***	2013	***		
	National Capital	32.09		31.76		-0.3	ns
	Cordillera	22.11		25.39		3.3	ns
	I - Ilocos	28.23		27.03		-1.2	ns
	II - Cagayan Valley	25.28		25.71		0.4	ns
	III - Central Luzon	28.26		30.54		2.3	ns
	IVA - Calabarzon	28.43		29.25		0.8	ns
	IVB - Mimaropa	29.43		23.11		-6.3	ns
	V - Bicol	20.13	[4]	28.40		8.3	ns
Philippines	VI - Western Visayas	25.26		29.00		3.7	ns
	VII - Central Visayas	27.31		25.42		-1.9	ns
	VIII - Eastern Visayas	27.99		30.79		2.8	ns
	IX - Zamboanga Peninsula	24.83		32.52		7.7	ns
	X - Northern Mindanao	21.47		32.19		10.7	**
	XI - Davao	22.77	[4]	23.52	[4]	0.8	ns
	XII - Soccskargen	20.89		30.77		9.9	ns
	XIII - Caraga	26.15		36.94		10.8	ns
	ARMM	32.54		29.40		-3.1	**
	Total	27.82		30.61		2.78	***

Notes:
p-values *≤0.05, **≤0.01, ***≤0.001, ns=not significant (p>0.05)
[1] An extended mean is computed to account for any underestimation in the restricted mean that would occur because the last observed analysis time is censored.
[2] p-value of significance of Tarone-Ware test for the equality of survivor functions across groups within each survey.
[3] p-value of significance of Tarone-Ware test for the equality of survivor functions across survey years.
[4] Extended mean is unnecessary because all failures are observed.
s indicates that the indicator is suppressed because it is based on fewer than 25 unweighted cases.
indicators in italics are based on fewer than 50 unweighted cases and should be interpreted with caution.

1.5.2.7 First Birth Interval and Husband's Education

Two variables that describe husbands' characteristics—education and occupation—and their association with the first birth interval are presented in Table 1.25 and Table 1.26, respectively.

Table 1.25. Mean[1] marriage to first birth interval (in months) among ever-married women age 25-49, by husband's education

Country	Education	Survey 1 Mean	Survey 1 p-value[2]	Survey 2 Mean	Survey 2 p-value[2]	Difference survey 1-survey 2	Difference p-value[3]
South Asia							
		2004	***	**2014**	***		
Bangladesh	No education	47.65		39.90		-7.75	***
	Primary	42.98		34.19		-8.79	***
	Secondary	42.67		38.26		-4.42	***
	Higher	41.64		40.34		-1.30	ns
	Don't know	na		na		--	--
	Total	44.76		38.29		-6.47	***
		1998-99	***	**2005-06**	***		
India	No education	45.28		43.12		-2.16	***
	Primary	40.50		39.12		-1.39	ns
	Secondary	36.52		38.48		1.96	***
	Higher	35.10		34.91		-0.19	ns
	Don't know	na		67.11		--	--
	Total	39.53		40.13		0.60	***
		2001	***	**2011**	***		
Nepal	No education	48.85		43.33		-5.52	***
	Primary	44.92		40.55		-4.36	***
	Secondary	36.74		35.67		-1.07	***
	Higher	33.10		34.47		1.37	ns
	Don't know	75.40		***50.61***		-24.79	ns
	Total	44.57		39.08		-5.49	***
		2006-07	***	**2012-13**	***		
Pakistan	No education	51.50		47.51		-3.99	*
	Primary	42.40		44.99		2.59	*
	Secondary	42.71		42.29		-0.41	***
	Higher	36.53		38.23		1.69	ns
	Don't know	s	[4]	***98.71***		55.12	ns
	Total	45.25		44.12		-1.13	***
Southeast Asia							
		2005	ns	**2014**	**		
Cambodia	No education	33.81		32.14		-1.67	ns
	Primary	31.49		30.57		-0.92	ns
	Secondary	31.13		31.52		0.39	ns
	Higher	40.44		30.68		-9.76	ns
	Don't know	52.44		58.95		6.51	ns
	Total	33.02		31.91		-1.11	ns
		2002-03	***	**2012**	***		
Indonesia	No education	50.11		47.63		-2.48	ns
	Primary	36.49		35.07		-1.42	ns
	Secondary	29.79		30.85		1.06	ns
	Higher	26.34		30.33		3.99	ns
	Don't know	81.05		93.39		12.33	ns
	Total	34.58		34.04		-0.54	***

Continued

Table 1.25—*Continued*

Country	Education	Survey 1 Mean	Survey 1 p-value[2]	Survey 2 Mean	Survey 2 p-value[2]	Difference survey 1-survey 2	p-value[3]
		2003	***	2013	***		
Philippines	No education	32.99		37.68		4.69	ns
	Primary	26.92		26.78		-0.14	ns
	Secondary	26.93		29.20		2.28	*
	Higher	29.52		35.25		5.73	*
	Don't know	s		s	[4]	-39.12	ns
	Total	27.82		30.61		2.78	***

Notes:
p-values *≤0.05, **≤0.01, ***≤0.001, ns=not significant (p>0.05)
[1] An extended mean is computed to account for any underestimation in the restricted mean that would occur because the last observed analysis time is censored.
[2] p-value of significance of Tarone-Ware test for the equality of survivor functions across groups within each survey.
[3] p-value of significance of Tarone-Ware test for the equality of survivor functions across survey years.
[4] Extended mean is unnecessary because all failures are observed.
s indicates that the indicator is suppressed because it is based on fewer than 25 unweighted cases.
indicators in italics are based on fewer than 50 unweighted cases and should be interpreted with caution.

Husband's education is significantly associated with the first birth in all seven study countries, although in Cambodia, the association only became detectable in the most recent survey (2014), as was the case with marriage age. In most cases, the first birth interval becomes shorter with increasing levels of husband's education. Bangladesh and Indonesia suggest slight exceptions to this overall pattern. The first birth interval becomes longer again among women married to men with higher education in Indonesia and with secondary and higher education in Bangladesh.

The disparity in the first birth interval between those married to men with the least education and with the most education ranges from a difference of about 2 months in Cambodia and the Philippines to 17.3 months in Indonesia.

The first birth interval has become shorter over time among most educational categories in Bangladesh and Nepal, but such change is isolated among women married to men with no education in India (p≤0.001) and women married to men with no education (p=0.049) and with

secondary education (p=0.001) in Pakistan. There has been a significant lengthening of the first birth interval only among Indian women married to men with secondary education (p≤0.001) and Pakistani women married to men with primary education (p=0.014), and among Philippine women married to men with secondary or higher education (p≤0.05). The disparity according to husband's education has decreased over the two survey periods in all seven countries.

1.5.2.8 First Birth Interval and Husband's Occupation

Husband's occupation is significantly associated with the first birth interval in all seven study countries, although at a lower level of significance (p≤0.05) in Cambodia and the Philippines. There had been no detectable association between husband's occupation and the first birth interval in Survey 1 in these two countries. In general, first birth intervals are longer among women married to men who are not working or who are employed in agricultural occupations. They are usually shorter among women married to men working in professional, clerical, sales, and service occupations. This pattern does not hold in Cambodia and the Philippines, where women married to men in professional occupations have relatively long first birth intervals and those married to men in unskilled labor positions have relatively short intervals.

Table 1.26. Mean[1] marriage to first birth interval (in months) among ever-married women age 25-49, by husband's occupation

Country	Occupation	Survey 1 Mean	Survey 1 p-value[2]	Survey 2 Mean	Survey 2 p-value[2]	Difference survey 1-survey 2	p-value[3]
South Asia							
		1998-99		**2005-06**			
			***		***		
	Agricultural	41.60		42.76		1.15	***
	Professional/technical/ managerial	35.30		36.16		0.86	ns
	Clerical	34.94		36.63		1.69	ns
India	Sales	36.03		36.95		0.92	ns
	Services	38.90		38.24		-0.65	ns
	Unskilled/skilled manual	38.84		38.20		-0.63	ns
	Other	41.70		51.83		10.14	***
	Not working	48.47		51.62		3.15	ns
	Total	39.53		40.13		0.60	***
		2001		**2011**			
			***		***		
	Agricultural	46.71		39.79		-6.9	***
	Professional/technical/ managerial	38.90		36.51		-2.4	**
	Clerical	43.16		35.95		-7.2	***
Nepal	Sales	na		na		--	--
	Services	42.82		37.82		-5.0	***
	Skilled manual	39.31		38.83		-0.5	*
	Unskilled manual	40.50		38.10		-2.4	*
	Other	39.55		48.12		8.6	ns
	Not working	na		na		--	--
	Total	44.57		39.08		-5.49	***
		2006-07		**2012-13**			
			***		***		
	Agricultural	56.40		54.70		-1.7	*
	Professional/technical/ managerial	33.03		39.92		6.9	ns
	Clerical	43.10		32.13		-11.0	**
Pakistan	Sales	41.01		32.71		-8.3	***
	Services	45.73		32.92		-12.8	***
	Skilled manual	37.41		43.57		6.2	ns
	Unskilled manual	42.74		47.36		4.6	*
	Other	s	[4]	s	[4]	-164.0	ns
	Not working	50.34		52.83		2.5	ns
	Total	45.25		44.12		-1.13	***

Continued

Table 1.26—*Continued*

Country	Occupation	Survey 1 Mean	Survey 1 p-value[2]	Survey 2 Mean	Survey 2 p-value[2]	Difference survey 1-survey 2	p-value[3]
Southeast Asia							
		2005	ns	**2014**	*		
	Agricultural	32.25		30.64		-1.6	ns
	Professional/technical/ managerial	33.71		33.98		0.3	ns
	Clerical	33.25		26.89		-6.4	ns
Cambodia	Sales	28.68		30.67		2.0	ns
	Services	39.30		32.58		-6.7	ns
	Skilled manual	29.11		31.20		2.1	ns
	Unskilled manual	29.64		23.03	[4]	-6.6	ns
	Other	41.37		32.14		-9.2	ns
	Not working	na		na		--	--
	Total	33.02		31.91		-1.11	ns
		2002-03	***	**2012**	***		
	Agricultural	36.76		36.34		-0.4	ns
	Professional/technical/ managerial	27.10		31.33		4.2	ns
	Clerical	26.90		29.68		2.8	ns
Indonesia	Sales	32.53		31.48		-1.1	ns
	Services	32.29		32.80		0.5	**
	Skilled manual	32.71		31.95		-0.8	ns
	Unskilled manual	30.89		23.68		-7.2	*
	Other	***38.16***		***30.61***		-7.5	ns
	Not working	50.17		54.17		4.0	ns
	Total	34.58		34.04		-0.54	***
		2003	ns	**2013**	*		
	Agricultural	25.40		27.45		2.0	**
	Professional/technical/ managerial	29.63		37.08		7.4	ns
	Clerical	44.56		21.20	[4]	-23.4	ns
Philippines	Sales	27.91		35.43		7.5	ns
	Services	34.52		28.72		-5.8	ns
	Skilled manual	24.24		32.73		8.5	ns
	Unskilled manual	25.08	[4]	24.40		-0.7	ns
	Other	31.44		40.55		9.1	ns
	Not working	na		na		--	--
	Total	27.82		30.61		2.78	***

Notes:

p-values *≤0.05, **≤0.01, ***≤0.001, ns=not significant (p>0.05)

[1] An extended mean is computed to account for any underestimation in the restricted mean that would occur because the last observed analysis time is censored.

[2] p-value of significance of Tarone-Ware test for the equality of survivor functions across groups within each survey.

[3] p-value of significance of Tarone-Ware test for the equality of survivor functions across survey years.

[4] Extended mean is unnecessary because all failures are observed.

na indicates indicator is not available for the survey.

Indonesia, Cambodia, and Philippines DHS do not collect data on husband's current employment status, but categorizes husband's occupation regardless of current employment status.

India DHS (NFHS-2 and NFHS-3) and Indonesia DHS capture husband's current employment status as a separate occupational category and categorizes husband's occupation only for husbands who are currently working.

India DHS (NFHS-2 and NFHS-3) do not distinguish between skilled manual and unskilled manual.

Nepal and Pakistan DHS do not include a separate category for sales; women in these occupations are included in "other" occupations.

s indicates that the indicator is suppressed because it is based on fewer than 25 unweighted cases.

indicators in italics are based on fewer than 50 unweighted cases and should be interpreted with caution.

Change in the first birth interval has been relatively widespread across husband's occupation in Nepal and Pakistan. Specifically, the first birth interval has become shorter over time in these two countries. The first birth interval has changed in only two occupational categories in India: it has become longer among women married to men in agricultural positions and "other" positions. There has been almost no discernible change in the first birth interval in husband's occupational groups in Southeast Asian countries in this study. Exceptions are Indonesian women married to men in service occupations —among whom first birth intervals have become slightly longer—and those married to men in unskilled manual labor positions—among whom intervals have become shorter.

1.6 DISCUSSION AND CONCLUSIONS

This study uses bivariate regression and survival analysis to investigate trends in marriage age and the first birth interval. Attention is given to associations with variables that describe the gender context and women's and husbands' socio-demographic characteristics. The study addresses these relationships in seven countries—four in South Asia and three in Southeast Asia—using DHS data from two points in time over approximately a 10-year period to examine changes in these dynamics over time.

Youth and gender equality advocates have brought recent attention in the literature to the causes and consequences of early marriage. Meanwhile, there has been little attention to the dynamics of the first birth interval since the 1980's. Whereas the majority of prior research are single country studies, this study examines timing dynamics of family formation in multiple countries, facilitating cross-national comparisons and the detection of regional patterns, if present.

Few studies examine a wide range of sociodemographic and gender context correlates of marriage timing or either age at first birth or the first birth interval, let alone in one study permitting comparison between both outcomes. Additionally, this study does so at more than one time point.

Several studies have examined general trends in age at first marriage or, to a lesser degree, in the first birth interval. However, fewer examine, as this study does, detailed trends disaggregated by subgroups of women. This study analyses the universal and divergent experiences over time with early stages of family formation. Moreover, by assembling in one study, cross-national analysis of (disaggregated) trends in both outcomes and their associated factors, this study lays the

groundwork for a more comprehensive analysis to further our understanding of the relationship between age at marriage and the first birth interval.

This study identified two distinct regional marriage patterns: mean age at marriage occurs during adolescent years in South Asia and at older ages (age 20-22) in Southeast Asia. Concomitantly, the interval from marriage to first birth is longer in South Asia (39-44 months) than in Southeast Asia (31-32 months). That older age at marriage coincides with shorter birth intervals (and the converse) is established in research that suggests that marriage age may be a determinant of the first birth interval (Amin and Bajracharya 2011b; Dyson and Moore 1983; Hirschman and Rindfuss 1982; Mensch, Bruce, and Greene 1998; Rindfuss and Morgan 1983).

1.6.1 Trends in Age at Marriage and the First Birth Interval

In contrast to the patterns from the most current time point, time trends are not distinctly contrasted between the two regions, nor are they uniform within region. The mean marriage age has increased significantly in all study countries, a general trend that has been found in Africa, Latin America, and elsewhere in Asia (Aryal 2007; Jones 2010; Löfstedt, Ghilagaber, and Johansson 2007; Mensch, Bruce, and Greene 1998; Mensch, Singh, and Casterline 2005; Retherford, Ogawa, and Matsukura 2001). However, the pace of change has been variable among study countries. Marriage age has increased rapidly in Indonesia, Nepal, and Bangladesh, but has been slower elsewhere; Variation in the rate of change does not align with South and Southeast Asia regional groupings. Cross-national variation has been noticed in prior research on marriage timing trends, but whereas Jones (2010) has identified marriage age has risen to a lesser extent in South Asia compared to Southeast Asia, this study finds several South Asian countries among those with the fastest rises in marriage age.

This study examined trends in marriage age across a range of indicators that describe the gender context, women's and husband's socio-economic and socio-cultural milieu. The study found mean marriage age increased universally in South Asia (and Indonesia) across nearly all categories or levels of these indicators. However, marriage age increased at differential rates among these groups in these countries. Meanwhile increases in marriage age are localized in Southeast Asia within groups where marriage age was already higher. This means that, in both regions, differentials in marriage age grew wider by most characteristics in most countries. Trends in Indonesia, both in marriage age overall and across subgroups of women, more closely resemble those observed in South Asia than in either Cambodia or the Philippines.

While increasing marriage age was universal, means from estimated survival curves indicate that the first birth interval changed significantly over the (roughly) last decade in six of seven countries, Cambodia being the sole exception. With this increase, the first birth interval has become significantly shorter, by 0.5-6.5 months, in four countries: Bangladesh, Nepal, Pakistan, and Indonesia. The decrease has been smaller in Pakistan and Indonesia than elsewhere. Meanwhile, the first birth interval has lengthened significantly by 0.6 months in India and by 2.8 months in the Philippines while there has been no change in Cambodia. Older studies on trends detect a rise in marriage age accompanying a smaller rise or no change in age at first birth, such that the first birth interval consistently is shorter with later marriage (Donaldson and Nichols 1978; Feng and Quanhe 1996; Hirschman and Rindfuss 1982). However, this study identified greater heterogeneity in first birth interval trends than has previously been the case.

In general, trends in the first birth interval have been more variable across gender context, women's, and husband's characteristics than have trends in marriage age. Change in the first birth

interval is observed to be more or less universal across subgroups of women in the South Asian countries in the study, according to women's decision-making, spousal age difference, household wealth quintile, subnational region, and both husband's education and occupation. Compared to changes in marriage age, change in the first birth interval is more often concentrated in specific groups of women according to attitudes toward wife beating, education, occupation, religion, and urban/rural residence. Change in the first birth interval is almost always localized in just a few select subgroups of women in Southeast Asia for all of the characteristics examined in the study. Indonesia again resembles the South Asian countries in trends of the first birth interval according to residence and region. Disparities in the first birth interval by spousal age difference, wealth, place of residence, and husband's education narrowed over time in most study countries, but increased or remained steady for other indicators.

1.6.2 Factors Associated with Age at Marriage and the First Birth Interval

This study joins previous research seeking to describe the correlates of age at marriage and extends it to a broad set of socio-demographic characteristics, as well as characteristics of the gender context. Further, it presents a side-by-side comparison with correlates of the first birth interval. Nearly all of the characteristics examined in this study are associated with marriage age in bivariate analyses in all study countries. The patterns of association with marriage age are observed in South and Southeast Asian countries alike, with country-wise rather than regional variation.

Women's education, employment in professional or clerical occupations, household wealth, and urban residence are positively associated with older marriage age in all study countries. Women who are not working or who work in agricultural occupations marry at younger ages, as do women

married to husbands in agricultural occupations. Husband's education and, to a lesser extent, husband's occupation in professional positions are also associated with marrying later.

Differences in marriage age across these characteristics are usually small and sometimes non-significant (for example, women's decision-making, women's occupation, and religion) in Cambodia, whereas they are generally large in India and Indonesia (as with education, wealth, place of residence, and husband characteristics).

This study's finding that women with more education marry later reaffirms findings from single country studies in Nepal, Turkey, China, and Bangladesh (Aryal 2007; Choe, Thapa, and Mishra 2005; Ertem et al. 2008; Feng and Quanhe 1996; Field and Ambrus 2008; Tian 2013) as well as cross-national studies in Asia and Africa (Chowdhury and Trovato 1994; Jones and Gubhaju 2009; Mensch, Singh, and Casterline 2005; Singh and Samara 1996; Westoff 1992).

There is not a consensus on the causal direction in the relationship between schooling and marriage, whether girls who drop out of school go on to marry early (Steinhaus et al. 2016) or whether early marriages bring a halt to girls' schooling (Lloyd and Mensch 1999; Lloyd and Mensch 2008). Regardless of causal direction, there is widespread consensus on the notion of incompatibility between marriage and education (Jones 2010; Jones and Gubhaju 2009; Nguyen and Wodon 2012; Plan 2011; Wodon, Nguyen, and Tsimpo 2016).

This study's findings are consistent with the few prior studies on women's economic roles and marriage. Several of which find a similar positive association between women's work outside of the home and later marriage in Asia s (Chowdhury and Trovato 1994; Tian 2013). One study found this association to be stronger among women working in professional fields, as did the

present study, and within more economically developed countries of Sri Lanka and Malaysia; the relationship was weaker in less developed South Asian countries (Chowdhury and Trovato 1994). However, another multi-country study found that women's labor force participation was not generally significant (Singh and Samara 1996).

Whereas one cross-national study also found a positive relationship with urban residence (Singh and Samara 1996), the widespread associations between marriage age and wealth, urban/rural residence, occupation, husbands' education and occupation, and religion detected in this study were less frequently echoed in the extant literature.

Much prior research on the first birth interval has attempted to identify the co-occurring pattern of earlier marriage with longer first birth interval or, conversely, later marriage with shorter first birth interval, with some offering theses as to why. Fewer have sought to identify the covariates of longer first birth intervals; this is the first to have done so while comparing them to the covariates of marriage age.

Compared with marriage age, there are somewhat fewer associations (and with substantial variation across countries) between first birth intervals and the characteristics examined in this study. Many of the variables associated with marriage timing in this study are also associated with the first birth interval, but in the reverse direction.

Differences in the survival means demonstrate that women's education is curvilinearly associated with shorter first birth intervals in all study countries but Cambodia (where the association is with longer first birth intervals): first birth intervals shorten with increasing education before increasing again with the highest levels of education. This finding confirms the negative association found

in prior studies in the Asian countries of China, Malaysia, Korea, Taiwan, Thailand, Bangladesh, and Indonesia, among others (Alam 2015; Chowdhury and Abdul Karim 2013; Dommaraju 2008; Feng and Quanhe 1996; Hidayat, Sumarno, and Nugrahani 2014; Hirschman and Rindfuss 1982; Hong 2006; Kallan and Udry 1986; Rahman, Mustafi, and Azad 2013; Rindfuss, Palmore, and Bumpass 1987). In contrast with this pervasive relationship, a sole study in Bangladesh found that women with more education were more likely to use contraception to delay first birth in Bangladesh, though this study did not directly measure the duration of the first birth interval (Rahman 2010).

Urban residence is associated with shorter first birth intervals in India, Nepal, and Pakistan, whereas rural residence is in Bangladesh and Indonesia. There is no association in Cambodia or the Philippines, which suggests that urban residence is more salient in South Asia than Southeast Asia. This variation in the direction and salience of rural/urban residence is resonant with that in the extant literature, which likewise found urban residence to be alternately negatively associated (Dommaraju 2008; Kallan and Udry 1986), positively associated (Hidayat, Sumarno, and Nugrahani 2014; Kallan and Udry 1986; Rahman 2010), or to be negligibly or not at all associated with the first birth interval (Alam 2015; Hirschman and Rindfuss 1982; Kallan and Udry 1986; Rahman, Mustafi, and Azad 2013; Rindfuss and Hirschman 1984).

The survival analysis presented here indicates that women who are not working or are employed in agricultural or unskilled manual labor occupations have shorter first birth intervals and those employed in professional and clerical occupations have longer first birth intervals. This finding confirms those in China and Bangladesh, where working women (particularly in professional positions) were found to have longer first birth intervals (Alam 2015; Feng and Quanhe 1996).

Such an association is, however, not universal (Chowdhury and Abdul Karim 2013; Hidayat, Sumarno, and Nugrahani 2014). Meanwhile, a study in Malaysia found that women's education and work outside the home increased age at birth, but this association worked indirectly through age at marriage (Hirschman and Rindfuss 1980).

Associations with wealth and religion are sporadic in this study, as they have been in previous studies (Alam 2015; Christensen and Bowden 1952; Dommaraju 2008; Rahman, Mustafi, and Azad 2013). Husbands' education and occupation are infrequently associated with the first birth interval in this study, but have occasionally been found to be modestly related to the first birth interval elsewhere (Alam 2015; Christensen 1939; Christensen and Bowden 1952; Hong 2006; Kallan and Udry 1986; Rahman, Mustafi, and Azad 2013).

Marriage age varies by subnational region, but patterns are inconsistent across countries. Similarly, the first birth interval varies by subnational region in three of five countries (India, Nepal, and the Philippines), with regional differences greatest in India and smaller in Nepal. There is no such association in Bangladesh or Pakistan, in contrast to regional differences detected in an earlier study in Bangladesh (Alam 2015). The variation across countries points to the significance of local context rather than broad regional patterns and may suggest the need to more closely investigate regional differences or control for unobserved fixed effects.

Another contribution of this study is its examination of significant associations at more than one time point. Most socio-demographic factors are associated with the first birth interval at both time points. This suggests that the effect of these characteristics are steady and have not changed. This may mean that, to the extent that the first birth interval has changed over time is due to changing levels or composition of these characteristics.

1.6.3 Gender Context, Age at Marriage, and the First Birth Interval

Much literature on child marriage points to gender inequality and women's lack of autonomy, agency, decision-making, and other markers of power as a driver of early marriage. While greater autonomy and decision-making before marriage are associated with later marriage, early marriage is associated with less autonomy and decision-making within marriage. One multi-country study suggests that women's empowerment, rather than education, better explains trends toward later marriage (Mensch, Singh, and Casterline 2005).

Simultaneously, women's intra-household power and decision-making are associated with contraceptive use, which would be a primary mechanism by which young married women may postpone the first birth. Further, many of the proposed explanations for the observed negative association between marriage age and the first birth interval invoke gender context or gender power, namely familiarity with a future spouse, romantic marriages, or participation in marriage decisions (Rindfuss and Morgan 1983). Therefore, this study assessed the bivariate associations between three measures of the gender context with both marriage timing and the first birth interval.

Indicators describing a more gender equitable context (women's participation in *more* decisions, attitudes *rejecting* wife beating, and *small* spousal age difference) are associated with an older marriage age for all three variables in most countries, with women's decision-making appearing to be the least important among them. In contrast, in an Indian study, women's autonomous decision-making was found to be *positively* associated with later marriage India (Santhya et al. 2010) while another suggests that women's empowerment is less important than gender performance in accordance with certain religious and cultural norms (e.g. purdah) (Desai and Andrist 2010).

Two indicators describing the gender context—spousal age difference and women's decision-making—are generally associated with the first birth interval in most South Asian countries, while attitudes toward wife beating are infrequently associated with the first birth interval. Women's decision-making is negatively related to the first birth interval, although not monotonically; there is a small increase with a longer first birth interval among women with the greatest decision-making capacity in some countries.

Spousal age difference is curvilinearly associated with the first birth interval, in that intervals are longest among those with very little and very large age differences. The curvilinear nature of this relationship may help to explain the mixed findings in previous studies: Greater spousal age difference was associated with longer first birth intervals in China and Bangladesh (Chowdhury and Abdul Karim 2013; Hong 2006), but with shorter first birth intervals in an early study in the United States (Christensen 1939).

It is possible that the elements of the gender context influencing the first birth interval are shaped by the gender context of marriage. For example, Ansley Coale (1992) concludes that the same factors favorable to later marriage—women's autonomy, working outside of the home, less family control and more individual control over marriage decisions—are also conducive to the "voluntary control of marital fertility" that contributes to a later first birth interval. Similarly, Indian women who marry at younger ages have less autonomy and self-efficacy than women who marry at older ages, who are more likely to use contraception to postpone the first birth (Santhya et al. 2010).

While these studies indicate that a more equitable gender context influences later marriage age and longer first birth interval in the same direction, other studies suggest a more mixed scenario in which a more gender equitable gender context influences marriage age and the first birth interval

differently, as is the case in the present study. Studies in China and Nepal have found that spousal familiarity and partner choice are associated with shorter first birth intervals (Fricke and Teachman 1993; Hong 2006; Shrestha 1998), though only one explicitly associates partner choice with women's autonomy (Shrestha 1998). However, arranged marriage has been connected with less decision-making power elsewhere (Banerji and Vanneman 2011).

Unfortunately, this study did not have available measures of spousal familiarity or participation in marriage decisions. Nonetheless, the findings here and prior literature would make it advisable to further examine the influence of gender context on the first birth interval while controlling for its influence on marriage age. It is possible that the gender context affects the first birth interval primarily through marriage timing.

1.6.4 Conclusions

Youth and gender equality advocates have brought recent attention in the literature to the causes and consequences of early marriage. Meanwhile, there has been little attention to the dynamics of the first birth interval since the 1980's. Whereas the majority of prior research are single country studies, this study examines timing dynamics of family formation in multiple countries, facilitating cross-national comparisons and the detection of regional patterns, if present.

Few studies examine a wide range of sociodemographic and gender context correlates of marriage timing or either age at first birth or the first birth interval, let alone in one study permitting comparison between both outcomes. Additionally, this study does so at more than one time point.

Several studies have examined general trends in age at first marriage or, to a lesser degree, in the first birth interval. However, fewer examine, as this study does, detailed trends disaggregated by

subgroups of women. This study analyses the universal and divergent experiences over time with early stages of family formation. Moreover, by assembling in one study, cross-national analysis of (disaggregated) trends in both outcomes and their associated factors, this study lays the groundwork for a more comprehensive analysis to further our understanding of the relationship between age at marriage and the first birth interval.

This study determines that most factors—whether describing the gender context or socio-demographic characteristics—are associated with both marriage age and the first birth interval, and at both time points. These factors typically are equally associated with both outcomes in most countries, but in opposing directions. Additionally, there tends to be more variation, in direction and consistency across countries, in factors associated with the first birth intervals than with age at marriage. This combination suggests that factors affecting both outcomes largely effect the first birth interval through age at marriage.

This possibility finds purchase in prior research. Marriage and initiation of childbearing are closely linked events in some settings that may be difficult to separate (Gipson and Hindin 2007; Jennings, Axinn, and Ghimire 2012; Jones and Gubhaju 2009; Mensch, Bruce, and Greene 1998; Rodriguez and Trussell 1980; Trussell and Reinis 1989; Trussell, Menken, and Coale 1979). Additionally, substantial literature indicates that age at marriage is a key determinant of the first birth interval. Additionally, at least two studies proffer evidence that certain characteristics, such as education, premarital work, husband's occupation, urban residence, ethnicity or religion, which were initially associated with the timing of the first birth are actually attenuated by age at marriage (Hirschman 1985; Kim and Stinner 1980). Further analysis to determine if socio-demographic and gender variables retain their significant association with the first birth interval in the presence

of marriage age (and, conversely, if marriage age maintains its association with socio-demographic controls) is warranted.

1.7 REFERENCES

Alam, M.M. 2015. "Marriage to First Birth Interval and Its Associated Factors in Bangladesh." *Asian Journal of Social Sciences & Humanities* 4(4):36-47.

Amin, S., and A. Bajracharya. 2011a. *Costs of Marriage--Marriage Transactions in the Developing World, Promoting Healthy, Safe, and Productive Transitions to Adulthood Brief No. 35*. New York, NY: Population Council.

Amin, S., and A. Bajracharya. 2011b. *Marriage and First Birth Intervals in Early and Late Marrying Societies: An Exploration of Determinants*. In *Population Association of America*. Washington, DC.

Aryal, T.R. 2007. "Age at First Marriage in Nepal: Differentials and Determinants." *Journal of Biosocial Science* 39(5):693-706.

Banerji, M., and R. Vanneman. 2011. "Does Love Make a Difference? Marriage Choice and Post-Marriage Decision-Making Power." *Indian Human Development Survey Working Paper No* 14.

Barker, C. 2012. "The Mean, Median, and Confidence Intervals of the Kaplan-Meier Survival Estimate—Computations and Applications." *The American Statistician* 63(1):78-80.

Basu, A.M. 1993. "Cultural Influences on the Timing of First Births in India: Large Differences That Add up to Little Difference." *Population Studies* 47(1):85-95.

Bhattacharya, B.N., K.K. Singh, U. Singh, and C.M. Pandey. 1989. "An Extension of a Model for First Birth Interval and Some Social Factors." *Sankhya: The Indian Journal of Statistics, Series B* 51(1):115-124.

Bloom, D.E., and P.H. Reddy. 1986. "Age Patterns of Women at Marriage, Cohabitation, and First Birth in India." *Demography* 23(4):509-523.

Bongaarts, J. 1978. "A Framework for Analyzing the Proximate Determinants of Fertility." *Population and Development Review* 4(1):105-132.

Bongaarts, J. 2015. "Modeling the Fertility Impact of the Proximate Determinants: Time for a Tune-Up." *Demographic Research* 33(19):535-559.

Bongaarts, J., and B. Cohen. 1998. "Introduction and Overview." *Studies in Family Planning* 29(2):99-105.

Box-Steffensmeier, J.M., and B.S. Jones. 2004. *Event History Modeling: A Guide for Social Scientists*. Cambridge: Cambridge University Press.

Chandra-Mouli, V., A.V. Camacho, and P.-A. Michaud. 2013. "Who Guidelines on Preventing Early Pregnancy and Poor Reproductive Outcomes among Adolescents in Developing Countries " *Journal of Adolescent Health* 52(5):517-522.

Chandra-Mouli, V., C. Lane, and S. Wong. 2015. "What Does Not Work in Adolescent Sexual and Reproductive Health: A Review of Evidence on Interventions Commonly Accepted as Best Practices." *Global Health: Science and Practice* 3(3):333-340.

Choe, M.K., S. Thapa, and V. Mishra. 2005. "Early Marriage and Early Motherhood in Nepal." *Journal of Biosocial Science* 37(2):143-162.

Chowdhury, A.H., and D. Abdul Karim. 2013. "Patterns and Differentials of Birth Intervals in Bangladesh." *Global Journal of Science Frontier Research* 13(2):19-32.

Chowdhury, F.I., and F. Trovato. 1994. "The Role and Status of Women and the Timing of Marriage in Five Asian Countries." *Journal of Comparative Family Studies* 25(2):143-157.

Christensen, H.T. 1939. "The Time-Interval between Marriage of Parents and the Birth of Their First Child in Utah County, Utah." *The American Journal of Sociology* 44(4):518-525.

Christensen, H.T., and O.P. Bowden. 1952. "Studies in Child Spacing: Ii. The Time-Interval between Marriage of Parents and Birth of Their First Child, Tippecanoe County, Indiana." *Social Forces* 31(4):346-351.

Cleves, M., R.G. Gutierrez, W. Gould, and Y.V. Marchenko. 2010. *An Introduction to Survival Analysis Using Stata*. Third ed. College Station, TX: Stata Press.

Coale, A.J. 1971. "Age Patterns of Marriage." *Population Studies* 25(2):193-214.

Coale, A.J. 1992. "Age of Entry into Marriage and the Date of the Initiation of Voluntary Birth Control." *Demography* 29(3):333-341.

Coale, A.J., and D.R. McNeil. 1972. "The Distribution by Age of the Frequency of First Marriage in a Female Cohort." *Journal of the American Statistical Association* 67(340):743-749.

Desai, S., and L. Andrist. 2010. "Gender Scripts and Age at Marriage in India." *Demography* 47(3):667-687.

Dommaraju, P. 2008. *Marriage Age and Fertility Dynamics in India*. Vol. 52, *DHS Working Paper No. 52*. Calverton, MD: ICF International.

Donaldson, P.J., and D.J. Nichols. 1978. "The Changing Tempo of Fertility in Korea." *Population Studies* 32(2):231-249.

Dyson, T., and M. Moore. 1983. "On Kinship Structure, Female Autonomy, and Demographic Behavior in India." *Population and Development Review* 9(1):35-60.

Ertem, M., G. Saka, A. Ceylan, V. Değer, and S. Çiftçi. 2008. "The Factors Associated with Adolescent Marriages and Outcomes of Adolescent Pregnancies in Mardin Turkey." *Journal of Comparative Family Studies* 39(2):229-239.

Feng, W., and Y. Quanhe. 1996. "Age at Marriage and the First Birth Interval: The Emerging Change in Sexual Behavior among Young Couples in China." *Population and Development Review* 22(2):299-320.

Field, E., and A. Ambrus. 2008. "Early Marriage, Age of Menarche, and Female Schooling Attainment in Bangladesh." *Journal of Political Economy* 116(5):881-930.

Fricke, T., and J.D. Teachman. 1993. "Writing the Names: Marriage Style, Living Arrangements, and First Birth Interval in a Nepali Society." *Demography* 30(2):175-188.

Ghimire, D.J. 2017. "Social Context of First Birth Timing in a Rapidly Changing Rural Setting." *Social Science Research* 61:314-329.

Ghimire, D.J., and W.G. Axinn. 2013. "Marital Processes, Arranged Marriage, and Contraception to Limit Fertility." *Demography* 50(5):1663-1686.

Gipson, J.D., and M.J. Hindin. 2007. "'Marriage Means Having Children and Forming Your Family, So What Is the Need of Discussion?'Communication and Negotiation of Childbearing Preferences among Bangladeshi Couples." *Culture, Health & Sexuality* 9(2):185-198.

Godha, D., D.R. Hotchkiss, and A.J. Gage. 2013. "Association between Child Marriage and Reproductive Health Outcomes and Service Utilization: A Multi-Country Study from South Asia." *Journal of Adolescent Health* 52(5):552-558.

Hidayat, R., H. Sumarno, and E.H. Nugrahani. 2014. "Survival Analysis in Modeling the Birth Interval of the First Child in Indonesia." *Open Journal of Statistics* 4(3):198.

Hindin, M.J., A.M. Kalamar, T.-A. Thompson, and U.D. Upadhyay. 2016. "Interventions to Prevent Unintended and Repeat Pregnancy among Young People in Low-and Middle-Income Countries: A Systematic Review of the Published and Gray Literature." *Journal of Adolescent Health* 59(3):S8-S15.

Hirschman, C. 1985. “Premarital Socioeconomic Roles and the Timing of Family Formation: A Comparative Study of Five Asian Societies.” *Demography* 22(1):35-59.

Hirschman, C., and R. Rindfuss. 1980. “Social, Cultural, and Economic Determinants of Age at Birth of First Child in Peninsular Malaysia.” *Population Studies* 34(3):507-518.

Hirschman, C., and R. Rindfuss. 1982. “The Sequence and Timing of Family Formation Events in Asia.” *American Sociological Review* 47(5):660-680.

Hong, Y. 2006. “Marital Decision-Making and the Timing of First Birth in Rural China before the 1990s.” *Population Studies* 60(3):329-341.

ICF International. 2015. *Questionnaires: Household, Woman's, and Man's, Demographic and Health Surveys Methodology*. Rockville, MD: ICF International.

Jennings, E.A., W.G. Axinn, and D.J. Ghimire. 2012. “The Effect of Parents’ Attitudes on Sons’ Marriage Timing.” *American Sociological Review* 77(6):923-945.

Jensen, R., and R. Thornton. 2003. “Early Female Marriage in the Developing World.” *Gender & Development* 11(2):9-19.

Jones, G. 2010. *Changing Marriage Patterns in Asia*. In *Asia Research Institute Working Paper Series*: National University of Singapore.

Jones, G.W. 2007. “Delayed Marriage and Very Low Fertility in Pacific Asia.” *Population and Development Review* 33(3):453-478.

Jones, G.W. 2009. *Changing Marriage Patterns in Asia*. In *IUSSP*. Marrakech, Morocco.

Jones, G.W., and B. Gubhaju. 2009. “Factors Influencing Changes in Mean Age at First Marriage and Proportions Never Marrying in the Low-Fertility Countries of East and Southeast Asia.” *Asian Population Studies* 5(3):237-265.

Kalamar, A.M., S. Lee-Rife, and M.J. Hindin. 2016. “Interventions to Prevent Child Marriage among Young People in Low-and Middle-Income Countries: A Systematic Review of the Published and Gray Literature.” *Journal of Adolescent Health* 59(3):S16-S21.

Kallan, J., and J.R. Udry. 1986. “The Determinants of Effective Fecundability Based on the First Birth Interval.” *Demography* 23(1):53-66.

Kaplan, E.L., and P. Meier. 1958. “Nonparametric Estimation from Incomplete Observations.” *Journal of the American Statistical Association* 53(282):457-481.

Kim, S.-Y., and W.F. Stinner. 1980. “Social Origins, Educational Attainment and the Timing of Marriage and First Birth among Korean Women.” *Journal of Marriage and the Family* 42(3):671-679.

Klugman, J., L. Hanmer, S. Twigg, T. Hasan, J. McCleary-Sills, and J. Santamaria. 2014. *Voice and Agency: Empowering Women and Girls for Shared Prosperity*: World Bank Publications.

Lavely, W. 2007. “Sex, Breastfeeding and Marital Fertility in Pretransition China.” *Population and Development Review* 33(2):289-320.

Lee-Rife, S., A. Malhotra, A. Warner, and A.M. Glinski. 2012. “What Works to Prevent Child Marriage: A Review of the Evidence.” *Studies in Family Planning* 43(4):287-303.

Lloyd, C.B. 2005. *Growing up Global: The Changing Transition to Adulthood in Developing Countries*. Washington, D.C.: The National Academies Press.

Lloyd, C.B., and B. Mensch. 1999. “Implications of Formal Schooling for Girls’ Transitions to Adulthood in Developing Countries.” In *Critical Perspectives on Schooling and Fertility in the Developing World*, edited by Caroline H Bledsoe, John B Casterline and Jennifer A Johnson-Kuhn, 80-104. Washington, D.C.: National Academy Press.

Lloyd, C.B., and B.S. Mensch. 2008. "Marriage and Childbirth as Factors in Dropping out from School: An Analysis of DHS Data from Sub-Saharan Africa." *Population Studies* 62(1):1-13.

Loaiza Sr., E., and S. Wong. 2012. "Marrying Too Young. End Child Marriage."

Löfstedt, P., G. Ghilagaber, and A. Johansson. 2007. "Birth-Spacing Patterns in Huaning County, Yunnan Province, Prc: Is the Adoption of a Small Family Norm Sustainable?" *Scandinavian Journal of Public Health* 35(3):257-264.

MacQuarrie, K.L.D. 2009. *The Unfolding of Women's Empowerment over the Life Course in Madhya Pradesh, India: The Influence of Family Formation and Early Empowerment Resources*. In *XXVI IUSSP International Population Conference*. Marrakech, Morocco.

Malhotra, A., and A.O. Tsui. 1996. "Marriage Timing in Sri Lanka: The Role of Modern Norms and Ideas." *Journal of Marriage and the Family* 58(2):476-490.

Malhotra, A., A. Warner, A. McGonagle, S. Lee-Rife, C. Powell, E.V. Cantrell, and R. Trasi. 2011. *Solutions to End Child Marriage: What the Evidence Shows*. Washington, DC: International Center for Research on Women.

Mason, W.M., and B. Entwisle. 1985. *Cross National Variability in Age at First Birth: Theory and Evidence.* Population Studies Center Report. University of Michigan Press.

Mensch, B.S., J. Bruce, and M.E. Greene. 1998. *The Uncharted Passage: Girls Adolescence in the Developing World*. New York, NY: Population Council.

Mensch, B.S., S. Singh, and J.B. Casterline. 2005. *Trends in the Timing of First Marriage among Men and Women in the Developing World*. Vol. 202, *Policy Research Division Working Papers No. 202*. New York, NY: Population Council.

Murphy, E., and D. Carr. 2009. *Powerful Partners, Adolescent Girls' Education and Delayed Childbearing*. Washington DC: Population Reference Bureau.

Nguyen, M.C., and Q. Wodon. 2012. *Child Marriage, Pregnancies, and the Gender Gap in Education Attainment: An Analysis Based on the Reasons for Dropping out of School*. Washington, DC: The World Bank.

Nguyen, M.C., and Q. Wodon. 2015. "Impact of Child Marriage on Literacy and Education Attainment in Africa." *Child Marriage and Education in Sub-Saharan Africa*.

Plan, U. 2011. "Breaking Vows: Early and Forced Marriage and Girls' Education." *Plan UK*.

Rahman, M., M.A.A. Mustafi, and M.M. Azad. 2013. "Analysis of the Determinant's of Marriage to First Birth Interval in Bangladesh." *International Journal of Management and Sustainability* 2(12):208-219.

Rahman, M.M. 2010. "Early Motherhood and Contraceptive Use among Adolescents: A Study from Rajshahi District of Bangladesh." *Journal of Nepal Paediatric Society* 30(1):8-17.

Raj, A. 2010. "When the Mother Is a Child: The Impact of Child Marriage on the Health and Human Rights of Girls." *Archives of Disease in Childhood* 95(11):931-935.

Raj, A., N. Saggurti, M. Winter, A. Labonte, M.R. Decker, D. Balaiah, and J.G. Silverman. 2010. "The Effect of Maternal Child Marriage on Morbidity and Mortality of Children under 5 in India: Cross Sectional Study of a Nationally Representative Sample." *BMJ* 340:b4258.

Retherford, R.D., N. Ogawa, and R. Matsukura. 2001. "Late Marriage and Less Marriage in Japan." *Population and Development Review* 27(1):65-102.

Rindfuss, R.R., and C. Hirschman. 1984. "The Timing of Family Formation: Structural and Societal Factors in the Asian Context." *Journal of Marriage and the Family* 46(1):205-214.

Rindfuss, R.R., and S.P. Morgan. 1983. "Marriage, Sex, and the First Birth Interval: The Quiet Revolution in Asia." *Population and Development Review* 9(2):259-278.

Rindfuss, R.R., J.A. Palmore, and L.L. Bumpass. 1987. "Analyzing Birth Intervals: Implications for Demographic Theory and Data Collection." *Sociological Forum* 2(4):811-828.

Rodriguez, G., and J. Trussell. 1980. "Maximum Likelihood Estimation of the Parameters of Coales Model Nuptiality Schedule from Survey Data." *World Fertility Survey Technical Bulletin* 7.

Rutstein, S.O. 2008. *The DHS Wealth Index: Approaches for Rural and Urban Areas, DHS Working Papers No. 60*. Calverton, MD: Macro International.

Rutstein, S.O., and K. Johnson. 2004. *The DHS Wealth Index, DHS Comparative Reports No. 6*. Calverton, MD: ORC Macro.

Rutstein, S.O., and G. Rojas. 2006. *Guide to DHS Statistics, Demographic and Health Surveys Methodology*. Calverton, MD: ICF International.

Santhya, K., U. Ram, R. Acharya, S.J. Jejeebhoy, F. Ram, and A. Singh. 2010. "Associations between Early Marriage and Young Women's Marital and Reproductive Health Outcomes: Evidence from India." *International Perspectives on Sexual and Reproductive Health* 36(3):132-139.

Shrestha, D.P. 1998. "Socio-Economic Changes, Women's Autonomy, and Timing of First Birth in a Semi-Urban Community in Nepal." *Contributions to Nepalese Studies* 25:129-143.

Singh, A., and S. Becker. 2012. "Concordance between Partners in Desired Waiting Time to Birth for Newlyweds in India." *Journal of Biosocial Science* 44(1):57-71.

Singh, S. 1998. "Adolescent Childbearing in Developing Countries: A Global Review." *Studies in Family Planning* 29(2):117-136.

Singh, S., and R. Samara. 1996. "Early Marriage among Women in Developing Countries." *International Family Planning Perspectives* 22(4):148-175.

Speizer, I.S., and E. Pearson. 2011. "Association between Early Marriage and Intimate Partner Violence in India: A Focus on Youth from Bihar and Rajasthan." *Journal of Interpersonal Violence* 26(10):1963-1981.

Steinhaus, M., A. Gregowski, N. Stevanovic Fenn, and S. Petroni. 2016. *'She Cannot Just Sit around Waiting to Turn Twenty': Understanding Why Child Marriage Persists in Kenya and Zambia*. Washington, DC: International Center for Research on Women.

Tarone, R.E., and J. Ware. 1977. "On Distribution-Free Tests for Equality of Survival Distributions." *Biometrika* 64(1):156-160.

Tian, F.F. 2013. "Transition to First Marriage in Reform-Era Urban China: The Persistent Effect of Education in a Period of Rapid Social Change." *Population Research and Policy Review* 32(4):529-552.

Trussell, J., J. Menken, and A.J. Coale. 1979. *A General Model for Analyzing the Effect of Nuptiality on Fertility*. Paper read at Nuptiality and fertility: proceedings of a seminar held in Bruges, at Liege, Belgium.

Trussell, J., and K. Reinis. 1989. "Age at Marriage and Age at First Birth." *Population Bulletin of the United Nations* 26:127-185.

Tsui, A.O. 1982. "The Family Formation Process among U.S. Marriage Cohorts." *Demography* 19(1):1-27.

UNICEF. 2005. *Early Marriage a Harmful Traditional Practice: A Statistical Exploration*. New York, NY: UNICEF.

Vogelstein, R.B. 2013. *Ending Child Marriage: How Elevating the Status of Girls Advances U.S. Foreign Policy Objectives*: Council on Foreign Relations.

Wachs, T.D. 2008. "Mechanisms Linking Parental Education and Stunting." *The Lancet* 371(9609):280-281.

Westoff, C. 1992. *Age at Marriage, Age at First Birth, and Fertility in Africa*. World Bank Technical Paper No. 169. The World Bank: Washington, DC.

Wodon, Q., M.C. Nguyen, and C. Tsimpo. 2016. "Child Marriage, Education, and Agency in Uganda." *Feminist Economics* 22(1):54-79.

Wood, J.W. 1994. *Dynamics of Human Reproduction: Biology, Biometry, Demography*: Transaction Publishers.

CHAPTER 1 APPENDIX TABLES

Appendix Table 1.1. Observations for mean age at first marriage among ever-married women age 25-49

	Survey 1		Survey 2	
	year	weighted n	year	weighted n
Bangladesh	2004	7,457	2014	12,454
India	1998-99	64,739	2005-06	73,665
Nepal	2001	6,099	2011	7,279
Pakistan	2006-07	7,955	2012-13	10,601
Cambodia	2005	9,133	2014	10,485
Indonesia	2002-03	24,077	2012	30,059
Philippines	2003	7,377	2013	8,290

Appendix Table 1.2. Observations for survival of the first birth interval

	Total subjects	Failures among subjects	Analysis time units	Last observed exit
South Asia				
Bangladesh	12,514	12,160	429,097	422
India	72,693	69,319	2,276,662	483
Nepal	7,258	7,034	253,942	457
Pakistan	9,800	9,120	332,194	426
Southeast Asia				
Cambodia	10,284	9,770	272,768	422
Indonesia	28,955	27,372	731,959	472
Philippines	8,352	7,910	195,019	364

Appendix Table 1.3. Tercile survival times to first birth in months, ever-married women age 25-49

	25th percentile	50th percentile (median)	75th percentile
South Asia			
Bangladesh	13	24	42
India	13	20	36
Nepal	15	24	41
Pakistan	12	21	40
Southeast Asia			
Cambodia	13	19	29
Indonesia	11	15	26
Philippines	10	14	24

Chapter 2. THE ASSOCIATION OF MARRIAGE AGE AND GENDER CONTEXT WITH FERTILITY TIMING IN ASIA

2.1 BACKGROUND

The previous several decades have seen a general, steady rise in the age at marriage for women around the world (Lloyd 2005). Marriage delay is a common feature of the Asian demographic landscape, although different regions of Asia experience variation in average ages at marriage and rates of increase (e.g. Jones 2007, 2009). Marriage continues to be near universal with more than 95% of women marrying by age 40 in each of the South and Southeast Asian countries, while rates of singlehood have increased appreciably in some East Asian countries (Jones 2009; Lloyd 2005; Retherford, Ogawa, and Matsukura 2001).

Marriage and the initiation of childbearing are two significant milestones that mark a transition from childhood or adolescence to adulthood. Early marriage (usually understood as marriage before the age of 18 or during adolescence) is viewed as a violation of human rights (Nguyen and Wodon 2012b; Nour 2009; UNICEF 2005). It is also associated with a range of adverse social outcomes (Singh 1998), including lower educational attainment (Field and Ambrus 2008; Kim and Stinner 1980; Lloyd and Mensch 1999; Lloyd and Mensch 2008; Nguyen and Wodon 2012a, 2015; Tian 2013; Vogelstein 2013; Wodon, Nguyen, and Tsimpo 2016), greater poverty and economic insecurity (UNICEF 2005), disempowerment of women (Klugman et al. 2014; MacQuarrie 2009b; Malhotra et al. 2011; Wodon, Nguyen, and Tsimpo 2016), and gender-based violence (Raj 2010; Speizer and Pearson 2011; UNICEF 2005). In countries where marriage age is traditionally low,

gender equality advocates herald marriage delay for its potential to improve girls' education, agency, and life options.

Marriage at young ages is also associated with "too early" pregnancy and poor reproductive health outcomes (Bongaarts and Cohen 1998; Godha, Hotchkiss, and Gage 2013; Santhya et al. 2010). This includes greater risk of maternal mortality and morbidity (Loaiza Sr. and Wong 2012; Murphy and Carr 2009) as well as infant mortality (Amin and Bajracharya 2011a; Wachs 2008), low birth weight and child stunting outcomes (Lloyd and Mensch 2008; Raj et al. 2010). The World Health Organization has estimated that births to adolescents contribute disproportionately to pregnancy and birth-related burden of disease (Chandra-Mouli, Camacho, and Michaud 2013).

Delayed marriage is often promoted as an effective strategy to delay childbearing, particularly where non-marital childbearing is rare (Chandra-Mouli, Camacho, and Michaud 2013; Hindin et al. 2016). Public health experts welcome such trends for the potential to avert "too early" pregnancies and closely spaced pregnancies, and the associated negative maternal health problems. These concerns form the impetus for policy and programmatic actions to delay marriage among girls, which have burgeoned in recent years (Chandra-Mouli, Lane, and Wong 2015; Kalamar, Lee-Rife, and Hindin 2016; Lee-Rife et al. 2012).

That prevailing nuptiality patterns and fertility are closely associated is well acknowledged in demographic literature, as evidenced by the inclusion of marriage age as one of four proximate determinants of fertility (Bongaarts 1978, 2015). Demographers have noted both implicitly and explicitly that there is a link between marriage timing and the quantum and tempo of fertility (Donaldson and Nichols 1978). In populations with higher age at marriage, total fertility is generally observed to be low (Abedin 2011; Ertem et al. 2008). This reduction in total fertility

with increasing marriage age can occur if non-marital fertility is negligible and age-specific marital fertility rates are not substantially different from marriage age. Where non-marital fertility is low and marriage universal, birth postponement promulgated by delayed marriage may contribute substantially to reduced fertility (Bongaarts 1999; Hirschman 1985; Hirschman and Rindfuss 1980; Timaeus and Moultrie 2008). When marriage age increases, fertility declines because fewer women are at risk of childbearing and they have shorter spans of their reproductive careers. Later marriage in such settings delays entry into childbearing. Furthermore, the length of the first birth interval frequently affects the pace of subsequent birth intervals (Rodriguez and Trussell 1980; Tsui 1982). In addition, shifts toward later marriage can result in lower fertility in settings where later marriage results in higher levels of "voluntary control of marital fertility" through contraception and/or abortion (Coale 1992). Thus, increases in age at marriage result in a compression of reproductive life span and influence both the tempo and the quantum of total fertility (Padmadas, Hutter, and Willekens 2004).

With the initiation of childbearing, empirical evidence typically observes that increases in the age at childbirth are smaller than increases in age at marriage (Bloom and Reddy 1986; Lloyd 2005; Mason and Entwisle 1985; Mensch, Bruce, and Greene 1998). That is, declining marital birth intervals accompany increasing age at marriage (Christensen 1939; Christensen and Bowden 1952; Dyson and Moore 1983; Feng and Quanhe 1996; Hirschman and Rindfuss 1982; Rindfuss and Morgan 1983; Trussell and Reinis 1989; Tsui 1982). Trussell and colleagues suggest that the first birth interval changes curviliearly with marriage age (Trussell, Menken, and Coale 1979). However, trends toward longer first birth intervals over time have also been observed (Christensen 1939; Christensen and Bowden 1952). This pattern has two implications. First, advocates who seek to move early pregnancies from the teen years and early 20's are likely to see smaller

increases in age at first birth for each unit increase in age at marriage than desired. Second, increasing age at marriage and changes in the timing of the first birth are not independent trends. Trends in the first birth interval are likely to be associated with trends in marriage age. Furthermore, each of these trends may be influenced by a common set of social forces that act on both marriage timing and the initiation of childbearing.

The observed association between increasing marriage age and declining first birth intervals has been attributed alternately to biological factors as marriage moves from women's sub-fecund period in the early adolescent years to peak fecund years in the 20's (Amin and Bajracharya 2011b; Kallan and Udry 1986; Trussell and Reinis 1989); motivations for couples marrying at older ages to compensate for their "late start" (a form of "catch-up" fertility) (Basu 1993; Mensch, Bruce, and Greene 1998), or greater coital frequency in choice marriages or marriages to a familiar partner as opposed to arranged marriages that may coincide with a later age at marriage (Feng and Quanhe 1996; Fricke and Teachman 1993; Rindfuss and Morgan 1983).

Empirical evidence largely bears out the expectation of a shorter first birth interval with increasing marriage age. While the available explanations support the general direction of the relationship between marriage timing and the first birth interval, they are inadequate in explaining the variation across populations. Although commonly co-occurring, the simultaneous trends of increasing age at marriage and declining first marital birth interval do not produce a clear and consistent relationship. For example, biological explanations of fecundity would lead us to expect shorter birth intervals at higher ages of marriage, and to expect birth intervals of similar duration among settings with similarly higher marriage ages. Instead, there is great variation in the duration of the first birth interval given an equivalent average age at marriage (Amin and Bajracharya 2011b).

While all countries in which the median age at marriage was below 17 years, the first birth interval was consistently longer than 24 months. However, the birth interval in countries with higher median ages at marriage varies considerably.

This variation indicates that there remains much we do not know about the trends in and relationship between marriage timing and timing of the first birth. Little research has focused on this topic since the mid-80s. More recent research has examined biological factors or trends in marriage age or first birth independently of one another. The sociological mechanisms that underlie this pattern remain under-explored.

The few sociological explanations suggest that trends toward later age at marriage may be accompanied by other changes—erosion of arranged marriage (Feng and Quanhe 1996; Ghimire 2017; Ghimire and Axinn 2013; Rindfuss and Morgan 1983), changes in spousal familiarity and coital frequency (Basu 1993; Fricke and Teachman 1993; Lavely 2007; Rindfuss and Morgan 1983), changing expectations about women's education and employment (Field and Ambrus 2008; Hirschman 1985; Hirschman and Rindfuss 1980; Kim and Stinner 1980), and shifts toward greater women's empowerment and a more equitable gender context (Desai and Andrist 2010; Dyson and Moore 1983; Malhotra and Tsui 1996; Mensch, Singh, and Casterline 2005; Shrestha 1998). These may also contribute to changes in the first birth interval directly or indirectly through their interaction with marriage age. For example, women who marry at older ages are more likely to participate in the selection of their marriage partner and have greater decision-making capacity upon marriage (Banerji and Vanneman 2011; Hong 2006; Jensen and Thornton 2003; Singh and Becker 2012). Such factors may influence the first birth interval directly through differences in coital frequency or the ability to enact decisions to control fertility. Whether an increase in

marriage age is the only change or whether it is accompanied by other significant social changes and for whom may determine the degree of the marriage age's influence on the first birth interval. We also do not know how robust the effect of marriage age is on subsequent birth spacing beyond the first birth.

Underexplored questions include (1) for whom marriages occur later and births earlier; that is, are these changes experienced universally by all women or are they concentrated among select social groups? It has been documented that marriage age varies across socio-economic and socio-cultural factors with, for example, women from wealthier families marrying at younger ages and those with more education marrying at older ages (Aryal 2007; Jensen and Thornton 2003; Kim and Stinner 1980). Work by Coale and colleagues suggests that the age pattern of marriage follows a predictable normal distribution in settings where the age of marriageability is low, although as the mean marriage age rises, so does the degree of heterogeneity (Coale 1971; Coale and McNeil 1972). It is possible that the increasing heterogeneity in the distribution of marriage ages could account for some of the observed variation in first birth intervals at older mean marriage ages (Amin and Bajracharya 2011b), particularly if increases in marriage age are unevenly distributed, for example, across educational or wealth subgroups.

Other questions that are underexplored are (2) whether births are occurring earlier for all who marry later, i.e., if the rate of the first birth interval is evenly distributed; (3) whether compositional shifts in marriage age or other social changes explain changes in the first birth interval and subsequent birth spacing; (4) the relative importance of marriage age when compared to these other factors in explaining the timing of the first birth; and (5) the relative importance of marriage age in explaining the first birth interval and subsequent birth spacing across country contexts.

This study examines the relationship between marriage age and two aspects of the family formation process: the initiation of childbearing (timing of the first birth) and subsequent birth spacing (the transition from the first to the second birth). Secondarily, it assesses the influence of the gender context on the onset of childbearing and birth spacing. To do so, the study uses Demographic and Health Surveys (DHS) data from seven countries in Asia: Bangladesh, India, Nepal, and Pakistan in South Asia and Cambodia, Indonesia, and the Philippines in Southeast Asia. Each of these countries has experienced a statistically significant change in the age at marriage or at first birth or both, while maintaining a norm of universal marriage. The study assesses the influence of age at marriage and gender context on the first birth interval through a multivariate hazard model. Subsequently, it decomposes the change in the first birth interval over time into shifts in composition (marriage age, gender context, and other factors) and changes in effects upon the first birth interval. Finally, the study estimates a second hazard model to determine the independent influence of these factors on the second birth interval.

2.2 METHODS AND DATA

2.2.1 Country and Survey Selection

This study uses data from seven countries in Asia: Bangladesh, India[15], Nepal, and Pakistan in South Asia and Cambodia, Indonesia, and the Philippines in Southeast Asia. Countries are included in the study if (1) marriage is or approaches being universal (≥95% women married by age 40); (2) the majority of childbearing occurs within marriage; (3) there has been a statistically significant change in either the age at marriage or at first birth or both; (4) there are two or more standard DHS surveys available over a span of more than 5 years; and (5) these surveys include the variables of interest.

DHS surveys are nationally representative, population-based household surveys that produce a broad range of demographic and health indicators. The surveys are generally large and enjoy response rates in excess of 90%. Standard DHS surveys routinely collect data on women's birth histories and on the timing of marriage, making these data well suited to the analysis of a variety of marriage and fertility dynamics. The surveys also collect data on a broad range of individual background characteristics and gender and women's empowerment relevant to the analysis of such dynamics. The surveys employ standardized questionnaires and modules for household, women's, and men's interviews (ICF International 2015b). As such, they produce indicators that are comparable across countries and within countries over time.

Standard DHS surveys are implemented at intervals of about 5 years to allow for comparisons over time. Thirty-three surveys have been conducted in the countries selected for this study. This study

[15] India DHS surveys are also referred to as the National Family and Health Surveys (NFHS).

uses the individual woman's survey, which is conducted among women of reproductive age (15-49). It uses either the most recent survey or the most recent survey paired with a survey that was conducted approximately 10 years prior. Sample parameters, including sample sizes and response rates, for the study's surveys can be found in Table 2.1.

Table 2.1. Sample parameters for surveys included in the analysis

Region and Country	Year of survey	Sample type	Age range	# of women interviewed (unweighted)	Eligible woman response rate
South Asia					
Bangladesh	2014	Ever married women	15-49	17,863	97.9
	2004	Ever married women	10-49	11,440	98.6
India	2005-06	All women	15-49	124,385	94.5
	1998-99	Ever married women	15-49	90,303	95.5
Nepal	2011	All women	15-49	12,674	98.1
	2001	Ever married women	15-49	8,726	98.2
Pakistan	2012-13	Ever married women	15-49	13,558	93.1
	2006-07	Ever married women	15-49	10,023	94.5
Southeast Asia					
Cambodia	2014	All women	15-49	17,578	97.6
	2005	All women	15-49	16,823	97.5
Indonesia	2012	All women	15-49	45,067	95.9
	2002-03	Ever married women	15-49	29,483	98.3
Philippines	2013	All women	15-49	16,155	98.3
	2003	All women	15-49	13,633	97.8

Note: Analysis is restricted to ever-married women age 25-49.

2.2.2 Sampling and Sample Weighting

The surveys employ multistage, clustered area sampling techniques. In the first sampling stage, the country is stratified into major subnational regions from which census-based enumeration areas are selected with probability proportional to size. The major regions may or may not coincide with administrative units (as in the Philippines) and consist of states (India), provinces or groups of provinces (Cambodia, Indonesia, Pakistan), divisions (Bangladesh), or ecological zones (Nepal). Urban areas and less populous areas are typically oversampled in the first sampling stage to produce reliable regional estimates and rural-urban comparisons of health indicators. A mapping

and household listing exercise is then conducted in each selected enumeration area. In the second sampling stage, households are randomly selected from the household list within each enumeration area.

Pre-calculated sampling weights are applied; these account for both sampling probability and non-response. In addition, the study uses the complex survey (svy) commands available within Stata 14.1 to account for the clustered sampling design and to estimate robust standard errors as the basis for 95% confidence intervals reported in the following sections.

2.2.3 Sample Restriction

This study's analysis is restricted to ever-married women age 25-49. This age restriction is imposed because the median age at marriage and first birth have not been reached by the start of the preceding age group, age 20-24, in all study countries; the median ages at these events have been reached by the start of the 25+ age groups. This restriction reduces the selection bias that would be present if early-marrying women were over-represented in the data.

Table 2.2. Proportion of women age 25-49 excluded from analysis due to never being married or experiencing a negative first birth interval

	Never married		Negative first birth interval	
	%	# (unweighted)	%	# (unweighted)
South Asia				
Bangladesh 2014	0.00	0	1.24	165
India 2005-06	2.44	3,623	1.68	1,307
Nepal 2011	3.06	232	1.50	113
Pakistan 2012-13	0.00	0	1.58	166
Southeast Asia				
Cambodia 2014	7.99	974	2.34	276
Indonesia 2012	4.66	1,850	2.62	1,006
Philippines 2013	11.98	1,118	7.01	615

Table 2.2 shows the attrition in sample size from excluding never-married women. As indicated, the proportion of women who are never-married at the most recent survey is sizable in Cambodia and the Philippines. Elsewhere, it does not exceed 5% of all women age 25-49.

While experiencing a birth is not a precondition for inclusion in the analytical sample, the analysis is restricted to women who marry prior to their first birth. That is, women who experience a negative first birth interval because their first birth occurred prior to marriage are excluded from all analyses. This demographically convenient life order sequence facilitates a valid and meaningful measure of the interval between marriage and first birth. The proportion of women experiencing a negative birth interval is small—less than 3%—in all study countries with the exception of the Philippines (7%), also as seen in Table 2.2. Analysis of the second birth interval is necessarily limited to women who have already experienced a first birth.

2.2.4 Measures

Century month codes

In DHS datasets, the dates of several key events are recorded in century month codes (CMC) (Rutstein and Rojas 2006). Both outcomes and the independent variable of interest—the first birth interval, the second birth interval, and age at marriage—are all calculated based on CMCs. The CMC is the number of months elapsed between an event and January 1900. For example, the CMC corresponding to June 2012 is 1350. Century month codes are used to record and calculate intervals between the respondent's date of birth, date of first union, date of birth for each of the respondent's children, and date of interview. The DHS invests significant effort to ensure that dates of these events are accurately reported through multiple data checks and procedures for

reconciling discrepant reports and imputing missing information (ICF International 2012, 2015a; Pullum 2006).

First birth interval

The first birth interval is the interval between marriage and the first birth. The length of the first birth interval is calculated as the difference between the CMCs for date of first union and date of first birth as expressed in months. Negative birth intervals (premarital births) are excluded from the analysis. First birth intervals of less than 8 months, which may possibly indicate premarital conceptions followed by a marriage and then birth, are retained in the analysis. The length of the first birth interval is the outcome of interest for the first hazard analysis of this study, while *change* in the first birth interval between two surveys is the outcome used in the multivariate decomposition analysis.

Second birth interval

Subsequent birth spacing is assessed through analysis of the second birth interval, which is the span of time between the first and the second births. The second birth interval is calculated as the difference between the CMCs for the second birth and the first birth, and is expressed in months. The second birth interval is the outcome of the last hazard analysis of this study.

Age at marriage

Marriage age is this study's focal predictor variable. Age at marriage refers to women's *first* marriage. It is calculated as the difference between the CMC of the respondent's date of first union and date of birth. This difference, expressed in months, is then divided by 12. Date of first union refers to the time that the respondent first began cohabiting with her husband. Cohabitation is a better measure of the initiation of marital sexual exposure—and thus of the starting point for the

period of risk for the first birth interval—than date of formal marriage in settings where ceremonial marriages, spousal separation prior to menarche, or return marriage characterize the marriage process (Basu 1993; Bhattacharya et al. 1989; Bloom and Reddy 1986; Choe, Thapa, and Mishra 2005; Rodriguez and Trussell 1980). Unions include both formal, legally recognized marriages as well as non-formal unions in which women are living together with a man as if married.

Birth cohort

Cultural ideas and behavioral patterns around onset of childbearing and birth spacing change over time with successive generations (Moultrie, Sayi, and Timæus 2012; Palmore and Gardner 1994). To distinguish age effects from cohort effects, a birth cohort measure is entered into estimated models of the first and second birth intervals. This measure that indicates the decade in which women were born is calculated based on the CMC for their date of birth. The decade 1960-69 serves as the reference category in multivariate analysis. Only the India dataset includes respondents in the 1950-59 birth cohort. All study countries include women born in the 1970-79 and 1980-89 cohorts, in addition to the referent period.

Gender context

Several explanations for the relationship between marriage and first birth invoke the social context of gender dynamics. Meanwhile, women's decision-making and empowerment have been found to influence birth spacing and contraceptive use (Edmeades et al. 2012; Fricke and Teachman 1993; Kishor 2000; MacQuarrie 2009a; Mason and Smith 2000; Nath, Land, and Goswami 1999; Upadhyay and Hindin 2005; Upadhyay, Gipson, et al. 2014). This study uses three individual-level measures to describe the gender context: women's decision-making, attitudes toward wife beating, and spousal age difference.

Women's decision-making

Women's decision-making is calculated as a simple (unweighted) additive index of the sum of the number of household decisions in which women participate. Component items are participation in decisions about:

1. Healthcare for herself
2. Major household purchases
3. Visits to her family or relatives

This index ranges from 0 to 3 in six of the seven study countries. In the Philippines, it ranges from 0-4 with an additional item about participation in decisions about purchases for daily household needs. Data on women's decision-making are included in the most recent survey for all countries in this study. However, these data were omitted from some earlier surveys in India and Pakistan. Therefore, this measure is excluded from analyses of change over time in these countries.

Attitudes toward wife beating

Women's attitudes toward wife beating are assessed by responses to a question that ask if respondents think a husband is justified in hitting or beating his wife in the following situations:

1. If she goes out without telling him
2. If she neglects the children
3. If she argues with him
4. If she refuses to have sex with him
5. If she burns the food

A dichotomous measure is calculated and set to 0 if the respondent reports wife beating to be acceptable in at least one of these scenarios and 1 if she rejects wife beating in all of these scenarios.

In the Nepal 2011 DHS survey but not the 2001 survey, a filter question was inserted. Respondents answering "no" when asked, "In your opinion, should a husband hit or beat his wife for any reason at all?" were not asked if wife beating was justified in specific scenarios. This questionnaire change may result in a measurement change (decrease) in the prevalence of attitudes accepting of wife beating as well as in detecting any associations with this variable.

Data on women's attitudes toward wife beating were not collected in Bangladesh DHS surveys. In addition, these data were omitted from some earlier surveys in India and Pakistan. Therefore, this measure is excluded from the analyses of change over time in these countries. Data on women's attitudes toward wife beating were collected consistently in the three Southeast Asian countries in this study.

Spousal age difference

Spousal age difference i is calculated as the difference, in whole years, between women's completed age and that of her husband. In situations where women are the same age as or are older than their husbands, this indicator is set to 0. Therefore, this measure can be interpreted as the number of years by which the husband's age exceeds the woman's age.

Socio-demographic control variables

Seven variables are used as socio-demographic controls in this study's analyses. These are: women's education, women's occupation, household wealth, religion, residence, husbands'

education, and husbands' occupation. They were selected for inclusion because they have been found to be associated with either marriage age or the onset of childbearing in previous studies. They are operationalized as follows.

Women's education

Women's education at the time of the survey is categorized into no education, primary, secondary, and higher education. No education is the reference category.

Women's occupation

Prior research in the Philippines found that women's work is associated with shorter birth intervals, though the relationship with the first birth, specifically, was unassessed (Upadhyay and Hindin 2005). This indicator captures whether women worked in the 12 months preceding the interview and, if so, in what occupation. Not working serves as the reference category. Occupational categories are:

1. Agricultural
2. Professional/technical/managerial (hereafter referred to as "professional")
3. Clerical
4. Sales
5. Services
6. Skilled manual labor
7. Unskilled manual labor
8. Other

No data on women's occupation is available in the Bangladesh DHS. In India, there is no differentiation between skilled and unskilled manual labor. In Nepal, there is no separate category

for women working in sales; these respondents are grouped with those working in "other" occupations.

Household wealth quintile

Household wealth quintile is a measure of relative wealth calculated based on ownership of a range of assets and housing materials. The construction of this measure, now standard in DHS surveys, is described in detail elsewhere (Rutstein 2008; Rutstein and Johnson 2004). The poorest wealth quintile serves as the reference category.

Religion

Women's religious affiliation is a variable with country-specific response options. As a result, the reference religion is also country-specific and is set as the largest religious group in each country. No data on religious affiliation is available in the Pakistan or Indonesia DHS surveys.

Place of residence

Place of residence captures whether the respondent resides in a rural or an urban area at the time of the survey, based on a priori classification of primary sampling units selected for the survey. Rural is the reference category.

Husband's education

Husband's education is taken from women's reports of their husband's level of educational attainment. This measure is also categorized as no education, primary, secondary, and higher education. There is a fifth category that does not exist for women's education: don't know. No education is the reference category.

Husband's occupation

Husband's occupation, also taken from women's reports, is categorized in the same manner as women's occupation:

1. Agricultural
2. Professional/technical/managerial (hereafter referred to as "professional")
3. Clerical
4. Sales
5. Services
6. Skilled manual labor
7. Unskilled manual labor
8. Other
9. Not working

Whereas "not working" is the reference category for women's occupation, agricultural occupation is the reference category for husband's occupation. Agricultural occupation is a category in every survey with data on husband's occupation and is frequently the most prevalent occupation. Indonesia 2012 DHS, Cambodia 2014 DHS, and Philippines 2013 DHS do not collect data on husband's current employment status, but categorizes husband's occupation regardless of current employment status. India 2005-06 DHS (NFHS-3) and Indonesia 2012 DHS capture husband's current employment status as a separate occupational category and categorize husband's occupation only for husbands who are currently working. As with women's occupation, no data on the husband's occupation are available in the Bangladesh DHS. In India, there is no differentiation between skilled and unskilled manual labor. In Nepal, there is no separate category

for husbands working in sales. These respondents are combined with those working in "other" occupations.

Regional fixed effects

Region has been shown to be an important factor by which there is substantial variation in demographic outcomes (Dyson and Moore 1983; Ghuman 2003; Jejeebhoy and Sathar 2001; Malhotra, Vanneman, and Kishor 1995; Mason and Smith 2003; Visaria 1996). That variation may be due to regionally prescribed social systems that condition behavior, whether those social systems be based on religion, ethnicity, the social context of gender dynamics, marriage and kinship patterns, or other socio-cultural factors. Some of these factors may be measured with available indicators while others are likely to be unobserved. To account for the possibility of unobserved regional effects, this study adopts a fixed effects approach and enters dummy variables for subnational region into each of the estimated models.

These subnational regions are necessarily country-specific, the second such country-specific indicator in these analyses. Dichotomous variables correspond to those regions used in the first sampling stratum in each survey. These are divisions in Bangladesh (6); states in India (26); provinces or small groupings of provinces in Cambodia (19), Indonesia (6), and Pakistan (4); ecological zones in Nepal (3); and administrative regions in the Philippines (17).

Although Bangladesh currently has 7 divisions, Rangpur and Rajshahi divisions were sampled as a single region in 2004 and not separately. Therefore, these two divisions are combined to ensure compatibility in the analyses of change over time. Similarly, several pairs of states from the India 2005-06 dataset—Bihar and Jharkhand, Madhya Pradesh and Chattisgarh, Uttar Pradesh and Uttaranchal—are combined to be comparable to sampled states in the 1998-99 dataset. In

Indonesia, Sulawesi is combined with Papua and Maluku to correspond with provincial groupings sampled in 2002.

In every country, the most populous region serves as the reference group. These are Dhaka, Bangladesh; Uttar Pradesh (including Uttaranchal), India; the Terai, Nepal; Punjab, Pakistan; Phnom Penh, Cambodia; Sumatera, Indonesia; and the National Capital administrative region, the Philippines. A full listing of the regions by country is found in Appendix Table 2.4.

2.2.5 Scope of the Analysis and Analytic Strategy

This study contains three related multivariate analyses:

1. Influence of marriage age and gender context on the length of the first birth interval
2. Decomposition of change in the first birth interval into composition and effects of marriage age and gender context
3. Influence of marriage age and gender context on the length of the second birth interval

With the first outcome—the first birth interval—the time to event is of interest. Therefore, it is analyzed using a survival analysis framework in Section 3. This approach uses data on all respondents, whether or not they have experienced the failure event (first birth) in question, while accounting for right censoring beyond the observation period. Specifically, the study compares the association of marriage age with the first birth interval, first, in bivariate and, secondly, in multivariate hazard models. These models also identify other background characteristics that may be associated with the first birth interval, independent of marriage age, as determined by extant empirical literature and previous analysis of these specific datasets by the author. Multivariate hazard models control for birth cohort to account for period shifts in the timing of marriage; gender

context (women's decision-making, attitudes toward wife beating, and spousal age difference); socio-demographic characteristics (education, occupation, household wealth, religion, place of residence, and husband's education and occupation); and subnational regional fixed effects. Sample sizes, including the number of cases who experience failure (had a first birth) and the total person-months of observation contributed by the sample, are presented in Appendix Table 2.2.

Hazard models are estimated as loglogistic accelerated failure time (AFT) models using data from the most recent DHS survey, with time ratios (i.e. exponentiated coefficients) reported for ease of interpretation (Allison 1995; Box-Steffensmeier and Jones 2004). The loglogistic distribution was selected as the best or second-best fitting distribution in each country, as assessed by the low Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) from tests for non-nested hazard models (Box-Steffensmeier and Jones 2004; Cleves et al. 2010). Results of model diagnostics are reported in Appendix Table 2.3. The loglogistic AFT model is a fully parametric hazard model in which hazards are not assumed to be proportional, which prior research has suggested may not be the case with covariates of the first birth (Trussell and Bloom 1983). The loglogistic model implies a hazard distribution *h(t)* that is unimodal and not necessarily monotonic, with the scale of the logistic-distributed baseline hazard[16] estimated by γ (Allison 1995; Box-Steffensmeier and Jones 2004). When γ approaches 0.5, as it does in this study's models, it implies an underlying hazard that quickly increases with time upon the onset of risk (marriage) before declining with a long tail as time increases[17] (Allison 1995; Cleves et al. 2010).

[16] As such, the log-logistic hazard model is analogous to the logit model for discrete dependent variables.
[17] This hazard function is similar to a lognormal distribution in which $\sigma=1$.

This study then estimates a multivariate decomposition analysis of the *change over time* in the first birth interval over in Section 4. This analysis uses data from both the most recent survey (Survey 2) and a survey approximately 10 years prior (Survey 1) to examine whether changes in the first birth interval over time are due to changes in the age distribution of marriage, or whether the influence of marriage age on the first birth interval has changed over time. The multivariate models use the same measures to describe the gender context and the same socio-demographic and subnational regional controls as in the hazard models. This allows analysis of the extent to which changes in the first birth interval are due to shifts in the gender context over time or other compositional changes in the population, or due to differences in their influence on the first birth interval between surveys.

The multivariate decomposition models are estimated using the mvdcmp commands available in Stata 14.1 (Powers, Yoshioka, and Yun 2011). This form of decomposition extends Oaxaca-Blinder decomposition techniques to non-linear models such as those handling hazard rates as well as observed difference in group means or proportions (Blinder 1973; Oaxaca 1973; Powers and Yun 2009). The mvdcmp multivariate decomposition procedure has several advantages for this study. It allows for overall decomposition into the composition component (also known as the characteristics or endowments component) and the effects component (also known as the coefficients or rate component). It also allows for a detailed decomposition of each variable in the model. The second advantage is a correction for the problem of path dependence, in which a nonlinear decomposition is sensitive to the *order* in which variables are entered into the model, or to the selection of the reference category of dichotomous or categorical covariates, by applying a normalized decomposition.

A piece-wise constant exponential decomposition is permitted using the mvdcmp procedure, but this model is both computationally complex, requiring a dummy variable for each person-period of observation (in this case, months), and assumes a proportional hazard across groups that is inappropriate for these data. Instead, I opt for a linear regression decomposition, partitioning the observed group mean into its composition and effects components. The linear regression conveniently produces exponentiated coefficients that are similar in interpretation to the time ratios presented for the hazard models in this study. However, the coefficients from a linear model may be biased if excessive right censoring is present. Fortunately, as shown earlier, the vast majority of observed cases fail (have a first birth) during the period of observation, mitigating the extent of such bias.

To assess the extent to which the linear form of the decomposition model is sensitive to any such bias present in the data, the β coefficients for a simple linear regression model are compared with those of a loglogistic model for each country at Survey 2. The results of this sensitivity analysis are presented in Appendix Table 2.5. The results indicate minor variations in the detected significance level for certain categories of selected variables, including several categories of borderline significance (p-value close to the $p \leq 0.05$ threshold) that appear to be significant in one model and non-significant in another. However, the failure to detect significant associations or to falsely detect a significant association is not systematic across surveys, nor are any discrepancies found in the direction of associations.

The final analysis presented in this study examines the implications of marriage age on subsequent birth spacing. Specifically, the study estimates hazard models of the second birth interval in Section 5. This analysis is based on all women in the analytic samples who have had a first birth.

As with the hazard models for the first birth interval, the second birth interval is estimated with loglogistic accelerated failure time models that report results in time ratios and use data from the most recent survey in each country. The sample sizes, observed failures, and person-months of observation contributed to the analysis of the second birth interval are displayed in Appendix Table 2.13. Model diagnostics, including the AIC and BIC, which were used to select the hazard form, are displayed in Appendix Table 2.14.

These models use age at marriage and the same covariates that are used to estimate the hazard of the first birth interval. In addition, a categorical measure that describes the duration of the first birth interval are entered into the models. The inclusion of this measure indicates whether marriage age has an independent effect on the second birth interval or, if it influences it at all, does so only through its effect on the duration of the first birth interval. The categorical measure of the duration of the first birth interval aligns roughly with terciles in South and Southeast Asian countries in the first birth interval. For South Asian countries, the categories are less than 16 months, 16-32 months, and greater than 32 months. In Southeast Asian countries, the categories are less than 12 months, 12-22 months, and greater than 22 months. Data on the observed terciles for each study country at the most recent survey are available in Appendix Table 2.15.

2.3 ASSOCIATION OF MARRIAGE AGE WITH THE FIRST BIRTH INTERVAL

Tables 3 and 4 present the results of loglogistic accelerated failure time models estimating the interval from marriage to the first birth. These models are estimated using data from the most recent DHS survey. Results are presented as time ratios, the exponentiated coefficient, to ease interpretation so that a positive coefficient (TR>1) corresponds to a greater expected time to the first birth and a negative coefficient (TR<1) indicates a shorter expected time to the first birth. Observations (unweighted) and diagnostics of the model form for the hazard models are available in Appendix Tables 2 and 3.

Table 2.3. Effect of age at marriage on the marriage to first birth interval: Time ratios from unadjusted loglogistic hazard models (95% confidence intervals in parentheses)

	South Asia				Southeast Asia		
	Bangladesh	India	Nepal	Pakistan	Cambodia	Indonesia	Philippines
Age at first marriage	0.976*** (0.97 - 0.98)	0.962*** (0.96 - 0.96)	0.940*** (0.93 - 0.95)	0.978*** (0.97 - 0.98)	0.981*** (0.98 - 0.98)	0.977*** (0.97 - 0.98)	1.002 (1.00 - 1.01)
Constant	33.25*** (29.68 - 37.25)	45.01*** (42.80 - 47.34)	77.35*** (65.32 - 91.59)	34.94*** (29.83 - 40.93)	28.71*** (26.22 - 31.44)	27.46*** (25.52 - 29.55)	14.16*** (12.85 - 15.60)
Gamma (γ)	0.5741 (0.56 - 0.59)	0.5277 (0.52 - 0.53)	0.4132 (0.40 - 0.43)	0.5732 (0.55 - 0.59)	0.3749 (0.36 - 0.39)	0.4401 (0.43 - 0.45)	0.479 (0.47 - 0.49)
Weighted sample size (person-months)	418,626	2,496,946	256,292	369,199	275,937	794,976	192,359

*** p≤0.001; ** p≤0.01; * p≤0.05

2.3.1 Age at Marriage

Table 2.3 displays the unadjusted time ratios for the effect of age at marriage on the length of the first birth interval. In 6 of the 7 study countries, marriage age is significantly associated with the length of the first birth interval at the p≤0.001 level; the Philippines is the sole exception. In each case, marriage age is negatively associated with the birth interval, so that with each additional year of age at which women marry, women experience a 2-6% shorter time to first birth. In the Philippines, the time ratio is greater than one; this suggests a positive relationship between

marriage age and the length of the first birth interval, were it to be statistically significant. Although the age pattern of marriage differs in South Asia from that in Southeast Asia (as does mean duration of the first birth interval), the effect of marriage age on the first birth interval appears to be similar across countries in both regions.

Table 2.4. Adjusted effects on the duration of the marriage to first birth interval: Time ratios from multivariate loglogistic hazard models

	South Asia				Southeast Asia		
	Bangladesh	**India**	**Nepal**	**Pakistan**	**Cambodia**	**Indonesia**	**Philippines**
Age at first marriage	0.949***	0.956***	0.940***	0.981***	0.978***	0.986***	1.009**
Birth cohort (ref=1960-69)							
1950-59	na	0.899***	na	na	na	na	na
1970-79	0.812***	1.128***	0.804***	0.959	0.934**	0.969	1.031
1980-89	0.671***	0.915***	0.713***	0.853***	0.899***	0.950**	0.967
Decision-making							
# of decisions in which respondent participates	1.009	0.981***	0.958***	1.011***	0.969	0.993	0.987
Wife beating attitudes (ref=acceptable in at least one scenario							
Rejects in all scenarios	na	0.994	0.913	1.032	1.007	0.992	0.993
Spousal age difference in years	0.987***	0.988***	1.000	0.998	1.002	1.003	1.010***
Education (ref=no education)							
Primary	0.988	1.01	0.958	0.977	1.04	0.997	0.907
Secondary	1.149***	1.078***	0.949	0.936	1.029	0.911	0.820**
Higher	1.602***	1.241***	1.245***	0.901*	1.031	0.947	0.778**
Occupation (ref=not working)							
Agricultural	na	0.950***	0.903**	0.877	0.998	0.998	0.984
Professional		1.058*	0.846*	1.122	1.047	1.039	0.945
Clerical	na	1.131**	0.819	1.142	1.029	1.111**	0.941
Sales	na	0.957	na	1.052	0.984	1.021	1.038
Services	na	0.881***	0.870***	1.005	1.056	1.012	0.928
Skilled manual	na		0.940	1.032	0.997	1.024	0.902*
Unskilled manual	na	0.958*	0.922	0.986	1.017	0.959	0.931**
Other	na	1.027	0.916	na	1.316*	3.790**	1.155
Household wealth quintile (ref=poorest)							
poorer	1.005	0.963*	1.026	0.925	0.964	0.987	0.940*
middle	0.987	0.959*	0.978	0.841*	0.977	0.967	0.982
richer	1.008	0.939**	0.890*	0.801**	0.999	0.968	1.022
richest	0.998	0.923***	0.914	0.761**	0.965	0.944*	1.011

Continued

Table 2.4—*Continued*

	South Asia				Southeast Asia		
	Bangladesh	**India**	**Nepal**	**Pakistan**	**Cambodia**	**Indonesia**	**Philippines**
Religion							
Reference religion	Muslim	Hindu	Hindu	na	Buddhist	na	Roman Catholic
Muslim	na	0.885***	1.054	na	0.924	na	1.126*
Christian	0.649	0.898***	na	na	0.947	na	na
Buddhist	1.009	1.011	0.973	na	na	na	na
Hindu	0.998	na	na	na	na	na	na
Other	na	1.109	1.031	na	0.947	na	0.976
Protestant	na	na	na	na	na	na	1.045
Iglesia Ni Kristo	na	na	na	na	na	na	0.888*
Aglipay	na	na	na	na	na	na	0.820*
Sikh	na	0.937	na	na	na	na	na
Jain	na	0.900	na	na	na	na	na
Kirat	na	na	0.929	na	na	na	na
Residence (ref=rural)							
urban	1.074**	0.951***	0.965	0.918*	1.060*	0.931***	0.99
Husband's education (ref=no education)							
Primary	0.909**	0.995	0.97	1.052	0.991	0.926	0.985
Secondary	0.973	1.022	0.977	1.037	0.981	0.894	0.971
Higher	1.115*	1.069**	0.989	1.094	0.982	0.922	0.939
Don't know	na	0.985	0.917	1.242	1.482	1.37	0.664**
Husband's occupation (ref=agricultural)							
Professional/technical/ managerial	na	1.006	0.970	1.116	0.961	0.918***	1.088
Clerical	na	1.011	1.059	0.988	0.943	0.949	0.940
Sales	na	0.979	na	na	0.933*	1.002	1.090
Services	na	1.038	1.039	1.021	1.002	0.919**	1.067
Skilled manual	na	1.000	0.971	1.087	1.013	0.966	1.049
Unskilled manual	na	na	0.998	1.030	0.942	0.936	1.027
Other	na	1.173	1.074	1.000	1.005	1.105	1.206
Not working	na	1.014	na	0.978	na	0.952	na
Constant	73.371*** (60.125 - 89.535)	60.107*** (55.626 - 64.949)	129.052*** (80.251 - 207.528)	38.011*** (29.652 - 48.727)	32.625*** (27.537 - 38.654)	27.882*** (23.408 - 33.210)	16.589*** (12.986 - 21.193)
Gamma (γ)	0.5492 (0.535 - 0.563)	0.5052 (0.499 - 0.511)	0.3955 (0.384 - 0.407)	0.5555 (0.537 - 0.575)	0.3629 (0.352 - 0.374)	0.4265 (0.418 - 0.435)	0.4695 (0.458 - 0.481)
Fixed regional effects	***	***	*		***	***	**
Weighted sample size (person-months)	381,297	2,231,385	240,034	342,734	239,300	716,796	175,005

Notes:

*** p≤0.001; ** p≤0.01; * p≤0.05

Hazard models for Bangladesh excludes controls for: wife beating attitudes, occupation, and husband's occupation as these data were not collected in the Bangladesh 2014 DHS

India 2005-06 DHS (NFHS-3) does not distinguish between skilled manual and unskilled manual.

Hazard models for Indonesia and Pakistan exclude religious affiliation as these data were not collected in the Indonesia 2012 DHS or Pakistan 2012-13 DHS.

Indonesia 2012 DHS, Cambodia 2014 DHS, and Philippines 2013 DHS do not collect data on husband's current employment status, but categorizes husband's occupation regardless of current employment status.

India 2005-06 DHS (NFHS-3) and Indonesia 2012 DHS captures husband's current employment status as a separate occupational category and categorizes husband's occupation only for husbands who are currently working.

Region names and time ratios for each region can be found in Appendix Table 2.4.

Table 2.4 indicates that this significant, negative relationship holds for the 6 countries when controlling for other covariates in an adjusted hazard model, with modest effects on the time ratios. Women in Bangladesh, India, and Nepal experience a first birth interval that is 4-6% shorter for each year of marriage delay. In Cambodia and Indonesia in Southeast Asia, and in Pakistan, women's expected first birth interval is 1-2% shorter for each year older at which they marry, again showing no distinguishing pattern by region.

While there is no significant bivariate association in the Philippines, marriage age is significantly and *positively* associated with the first birth interval in the multivariate model. The effect is small (similar in size to the other Southeast Asian countries and Pakistan, but in the opposite direction): the expected time to first birth is 1% greater for each year increase in women's age at marriage.

2.3.2 Birth Cohort

The decadal birth cohort variable is significant in all countries but the Philippines; this indicates that the expected duration of the first birth interval has changed over time, even after controlling for individual age at marriage. The expected time to first birth has become shorter, monotonically, with successive birth cohorts since the 1960-69 birth cohort in Bangladesh, Nepal, Pakistan, Cambodia, and Indonesia. The changes are the most striking in Bangladesh and Nepal. Compared to the 1960-69 birth cohort, Bangladeshi women born 1970-79 have a 19% shorter expected time to first birth and those born between 1980-89 have a 33% shorter expected time to first birth after marriage. In Nepal, these figures are 20% and 29%, respectively. In comparison, the expected interval from marriage to first birth is only 5-10% shorter in Cambodia and Indonesia for women born 1980-89 compared to those born 1960-69. In Pakistan, this figure is 15% shorter. The

differences in expected time to first birth are not significantly different between women born in 1970-79 and 1960-69 in Pakistan and Indonesia.

Birth cohorts in India manifest a different pattern than the monotonic decrease in the first birth interval over time that is seen elsewhere. Women born in the decade before the reference cohort show an expected time to first birth that is 10% shorter than those born in 1960-69. Those born in 1970-79 have an expected time to first birth that is 13% longer, while those born in 1980-89 have an expected interval that is 8.5% shorter than those born in 1960-69. Stated otherwise, the length of the interval from marriage to first birth increased among those born in 1960-69 and 1970-79 before becoming shorter again for the later cohort. These differences are all statistically significant at the $p \leq 0.001$ level.

2.3.3 Gender Context

Of the three variables describing the gender context—women's decision-making, attitudes toward wife beating, and spousal age difference—wife beating attitudes showed no significant association with the length of the first birth interval in any of the study countries net of marriage age and socio-demographic controls. The other two indicate statistically significant associations in three countries each.

There is a significant association between at least one gender context measure and the first birth interval in every South Asian country. India is the only country for which two gender variables—women's decision-making and spousal age difference—are associated with the length of the first birth interval net of each other and the other variables in the model. In contrast, associations between gender context by any of these three measures and the first birth interval are almost non-existent in Southeast Asia; spousal age difference in the Philippines is the sole exception.

The expected time from marriage to first birth decreases by 2-5% with increasing number of decisions in which the respondent is involved in India and Nepal. In Pakistan, each additional decision is associated with a 1% increase in the first birth interval. There is no association between women's decision-making and the first birth interval in any of the Southeast Asian countries, nor in Bangladesh.

The spousal age difference is associated with the first birth interval in Bangladesh, India, and the Philippines. In the two South Asian countries, Bangladesh and India, larger spousal age differences are associated with shorter first birth intervals, although the magnitude of the effect is small, with the expected time to first birth from marriage 1.1-1.2% shorter with each year of difference between spouses. In the Philippines, the difference is of similar magnitude in the opposite direction. The expected time to first birth is 1% longer with each added year difference in spouse's ages.

2.3.4 Socio-demographic Controls

Among socio-demographic controls in the hazard model, women's education and residence are most consistently associated with the first birth interval. Even so, the direction of the association is variable across countries, with no regional pattern emerging.

Higher levels of women's education is significantly associated with a longer duration to first birth in Bangladesh, India, and Nepal, 25-60% longer among women with higher education. In contrast, women with higher education in the Philippines and Pakistan have shorter first birth intervals than women with no education. There is no association in Cambodia and Indonesia. In India, Pakistan,

and Indonesia, urban residence is associated with a shorter birth interval. In Bangladesh and Cambodia, it is associated with a longer birth interval.

Other covariates are more variable in their associations with the time from marriage to first birth across countries. Women's employment status and occupation are inconsistently associated with the length of the first birth interval across study countries, appearing to be slightly more salient in India and Nepal than in other countries. Husband's education and occupation appear to exert weaker influence than these variables for women, as they are seldom associated with the length of the first birth interval. First birth intervals are shorter with increasing wealth quintiles in India and Pakistan, but not elsewhere. Religion is seldom associated with differences in the first birth interval, except among certain religious affiliations in India and the Philippines.

2.3.5 Fixed Regional Effects

As shown in Table 2.4, subnational regional effects are jointly significant in all countries but Pakistan. Dichotomous variables for each subnational region were entered into the models; these results are shown in Appendix Table 2.4. Individually, a majority of subnational regions differ significantly from the reference region only in India (15 of 25) and Indonesia (3 of 5) and fewer than a third of regions in Cambodia (5 of 1, all longer than Phnom Penh) and in the Philippines (5 of 16, all shorter than in the National Capital region).

2.3.6 Underlying Hazard Distribution

The hazard model for the length of the first birth interval was fit using a loglogistic distribution, based on this model having the lowest or second-lowest AIC and BIC in all study countries (Appendix Table 2.2). In the unadjusted model with a single covariate for marriage age (Table

2.3), the shape parameter gamma (γ) ranges from 0.3749 in Cambodia to 0.5741 in Bangladesh. These parameters change little with the addition of covariates into the multivariate hazard model. In this model (Table 2.4), γ ranges from 0.3629 to 0.5492, respectively. The average difference between models is 0.0169. This implies a hazard distribution *h(t)* that quickly increases to near 1 before declining with a long tail as time increases.

2.4 DECOMPOSITION OF THE FIRST BIRTH INTERVAL

While the previous section describes associations between indicators and the first birth interval, this section explores the effect of age at marriage and other covariates on the *change* in the first birth interval over time. To address this question, the change in the first birth interval is decomposed into two components, one representing changes in the distribution of women's characteristics (the "composition" or "endowments" component) and the other representing changes in the effect of those characteristics (the "effects", "rate", or "coefficients" component). The analysis presented in this section uses data from the two time points used earlier in this study, Survey 1 and Survey 2. Survey 2 is the most recent DHS survey and Survey 1 is a DHS survey conducted approximately 10 years prior; these surveys are more closely spaced in India and Pakistan.

There is a significant change in the mean duration of the first interval over the last 10 years in every study country except Cambodia. Here, the observed decrease in the first birth interval of just over 1 month is not statistically significant. The significant decline in the duration of the first birth interval ranges from 0.5 months (Indonesia) to 6.5 months (Bangladesh). In India, the first birth interval increased by 0.6 months and in the Philippines by 2.8 months.

The results of the decomposition analysis indicate whether this change in the first birth interval is the result of changing composition of the population or a change in the effect that each variable has on the first birth interval over time. The results present the proportion of the change in the first birth interval attributed to the composition component, cumulatively, and to the effects component, cumulatively (Table 2.5). This study also presents the detailed results that show the contribution of compositional and effect changes for each covariate to the overall change in the

first birth interval in Tables 6-8 and Appendix Tables 7-12. The multivariate decomposition models are estimated using age at marriage, gender context, and the same socio-demographic controls included in the hazards analysis of the preceding section.

2.4.1 Overall Change in the First Birth Interval

2.4.1.1 Compositional Changes

Table 2.5 shows that in all four South Asian countries, the composition component is significantly associated with the change in the first birth interval. In all four of these countries, changes in the composition of characteristics across the population would contribute to declines in the duration of the first birth interval, holding the effects of these characteristics constant. In India, compositional changes contribute -47% of the increase (i.e., a decrease) in the first birth interval. Compositional changes account for between 37% (Bangladesh) and 97% (Nepal) of the decline in the first birth interval, net of any changes to the effects of characteristics. Pakistan is similar to Nepal with 86% of the decrease contributed by compositional changes.

Table 2.5. Overall multivariate decomposition of change in the first birth interval, showing contributions to the change attributed to differences in composition and to differences in effects

		Composition component		Effects component		Total
	n	β	Percent	β	Percent	β
South Asia						
Bangladesh 2004-2014	20,017	-1.67 ***	36.76	-2.88 ***	63.24	-4.55 ***
India 1998/99-2005/06	139,267	-0.46 ***	-46.77	1.43 ***	146.77	0.98 ***
Nepal 2001-2011	13,385	-5.18 ***	97.17	-0.15	2.83	-5.33 ***
Pakistan 2006-2013	17,685	-0.69 ***	85.87	-0.11	14.13	-0.80
Southeast Asia						
Cambodia 2005-2014	19,455	0.01	-107.99	-0.03	207.99	-0.01
Indonesia 2002-2012	52,999	-1.69 ***	115.00	0.22	-15.00	-1.47 ***
Philippines 2003-2013	15,783	-0.82 ***	-120.5	1.50 ***	220.5	0.68 *

Notes:

*** p≤0.001; ** p≤0.01; * p≤0.05

Decomposition models are estimated with the following covariates: marriage age, women's decision-making (except India and Pakistan), attitudes toward wife beating (except Bangladesh, India, and Pakistan), spousal age difference, education, occupation (except Bangladesh), household wealth quintile, religion (except Pakistan and Indonesia), residence, husband's education, husband's occupation (except Bangladesh), and subnational region.

The table also shows that in Southeast Asia, as in South Asia, the composition component is frequently associated with changes in the first birth interval. In both Indonesia (115%) and the Philippines (-121%), a significant share of the change in the first birth interval can be attributed to compositional changes and, in both cases, these compositional changes would have contributed to a shortened first birth interval, holding the effects of characteristics constant. In this regard, Indonesia, in particular resembles Nepal and Pakistan in South Asia. Thus, similarities in the composition component cross regional groupings with no distinctive South Asian or Southeast Asian patterns apparent.

2.4.1.2 Changes in Effects

Table 2.5 further indicates that the effects component is less frequently associated with changes in the first birth interval than is the composition component, among both the South and Southeast Asian countries in the study, alike. In South Asia, changes in the effects of characteristics on the first birth interval are not significant in either Nepal or Pakistan; here, only the composition component is significant. However, in both Bangladesh and India, the effects component is also significant. Changes in the effects of characteristics, collectively, contribute more to the change in the first birth interval than do changes in the composition of the population in both Bangladesh (63% vs 37%) and India (147% vs -47%).

In Bangladesh, the changes in composition and effects reinforce one another. Holding the effects constant, changes in the composition would have resulted in a reduction of the first birth interval of approximately 1.7 months. Meanwhile, holding the composition constant, changes in the effects of the characteristics would have resulted in a first birth interval shorter by about 2.9 months.

In India, the composition and effects component operate in opposing directions. While compositional changes would have yielded a shorter birth interval (of about 0.5 month) controlling for the effects component, changes in the effects of characteristics would have yielded a first birth interval longer by about 1.5 months controlling for compositional shifts. The net effect is a slightly longer first birth interval in India.

In contrast to the composition component in Southeast Asia, the effects component is significant in just one country in the region: the Philippines. However, as is the case in Bangladesh and India, the contribution of the effects component outweighs that of the composition component here (221% vs -121%). Furthermore, while the compositional changes worked to produce shorter first birth intervals, this is offset by changes in the effects of characteristics that work to lengthen the first birth interval in the Philippines, as is the case in India.

In Cambodia, the overall change is not statistically significant, nor is either the composition or effects component.

2.4.2 Age at Marriage and Change in the First Birth Interval

Age at marriage, shown in Table 2.6, appears to be the most influential factor associated with change in the first birth interval. No other covariate is as consistently—across countries and regions—significantly associated with the change in the first birth interval. Furthermore, no other covariate by and large contributes a larger proportion to the change in the first birth interval.

Table 2.6. Detailed multivariate decomposition of changes in the first birth interval, showing contributions to the change attributed to differences in composition and to differences in effects of marriage age

		Composition component		Effects component	
	n	β	Percent	β	Percent
South Asia					
Bangladesh 2004-2014	20,017	-1.75 ***	38.44	1.51	-33.13
India 1998/99-2005/06	139,267	-0.87 ***	-88.91	-4.27 ***	-437.08
Nepal 2001-2011	13,385	-2.03 ***	38.13	12.37 **	-231.83
Pakistan 2006-2013	17,685	-0.61 ***	76.76	1.74	-217.66
Southeast Asia					
Cambodia 2005-2014	19,455	-0.36	2774.1	-8.06	61270
Indonesia 2002-2012	52,999	-1.26 ***	86.14	0.6	-41.06
Philippines 2003-2013	15,783	-0.07 ***	-10.4	1.57	230.51

Notes:

*** p≤0.001; ** p≤0.01; * p≤0.05

Decomposition models are estimated with the following covariates: marriage age, women's decision-making (except India and Pakistan), attitudes toward wife beating (except Bangladesh, India, and Pakistan), spousal age difference, education, occupation (except Bangladesh), household wealth quintile, religion (except Pakistan and Indonesia), residence, husband's education, husband's occupation (except Bangladesh), and subnational region.

2.4.2.1 Compositional Changes in Age at Marriage

In all six countries with significant change in the first birth interval, compositional changes in the age distribution of marriage are significantly associated with a decline in the first birth interval, net of other factors. In the two countries in which first birth intervals experienced a net increase—India and the Philippines—changes in the age distribution of marriage account for -10% to -89% of that change. Elsewhere, between 38% (Nepal) and 89% (Bangladesh) of the decline in the first birth interval can be attributed to changes in the age at marriage. If nothing in the model changed between Survey 1 and Survey 2 except the age at which women married, the first birth interval would have become a mere 0.1 month shorter in the Philippines, but would range from 0.6 months (Pakistan) shorter to 2 months (Nepal) shorter in the other countries.

2.4.2.2 Changes in the Effect of Age at Marriage

Within the effects component, the effect of marriage age upon the first birth interval has changed over time in two countries, both in South Asia: India and Nepal. The change in the effect of marriage age accounts for -232% to -437% of the change in the first birth interval in these two countries. In India, the first birth interval would be shorter by 4.3 months, on average, in 2005-06 than it was in 1998-99 if neither the composition nor effect of the other characteristics in the model changed. However, the first birth interval would be 12.4 months longer in Nepal if nothing else in the model changed between 2001 and 2011.

There is no evidence that the effects of marriage age has changed significantly over time in any of the Southeast Asian countries in the study or in Bangladesh or Pakistan. To the extent that changes in the first birth interval are due to changing effects of characteristics (as is the case in Bangladesh and the Philippines), this is a result of changes in the effect of characteristics other than age at marriage.

2.4.3 Gender Context and Change in the First Birth Interval

Table 2.7 presents the detailed decomposition results for the three variables that describe the gender context. Few of these variables are associated with changes to the first birth interval in the composition component and the effect of none of them has changed over time.

In Nepal, changes in the level of women's decision-making from 2001 to 2011would have resulted in a first birth interval that is shorter by 1 month, with everything else held constant. In Indonesia, ceteris paribus, changes to 2012 levels of women's decision-making would have resulted in a minute lengthening of the first birth interval (.02 months).

Table 2.7. Detailed multivariate decomposition of changes in the interval to first birth, showing contributions to the change attributed to differences in composition and to differences in effects of gender context variables

		Composition component			Effects component	
	n	β		Percent	β	Percent
Decision-making						
South Asia						
Bangladesh 2004-2014	20,017	0.11		-2.37	1.61	-35.28
Nepal 2001-2011	13,385	-1.04	***	19.41	-0.50	9.30
Southeast Asia						
Cambodia 2005-2014	19,455	-0.09		715.90	-2.31	17537.00
Indonesia 2002-2012	52,999	0.02	*	-1.51	-2.40	163.79
Philippines 2003-2013	15,783	-0.09		-13.10	-1.95	-286.31
Wife beating attitudes						
South Asia						
Nepal 2001-2011	13,385					
Acceptable in at least one scenario		-0.48		8.96	0.51	-9.61
Rejects in all scenarios		-0.48		9.03	-1.32	24.66
Southeast Asia						
Cambodia 2005-2014	19,455					
Acceptable in at least one scenario		0.01		-105.82	0.25	-1886.70
Rejects in all scenarios		0.02		-128.81	-0.16	1231.60
Indonesia 2002-2012	52,999					
Acceptable in at least one scenario		-0.01		0.65	-0.03	2.19
Rejects in all scenarios		-0.01		0.67	0.09	-5.90
Philippines 2003-2013	15,783					
Acceptable in at least one scenario		-0.01		-1.69	0.12	17.49
Rejects in all scenarios		-0.01		-1.65	-0.32	-47.55
Spousal age difference in years						
South Asia						
Bangladesh 2004-2014	20,017	0.18	***	-3.94	-1.43	31.38
India 1998/99-2005/06	139,267	0.15	***	15.35	-0.05	-4.89
Nepal 2001-2011	13,385	0.01		-0.17	0.82	-15.45
Pakistan 2006-2013	17,685	0.07	*	-8.71	0.47	-58.30
Southeast Asia						
Cambodia 2005-2014	19,455	0.01		-44.80	0.87	-6641.20
Indonesia 2002-2012	52,999	0.03		-1.71	-0.20	13.32
Philippines 2003-2013	15,783	0.00		0.29	-0.11	-15.75

Notes:

*** p≤0.001; ** p≤0.01; * p≤0.05

Decomposition models are estimated with the following covariates: marriage age, women's decision-making (except India and Pakistan), attitudes toward wife beating (except Bangladesh, India, and Pakistan), spousal age difference, education, occupation (except Bangladesh), household wealth quintile, religion (except Pakistan and Indonesia), residence, subnational region, husband's education, and husband's occupation (except Bangladesh).

There are no significant compositional changes in women's decision-making that exert influence on the change in the first birth interval in Bangladesh, Cambodia, or the Philippines. Change in women's decision-making was not measured in India or Pakistan.

Changes in spousal age difference are associated with lengthened first birth intervals in three of four South Asian countries; Nepal is the exception. In these three countries, changes in spousal age difference (controlling for all else) all tend toward a longer first birth interval (by 0.1-0.2 months), however, the impact is quite modest. These changes account for 15% of the increase in the first birth interval in India and for between -4% and -9% of the decrease in the first birth interval in Bangladesh and Pakistan. Changes in spousal age difference are not significantly associated with changes in the first birth interval in any Southeast Asian country in the study.

Women's attitudes toward wife beating are not associated with changes in the first birth interval, in either component, in any of the study countries.

2.4.4 Socio-Demographic Controls and Changes in the First Birth Interval

Detailed decomposition results for socio-demographic characteristics can be found in Appendix Tables 2.6-2.12. Few compositional changes in socio-demographic characteristics contribute significantly to change in the first birth interval over time. There are even fewer changes in the effect of socio-demographic characteristics upon the first birth interval. Furthermore, with the possible exception of women's education, socio-demographic characteristics are isolated and country-specific in their associations with change in the first birth interval, rather than consistent across countries or within either region.

Changing education levels among women are associated with changes in the first birth interval in South Asia and among secondary and higher education levels in Southeast Asia (Appendix Table 2.6). Generally, these educational shifts led to shorter first birth intervals. The magnitude of these changes is small in most South Asian countries, but sometimes contribute more than 10% of the change in Indonesia, the Philippines, and Pakistan. There has not been a change in the effect of education on the first birth interval, except among uneducated women in India.

Shifts in the proportion of women not working (Appendix Table 2.7) and in husbands' education (Appendix Table 2.11) are sporadic and contribute more than 10% of the change in the first birth interval only in Indonesia and the Philippines. Shifts in wealth, religion, rural/urban residence, and husbands' occupation contribute less to the change in the first birth interval and with less frequency.

Substantial contributions (greater than 10%) from changes in the effects of these characteristics are even more isolated. For example, the effect of all husbands' occupational categories has changed in Pakistan (but nowhere else), as has the effect of women having no education (India only), husbands having primary education (Bangladesh only), women's employment in services (Indonesia only), poorer (Nepal only), richer (the Philippines only), or being of Catholic or Aglipay faith (the Philippines only).

This hodgepodge of inconsistent findings across countries leaves a question for the three counties—Bangladesh, India, and the Philippines—in which changes in the effects component contribute significantly (and more than the characteristics component) to the change in the first birth interval: To changes in the effect of *which* characteristics, specifically, can the change in the first birth interval be attributed? In Bangladesh, where marriage age and the gender context did

not change in its influence on the first birth interval, changes in the effect of husbands' education is the single biggest contributor, in the effects component, to the change the first birth interval. Here, 19% of the decline in the first birth interval can be attributed to a change in the effect of husbands with primary education and -9% to change in the effect of husbands with higher education. The remaining 53% of the decline is the cumulative result of individually non-significant changes in the effects of other characteristics.

The effect of religion has changed in the Philippines, which likewise experienced no change in the effects of marriage age nor gender context. Here, first birth intervals among Catholics lengthened such that being Catholic (ceteris paribus) would contribute 345% of the overall increase in the first birth interval. Partially offsetting this increase are changes in the effect of adhering to the Aglipay faith (contributing -15% of the increase) and being in the poorer wealth quintile (contributing -52% of the increase).

In India, women's education plays a role: Specifically, -73% of the (modest) increase in the first birth interval can be attributed to changes in women having no education, a net decline in the first birth interval if all else in the model were held constant. The effect of living in a particular state has also changed, in particular for residents of Arunchal Pradesh (-32%), West Bengal (-40%), and Uttar Pradesh and Uttaranchal (-85%), again all contributing to a shorter first birth interval, controlling for all else in the model. The change in each of these effects contributes a lesser proportion but reinforces the change in the effect of marriage age (-437%) upon the first birth interval.

2.4.5 Subnational Region and Changes in the First Birth Interval

Elsewhere in this study, subnational region is incorporated as a control for unobserved fixed effects. Changes in the first birth interval can be attributed to *compositional* shifts in residence in selected subnational regions in Bangladesh, India, Nepal, Indonesia, and the Philippines, but the magnitude of change attributable to these shifts are quite small (with the exception of residence in Andhra Pradesh in India). The effect of living in a given subnational region has changed in India, Nepal, Pakistan, and Indonesia. These results are presented in Appendix Table 2.12. That the composition and/or the effect of residence in a given subnational region influences changes in the first birth interval in several countries, controlling for other factors, reinforces the utility of controlling for fixed regional effects in the study's other analyses.

2.5 MARRIAGE AGE AND SUBSEQUENT BIRTH INTERVALS

Prior demographic literature suggests that age at marriage can influence both the quantum and tempo of fertility, and not just the onset of childbearing. To explore this question, this study uses a multivariate hazard model to estimate associations between covariates and subsequent inter-birth intervals. Specifically, this study estimates models for the second birth interval. Restricting analysis of subsequent birth intervals to the second birth interval carries the advantage of limiting attrition of the sample size in a sample of women who have not completed their fertility, particularly in settings with declining fertility levels. As in the hazards analysis of the first birth interval, these models specify a loglogistic hazard distribution and are estimated with the age at marriage, birth cohort, gender context, and women's and husband's socio-demographic characteristics as covariates. In addition, a control for the duration of the first interval is included in the models.

Table 2.8. Effect of age at marriage on the duration of the second birth interval: Time ratios from unadjusted loglogistic hazard models

	South Asia				Southeast Asia		
	Bangladesh	**India**	**Nepal**	**Pakistan**	**Cambodia**	**Indonesia**	**Philippines**
Age at first marriage	1.035*** (1.027 - 1.042)	1.022*** (1.019-1.024)	1.025*** (1.018 - 1.032)	1.004 (1.000 - 1.008)	1.015*** (1.009 - 1.020)	1.013*** (1.009 - 1.017)	1.030*** (1.025 - 1.035)
Constant	25.913*** (23.102 - 29.067)	22.178*** (21.315-23.075)	22.265*** (19.909 - 24.901)	24.271*** (22.340 - 26.370)	29.202*** (26.292 - 32.434)	44.853*** (41.105 - 48.942)	18.189*** (16.494 - 20.058)
Gamma (γ)	0.4055*** (0.397 - 0.414)	0.3511*** (0.347-0.355)	0.3233*** (0.313 - 0.334)	0.3080*** (0.299 - 0.317)	0.3750*** (0.365 - 0.385)	0.4607*** (0.453 - 0.469)	0.4382*** (0.428 - 0.448)
Weighted sample size (person-months)	667,060	2,898,826	286,577	312,553	463,907	1,832,481	346,881

*** p≤0.001; ** p≤0.01; * p≤0.05

2.5.1 Age at Marriage

Table 2.8 displays the unadjusted time ratios for the effect of marriage age on the length of the second birth interval. In 6 of the 7 study countries, marriage age is significantly associated with the duration of the second birth interval. Pakistan is the exception. In all six countries, marriage age has a positive association with the length of the second birth interval. This finding contrasts with the negative association detected with the first birth interval.

Table 2.9 displays the results of the multivariate hazard models predicting the second birth interval. In all six countries (the exception again being Pakistan), age at marriage remains significantly and positively associated with the second birth interval when controlling for other covariates in the model. The magnitude of the effect is not large. Women experience a second birth interval that is, consistently across countries, 1-2% longer with each year of age older at which women marry. However, the magnitude of the effect is virtually unchanged from that of the unadjusted effect with the inclusion of other covariates.

These results for marriage age are similar to those in the analysis of the hazard of the first birth interval, albeit operating in the opposite direction. Again, no patterns by region emerge in the association between marriage age and birth intervals.

Table 2.9. Adjusted effects on the duration of the second birth interval: Time ratios from multivariate loglogistic hazard models

	South Asia				Southeast Asia		
	Bangladesh	India	Nepal	Pakistan	Cambodia	Indonesia	Philippines
Age at first marriage	1.019***	1.013***	1.014***	1.003	1.010***	1.018***	1.020***
Duration of 1st birth interval (ref= <16 months)							
16-32 months	1.032	1.025***	0.967	1.01			
>32 months	1.109***	1.162***	0.992	1.073***			
Duration of 1st birth interval (ref= <12 months)							
12-22 months					0.993	1.022	1.003
>22 months					1.050*	1.161***	1.209***
Birth cohort (ref=1960-69)							
1950-59		0.970					
1970-79	1.078**	1.008	1.027	1.024	1.053*	1.330***	1.118***
1980-89	1.207***	1.030	1.173***	1.033	1.255***	1.603***	1.306***
Decisionmaking		0.999					
number of decisions in which Respondent is involved	0.990		1.003	1.000	0.994	1.001	1.002
Wife beating attitudes (ref=wife beating is acceptable in at least one scenario							
Respondent rejects wife beating	na	1.007	1.065	1.026	1.053**	1.024	1.004
Spousal age difference in years	0.994***	1.002**	1.001	0.999	1.007**	0.994***	0.999
Education (ref=no education)							
Primary	1.032	0.979*	1.013	0.992	0.996	1.103*	0.892
Secondary	1.181***	1.029**	1.093**	0.996	1.031	1.138**	0.911
Higher	1.282***	1.355***	1.316***	1.123**	0.982	1.014	0.991
Occupation (ref=not working)							
Agricultural	na	1.004	1.01	1.012	1.015	0.994	0.986
Professional/technical/managerial		1.064	1.040	0.928	1.112	1.065	0.983
Clerical	na	1.142**	1.138	0.903	1.033	0.995	1.042
Sales	na	0.968	na	0.851*	1.043	1.053*	1.101
Services	na	0.963*	1.025	0.976	1.035	1.068	1.073
Skilled manual	na	na	1.112	1.091	1.092*	1.080**	0.974
Unskilled manual	na	1.001	1.017	0.98	1.001	1.075	0.958
Other	na	1.102	0.654***	na	1.316*	0.458***	1.155
Household wealth quintile (ref=poorest)							
poorer	1.024	1.001	1.043	1.014	1.044	1.190***	1.061*
middle	1.039	1.007	1.008	0.962	1.055*	1.260***	1.123***
richer	1.035	0.987	1.052	1.003	1.087**	1.285***	1.253***
richest	1.066	1.068***	1.124**	1.017	1.612*	1.245***	1.367***
Religion							
Reference religion	Muslim	Hindu	Hindu	na	Buddhist	na	Roman Catholic
Muslim	ref	0.929***	0.945	na	1.120	na	0.779***
Christian	1.078	0.963	na	na	0.829**	na	na
Buddhist	0.956	0.948	1.064*	na	ref	na	na
Hindu	1.029	ref	ref	na	na	na	na
Other	na	1.009	1.144**	na	0.910	na	0.939
Protestant	na	na	na	na	na	na	1.084
Iglesia Ni Kristo	na	na	na	na	na	na	1.003
Aglipay	na	na	na	na	na	na	0.910
Sikh	na	1.008	na	na	na	na	na
Jain	na	0.923	na	na	na	na	na
Kirat	na	na	0.861**	na	na	na	na

Continued

Table 2.9—*Continued*

	South Asia				Southeast Asia		
	Bangladesh	**India**	**Nepal**	**Pakistan**	**Cambodia**	**Indonesia**	**Philippines**
Residence (ref=rural)							
urban	1.087***	1.018	1.051	0.958*	0.99	0.884***	0.986
Husband's education (ref=no education)							
Primary	1.014	0.994	0.994	1.03	0.967	1.041	0.918
Secondary	1.116***	1.012	1.024	1.047*	1.001	1.008	0.937
Higher	1.100**	1.060***	0.912	1.074*	1.012	0.904	0.987
Don't know	na	0.958	0.868	1.250*	0.633***	0.982	1.057
Husband's occupation (ref=agricultural)							
Professional/technical/managerial	na	1.031	0.968	0.967	0.996	0.949	1.008
Clerical	na	1.006	1.105**	0.936	1.122	0.936	1.087
Sales	na	0.990	na	0.956	0.986	0.926**	1.224*
Services	na	1.024	1.065*	1.004	1.071	0.959	1.031
Skilled manual	na	na	0.998	0.978	1.066**	0.989	0.988
Unskilled manual	na	1.021*	1.041	1.003	0.938	0.861**	1.005
Other	na	1.026	1.049	0.905*	1.016	0.862	1.008
Not working	na	1.000	na	0.956	na	0.915	na
Constant	25.841*** (21.437 - 31.151)	21.314*** (20.191- 22.499)	21.149*** (15.003 - 29.813)	22.419*** (19.948 - 25.197)	23.769*** (19.648 - 28.755)	18.930*** (15.954 - 22.461)	19.178*** (15.250- 24.116)
Gamma (γ)	0.3710*** (0.363 - 0.379)	0.3317*** (0.328- 0.336)	0.3115*** (0.302 - 0.321)	0.2965*** (0.288 - 0.305)	0.3389*** (0.330 - 0.348)	0.4186*** (0.411 - 0.426)	0.4099*** (0.400-0.420)
Regional fixed effects	***	***		***	***	***	***
Weighted sample size (person-months)	603,029	2,898,826	271,254	288,645	391,788	1,678,620	312,180

Notes:

*** p≤0.001; ** p≤0.01; * p≤0.05

Shorter, medium, and longer first birth intervals roughly align with the average tercile among countries in the region. See Appendix Table 2.15.

Hazard models for Bangladesh excludes controls for: wife beating attitudes, occupation, and husband's occupation, as these data were not collected in the Bangladesh 2014 DHS.

India 2005-06 DHS (NFHS-3) does not distinguish between skilled manual and unskilled manual.

Hazard models for Indonesia and Pakistan exclude religious affiliation because these data were not collected in the Indonesia 2012 DHS or Pakistan 2012-13 DHS.

Indonesia 2012 DHS, Cambodia 2014 DHS, and Philippines 2013 DHS do not collect data on husband's current employment status, but categorizes husband's occupation regardless of current employment status.

India 2005-06 DHS (NFHS-3) and Indonesia 2012 DHS captures husband's current employment status as a separate occupational category and categorizes husband's occupation only for husbands who are currently working.

Region names can be found in Appendix Table 2.4.

2.5.2 First Birth Interval and Birth Cohort

Table 2.9 indicates that there is no statistically significant difference in the second birth interval depending on whether women experienced a shorter or a medium-length first birth interval in most countries. India is the exception, where women who experienced a medium-length first birth

interval experience a longer second birth interval than do women who experienced a short first birth interval. However, in all countries but Nepal, women who experienced a longer first birth interval also experience a longer second birth interval compared to women experienced a shorter first birth interval. The effect appears to be generally of larger magnitude in Southeast Asia than in South Asia. However, two countries do not reflect this pattern: India—where the effect is larger (16%) than its South Asian neighbors—and Cambodia—where the effect is smaller. The level of the effect ranges from Cambodia, where women with the longest tercile first interval experience a second interval that is 5% longer, to the Philippines where women in this tercile experience a second interval that is 20% longer than women who had shorter first birth intervals.

Birth cohort is significantly and positively associated with the second birth cohort, such that women in successive birth cohorts experience longer second birth intervals, in all countries except India and Pakistan. Here, there is no difference by birth cohort. The difference is greatest in Indonesia where women born between 1970-79 experience second birth intervals that are 33% longer and women born 1980-89 experience birth intervals that are 60% longer than do women born between 1960 and 1969. Birth cohort, thus, demonstrates a similarly consistent pattern across regions as was the case with the first birth interval, again in the opposite direction. Whereas first birth intervals have become shorter across birth cohorts in South and Southeast Asia, alike, they second birth intervals have become longer.

2.5.3 Gender Context

With one exception, women's decision-making and attitudes toward wife beating are not associated with the second birth interval: In Cambodia, women who reject wife beating in any of

the listed scenarios have second birth intervals that are 5% longer, on average, than women who think that wife beating is acceptable in at least one scenario.

Spousal age difference is significantly associated with the second birth interval in four of seven study countries—Bangladesh, India, Cambodia, and Indonesia. However, the direction of this association is inconsistent. In Bangladesh and Indonesia, women experience a second birth interval that is 1% shorter with each additional year difference in age with their spouse. Meanwhile in Cambodia, second birth intervals are nearly 1% longer with each additional year difference in age between spouses. The positive association between spousal age difference and second birth intervals is smaller in India. Thus, these data indicate that the break between positive and negative associations do not align with the South and Southeast Asian regional groupings. This stands in contrast to the hazard of the first birth interval, which suggested gender context may be modestly more salient in South Asia than in Southeast Asia.

2.5.4 Socio-Demographic Controls

Among socio-demographic controls, women's education emerges as an important covariate, as was the case with first birth intervals. However, a regional pattern is more apparent in the association of women's education with the hazard of the second birth interval than with the first birth interval. Women's education is significantly and positively associated with longer second birth intervals in all four South Asian countries. The effect is monotonically larger with increasing levels of education. In Southeast Asia, only Indonesia has a significant association between women's education and the second birth interval. Women who have a primary or secondary education have second birth intervals that are 10-14% longer than women with no education. There is no statistically significant difference with women with higher education.

There are weaker associations with husband's education than with women's education. There is positive association between husbands with secondary or higher education and longer second birth intervals in Bangladesh and Pakistan and with husbands with higher education in India. These associations are absent in the Southeast Asian countries in the study.

Household wealth is associated with the second birth interval to a greater extent in Southeast Asia than in South Asia. In Indonesia, the Philippines, and Cambodia, the second birth interval lengthens monotonically with household wealth quintile. In India and Nepal, only women who live in households in the richest wealth quintile have second birth intervals than women living in the poorest wealth quintile.

Women's occupation, husbands' occupation, and religious affiliation are infrequently associated with the second birth interval, with no evident regional pattern. Women in living urban areas have longer second birth intervals than do rural women in Bangladesh, but shorter birth intervals in Pakistan and Indonesia.

2.5.5 Regional Fixed Effects

Subnational regional effects are jointly significant in all countries but Nepal, as shown in Table 2.10. Results for subnational regions, individually, are presented in Appendix Table 2.16. This table shows there are pervasive differences in the second birth interval by subnational region in 3 of 4 South Asian countries—Bangladesh, India, and Pakistan—and also Indonesia, while these differences are intermittent in Cambodia and the Philippines.

2.6 DISCUSSION AND CONCLUSIONS

This study uses hazard models and multivariate decomposition techniques to investigate the influence of marriage age on the first birth interval over time, and the implications of both marriage age and first birth interval for the second birth interval. Secondarily, attention is given to variables that describe the gender context. The study addresses these relationships in seven countries—four in South Asia and three in Southeast Asia. DHS data is used from two points in time over approximately a 10-year period to examine changes in these dynamics over time.

The mean marriage age has increased significantly in all study countries, more rapidly in Indonesia, Nepal, and Bangladesh, but slower elsewhere. With this increase, the first birth interval has become significantly shorter in four countries: Bangladesh, Nepal, Pakistan, and Indonesia. Meanwhile, the first birth interval has lengthened significantly in India and the Philippines while there has been no significant change in Cambodia.

This study finds a strong, consistent, negative association between marriage age and the hazard of the first birth interval in bivariate and multivariate analysis in six of the seven study countries, with the Philippines as the exception. However, the magnitude is modest with first birth intervals 2-6% shorter with each one year increase in age at marriage. This relationship is robust to the inclusion of controls, but declines to 1-2% shorter intervals with each year increase in age at marriage. A significant positive association between marriage age and the first birth interval emerges in the Philippines when controlling for other factors. Marriage age influences the first birth interval independent of the effect of birth cohort. The prominence of marriage age in explaining the first birth interval reinforces findings from previous studies (Westoff 1992).

Birth cohort also independently influences the first birth interval. Birth cohort has a negative association, in that the first birth interval declines over time even after controlling for increases in marriage age. This birth cohort effect reinforces the influence of marriage age on first birth intervals over time.

There is substantial variation across countries in other characteristics that are associated with the first birth interval in multivariate hazard models. Two indicators describing the gender context—spousal age difference and women's decision-making—are generally associated with the first birth interval in most South Asian countries, while attitudes toward wife beating are not. Women's decision-making is negatively related to the first birth interval, although not monotonically; there is a small increase with a longer first birth interval among women with the greatest decision-making capacity in some countries. This association loses significance when controlling for marriage age and other factors in Cambodia. Spousal age difference is curvilinearly associated with the first birth interval, in that intervals are longest among those with very little and very large age differences.

Women's education is associated with shorter first birth intervals in bivariate analysis, and retains this association in Pakistan and the Philippines with multivariate controls. However, education has a positive association with the first birth interval when accounting for marriage age and other controls.

First birth intervals are longer among women living in rural areas in India, Nepal, and Pakistan, whereas they are longer in urban areas in Bangladesh and Indonesia. There is no association with urban/rural residence in Cambodia or the Philippines, which suggests that place of residence is more salient in South Asia than Southeast Asia. The first birth interval varies by subnational region

in three of five countries (India, Nepal, and the Philippines) after controlling for other factors, with regional differences greatest in India and smaller in Nepal. There is no such association in Bangladesh or Pakistan.

While bivariate analysis suggested that women who are not working or are employed in agricultural or unskilled manual labor occupations have shorter first birth intervals and those employed in professional and clerical occupations have longer first birth intervals, these associations are rarely observed when controlling for marriage age and other covariates. Associations with wealth and religion are similarly sporadic in multivariate analysis. Single-country studies elsewhere have found some of these factors to be associated with the first birth interval (Alam 2015; Dommaraju 2008; Rindfuss, Palmore, and Bumpass 1987). Attitudes toward wife beating and husband's characteristics (education and occupation) are infrequently associated with the first birth interval.

Decomposition analysis investigated whether first birth intervals changed over time because women marry at later ages or other characteristics changed (composition component), or whether the first birth interval changed because the rate these women are subject to has changed (effects component). The study finds no regional pattern in whether it is changes in composition, changes in rates, or both that drive the change in the first birth interval. Changes in the composition component contribute the majority of change in the first birth interval in Nepal and Pakistan in South Asia and Indonesia in Southeast Asia, whereas changes in the effects component contribute more to the overall change in Bangladesh and India in South Asia and the Philippines in Southeast Asia.

Both India and the Philippines experience significant change in the composition and effects components, in opposing directions. Changes in composition would imply shorter first birth intervals and changes in rates would imply longer first birth intervals; the net effect of these changes is a longer first birth interval over time. The lack of significant change in first birth intervals in Cambodia could have been the net result of compositional and rate changes of equal magnitude operating in opposing directions. It is not. Cambodia has not experienced a significant change in either the overall composition or effects component, nor in the composition or effect of marriage age or any other constituent factors.

In detailed decomposition results, marriage age proves to be a significant influence on declines in first birth intervals in the six countries experiencing change in the first birth interval. That more women marry later than they did in the past accounts for 38-89% of the change in the first birth interval in the four South Asian countries and -10% of the change in Philippines and 86% of the change in Indonesia. The effect of marriage age has changed over time in India and Nepal, implying shorter first birth intervals at each age of marriage in India and longer first birth intervals at each age of marriage in Nepal. With these two exceptions, the effect of marriage age on the first birth interval has not changed over time.

Neither changes in the composition nor effect of the gender context variables contribute to change in the first birth interval. Changes (reductions) in the spousal age difference contribute modestly to longer first birth intervals in South Asia, but not in Southeast Asia.

The two countries where the first birth interval increased rather than decreased over time (the Philippines and India) manifest slightly different driving factors. In India, the contributions to a shorter first birth interval of more women marrying at older ages are amplified by a shorter first

birth interval at all ages of marriage. However, the effect of these shifts in both composition and rate is reversed by cumulative changes in rates. Women in selected occupations, with secondary and higher education, and Hindu women, among others, experience longer first birth intervals than in the past, and this results in slightly longer first birth intervals overall.

In the Philippines, contributions to shorter first birth intervals of more women marrying at older ages than in the past are reversed by cumulative changes in rates over time for certain subgroups. Most notably, the first birth interval has become longer among Roman Catholics (contributing 345% to the change in the first birth interval), women with any education, women in the National Capital and two other regions, women who do not work, and those with husbands in professional occupations.

As with the first birth interval, marriage age is strongly significantly associated with the second birth interval, but the size of the effect is modest. Marriage age is associated with a 1.3-3.5% longer second birth interval in all seven countries. The effect is attenuated slightly when controls are added except in Pakistan, where the association is not significant. The result leads to the conclusion that marriage age influences not just the timing of the first birth, but also birth spacing, even after controlling for changes in birth cohort, the duration of the first birth interval, and other covariates.

The duration of the first birth interval is positively associated with second birth interval, except in Nepal. This influence is particularly strong for women with first birth intervals in the longest tercile. These women experience second birth intervals that are 5-20% longer than women whose first birth intervals fall in the shortest tercile. Similarly, women who were born in later birth

cohorts experience longer second birth intervals than do women born 1960-69 in all countries except India and Pakistan.

In contrast, indicators that describe the gender context are poorly and inconsistently associated with longer second birth intervals, after marriage age, birth cohort, first birth interval, and other covariates are controlled. This finding would suggest that, to the extent that gender context influences birth spacing, it does so largely indirectly through these other factors. Husband's characteristics and women's place of residence are also inconsistently associated with the second birth interval. However, several socio-economic and socio-cultural indicators (education, wealth, and occasionally subnational region and religion) tend to be independently associated with the second birth interval, independent of other factors.

In all three analyses presented here—the hazard analysis of the first birth interval, the hazard analysis of the second birth interval, and the decomposition of the change in the first birth interval—marriage age played an influential role with regard to these outcomes. Gender context did not. The lack of strong and consistent associations between the three gender variables and the study's outcomes is surprising given the prominent profile afforded gender in the body of literature coming from the child marriage community, the public health community, and some parts of demographic literature on the relationship between marriage and family formation. There are, at a minimum, three possible explanations for the modest and inconsistent results vis à vis gender context.

First, there may be measurement deficiencies in the gender context variables used. For example, reproductive empowerment and women's empowerment researchers have not reached consensus on how best to measure women's decision-making, questioning whether it is preferable to assess women's autonomous or joint participation in decisions and which decisions are most salient to

capture (Edmeades and Mandal 2016; James-Hawkins et al. 2016; Upadhyay, Dworkin, et al. 2014; Upadhyay, Gipson, et al. 2014). Similarly, the three variables used in this study might not be the most relevant aspects of the gender context for assessing the influence of gender context on the first or second birth interval. Furthermore, they may assess the gender context at the right point of time. It is possible that measures capturing the gender context around the time of marriage or the time just preceding the first pregnancy rather than the time of the survey.

Second, these measures all assess aspects of the gender context at the individual woman's level. The gender context at the community level may be more salient than at the individual level (Mason and Smith 2003; Yount et al. 2016). A relationship between the gender context and birth intervals may become more apparent if these same variables were assessed as the aggregate levels (mean minus the respondent) in each enumeration area of women's decision-making, attitudes toward wife beating, and average age difference between spouses or entirely different variables that capture community-level gender context.

Third, marriage age, itself, may be a feature of the gender context (Malhotra, Vanneman, and Kishor 1995). If it is conceptualized in this manner, it may be that marriage age reflects the majority of gender context's influence on the first birth interval and birth spacing, with relatively little significant marginal effect of the other gender variables to be detected once marriage age is controlled for.

Finally, we cannot disregard the possibility that there is little true influence of the gender context to be detected even if the most relevant aspects of gender context were perfectly measured at the correct level.

2.7 REFERENCES

Abedin, S. 2011. "Identification of Fertility Enhancing and Inhibiting Factors: A Study on Married Adolescents in Bangladesh." *Asian Social Science* 7(5):191.

Alam, M.M. 2015. "Marriage to First Birth Interval and Its Associated Factors in Bangladesh." *Asian Journal of Social Sciences & Humanities* 4(4):36-47.

Allison, P.D. 1995. *Survival Analysis Using Sas: A Practical Guide*. 10th printing ed. Cary, NC: SAS Institute Inc.

Amin, S., and A. Bajracharya. 2011a. *Costs of Marriage--Marriage Transactions in the Developing World, Promoting Healthy, Safe, and Productive Transitions to Adulthood Brief No. 35*. New York, NY: Population Council.

Amin, S., and A. Bajracharya. 2011b. *Marriage and First Birth Intervals in Early and Late Marrying Societies: An Exploration of Determinants*. In *Population Association of America*. Washington, DC.

Aryal, T.R. 2007. "Age at First Marriage in Nepal: Differentials and Determinants." *Journal of Biosocial Science* 39(5):693-706.

Banerji, M., and R. Vanneman. 2011. "Does Love Make a Difference? Marriage Choice and Post-Marriage Decision-Making Power." *Indian Human Development Survey Working Paper No* 14.

Basu, A.M. 1993. "Cultural Influences on the Timing of First Births in India: Large Differences That Add up to Little Difference." *Population Studies* 47(1):85-95.

Bhattacharya, B.N., K.K. Singh, U. Singh, and C.M. Pandey. 1989. "An Extension of a Model for First Birth Interval and Some Social Factors." *Sankhya: The Indian Journal of Statistics, Series B* 51(1):115-124.

Blinder, A.S. 1973. "Wage Discrimination: Reduced Form and Structural Estimates." *Journal of Human Resources*:436-455.

Bloom, D.E., and P.H. Reddy. 1986. "Age Patterns of Women at Marriage, Cohabitation, and First Birth in India." *Demography* 23(4):509-523.

Bongaarts, J. 1978. "A Framework for Analyzing the Proximate Determinants of Fertility." *Population and Development Review* 4(1):105-132.

Bongaarts, J. 1999. "The Fertility Impact of Changes in the Timing of Childbearing in the Developing World." *Population Studies* 53(3):277-289.

Bongaarts, J. 2015. "Modeling the Fertility Impact of the Proximate Determinants: Time for a Tune-Up." *Demographic Research* 33(19):535-559.

Bongaarts, J., and B. Cohen. 1998. "Introduction and Overview." *Studies in Family Planning* 29(2):99-105.

Box-Steffensmeier, J.M., and B.S. Jones. 2004. *Event History Modeling: A Guide for Social Scientists*. Cambridge: Cambridge University Press.

Chandra-Mouli, V., A.V. Camacho, and P.-A. Michaud. 2013. "Who Guidelines on Preventing Early Pregnancy and Poor Reproductive Outcomes among Adolescents in Developing Countries " *Journal of Adolescent Health* 52(5):517-522.

Chandra-Mouli, V., C. Lane, and S. Wong. 2015. "What Does Not Work in Adolescent Sexual and Reproductive Health: A Review of Evidence on Interventions Commonly Accepted as Best Practices." *Global Health: Science and Practice* 3(3):333-340.

Choe, M.K., S. Thapa, and V. Mishra. 2005. "Early Marriage and Early Motherhood in Nepal." *Journal of Biosocial Science* 37(2):143-162.

Christensen, H.T. 1939. "The Time-Interval between Marriage of Parents and the Birth of Their First Child in Utah County, Utah." *The American Journal of Sociology* 44(4):518-525.

Christensen, H.T., and O.P. Bowden. 1952. "Studies in Child Spacing: Ii. The Time-Interval between Marriage of Parents and Birth of Their First Child, Tippecanoe County, Indiana." *Social Forces* 31(4):346-351.

Cleves, M., R.G. Gutierrez, W. Gould, and Y.V. Marchenko. 2010. *An Introduction to Survival Analysis Using Stata*. Third ed. College Station, TX: Stata Press.

Coale, A.J. 1971. "Age Patterns of Marriage." *Population Studies* 25(2):193-214.

Coale, A.J. 1992. "Age of Entry into Marriage and the Date of the Initiation of Voluntary Birth Control." *Demography* 29(3):333-341.

Coale, A.J., and D.R. McNeil. 1972. "The Distribution by Age of the Frequency of First Marriage in a Female Cohort." *Journal of the American Statistical Association* 67(340):743-749.

Desai, S., and L. Andrist. 2010. "Gender Scripts and Age at Marriage in India." *Demography* 47(3):667-687.

Dommaraju, P. 2008. *Marriage Age and Fertility Dynamics in India, DHS Working Paper No. 52*. Calverton, MD: ICF International.

Donaldson, P.J., and D.J. Nichols. 1978. "The Changing Tempo of Fertility in Korea." *Population Studies* 32(2):231-249.

Dyson, T., and M. Moore. 1983. "On Kinship Structure, Female Autonomy, and Demographic Behavior in India." *Population and Development Review* 9(1):35-60.

Edmeades, J., and M. Mandal. 2016. *Reproductive Empowerment: Moving Towards a Common Conceptual Framing and Measurement. White Paper*. Washington, DC: International Center for Research on Women and MEASURE Evaluation.

Edmeades, J., R. Pande, K. MacQuarrie, T. Falle, and A. Malhotra. 2012. "Two Sons and a Daughter: Sex Composition and Women's Reproductive Behaviour in Madhya Pradesh, India." *Journal Biosocial Science* 44(6):749-764.

Ertem, M., G. Saka, A. Ceylan, V. Değer, and S. Çiftçi. 2008. "The Factors Associated with Adolescent Marriages and Outcomes of Adolescent Pregnancies in Mardin Turkey." *Journal of Comparative Family Studies* 39(2):229-239.

Feng, W., and Y. Quanhe. 1996. "Age at Marriage and the First Birth Interval: The Emerging Change in Sexual Behavior among Young Couples in China." *Population and Development Review* 22(2):299-320.

Field, E., and A. Ambrus. 2008. "Early Marriage, Age of Menarche, and Female Schooling Attainment in Bangladesh." *Journal of Political Economy* 116(5):881-930.

Fricke, T., and J.D. Teachman. 1993. "Writing the Names: Marriage Style, Living Arrangements, and First Birth Interval in a Nepali Society." *Demography* 30(2):175-188.

Ghimire, D.J. 2017. "Social Context of First Birth Timing in a Rapidly Changing Rural Setting." *Social Science Research* 61:314-329.

Ghimire, D.J., and W.G. Axinn. 2013. "Marital Processes, Arranged Marriage, and Contraception to Limit Fertility." *Demography* 50(5):1663-1686.

Ghuman, S.J. 2003. "Women's Autonomy and Child Survival: A Comparison of Muslims and Non-Muslims in Four Asian Countries." *Demography* 40(3):419-436.

Godha, D., D.R. Hotchkiss, and A.J. Gage. 2013. "Association between Child Marriage and Reproductive Health Outcomes and Service Utilization: A Multi-Country Study from South Asia." *Journal of Adolescent Health* 52(5):552-558.

Hindin, M.J., A.M. Kalamar, T.-A. Thompson, and U.D. Upadhyay. 2016. "Interventions to Prevent Unintended and Repeat Pregnancy among Young People in Low-and Middle-Income Countries: A Systematic Review of the Published and Gray Literature." *Journal of Adolescent Health* 59(3):S8-S15.

Hirschman, C. 1985. "Premarital Socioeconomic Roles and the Timing of Family Formation: A Comparative Study of Five Asian Societies." *Demography* 22(1):35-59.

Hirschman, C., and R. Rindfuss. 1980. "Social, Cultural, and Economic Determinants of Age at Birth of First Child in Peninsular Malaysia." *Population Studies* 34(3):507-518.

Hirschman, C., and R. Rindfuss. 1982. "The Sequence and Timing of Family Formation Events in Asia." *American Sociological Review* 47(5):660-680.

Hong, Y. 2006. "Marital Decision-Making and the Timing of First Birth in Rural China before the 1990s." *Population Studies* 60(3):329-341.

ICF International. 2012. *Demographic and Health Survey Interviewer's Manual, Measure DHS Basic Documentation No. 2*. Calverton, MD: ICF International.

ICF International. 2015a. *Demographic and Health Survey Supervisor's and Editor's Manual, The DHS Methodology Toolbox*. Rockville, MD: ICF International.

ICF International. 2015b. *Questionnaires: Household, Woman's, and Man's, Demographic and Health Surveys Methodology*. Rockville, MD: ICF International.

James-Hawkins, L., C. Peters, K. VanderEnde, L. Bardin, and K.M. Yount. 2016. "Women's Agency and Its Relationship to Current Contraceptive Use in Lower-and Middle-Income Countries: A Systematic Review of the Literature." *Global Public Health*:1-16.

Jejeebhoy, S.J., and Z.A. Sathar. 2001. "Women's Autonomy in India and Pakistan: The Influence of Religion and Region." *Population and Development Review* 27(4):687-712.

Jensen, R., and R. Thornton. 2003. "Early Female Marriage in the Developing World." *Gender & Development* 11(2):9-19.

Jones, G.W. 2007. "Delayed Marriage and Very Low Fertility in Pacific Asia." *Population and Development Review* 33(3):453-478.

Jones, G.W. 2009. *Changing Marriage Patterns in Asia*. In *IUSSP*. Marrakech, Morocco.

Kalamar, A.M., S. Lee-Rife, and M.J. Hindin. 2016. "Interventions to Prevent Child Marriage among Young People in Low-and Middle-Income Countries: A Systematic Review of the Published and Gray Literature." *Journal of Adolescent Health* 59(3):S16-S21.

Kallan, J., and J.R. Udry. 1986. "The Determinants of Effective Fecundability Based on the First Birth Interval." *Demography* 23(1):53-66.

Kim, S.-Y., and W.F. Stinner. 1980. "Social Origins, Educational Attainment and the Timing of Marriage and First Birth among Korean Women." *Journal of Marriage and the Family* 42(3):671-679.

Kishor, S. 2000. *Women's Contraceptive Use in Egypt: What Do Direct Measures of Empowerment Tell Us?* Paper read at annual meeting of the Population Association of America, Los Angeles.

Klugman, J., L. Hanmer, S. Twigg, T. Hasan, J. McCleary-Sills, and J. Santamaria. 2014. *Voice and Agency: Empowering Women and Girls for Shared Prosperity*: World Bank Publications.

Lavely, W. 2007. "Sex, Breastfeeding and Marital Fertility in Pretransition China." *Population and Development Review* 33(2):289-320.

Lee-Rife, S., A. Malhotra, A. Warner, and A.M. Glinski. 2012. "What Works to Prevent Child Marriage: A Review of the Evidence." *Studies in Family Planning* 43(4):287-303.

Lloyd, C.B. 2005. *Growing Up Global: The Changing Transition to Adulthood in Developing Countries*. Washington, D.C.: The National Academies Press.

Lloyd, C.B., and B. Mensch. 1999. "Implications of Formal Schooling for Girls' Transitions to Adulthood in Developing Countries." In *Critical Perspectives on Schooling and Fertility in the Developing World*, edited by Caroline H Bledsoe, John B Casterline and Jennifer A Johnson-Kuhn, 80-104. Washington, D.C.: National Academy Press.

Lloyd, C.B., and B.S. Mensch. 2008. "Marriage and Childbirth as Factors in Dropping out from School: An Analysis of DHS Data from Sub-Saharan Africa." *Population Studies* 62(1):1-13.

Loaiza Sr., E., and S. Wong. 2012. "Marrying Too Young. End Child Marriage."

MacQuarrie, K. 2009a. *Time to Conception in Higher Order Births in India: Does Women's Empowerment Moderate the Influence of Son Preference and Sex Composition?* In *American Sociological Association*. San Francisco.

MacQuarrie, K.L.D. 2009b. *The Unfolding of Women's Empowerment over the Life Course in Madhya Pradesh, India: The Influence of Family Formation and Early Empowerment Resources*. In *XXVI IUSSP International Population Conference*. Marrakech, Morocco.

Malhotra, A., and A.O. Tsui. 1996. "Marriage Timing in Sri Lanka: The Role of Modern Norms and Ideas." *Journal of Marriage and the Family* 58(2):476-490.

Malhotra, A., R. Vanneman, and S. Kishor. 1995. "Fertility, Dimensions of Patriarchy, and Development in India." *Population and Development Review* 21(2):281-305.

Malhotra, A., A. Warner, A. McGonagle, S. Lee-Rife, C. Powell, E.V. Cantrell, and R. Trasi. 2011. *Solutions to End Child Marriage: What the Evidence Shows*. Washington, DC: International Center for Research on Women.

Mason, K.O., and H.L. Smith. 2000. "Husbands' Versus Wives' Fertility Goals and Use of Contraception: The Influence of Gender-Context in Five Asian Countries." *Demography* 37(3):299-311.

Mason, K.O., and H.L. Smith. 2003. "Women's Empowerment and Social Context: Results from Five Asian Countries." *Gender and Development Group, World Bank, Washington, DC*.

Mason, W.M., and B. Entwisle. 1985. *Cross National Variability in Age at First Birth: Theory and Evidence.* Population Studies Center Report. University of Michigan Press.

Mensch, B., J. Bruce, and M. Greene. 1998. *The Unchartered Passage: Girls' Adolescence in the Developing World*. New York: Population Council.

Mensch, B.S., S. Singh, and J.B. Casterline. 2005. *Trends in the Timing of First Marriage among Men and Women in the Developing World*. Vol. 202, *Policy Research Division Working Papers No. 202*. New York, NY: Population Council.

Moultrie, T.A., T.S. Sayi, and I.M. Timæus. 2012. "Birth Intervals, Postponement, and Fertility Decline in Africa: A New Type of Transition?" *Population Studies* 66(3):241-258.

Murphy, E., and D. Carr. 2009. *Powerful Partners, Adolescent Girls' Education and Delayed Childbearing*. Washington DC: Population Reference Bureau.

Nath, D.C., K.C. Land, and G. Goswami. 1999. "Effects of the Status of Women on the First-Birth Interval in Indian Urban Society." *Journal of Biosocial Science* 31(1):55-69.

Nguyen, M.C., and Q. Wodon. 2012a. *Child Marriage, Pregnancies, and the Gender Gap in Education Attainment: An Analysis Based on the Reasons for Dropping out of School*. Washington, DC: The World Bank.

Nguyen, M.C., and Q. Wodon. 2012b. "Measuring Child Marriage." *Economics Bulletin* 32(1):398-411.

Nguyen, M.C., and Q. Wodon. 2015. “Impact of Child Marriage on Literacy and Education Attainment in Africa.” *Child Marriage and Education in Sub-Saharan Africa*.

Nour, N.M. 2009. “Child Marriage: A Silent Health and Human Rights Issue.” *Review of Obstetrics and Gynecology* 2(1):51-56.

Oaxaca, R. 1973. “Male-Female Wage Differentials in Urban Labor Markets.” *International Economic Review*:693-709.

Padmadas, S.S., I. Hutter, and F. Willekens. 2004. “Compression of Women's Reproductive Spans in Andhra Pradesh, India.” *International Family Planning Perspectives*:12-19.

Palmore, J.A., and R.W. Gardner. 1994. *Measuring Mortality, Fertility, and Natural Increase: A Self-Teaching Guide to Elementary Measures*. Honolulu, HI: East-West Center.

Powers, D.A., H. Yoshioka, and M.-S. Yun. 2011. “Mvdcmp: Multivariate Decomposition for Nonlinear Response Models.” *Stata Journal* 11(4):556-576.

Powers, D.A., and M.S. Yun. 2009. “Multivariate Decomposition for Hazard Rate Models.” *Sociological Methodology* 39(1):233-263.

Pullum, T.W. 2006. *An Assessment of Age and Date Reporting in the DHS Surveys, 1985-2003*. DHS Methodological Reports No. 5. Calverton, Maryland, USA: Macro International. Available at http://DHSprogram.com/pubs/pdf/MR5/MR5.pdf.

Raj, A. 2010. “When the Mother Is a Child: The Impact of Child Marriage on the Health and Human Rights of Girls.” *Archives of Disease in Childhood* 95(11):931-935.

Raj, A., N. Saggurti, M. Winter, A. Labonte, M.R. Decker, D. Balaiah, and J.G. Silverman. 2010. “The Effect of Maternal Child Marriage on Morbidity and Mortality of Children under 5 in India: Cross Sectional Study of a Nationally Representative Sample.” *BMJ* 340:b4258.

Retherford, R.D., N. Ogawa, and R. Matsukura. 2001. “Late Marriage and Less Marriage in Japan.” *Population and Development Review* 27(1):65-102.

Rindfuss, R.R., and S.P. Morgan. 1983. “Marriage, Sex, and the First Birth Interval: The Quiet Revolution in Asia.” *Population and Development Review* 9(2):259-278.

Rindfuss, R.R., J.A. Palmore, and L.L. Bumpass. 1987. “Analyzing Birth Intervals: Implications for Demographic Theory and Data Collection.” *Sociological Forum* 2(4):811-828.

Rodriguez, G., and J. Trussell. 1980. “Maximum Likelihood Estimation of the Parameters of Coales Model Nuptiality Schedule from Survey Data.” *World Fertility Survey Technical Bulletin* 7.

Rutstein, S.O. 2008. *The DHS Wealth Index: Approaches for Rural and Urban Areas, DHS Working Papers No. 60*. Calverton, MD: Macro International.

Rutstein, S.O., and K. Johnson. 2004. *The DHS Wealth Index, DHS Comparative Reports No. 6*. Calverton, MD: ORC Macro.

Rutstein, S.O., and G. Rojas. 2006. *Guide to DHS Statistics, Demographic and Health Surveys Methodology*. Calverton, MD: ICF International.

Santhya, K., U. Ram, R. Acharya, S.J. Jejeebhoy, F. Ram, and A. Singh. 2010. “Associations between Early Marriage and Young Women's Marital and Reproductive Health Outcomes: Evidence from India.” *International Perspectives on Sexual and Reproductive Health* 36(3):132-139.

Shrestha, D.P. 1998. “Socio-Economic Changes, Women’s Autonomy, and Timing of First Birth in a Semi-Urban Community in Nepal.” *Contributions to Nepalese Studies* 25:129-143.

Singh, A., and S. Becker. 2012. “Concordance between Partners in Desired Waiting Time to Birth for Newlyweds in India.” *Journal of Biosocial Science* 44(1):57-71.

Singh, S. 1998. “Adolescent Childbearing in Developing Countries: A Global Review.” *Studies in Family Planning* 29(2):117-136.

Speizer, I.S., and E. Pearson. 2011. “Association between Early Marriage and Intimate Partner Violence in India: A Focus on Youth from Bihar and Rajasthan.” *Journal of Interpersonal Violence* 26(10):1963-1981.

Tian, F.F. 2013. “Transition to First Marriage in Reform-Era Urban China: The Persistent Effect of Education in a Period of Rapid Social Change.” *Population Research and Policy Review* 32(4):529-552.

Timaeus, I.M., and T.A. Moultrie. 2008. “On Postponement and Birth Intervals.” *Population and Development Review* 34(3):483-510.

Trussell, J., and D.E. Bloom. 1983. “Estimating the Co-Variates of Age at Marriage and First Birth.” *Population Studies* 37(3):403-416.

Trussell, J., J. Menken, and A.J. Coale. 1979. *A General Model for Analyzing the Effect of Nuptiality on Fertility*. Paper read at Nuptiality and fertility: proceedings of a seminar held in Bruges, at Liege, Belgium.

Trussell, J., and K. Reinis. 1989. “Age at Marriage and Age at First Birth.” *Population Bulletin of the United Nations* 26:127-185.

Tsui, A.O. 1982. “The Family Formation Process among U.S. Marriage Cohorts.” *Demography* 19(1):1-27.

UNICEF. 2005. *Early Marriage a Harmful Traditional Practice: A Statistical Exploration*. New York, NY: UNICEF.

Upadhyay, U.D., S.L. Dworkin, T.A. Weitz, and D.G. Foster. 2014. “Development and Validation of a Reproductive Autonomy Scale.” *Studies in Family Planning* 45(1):19-41.

Upadhyay, U.D., J.D. Gipson, M. Withers, S. Lewis, E.J. Ciaraldi, A. Fraser, M.J. Huchko, and N. Prata. 2014. “Women's Empowerment and Fertility: A Review of the Literature.” *Social Science & Medicine* 115:111-120.

Upadhyay, U.D., and M.J. Hindin. 2005. “Do Higher Status and More Autonomous Women Have Longer Birth Intervals?: Results from Cebu, Philippines.” *Social Science & Medicine* 60(11):2641-2655.

Visaria, L. 1996. “Regional Variations in Female Autonomy and Fertility and Contraception in India.” In *Girl's Schooling, Women's Autonomy, and Fertility Change in South Asia*, edited by Roger Jeffery and Alaka Malwade Basu. New Delhi: Sage Publications.

Vogelstein, R.B. 2013. *Ending Child Marriage: How Elevating the Status of Girls Advances U.S. Foreign Policy Objectives*: Council on Foreign Relations.

Wachs, T.D. 2008. “Mechanisms Linking Parental Education and Stunting.” *The Lancet* 371(9609):280-281.

Westoff, C. 1992. *Age at Marriage, Age at First Birth, and Fertility in Africa*. World Bank Technical Paper No. 169. The World Bank: Washington, DC.

Wodon, Q., M.C. Nguyen, and C. Tsimpo. 2016. “Child Marriage, Education, and Agency in Uganda.” *Feminist Economics* 22(1):54-79.

Yount, K., A. Crandall, Y.F. Cheong, T. Osypuk, R. Naved, L. Bates, and S.R. Schuler. 2016. “Child Marriage and Intimate Partner Violence in Rural Bangladesh: A Longitudinal Multilevel Analysis.” *Demography* 53:1821-1852.

CHAPTER 2 APPENDIX TABLES

Appendix Table 2.1. Observations for mean age at first marriage among ever-married women age 25-49

	Survey 1		Survey 2	
	year	weighted n	year	weighted n
Bangladesh	2004	7,457	2014	12,454
India	1998-99	64,739	2005-06	73,665
Nepal	2001	6,099	2011	7,279
Pakistan	2006-07	7,955	2012-13	10,601
Cambodia	2005	9,133	2014	10,485
Indonesia	2002-03	24,077	2012	30,059
Philippines	2003	7,377	2013	8,290

Appendix Table 2.2. Observations for hazard models predicting the first birth interval

	Total subjects	Failures among subjects	Analysis time units	Last observed exit
South Asia				
Bangladesh 2014	12,514	12,160	429,097	422
India 2005-06	72,693	69,319	2,276,662	483
Nepal 2011	7,258	7,034	253,942	457
Pakistan 2012-13	9,800	9,120	332,194	426
Southeast Asia				
Cambodia 2014	10,284	9,770	272,768	422
Indonesia 2012	28,955	27,372	731,959	472
Philippines 2013	8,352	7,910	195,019	364

Appendix Table 2.3. Model diagnostics of the underlying hazard of the first birth interval

Model	Observations	Degrees of freedom	AIC	BIC
South Asia				
Bangladesh 2014				
exponential	388,624	25	33649.65	33921.41
weibull	388,624	26	33513.45	33796.08
ggamma	388,624	27	32687.24	32980.74
gompertz	388,624	26	32204.60	32487.23
lognormal	388,624	26	31781.07	32063.70
loglogistic	388,624	26	31116.42	31399.05
India 2005-06				
gompertz	2,029,150	66	228729.7	229556.3
lognormal	2,029,150	66	220245.8	221072.4
loglogistic	2,029,150	66	215279.8	216106.4
exponential	2,029,150	65	194353.0	195167.0
weibull	2,029,150	66	193250.6	194077.1
Nepal 2011				
gompertz	236,616	39	18600.94	19005.54
exponential	236,616	38	17982.10	18376.31
weibull	236,616	39	17168.00	17572.60
lognormal	236,616	39	16143.39	16547.99
ggamma	236,616	38	15688.39	16082.61
loglogistic	236,616	39	15631.39	16035.99
Pakistan 2012-13				
gompertz	308,190	38	34986.11	35390.37
lognormal	308,190	38	34329.57	34733.83
loglogistic	308,190	38	33552.04	33956.30
exponential	308,190	37	29939.09	30332.71
weibull	308,190	38	29930.92	30335.18
ggamma	308,190	39	28664.39	29079.29

Appendix Table 2.3—*Continued*

Model	Observations	Degrees of freedom	AIC	BIC
Southeast Asia				
Cambodia 2014				
gompertz	236,931	56	24470.07	25051.10
exponential	236,931	55	24038.84	24609.49
weibull	236,931	56	23174.29	23755.32
lognormal	236,931	56	20246.95	20827.97
ggamma	236,931	57	19568.98	20160.39
loglogistic	236,931	56	19203.31	19784.34
Indonesia 2012				
gompertz	663,139	41	86996.45	87464.04
lognormal	663,139	41	78326.18	78793.78
exponential	663,139	40	77469.09	77925.28
weibull	663,139	41	77023.72	77491.32
loglogistic	663,139	41	75637.12	76104.71
ggamma	663,139	42	66418.39	66897.39
Philippines 2013				
exponential	178,255	55	22151.98	22706.98
weibull	178,255	56	22138.82	22703.91
gompertz	178,255	56	20731.96	21297.06
ggamma	178,255	57	19365.84	19941.02
lognormal	178,255	56	18913.64	19478.74
loglogistic	178,255	56	18336.47	18901.56

Notes:

Full hazard models for Bangladesh exclude controls for: wife beating attitudes, occupation, and husband's occupation as these data were not collected in the Bangladesh 2014 DHS

India 2005-06 DHS (NFHS-3) does not distinguish between skilled manual and unskilled manual.

Full hazard models for Indonesia and Pakistan exclude religious affiliation as these data were not collected in the Indonesia 2012 DHS or Pakistan 2012-13 DHS.

Indonesia 2012 DHS, Cambodia 2014 DHS, and Philippines 2013 DHS do not collect data on husband's current employment status, but categorizes husband's occupation regardless of current employment status.

India 2005-06 DHS (NFHS-3) and Indonesia 2012 DHS captures husband's current employment status as a separate occupational category and categorizes husband's occupation only for husbands who are currently working.

Appendix Table 2.4. Country-specific regional categories and coefficients (time ratios) from adjusted loglogistic hazard models of the marriage to first birth interval

Bangladesh		India		Nepal		Pakistan		Cambodia		Indonesia		Philippines	
Ref=Dhaka		Ref=Uttar Pradesh and Uttaranchal		Ref=terai		Ref=Punjab		Ref=Phnom Penh		Ref=Sumatera		Ref=National Capital	
Barisal	0.979	Andhra Pradesh	1.199***	mountain	1.102*	Sindh	1.059	Banteay Mean Chey	0.936	Java	1.121***	Cordillera	0.865*
Chittagong	0.881***	Arunachal Pradesh	0.967	hill	0.983	Khyber Pakhtunkwa	0.985	Kampong Cham	0.939	Bali & Nusa Tenggara	0.961*	I - Ilocos	0.915
Khulna	1.028	Assam	0.899**			Balochistan	1.039	Kampong Chhnang	1.117*	Kalimantan	1.045**	II – Cagayan Valley	0.933
Rajshahi	0.961	Bihar & Jharkhand	1.023					Kampong Speu	0.993	Sulawesi	1.014	III - Central Luzon	0.928
Rangpur	0.964	Delhi	1.045					Kampong Thom	1.058	Maluku & Papua	1.044	IVA - Calabarzon	0.869**
Sylhet	0.918	Goa	1.166***					Kandal	1.068			IVB - Mimaropa	0.928
		Gujarat	1.130***					Kratie	1.255***			V - Bicol	0.898*
		Haryana	1.138***					Prey veng	1.191***			VI – Western Visayas	0.894*
		Himachal Pradesh	0.898***					Pursat	0.963			VII – Central Visayas	0.883*
		Jammu & Kashmir	0.851***					Siem reap	1.022			VIII - Eastern Visayas	0.941
		Karnataka	0.909***					Svay rieng	1.144**			IX - Zambo- anga Peninsula	0.939
		Kerala	0.923***					Takeo	1.095			X – Northern Mindanao	0.986
		Madhya Pradesh	1.099***					Otdar Mean Chey	0.993			XI - Davao	0.946
		Mahara- shtra	0.977					Battam- bang & Pailin	1.06			XII - Socc- skargen	0.911
		Manipur	0.874***					Kampot & Kep	1.112*			XIII - Caraga	1
		Meghalaya	0.98					Preah Sihanouk & Kaoh Kong	1.026			ARMM	1.119
		Mizoram	0.815***					Preah Vihear & Steung Treng	1.007				
		Nagaland	0.959					Mondol Kiri & Ratta- nak Kiri	1.021				
		Orissa	0.962										
		Punjab	1.013										
		Rajasthan	1.307***										
		Sikkim	0.977										
		Tamil Nadu	0.907***										
		Tripura	1.026										
		West Bengal	0.866***										

Notes:

*** p≤0.001; ** p≤0.01; * p≤0.05

Hazard models for most surveys control for: age at marriage, birth cohort, decision-making ability, wife beating attitudes, spousal age difference, education, occupation, household wealth quintile, rural/urban residence, region of country, husband's education, and husband's occupation

Hazard model for Bangladesh excludes controls for: wife beating attitudes, occupation, and husband's occupation as these data were not collected in the Bangladesh 2014 DHS

Hazard models for Indonesia and Pakistan exclude religious affiliation as these data were not collected in the Indonesia 2012 DHS or Pakistan 2012-13 DHS.

Appendix Table 2.5. Comparison of β coefficients from linear regression models and loglogistic accelerated failure-time hazard models predicting duration of the first birth interval (Discrepancies in direction or significance highlighted in red)

	Bangladesh		India		Nepal		Pakistan		Cambodia		Indonesia		Philippines	
	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β
Age at first cohabitation in years	-1.89***	-0.05***	-1.94***	-0.04***	-2.57***	-0.06***	-1.41***	-0.02***	-0.97***	-0.02***	-1.04***	-0.01***	-0.49***	0.01**
	(-2.14 - -1.63)	(-0.06 - -0.04)	(-2.04 - -1.84)	(-0.05 - -0.04)	(-2.93 - -2.21)	(-0.07 - -0.05)	(-1.66 - -1.16)	(-0.03 - -0.01)	(-1.13 - -0.81)	(-0.03 - -0.02)	(-1.19 - -0.89)	(-0.02 - -0.01)	(-0.64 - -0.34)	(0.00 - 0.01)
Birth cohort (ref=1960-69)														
1950-59	na	na	4.57***	0.12***	na	na	na	na	na	na	na	na	na	na
	na	na	(3.31 - 5.83)	(0.09 - 0.16)	na	na	na	na	na	na	na	na	na	na
1970-79	-6.82***	-0.21***	-3.89***	-0.09***	-8.29***	-0.22***	-3.50**	-0.04	-2.57**	-0.07**	-1.54*	-0.03	-1.13	0.03
	(-9.36 - -4.28)	(-0.28 - -0.14)	(-4.49 - -3.28)	(-0.11 - -0.07)	(-10.41 - -6.18)	(-0.27 - -0.16)	(-5.79 - -1.21)	(-0.11 - 0.03)	(-4.43 - -0.70)	(-0.12 - -0.02)	(-2.75 - -0.33)	(-0.07 - 0.00)	(-2.55 - 0.28)	(-0.02 - 0.08)
1980-89	-13.94***	-0.40***	-7.24***	-0.11***	-13.31***	-0.34***	-9.79***	-0.16***	-4.75***	-0.11***	-4.82***	-0.05**	-4.26***	-0.03
	(-16.30 - -11.58)	(-0.47 - -0.33)	(-8.14 - -6.33)	(-0.14 - -0.07)	(-15.83 - -10.79)	(-0.40 - -0.27)	(-12.02 - -7.55)	(-0.23 - -0.09)	(-6.44 - -3.07)	(-0.16 - -0.06)	(-6.05 - -3.60)	(-0.09 - -0.01)	(-5.79 - -2.73)	(-0.09 - 0.02)
Decisionmaking number of decisions in which Respondent is involved	0.25	0.01	-0.64***	-0.02***	-1.56***	-0.04***	0.24***	0.01***	-1.01*	-0.03	-0.58*	-0.01	-0.61	-0.01
	(-0.90 - 1.41)	(-0.02 - 0.03)	(-0.90 - -0.38)	(-0.03 - -0.01)	(-2.25 - -0.87)	(-0.06 - -0.02)	(0.14 - 0.34)	(0.01 - 0.01)	(-2.01 - -0.02)	(-0.06 - 0.00)	(-1.13 - -0.03)	(-0.02 - 0.01)	(-1.53 - 0.30)	(-0.04 - 0.02)
Wife beating attitudes (ref=wife beating is acceptable in at least one scenario														
Respondent rejects wife beating in any scenario	na	na	-4.28	-0.09	1.44	0.03	0.72	0.01	0.02	-0.01	-0.15	-0.01	na	na
	na	na	(-0.61 - 0.58)	(-0.03 - 0.01)	(-13.00 - 4.43)	(-0.42 - 0.24)	(-0.10 - 2.98)	(-0.02 - 0.09)	(-0.54 - 1.98)	(-0.03 - 0.04)	(-0.91 - 0.95)	(-0.04 - 0.02)	(-1.52 - 1.22)	(-0.06 - 0.04)
Spousal age difference in years	-0.41***	-0.01***	-0.38***	-0.01***	-0.06	0	-0.17	0	0.05	0	-0.07	0	0.04	0.01***
	(-0.61 - -0.20)	(-0.02 - -0.01)	(-0.46 - -0.31)	(-0.01 - -0.01)	(-0.25 - 0.14)	(-0.00 - 0.00)	(-0.34 - 0.00)	(-0.01 - 0.00)	(-0.19 - 0.29)	(-0.00 - 0.01)	(-0.21 - 0.07)	(-0.00 - 0.01)	(-0.08 - 0.16)	(0.01 - 0.01)
Education (ref=no education)														
Primary	-1.63	-0.01	-0.03	0.01	0.07	-0.04	-0.63	-0.02	1.61*	0.04	0.26	0	-2.21	-0.1
	(-3.70 - 0.44)	(-0.08 - 0.05)	(-0.90 - 0.84)	(-0.02 - 0.04)	(-2.49 - 2.62)	(-0.10 - 0.01)	(-3.12 - 1.86)	(-0.10 - 0.05)	(0.06 - 3.16)	(-0.00 - 0.09)	(-3.07 - 3.58)	(-0.09 - 0.09)	(-6.99 - 2.57)	(-0.24 - 0.05)
Secondary	1.8	0.14***	1.12*	0.08***	-0.79	-0.05	-1.14	-0.07	0.98	0.03	-0.65	-0.09	-3.4	-0.19**
	(-0.37 - 3.96)	(0.06 - 0.22)	(0.25 - 1.99)	(0.05 - 0.10)	(-2.97 - 1.39)	(-0.12 - 0.01)	(-3.76 - 1.48)	(-0.14 - 0.01)	(-0.82 - 2.79)	(-0.03 - 0.09)	(-4.11 - 2.82)	(-0.19 - 0.01)	(-8.16 - 1.35)	(-0.34 - -0.05)
Higher	10.10***	0.47***	4.99***	0.22***	6.62***	0.22***	0.34	-0.10*	0.97	0.03	1.79	-0.05	-3.33	-0.24**
	(6.74 - 13.45)	(0.35 - 0.59)	(3.64 - 6.34)	(0.17 - 0.26)	(3.06 - 10.18)	(0.09 - 0.34)	(-2.73 - 3.41)	(-0.20 - 0.01)	(-2.66 - 4.59)	(-0.11 - 0.17)	(-2.15 - 5.74)	(-0.16 - 0.06)	(-8.24 - 1.59)	(-0.40 - -0.09)

Continued

Appendix Table 2.5—*Continued*

	Bangladesh		India		Nepal		Pakistan		Cambodia		Indonesia		Philippines	
	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β
Occupation (ref=not working)														
Agricultural	na	na	-1.75***	-0.05***	-3.73**	-0.10**	-3.42	-0.13	-0.27	0.00	-0.13	0.00	-2.49**	-0.01
	na	na	(-2.64 - -0.86)	(-0.08 - -0.02)	(-6.40 - -1.06)	(-0.17 - -0.03)	(-7.33 - 0.49)	(-0.30 - 0.04)	(-1.67 - 1.12)	(-0.05 - 0.05)	(-1.82 - 1.55)	(-0.05 - 0.05)	(-4.05 - -0.92)	(-0.08 - 0.05)
Professional/technical/managerial	na	na	0.91	0.06*	-3.65*	-0.17*	1.85	0.11	1.01	0.05	0.51	0.04	-3.01***	-0.06
	na	na	(-0.44 - 2.26)	(0.01 - 0.10)	(-7.07 - -0.24)	(-0.29 - -0.04)	(-3.01 - 6.71)	(-0.05 - 0.28)	(-1.68 - 3.70)	(-0.06 - 0.15)	(-1.76 - 2.78)	(-0.01 - 0.09)	(-4.51 - -1.51)	(-0.12 - 0.01)
Clerical	na	na	2.93*	0.12**	-5.13	-0.2	-15.58***	0.13	-0.75	0.03	2.84*	0.11**	-3.75**	-0.06
	na	na	(0.05 - 5.80)	(0.05 - 0.20)	(-15.01 - 4.76)	(-0.55 - 0.15)	(-21.54 - -9.63)	(-0.90 - 1.16)	(-4.76 - 3.26)	(-0.17 - 0.23)	(0.18 - 5.51)	(0.04 - 0.17)	(-6.05 - -1.46)	(-0.17 - 0.05)
Sales	na	na	-0.52	-0.04	na	na	-1.14	0.01	-0.66	-0.02	0.05	0.02	-0.87	0.04
	na	na	(-2.56 - 1.52)	(-0.11 - 0.02)	na	na	(-3.88 - 1.60)	(-0.09 - 0.10)	(-2.16 - 0.84)	(-0.07 - 0.04)	(-1.07 - 1.17)	(-0.01 - 0.05)	(-3.25 - 1.51)	(-0.06 - 0.14)
Services	na	na	-3.13***	-0.13***	-3.93**	-0.14***	1.01	0.03	0.76	0.06	0.45	0.01	-3.30*	-0.08
	na	na	(-4.61 - -1.64)	(-0.17 - -0.08)	(-6.53 - -1.33)	(-0.22 - -0.06)	(-6.33 - 8.35)	(-0.22 - 0.29)	(-1.94 - 3.46)	(-0.03 - 0.15)	(-1.55 - 2.45)	(-0.05 - 0.07)	(-5.91 - -0.69)	(-0.17 - 0.02)
Skilled manual	na	na	-1.76***	-0.04*	-2.87	-0.06	-1.45	-0.01	-0.11	0	-0.45	0.02	-3.90**	-0.10*
	na	na	(-2.73 - -0.78)	(-0.08 - -0.01)	(-6.94 - 1.20)	(-0.20 - 0.08)	(-4.42 - 1.51)	(-0.12 - 0.09)	(-1.91 - 1.70)	(-0.07 - 0.06)	(-1.77 - 0.87)	(-0.02 - 0.06)	(-6.23 - -1.56)	(-0.20 - -0.00)
Unskilled manual	na	na	na	na	-3.96	-0.08	1.8	0.05	0.2	0.02	-2.45	-0.04	-2.80***	-0.07**
	na	na	na	na	(-10.24 - 2.31)	(-0.21 - 0.05)	(-11.71 - 15.31)	(-0.40 - 0.50)	(-4.60 - 5.01)	(-0.15 - 0.18)	(-5.49 - 0.59)	(-0.14 - 0.05)	(-4.26 - -1.34)	(-0.12 - -0.02)
Other	na	na	-0.3	0.03	-12.83**	-0.08	na	na	-0.09	0.27*	26.43*	1.34**	-2.19	0.14
	na	na	(-7.98 - 7.39)	(-0.26 - 0.31)	(-21.70 - -3.96)	(-0.70 - 0.53)	na	na	(-4.23 - 4.04)	(0.01 - 0.53)	(2.17 - 50.69)	(0.37 - 2.30)	(-11.78 - 7.41)	(-0.46 - 0.74)
Household wealth quintile (ref=poorest)														
poorer	0.56	0	-1.43**	-0.04*	-0.08	0.03	-4.30*	-0.08	-1.33	-0.04	-1.31	-0.01	-1.70*	-0.06*
	(-2.88 - 4.00)	(-0.08 - 0.09)	(-2.46 - -0.41)	(-0.07 - -0.00)	(-2.50 - 2.33)	(-0.04 - 0.09)	(-8.16 - -0.43)	(-0.22 - 0.06)	(-3.25 - 0.60)	(-0.09 - 0.02)	(-3.00 - 0.37)	(-0.06 - 0.04)	(-3.11 - -0.29)	(-0.11 - -0.01)
middle	-1.74	-0.01	-1.35*	-0.04*	-2.23	-0.02	-5.63*	-0.17*	-1.34	-0.02	-2.98***	-0.03	-0.53	-0.02
	(-4.00 - 0.52)	(-0.10 - 0.07)	(-2.45 - -0.25)	(-0.08 - -0.00)	(-5.61 - 1.16)	(-0.11 - 0.07)	(-10.06 - -1.20)	(-0.33 - -0.02)	(-3.38 - 0.70)	(-0.08 - 0.03)	(-4.75 - -1.21)	(-0.08 - 0.02)	(-2.09 - 1.03)	(-0.08 - 0.04)
richer	-0.6	0.01	-2.55***	-0.06**	-7.13***	-0.12*	-7.99***	-0.22**	-0.94	0	-2.98**	-0.03	-0.21	0.02
	(-2.83 - 1.62)	(-0.07 - 0.09)	(-3.72 - -1.39)	(-0.10 - -0.02)	(-10.60 - -3.65)	(-0.21 - -0.03)	(-12.66 - -3.33)	(-0.38 - -0.06)	(-3.01 - 1.13)	(-0.06 - 0.06)	(-4.90 - -1.07)	(-0.08 - 0.02)	(-2.13 - 1.70)	(-0.05 - 0.10)
richest	-1.9	0	-2.67***	-0.08***	-6.61***	-0.09	-10.89***	-0.27**	-0.84	-0.04	-3.79***	-0.06*	1.06	0.01
	(-4.58 - 0.77)	(-0.09 - 0.09)	(-4.04 - -1.30)	(-0.12 - -0.04)	(-10.38 - -2.84)	(-0.20 - 0.01)	(-15.93 - -5.86)	(-0.45 - -0.10)	(-3.17 - 1.49)	(-0.10 - 0.03)	(-5.74 - -1.84)	(-0.11 - -0.00)	(-1.06 - 3.18)	(-0.07 - 0.10)

Continued

Appendix Table 2.5—*Continued*

	Bangladesh		India		Nepal		Pakistan		Cambodia		Indonesia		Philippines	
	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β
Religion														
Reference religion	Muslim		Hindu		Hindu				Buddhist				Catholic	
Muslim			-3.40***	-0.12***	1.24	0.05	na	na	-4.95**	-0.08	na	na	3.30*	0.12*
			(-4.37 - -2.44)	(-0.16 - -0.09)	(-5.53 - 8.00)	(-0.11 - 0.22)	na	na	(-8.53 - -1.36)	(-0.22 - 0.06)	na	na	(0.52 - 6.08)	(0.03 - 0.22)
Christian	-9.71***	-0.43	-2.13**	-0.11***	-0.65	-0.03	na	na	-1.4	-0.06	na	na	na	na
	(-14.70 - -4.72)	(-0.94 - 0.07)	(-3.60 - -0.66)	(-0.16 - -0.06)	(-3.70 - 2.40)	(-0.10 - 0.05)	na	na	(-9.30 - 6.50)	(-0.25 - 0.14)	na	na	na	na
Buddhist	2.51	0.01	-0.58	0.01	1.63	0.03	na	na	-0.63	-0.05	na	na	na	na
	(-0.74 - 5.76)	(-0.12 - 0.14)	(-4.79 - 3.63)	(-0.16 - 0.18)	(-2.96 - 6.22)	(-0.11 - 0.17)	na	na	(-4.86 - 3.60)	(-0.22 - 0.12)	na	na	na	na
Hindu	0.63	0					na	na	na	na	na	na	na	na
	(-0.97 - 2.23)	(-0.07 - 0.06)					na	na	na	na	na	na	na	na
Other	na	na	3.62	0.1	na	na	na	na	na	na	na	na	-1.43	-0.03
	na	na	(-6.19 - 13.44)	(-0.17 - 0.37)	na	na	na	na	na	na	na	na	(-3.09 - 0.24)	(-0.09 - 0.04)
Protestant	na	na	na	na	na	na	na	na	na	na	na	na	-0.24	0.04
	na	na	na	na	na	na	na	na	na	na	na	na	(-2.46 - 1.97)	(-0.04 - 0.13)
Iglesia Ni Kristo	na	na	na	na	na	na	na	na	na	na	na	na	-2.92*	-0.12*
	na	na	na	na	na	na	na	na	na	na	na	na	(-5.33 - -0.50)	(-0.23 - -0.01)
Aglipay	na	na	na	na	na	na	na	na	na	na	na	na	-5.04***	-0.20*
	na	na	na	na	na	na	na	na	na	na	na	na	(-7.36 - -2.72)	(-0.37 - -0.03)
Sikh	na	na	-1.51	-0.07	na	na	na	na	na	na	na	na	na	na
	na	na	(-3.39 - 0.36)	(-0.14 - 0.01)	na	na	na	na	na	na	na	na	na	na
Jain	na	na	-1.86	-0.11	na	na	na	na	na	na	na	na	na	na
	na	na	(-5.24 - 1.52)	(-0.21 - 0.00)	na	na	na	na	na	na	na	na	na	na
Kirat	na	na	na	na	-0.73	-0.07	na	na	na	na	na	na	na	na
	na	na	na	na	(-5.90 - 4.43)	(-0.21 - 0.06)	na	na	na	na	na	na	na	na
Residence (ref=rural)														
urban	1.72*	0.07**	-0.99**	-0.05***	-0.78	-0.04	-2.21	-0.09*	1.28	0.06*	-1.61**	-0.07***	-0.79	-0.01
	(0.24 - 3.19)	(0.02 - 0.12)	(-1.74 --0.24)	(-0.08 --0.02)	(-2.59 - 1.03)	(-0.09 - 0.02)	(-4.49 - 0.06)	(-0.16 --0.01)	(-0.22 - 2.77)	(0.00 - 0.11)	(-2.61 - 0.60)	(-0.11 --0.04)	(-2.01 - 0.43)	(-0.06 - 0.04)

Continued

Appendix Table 2.5—*Continued*

	Bangladesh		India		Nepal		Pakistan		Cambodia		Indonesia		Philippines	
	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β
Region (ref=region 1)														
Region 1	Dhaka		Uttar Pradesh & Uttaranchal		terai		Punjab		Phnom Penh		Sumatera		National Capital	
Region 2	-1.14 (-3.43 - 1.16)	-0.02 (-0.10 - 0.06)	3.19*** (1.62 - 4.75)	0.18*** (0.13 - 0.23)	2.82 (-0.98 - 6.62)	0.10* (0.01 - 0.19)	1.17 (-1.43 - 3.77)	0.06 (-0.02 - 0.14)	0.78 (-2.37 - 3.93)	-0.07 (-0.20 - 0.07)	3.43*** (2.45 - 4.41)	0.11*** (0.08 - 0.14)	-2.29 (-5.11 - 0.54)	-0.14* (-0.27 - - 0.02)
Region 3	-3.06** (-4.97 - - 1.15)	-0.13*** (-0.20 - - 0.06)	0.56 (-1.99 - 3.10)	-0.03 (-0.11 - 0.05)	-0.54 (-2.83 - 1.74)	-0.02 (-0.07 - 0.04)	0.66 (-1.99 - 3.31)	-0.01 (-0.09 - 0.07)	0.72 (-1.97 - 3.40)	-0.06 (-0.16 - 0.03)	0.52 (-0.59 - 1.64)	-0.04* (-0.08 - - 0.00)	-2.2 (-4.95 - 0.54)	-0.09 (-0.20 - 0.02)
Region 4	-0.19 (-2.36 - 1.98)	0.03 (-0.04 - 0.09)	-2.10** (-3.67 - - 0.52)	-0.11** (-0.18 - - 0.03)			1.78 (-3.00 - 6.56)	0.04 (-0.11 - 0.18)	2.17 (-0.14 - 4.48)	0.11* (0.02 - 0.20)	0.9 (-0.18 - 1.97)	0.04** (0.01 - 0.08)	-1.57 (-4.21 - 1.08)	-0.07 (-0.18 - 0.04)
Region 5	-1.77 (-4.15 - 0.62)	-0.04 (-0.11 - 0.04)	0.81 (-0.77 - 2.39)	0.02 (-0.03 - 0.08)					0.47 (-1.72 - 2.65)	-0.01 (-0.10 - 0.09)	0.22 (-0.84 - 1.28)	0.01 (-0.02 - 0.05)	-2.25* (-4.43 - - 0.06)	-0.08 (-0.16 - 0.01)
Region 6	-2.2 (-4.74 - 0.35)	-0.04 (-0.12 - 0.05)	0.94 (-0.60 - 2.47)	0.04 (-0.01 - 0.10)					1.78 (-0.54 - 4.10)	0.06 (-0.03 - 0.15)	1.68 (-0.42 - 3.78)	0.04 (-0.04 - 0.12)	-3.56*** (-5.58 - - 1.55)	-0.14** (-0.22 - - 0.05)
Region 7	-1 (-3.45 - 1.45)	-0.09 (-0.18 - 0.01)	4.53*** (2.89 - 6.18)	0.15*** (0.10 - 0.21)					1.71 (-0.40 - 3.81)	0.07 (-0.03 - 0.16)			-1.97 (-4.71 - 0.77)	-0.07 (-0.19 - 0.04)
Region 8			1.68* (0.06 - 3.30)	0.12*** (0.07 - 0.17)					7.35*** (4.22 - 10.47)	0.23*** (0.13 - 0.32)			-2.69* (-5.26 - - 0.12)	-0.11* (-0.21 - - 0.00)
Region 9			2.21** (0.62 - 3.81)	0.13*** (0.07 - 0.18)					5.49*** (2.88 - 8.09)	0.17*** (0.08 - 0.27)			-2.18 (-4.57 - 0.22)	-0.11* (-0.22 - - 0.01)
Region 10			-3.52*** (-4.97 - - 2.06)	-0.11*** (-0.17 - - 0.05)					1.61 (-0.98 - 4.19)	-0.04 (-0.13 - 0.06)			-3.31** (-5.58 - - 1.05)	-0.12* (-0.23 - - 0.01)
Region 11			-2.70*** (-4.19 - - 1.20)	-0.16*** (-0.23 - - 0.09)					0.34 (-1.67 - 2.36)	0.02 (-0.06 - 0.11)			-2.47 (-5.30 - 0.37)	-0.06 (-0.17 - 0.05)
Region 12			-1.76* (-3.13 - - 0.38)	-0.10*** (-0.14 - - 0.05)					4.62*** (2.12 - 7.11)	0.13** (0.04 - 0.23)			-2.85* (-5.38 - - 0.31)	-0.06 (-0.18 - 0.05)
Region 13			-1.70* (-3.00 - - 0.40)	-0.08*** (-0.13 - - 0.03)					5.14*** (2.31 - 7.98)	0.09 (-0.01 - 0.19)			-0.1 (-3.48 - 3.27)	-0.01 (-0.11 - 0.08)
Region 14			0.6 (-0.72 - 1.93)	0.09*** (0.05 - 0.14)					4.07* (0.16 - 7.98)	-0.01 (-0.14 - 0.13)			-1.2 (-4.17 - 1.78)	-0.06 (-0.17 - 0.06)
Region 15			-1.06 (-2.35 - 0.22)	-0.02 (-0.07 - 0.02)					2.07 (-0.72 - 4.86)	0.06 (-0.04 - 0.16)			-2.68 (-5.37 - 0.01)	-0.09 (-0.20 - 0.01)
Region 16			-2.14** (-3.44 - - 0.84)	-0.14*** (-0.18 - - 0.09)					3.90** (1.25 - 6.55)	0.11* (0.00 - 0.21)			-0.67 (-3.76 - 2.43)	0 (-0.10 - 0.09)

Continued

Appendix Table 2.5—*Continued*

	Bangladesh		India		Nepal		Pakistan		Cambodia		Indonesia		Philippines	
	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β
Region 17			-2.04 (-4.10 - 0.01)	-0.02 (-0.09 - 0.05)					2.26 (-0.24 - 4.76)	0.03 (-0.06 - 0.11)			-0.01 (-3.53 - 3.50)	0.11 (-0.01 - 0.24)
Region 18			-3.53** (-5.84 - -1.22)	-0.20*** (-0.28 - -0.12)					1.74 (-0.77 - 4.24)	0.01 (-0.09 - 0.10)				
Region 19			-1.56 (-3.42 - 0.29)	-0.04 (-0.11 - 0.02)					1.32 (-1.24 - 3.87)	0.02 (-0.09 - 0.13)				
Region 20			-0.78 (-2.48 - 0.92)	-0.04 (-0.10 - 0.02)										
Region 21			-0.65 (-2.39 - 1.08)	0.01 (-0.05 - 0.08)										
Region 22			5.26*** (3.53 - 6.98)	0.27*** (0.21 - 0.32)										
Region 23			-0.97 (-2.94 - 1.01)	-0.02 (-0.10 - 0.05)										
Region 24			-2.31*** (-3.67 - -0.95)	-0.10*** (-0.15 - -0.05)										
Region 25			-1.21 (-2.93 - 0.51)	0.03 (-0.03 - 0.08)										
Region 26			-3.99*** (-5.40 - -2.58)	-0.14*** (-0.20 - -0.08)										
			-0.5	0										
Husband's education (ref=no education)	(-1.39 - 0.40)	(-0.03 - 0.02)												
Primary	-3.01** (-5.13 - -0.88)	-0.10** (-0.16 - -0.03)	0.49 (-0.36 - 1.34)	0.02 (-0.01 - 0.05)	-2.26 (-5.35 - 0.83)	-0.03 (-0.09 - 0.04)	-0.28 (-2.71 - 2.15)	0.05 (-0.04 - 0.14)	-0.14 (-2.27 - 2.00)	-0.01 (-0.07 - 0.05)	-2.91 (-6.66 - 0.84)	-0.08 (-0.19 - 0.04)	-2.08 (-6.67 - 2.51)	-0.01 (-0.16 - 0.13)
Secondary	-1.32 (-3.12 - 0.48)	-0.03 (-0.10 - 0.04)	1.63* (0.36 - 2.90)	0.07** (0.03 - 0.11)	-0.99 (-3.95 - 1.97)	-0.02 (-0.10 - 0.06)	0.61 (-1.90 - 3.12)	0.04 (-0.05 - 0.12)	-0.25 (-2.46 - 1.96)	-0.02 (-0.08 - 0.04)	-3.37 (-7.18 - 0.43)	-0.11 (-0.23 - 0.01)	-1.43 (-6.06 - 3.21)	-0.03 (-0.18 - 0.12)
Higher	3.05* (0.59 - 5.51)	0.11* (0.02 - 0.19)	0.27 (-3.47 - 4.01)	-0.01 (-0.16 - 0.13)	-0.53 (-4.04 - 2.97)	-0.01 (-0.10 - 0.09)	1.7 (-1.24 - 4.65)	0.09 (-0.02 - 0.20)	-0.1 (-3.42 - 3.22)	-0.02 (-0.13 - 0.09)	-2.51 (-6.61 - 1.59)	-0.08 (-0.21 - 0.04)	-1.8 (-6.54 - 2.93)	-0.06 (-0.22 - 0.09)
Don't know	na na	na na	na na	na na	-3.36 (-13.45 - 6.73)	-0.09 (-0.35 - 0.18)	-0.79 (-13.94 - 12.35)	0.22 (-0.35 - 0.78)	4.88 (-4.55 - 14.32)	0.38 (-0.06 - 0.81)	19.28 (-4.59 - 43.15)	0.31 (-0.34 - 0.96)	-9.66** (-16.58 - 2.74)	-0.41** (-0.72 –-0.10)

Continued

Appendix Table 2.5—*Continued*

	Bangladesh		India		Nepal		Pakistan		Cambodia		Indonesia		Philippines	
	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β	Linear Regression β	Loglogistic Hazard β
Husband's occupation (ref=agricultural)														
Professional/technical/ managerial			0.72	0.01	-0.99	-0.03			-1.23	-0.04	-0.58	-0.09***	1.99*	0.08*
			(-0.53 - 1.96)	(-0.03 - 0.04)	(-4.17 - 2.19)	(-0.12 - 0.05)			(-3.37 - 0.91)	(-0.11 - 0.03)	(-2.36 - 1.20)	(-0.14 - -0.04)	(0.12 - 3.87)	(0.01 - 0.16)
Clerical			0.42	0.01	2.04	0.06	3.74*	0.11	-2.99*	-0.06	0.11	-0.05	-0.55	-0.06
			(-0.90 - 1.75)	(-0.03 - 0.05)	(-0.82 - 4.91)	(-0.01 - 0.13)	(0.73 - 6.76)	(-0.00 - 0.22)	(-5.88 - -0.09)	(-0.19 - 0.07)	(-1.89 - 2.12)	(-0.12 - 0.01)	(-3.90 - 2.79)	(-0.20 - 0.07)
Sales			-0.58	-0.02	na	na	1.44	-0.01	-0.43	-0.07*	1.48	0	3.63	0.09
			(-1.58 - 0.43)	(-0.05 - 0.01)	na	na	(-3.53 - 6.41)	(-0.16 - 0.14)	(-2.88 - 2.02)	(-0.14 - -0.00)	(-0.26 - 3.22)	(-0.05 - 0.05)	(-0.88 - 8.14)	(-0.09 - 0.26)
Services			1.2	0.04	1.09	0.04	1.89	0.02	-0.47	0	-1.1	-0.08**	0.39	0.07
			(-0.19 - 2.59)	(-0.00 - 0.08)	(-1.56 - 3.74)	(-0.02 - 0.10)	(-0.82 - 4.60)	(-0.08 - 0.12)	(-2.62 - 1.67)	(-0.08 - 0.08)	(-2.75 - 0.55)	(-0.14 - -0.03)	(-1.56 - 2.34)	(-0.02 - 0.15)
Skilled manual			na	na	-1.64	-0.03	3.90**	0.08	1.16	0.01	0.26	-0.03	0.89	0.05
			na	na	(-4.29 - 1.01)	(-0.11 - 0.05)	(1.16 - 6.65)	(-0.01 - 0.18)	(-0.38 - 2.69)	(-0.03 - 0.06)	(-1.12 - 1.63)	(-0.07 - 0.01)	(-0.41 - 2.19)	(-0.00 - 0.10)
Unskilled manual			0.36	0	-0.3	0	2.02	0.03	-2.36	-0.06	-1.43	-0.06	1.28	0.03
			(-0.48 - 1.19)	(-0.03 - 0.03)	(-3.07 - 2.48)	(-0.07 - 0.07)	(-0.36 - 4.39)	(-0.06 - 0.12)	(-6.01 - 1.30)	(-0.22 - 0.10)	(-3.13 - 0.26)	(-0.13 - 0.00)	(-0.34 - 2.89)	(-0.03 - 0.08)
Other			7.61*	0.16	1.52	0.07	1.23	0	2.01	0	-1.15	-0.05	3.55	0.18
			(0.30 - 14.92)	(-0.04 - 0.36)	(-3.55 - 6.59)	(-0.06 - 0.20)	(-1.38 - 3.85)	(-0.09 - 0.09)	(-3.29 - 7.30)	(-0.14 - 0.14)	(-4.49 - 2.20)	(-0.17 - 0.06)	(-0.62 - 7.72)	(-0.03 - 0.39)
Not working			-0.56	0.01	na	na	-1.13	-0.02	na	na	-2.95	0.09	na	na
			(-2.47 - 1.36)	(-0.05 - 0.08)	na	na	(-5.58 - 3.32)	(-0.22 - 0.17)	na	na	(-12.50 - 6.61)	(-0.52 - 0.71)	na	na
Weighted sample size (person-months)	11,273	381,297	65,486	2,231,385	6,754	240,034	9,323	342,734	8,930	239,300	26,492	716,796	7,191	175,005

Notes:

*** p≤0.001; ** p≤0.01; * p≤0.05

Model for Bangladesh excludes controls for: wife beating attitudes, occupation, and husband's occupation as these data were not collected in the Bangladesh 2014 DHS

India 2005-06 DHS (NFHS-3) does not distinguish between skilled manual and unskilled manual.

Models for Indonesia and Pakistan exclude religious affiliation as these data were not collected in the Indonesia 2012 DHS or Pakistan 2012-13 DHS.

Indonesia 2012 DHS, Cambodia 2014 DHS, and Philippines 2013 DHS do not collect data on husband's current employment status, but categorizes husband's occupation regardless of current employment status.

India 2005-06 DHS (NFHS-3) and Indonesia 2012 DHS captures husband's current employment status as a separate occupational category and categorizes husband's occupation only for husbands who are currently working.

Regions listed in Appendix Table 2.4.

Appendix Table 2.6. Detailed multivariate decomposition of changes in the interval to first birth, showing contributions to the change attributed to differences in composition and to differences in effects of women's socio-demographic variables: Education

		Composition component		Effects component	
	n	β	Percent	β	Percent
South Asia					
Bangladesh 2004-2014	20,017				
No education		-0.11	2.34	0.07	-1.53
Primary		-0.04***	0.83	-0.30	6.66
Secondary		-0.37***	8.12	0.14	-3.17
Higher		0.15***	-3.35	0.00	-0.01
India 1998/99-2005/06	139,267				
No education		0.02	1.82	-0.72***	-73.37
Primary		0.02***	1.86	-0.06	-6.47
Secondary		-0.07***	-7.23	0.13	13.19
Higher		-0.04***	-3.91	0.09	9.46
Nepal 2001-2011	13,385				
No education		-0.33	6.12	-0.10	1.91
Primary		-0.04	0.83	0.09	-1.65
Secondary		-0.44***	8.24	0.07	-1.34
Higher		0.12**	-2.31	-0.02	0.28
Pakistan 2006-2013	17,685				
No education		-0.14*	17.81	0.54	-66.83
Primary		0.00	0.15	-0.08	9.76
Secondary		-0.04*	5.33	0.03	-3.49
Higher		-0.01	1.49	-0.03	3.88
Southeast Asia					
Cambodia 2005-2014	19,455				
No education		0.02	-141.18	0.86	-6565.10
Primary		-0.03	237.45	3.07	-23314.00
Secondary		0.00	10.05	0.97	-7352.90
Higher		-0.01	100.16	-0.08	634.91
Indonesia 2002-2012	52,999				
No education		-0.04	2.40	-0.13	9.17
Primary		-0.04	2.59	0.51	-34.71
Secondary		-0.20***	13.68	0.08	-5.25
Higher		0.03	-1.81	0.02	-1.56
Philippines 2003-2013	17,685				
No education		-0.01	-0.99	-0.07	-10.58
Primary		-0.03	-4.58	0.56	81.55
Secondary		-0.10*	-14.11	0.35	51.32
Higher		-0.03*	-4.65	0.34	49.26

Notes:

*** p≤0.001; ** p≤0.01; * p≤0.05

Decomposition models are estimated with the following covariates: marriage age, women's decision-making (except India and Pakistan), attitudes toward wife beating (except Bangladesh, India, and Pakistan), spousal age difference, education, occupation (except Bangladesh), household wealth quintile, religion (except Pakistan and Indonesia), residence, subnational region, husband's education, and husband's occupation (except Bangladesh).

Appendix Table 2.7. Detailed multivariate decomposition of changes in the interval to first birth, showing contributions to the change attributed to differences in composition and to differences in effects of women's socio-demographic variables: Occupation

		Composition component		Effects component	
	n	β	Percent	β	Percent
South Asia					
India 1998/99-2005/06	139,267				
Not working		-0.02	-1.87	0.45	45.81
Agricultural		-0.03*	-3.44	0.24	25.06
Professional/technical/ managerial		0.01*	0.73	-0.02	-2.49
Clerical		0.01**	0.83	-0.01	-0.64
Sales		0.00	0.04	0.02	2.13
Services		-0.08***	-8.20	0.00	-0.16
Unskilled manual		0.00*	-0.26	-0.06	-6.10
Other		0.00	0.10	0.00	0.06
Nepal 2001-2011	13,385				
Not working		0.34***	-6.33	-0.17	3.18
Agricultural		-0.32	6.08	-0.63	11.86
Professional/technical/ managerial		0.01	-0.11	0.02	-0.36
Clerical		0.00	0.05	0.03	-0.56
Sales		na	na	na	na
Services		0.12	-2.20	0.03	-0.51
Skilled manual		0.01	-0.18	-0.03	0.63
Unskilled manual		0.01	-0.19	-0.04	0.66
Other		0.29	-5.52	-0.35	6.52
Pakistan 2006-2013	17,685				
Not working		-0.01	1.14	1.57	-196.44
Agricultural		0.03	-3.36	-0.15	19.14
Professional/technical/ managerial		0.00	0.02	0.08	-10.53
Clerical		0.00***	-0.25	-0.01*	1.06
Sales		0.00	-0.45	0.01	-0.64
Services		-0.01	0.78	0.19	-23.87
Skilled manual		0.03	-4.03	0.05	-6.09
Unskilled manual		0.02	-1.99	-0.01	1.66

Appendix Table 2.7—*Continued*

		Composition component		Effects component	
	n	β	Percent	β	Percent
Southeast Asia					
Cambodia 2005-2014	19,455				
Not working		-0.04	308.56	-0.07	523.01
Agricultural		-0.01	38.30	2.49	-18931.00
Professional/technical/ managerial		0.02	-166.02	0.20	-1548.00
Clerical		0.00	-11.60	0.03	-245.42
Sales		0.04	-270.49	0.51	-3885.40
Services		0.02	-125.27	-0.11	800.64
Skilled manual		-0.08	632.37	-0.04	273.98
Unskilled manual		-0.09	666.30	0.90	-6850.70
Other		0.00	1.62	0.03	-218.33
Indonesia 2002-2012	52,999				
Not working		0.33*	-22.74	-1.39	94.76
Agricultural		0.30	-20.15	-1.01	68.57
Professional/technical/ managerial		-0.06	4.35	-0.19	13.11
Clerical		0.00	0.08	-0.04	2.87
Sales		-0.10	6.77	-0.33	22.46
Services		-0.03	2.14	-0.20*	13.34
Skilled manual		-0.33*	22.32	-0.17	11.66
Unskilled manual		-0.10***	7.13	0.00	0.01
Other		-0.01	0.48	0.01	-0.72
Philippines 2003-2013	15,783				
Not working		-0.15**	-21.82	0.31	44.84
Agricultural		0.01	1.41	0.06	8.97
Professional/technical/ managerial		-0.02	-3.10	-0.14	-21.24
Clerical		0.00	0.44	-0.07	-10.33
Sales		-0.14	-21.06	0.15	21.55
Services		-0.01	-0.88	0.03	4.78
Skilled manual		0.01	0.88	-0.11	-16.09
Unskilled manual		-0.01	-1.94	-0.02	-2.73
Other		0.00	-0.12	0.00	0.50

Notes:

*** p≤0.001; ** p≤0.01; * p≤0.05

Decomposition models are estimated with the following covariates: marriage age, women's decision-making (except India and Pakistan), attitudes toward wife beating (except Bangladesh, India, and Pakistan), spousal age difference, education, occupation (except Bangladesh), household wealth quintile, religion (except Pakistan and Indonesia), residence, subnational region, husband's education, and husband's occupation (except Bangladesh).

Appendix Table 2.8. Detailed multivariate decomposition of changes in the interval to first birth, showing contributions to the change attributed to differences in composition and to differences in effects of women's socio-demographic variables: Household wealth quintile

		Composition component		Effects component	
	n	β	Percent	β	Percent
South Asia					
Bangladesh 2004-2014	20,017				
Poorest		0.00	-0.10	-0.28	6.18
Poorer		-0.01	0.22	-0.14	3.03
Middle		-0.01	0.21	-0.07	1.49
Richer		0.00	0.09	0.41	-8.91
Richest		0.00	0.02	0.13	-2.85
India 1998/99-2005/06	139,267				
Poorest		-0.01	-0.59	0.01	1.21
Poorer		0.00	0.05	-0.16	-16.26
Middle		0.00	0.01	0.00	-0.10
Richer		0.00*	-0.33	0.05	5.51
Richest		0.00	0.08	0.12	12.67
Nepal 2001-2011	**13,385**				
Poorest		-0.06	1.17	-0.02	0.38
Poorer		-0.01*	0.16	0.20	-3.68
Middle		0.01	-0.27	0.25	-4.65
Richer		-0.03***	0.59	-0.67*	12.60
Richest		-0.04	0.67	0.23	-4.28
Pakistan 2006-2013	17,685				
Poorest		-0.02***	3.12	0.48	-59.58
Poorer		0.00	0.08	0.14	-17.57
Middle		0.00	0.01	-0.20	25.03
Richer		0.00*	0.03	-0.44	54.86
Richest		-0.01***	1.44	-0.04	5.10
Southeast Asia					
Cambodia 2005-2014	19,455				
Poorest		0.00	37.16	0.01	-60.55
Poorer		0.00	13.32	-0.43	3264.40
Middle		-0.01	42.06	0.07	-500.51
Richer		0.00	16.21	-0.07	545.34
Richest		0.00	-27.22	0.42	-3194.70
Indonesia 2002-2012	52,999				
Poorest		-0.05***	3.49	0.15	-10.06
Poorer		0.00	0.07	0.02	-1.13
Middle		-0.01	0.47	-0.15	10.33
Richer		-0.01	0.77	0.11	-7.46
Richest		0.00*	0.21	-0.13	8.92
Philippines 2003-2013	15,783				
Poorest		0.00	-0.66	-0.06	-8.50
Poorer		0.03***	3.70	-0.35**	-51.95
Middle		0.00	0.17	0.08	11.68
Richer		0.00	0.15	0.15	21.74
Richest		0.00**	0.03	0.21	30.50

Notes:

*** p≤0.001; ** p≤0.01; * p≤0.05

Decomposition models are estimated with the following covariates: marriage age, women's decision-making (except India and Pakistan), attitudes toward wife beating (except Bangladesh, India, and Pakistan), spousal age difference, education, occupation (except Bangladesh), household wealth quintile, religion (except Pakistan and Indonesia), residence, subnational region, husband's education, and husband's occupation (except Bangladesh).

Appendix Table 2.9. Detailed multivariate decomposition of changes in the interval to first birth, showing contributions to the change attributed to differences in composition and to differences in effects of women's socio-demographic variables: Religion quintile

		Composition component		Effects component	
	n	β	Percent	β	Percent
South Asia					
Bangladesh 2004-2014	20,017				
Muslim		0.00	0.04	-0.20	4.43
Christian		0.05*	-1.09	-0.05	1.10
Buddhist		0.05	-1.07	0.00	-0.07
Hindu		-0.02	0.36	0.23	-5.15
India 1998/99-2005/06	139,267				
Muslim		-0.02***	-1.70	-0.11	-11.09
Christian		0.00	0.06	0.01	1.29
Buddhist		0.00	0.03	0.02	1.74
Hindu		0.00***	0.07	0.36	36.60
Other		0.00	0.07	-0.01	-0.64
Sikh		0.00	0.00	0.00	-0.22
Jain		0.00	0.04	0.00	-0.13
Nepal 2001-2011	13,385				
Muslim		0.00	0.00	-0.28	5.30
Christian					
Buddhist		-0.01	0.10	0.07	-1.38
Hindu		0.00	0.00	-0.75	14.00
Other		-0.01	0.21	0.02	-0.42
Kirat		-0.01	0.20	0.04	-0.67
Southeast Asia					
Cambodia 2005-2014	19,455				
Muslim		-0.01	55.64	-0.02	122.08
Christian		0.00	-16.40	0.01	-49.92
Buddhist		0.01	-45.07	-2.46	18676.00
Other		0.00	-12.84	0.02	-152.59
Philippines 2003-2013	15,783				
Other		-0.01	-1.31	-0.01	-1.12
Roman Catholilc		-0.03*	-4.04	2.35***	345.01
Protestant		-0.01	-0.76	0.14	20.34
Iglesia Ni Kristo		0.00	0.72	-0.02	-3.17
Aglipay		0.03***	4.63	-0.10***	-14.77

Notes:

*** p≤0.001; ** p≤0.01; * p≤0.05

Decomposition models are estimated with the following covariates: marriage age, women's decision-making (except India and Pakistan), attitudes toward wife beating (except Bangladesh, India, and Pakistan), spousal age difference, education, occupation (except Bangladesh), household wealth quintile, religion (except Pakistan and Indonesia), residence, subnational region, husband's education, and husband's occupation (except Bangladesh).

Appendix Table 2.10. Detailed multivariate decomposition of changes in the interval to first birth, showing contributions to the change attributed to differences in composition and to differences in effects of women's socio-demographic variables: Place of residence

		Composition component		Effects component	
	n	β	Percent	β	Percent
South Asia					
Bangladesh 2004-2014	20,017				
rural		0.04	-0.80	0.08	-1.80
urban		0.04	-0.82	-0.27	5.93
India 1998/99-2005/06	139,267				
rural		-0.02***	-2.54	-0.04	-3.76
urban		-0.02***	-2.25	0.09	9.45
Nepal 2001-2011	13,385				
rural		-0.02	0.32	0.02	-0.30
urban		-0.02	0.31	-0.14	2.70
Pakistan 2006-2013	17,685				
rural		-0.01*	0.83	-0.32	40.23
urban		-0.01*	1.08	0.60	-75.50
Southeast Asia					
Cambodia 2005-2014	19,455				
rural		0.00	-7.11	0.16	-1212.40
urban		-0.01	58.45	-0.83	6275.00
Indonesia 2002-2012	52,999				
rural		-0.02***	1.66	-0.21	14.27
urban		-0.03***	1.75	0.23	-15.93
Philippines 2003-2013	15,783				
rural		0.02	3.07	-0.28	-41.73
urban		0.02	2.89	0.25	36.10

Notes:

*** p≤0.001; ** p≤0.01; * p≤0.05

Decomposition models are estimated with the following covariates: marriage age, women's decision-making (except India and Pakistan), attitudes toward wife beating (except Bangladesh, India, and Pakistan), spousal age difference, education, occupation (except Bangladesh), household wealth quintile, religion (except Pakistan and Indonesia), residence, subnational region, husband's education, and husband's occupation (except Bangladesh).

Table 2.11. Detailed multivariate decomposition of changes in the interval to first birth, showing contributions to the change attributed to differences in composition and to differences in effects of husbands' characteristics

		Composition component		Effects component	
	n	β	Percent	β	Percent
Husbands' education					
South Asia					
Bangladesh 2004-2014	20,017				
No education		0.01	-0.27	0.39	-8.58
Primary		-0.03***	0.65	-0.85***	18.66
Secondary		-0.04	0.85	-0.22	4.93
Higher		0.15***	-3.36	0.39**	-8.56
Don't know					
India 1998/99-2005/06	139,267				
No education		0.00	0.17	-0.13	-13.57
Primary		0.02*	2.44	0.01	0.82
Secondary		-0.01	-0.66	-0.13	-13.35
Higher		-0.06**	-5.91	0.15	15.45
Don't know					
Nepal 2001-2011	13,385				
No education		-0.30	5.60	0.04	-0.79
Primary		0.02	-0.34	0.00	0.02
Secondary		-0.09	1.70	0.46	-8.59
Higher		0.01	-0.18	-0.10	1.87
Don't know		0.01	-0.12	-0.01	0.18
Pakistan 2006-2013	17,685				
No education		0.01	-0.73	0.18	-23.01
Primary		0.00	-0.37	-0.15	19.33
Secondary		0.00	0.06	0.18	-22.45
Higher		0.03	-4.13	0.55	-68.49
Don't know		0.00	0.03	-0.01	1.04
Southeast Asia					
Cambodia 2005-2014	19,455				
No education		0.01	-63.45	-0.41	3100.10
Primary		0.03	-247.53	-1.00	7636.50
Secondary		-0.07	528.63	-0.56	4273.80
Higher		-0.04	289.77	0.01	-50.64
Don't know		-0.02	153.87	0.06	-454.12
Indonesia 2002-2012	52,999				
No education		0.05	-3.37	0.00	0.08
Primary		0.60*	-41.03	-2.19	149.33
Secondary		-0.66*	45.28	-1.56	106.11
Higher		-0.16*	10.69	-0.38	26.00
Don't know		0.00	-0.23	0.01	-0.91
Philippines 2003-2013	15,783				
No education		-0.01	-1.73	0.09	13.39
Primary		-0.07	-10.54	0.34	49.93
Secondary		0.08*	12.24	0.72	105.96
Higher		0.01	0.96	0.46	67.76
Don't know		0.00***	0.12	-0.01	-0.93

Continued

Table 2.11—*Continued*

		Composition component		Effects component	
	n	β	Percent	β	Percent
Husband's occupation					
South Asia					
India 1998/99-2005/06	139,267				
Agricultural		0.07	7.21	-0.16	-16.45
Professional/technical/ managerial		0.00	0.12	-0.08	-7.93
Clerical		0.00	-0.30	-0.03	-3.11
Sales		-0.05***	-4.70	-0.12	-12.64
Services		0.00	-0.34	-0.04	-4.09
Skilled manual		-0.07**	-7.60	-0.15	-15.69
Other		-0.04	-4.20	0.05	5.48
Not working		0.00	0.28	-0.04	-4.16
Nepal 2001-2011	13,385				
Agricultural		-0.28	5.31	0.86	-16.06
Professional/technical/ managerial		0.00	0.00	0.10	-1.85
Sales		0.02	-0.35	0.03	-0.56
Services		0.07	-1.32	-0.15	2.83
Skilled manual		-0.17**	3.22	-0.03	0.47
Unskilled manual		-0.02	0.46	-0.01	0.19
Other		-0.12	2.27	0.10	-1.91
Pakistan 2006-2013	17,685				
Agricultural		0.01	-1.70	3.35***	-418.05
Professional/technical/ managerial		0.00***	0.54	1.89***	-235.82
Clerical		-0.04	4.56	0.70***	-87.27
Sales		0.00	-0.29	2.61***	-326.27
Services		-0.01	0.63	1.87***	-233.93
Skilled manual		0.02***	-2.35	3.56***	-444.86
Unskilled manual		0.10	-12.11	3.84***	-479.81
Other		0.00***	-0.12	-0.02***	2.67
Not working		-0.01	0.84	0.57***	-70.67
Southeast Asia					
Cambodia 2005-2014	19,455				
Agricultural		-0.08	590.49	1.46	-11080.00
Professional/technical/ managerial		0.00	-8.46	-0.10	777.04
Clerical		0.02	-185.25	-0.10	780.69
Sales		0.00	22.44	0.05	-371.04
Services		0.01	-90.73	-0.02	176.34
Skilled manual		0.26	-1987.30	0.54	-4121.50
Unskilled manual		0.13	-950.70	-0.14	1084.00
Other		-0.03	198.95	0.09	-659.32
Indonesia 2002-2012	52,999				
Agricultural		-0.08	5.53	-0.18	12.29
Professional/technical/ managerial		0.00	-0.21	0.05	-3.42
Clerical		0.00	-0.23	0.03	-2.28
Sales		-0.02*	1.67	-0.05	3.70
Services		0.02	-1.47	-0.11	7.45
Skilled manual		0.19	-12.83	0.03	-2.23
Unskilled manual		0.12	-7.87	-0.27	18.16
Other		0.00	-0.30	0.00	-0.24
Not working		0.00	0.04	0.01	-0.53

Continued

Table 2.11—*Continued*

		Composition component		Effects component	
	n	β	Percent	β	Percent
Philippines 2003-2013	15,783				
Agricultural		0.01	1.39	0.05	7.73
Professional/technical/ managerial		0.01	1.52	0.21	31.25
Clerical		-0.02	-2.24	-0.03	-3.78
Sales		-0.09	-13.90	0.06	8.43
Services		0.00	0.43	-0.11	-15.89
Skilled manual		-0.07	-10.05	0.01	0.85
Unskilled manual		0.02	2.77	0.02	2.36
Other		-0.04	-6.37	0.02	2.52

Notes:

*** p≤0.001; ** p≤0.01; * p≤0.05

Decomposition models are estimated with the following covariates: marriage age, women's decision-making (except India and Pakistan), attitudes toward wife beating (except Bangladesh, India, and Pakistan), spousal age difference, education, occupation (except Bangladesh), household wealth quintile, religion (except Pakistan and Indonesia), residence, subnational region, husband's education, and husband's occupation (except Bangladesh).

Appendix Table 2.12. Detailed multivariate decomposition of changes in the interval to first birth, showing contributions to the change attributed to differences in composition and to differences in effects of women's socio-demographic variables: Subnational region

		Composition component		Effects component	
	n	β	Percent	β	Percent
South Asia					
Bangladesh 2004-2014	20,017				
Dhaka		0.02	-0.41	0.51	-11.20
Barisal		0.00	0.05	-0.02	0.43
Chittagong		-0.01***	0.20	-0.07	1.57
Khulna		-0.02*	0.36	0.30*	-6.51
Rajshahi & Rangpur		0.01	-0.26	-0.28	6.22
Sylhet		0.00	0.03	-0.14	3.03
India 1998/99-2005/06	139,267				
Uttar Pradesh & Uttaranchal		0.00	0.50	-0.83***	-85.28
Andhra Pradesh		0.27***	27.34	0.01***	0.61
Arunachal Pradesh		-0.02	-1.77	-0.31***	-31.88
Assam		0.00**	-0.19	0.04*	4.39
Bihar & Jharkhand		0.00**	0.35	-0.10	-10.54
Delhi		0.00**	-0.23	0.02	1.89
Goa		0.00***	0.01	0.00	0.09
Gujarat		0.01***	0.67	0.03	3.53
Haryana		0.00***	-0.29	0.03	3.26
Himachal Pradesh		0.00***	0.02	-0.01	-0.90
Jammu & Kashmir		0.00**	0.00	-0.02*	-1.79
Karnataka		-0.01*	-0.58	0.03	3.04
Kerala		0.00	0.48	-0.02	-1.61
Madhya Pradesh & Chattisgarh		0.01***	1.31	-0.09	-9.31
Maharashtra		0.00	0.09	-0.11	-11.19
Manipur		0.00***	0.02	0.00*	0.34
Meghalaya		0.00***	0.09	0.01**	0.56
Mizoram		0.00***	0.01	0.00	0.03
Nagaland		0.00***	0.06	0.00	0.31
Orissa		0.00	0.01	0.00	0.34
Punjab		0.00	0.08	0.06*	5.73
Rajasthan		0.01***	0.63	-0.04	-4.45
Sikkim		0.00	0.01	0.00	0.04
Tamil Nadu		0.02***	1.73	-0.08	-7.69
Tripura		0.00	0.00	0.00	0.15
West Bengal		0.00***	0.28	-0.38***	-39.40
Nepal 2001-2011	13,385				
Terai		-0.03	0.48	1.22*	-22.92
Mountain		-0.01***	0.23	-0.12	2.24
Hill		0.01	-0.27	-0.29	5.44
Pakistan 2006-2013	17,685				
Punjab		0.00	-0.61	0.73	-91.56
Sindh		0.00	-0.35	0.02	-2.21
Khyber Pakhtunkwa		0.00	0.05	0.40**	-49.94
Balochistan		0.00	0.04	-0.20***	25.28

Continued

Appendix Table 2.12—*Continued*

		Composition component		Effects component	
	n	β	Percent	β	Percent
Southeast Asia					
Cambodia 2005-2014	19,455				
Phnom Penh		0.01	-55.95	-0.13	964.46
Banteay Mean Chey		0.00	18.33	-0.14	1080.50
Kampong Cham		0.00	15.81	-0.01	49.37
Kampong Chhnang		0.00	-2.36	-0.07	539.89
Kampong Speu		-0.05	375.97	-0.23	1747.70
Kampong Thom		0.00	17.46	0.03	-207.89
Kandal		0.01	-88.21	-0.12	900.56
Kratie		0.04	-320.27	0.10	-734.78
Prey Veng		-0.04	329.95	0.14	-1065.50
Pursat		-0.01	93.70	0.11	-810.82
Siem Reap		0.02	-122.98	0.06	-446.22
Svay Rieng		0.00	-5.54	0.02	-145.50
Takeo		-0.04	312.73	0.26	-1991.00
Otdar Mean Chey		0.01	-58.62	0.08	-576.45
Battambang & Pailin		0.00	36.59	-0.21	1592.90
Kampot & Kep		-0.01	48.65	0.00	9.88
Preah Sihanouk & Kaoh Kong		0.00	-3.77	-0.04	341.64
Preah Vihear & Steung Treng		0.00	-3.94	0.04	-272.99
Mondol Kiri & Rattanak Kiri		-0.01	64.37	-0.10	755.20
Indonesia 2002-2012	52,999				
Sumatera		0.00***	-0.31	-0.29*	19.91
Java		-0.04***	2.84	-0.01	0.63
Bali & Nusa Tenggara		0.00	0.19	0.11**	-7.41
Kalimantan		0.00	0.00	-0.03	1.88
Sulawesi		-0.01	0.43	-0.02	1.16
Maluku & Papua		0.00***	-0.31	-0.29*	19.91

Continued

Appendix Table 2.12—*Continued*

		Composition component		Effects component	
	n	β	Percent	β	Percent
Philippines 2003-2013	15,783				
National Capital		-0.01	-1.09	0.16	22.78
Cordillera		0.00	0.03	-0.03	-4.43
I - Ilocos		0.00	0.06	0.01	1.19
II - Cagayan Valley		0.00	0.05	0.02	3.24
III - Central Luzon		0.00	0.08	0.04	5.25
IVA - Calabarzon		-0.02*	-2.59	-0.19	-27.20
IVB - Mimaropa		0.00	0.04	0.00	-0.30
V - Bicol		0.00	0.08	-0.05	-6.83
VI - Western Visayas		0.00	0.01	0.04	5.23
VII - Central Visayas		0.02*	3.30	-0.14	-20.02
VIII - Eastern Visayas		0.00	0.20	-0.11	-15.47
IX - Zamboanga Peninsula		-0.01	-1.10	-0.14*	-20.13
X - Northern Mindanao		0.00	0.08	0.12	18.29
XI - Davao		0.00	0.30	0.11	16.87
XII - Soccskargen		0.00	-0.44	0.06	8.67
XIII - Caraga		0.00	0.62	0.06	8.78
ARMM		-0.01	-1.20	0.03	4.63

Notes:

*** p≤0.001; ** p≤0.01; * p≤0.05

Decomposition models are estimated with the following covariates: marriage age, women's decision-making (except India and Pakistan), attitudes toward wife beating (except Bangladesh, India, and Pakistan), spousal age difference, education, occupation (except Bangladesh), household wealth quintile, religion (except Pakistan and Indonesia), residence, subnational region, husband's education, and husband's occupation (except Bangladesh).

Appendix Table 2.13. Observations for hazard models predicting the second birth interval

	Total subjects	Failures among subjects	Analysis time units	Last observed exit	dropped
South Asia					
Bangladesh 2014	12,083	10,614	675,450	417	77
India 2005-06	68,933	60,823	2,873,777	413	386
Nepal 2011	6,990	6,288	288,677	391	44
Pakistan 2012-13	9,052	8,270	290,566	381	68
Southeast Asia					
Cambodia 2014	9,710	8,120	450,916	437	60
Indonesia 2012	27,206	21,623	1,605,630	385	166
Philippines 2013	7,871	6,632	345,895	354	39

Appendix Table 2.14. Model diagnostics of the underlying hazard of the second birth interval

Model	Observations	Degrees of freedom	AIC	BIC
South Asia				
Bangladesh 2014				
exponential	11,226	27	27376.31	27574.11
weibull	11,226	28	25148.41	25353.54
ggamma	11,226	29	21734.75	21947.21
gompertz	11,226	28	27087.63	27292.76
lognormal	11,226	28	22021.14	22226.27
loglogistic	11,226	28	21864.10	22069.23
India 2005-06				
gompertz	2,588,855	69	162194.90	163075.80
exponential	2,588,855	68	158714.00	159582.20
weibull	2,588,855	69	145947.20	146828.10
lognormal	2,588,855	69	123875.00	124755.90
loglogistic	2,588,855	69	120199.10	121080.00
ggamma	2,588,855	70	111990.80	112884.40
Nepal 2011				
exponential	270,391	40	15696.40	16116.70
weibull	270,391	41	13585.48	14016.29
ggamma	270,391	42	10782.44	11223.76
gompertz	270,391	41	15572.59	16003.40
lognormal	270,391	41	11453.29	11884.10
loglogistic	270,391	41	11253.95	11684.76
Pakistan 2012-13				
exponential	270,466	38	21709.57	22108.87
weibull	270,466	39	19336.59	19746.40
ggamma	270,466	40	13627.78	14048.09
gompertz	270,466	39	25140.15	25549.96
lognormal	270,466	39	18571.61	18981.42
loglogistic	270,466	39	17942.46	18352.27

Continued

Appendix Table 2.14—*Continued*

Model	Observations	Degrees of freedom	AIC	BIC
Southeast Asia				
Cambodia 2014				
exponential	384,057	57	20757.30	21376.24
weibull	384,057	58	18702.13	19331.93
ggamma	384,057	59	15202.11	15842.76
gompertz	384,057	58	21694.92	22324.71
lognormal	384,057	58	16937.03	17566.83
loglogistic	384,057	58	16698.47	17328.26
Indonesia 2012				
gompertz	1,466,215	43	81579.57	82104.09
lognormal	1,466,215	43	73296.11	73820.63
loglogistic	1,466,215	43	73135.86	73660.38
exponential	1,466,215	42	61968.53	62480.86
weibull	1,466,215	43	58188.71	58713.23
ggamma	1,466,215	44	52935.71	53472.44
Philippines 2013				
exponential	312,246	57	18012.64	18619.78
weibull	312,246	58	17356.15	17973.94
ggamma	312,246	59	14004.83	14633.28
gompertz	312,246	58	17994.16	18611.95
lognormal	312,246	58	15124.84	15742.63
loglogistic	312,246	58	15036.36	15654.15

Notes:

Full hazard models for Bangladesh exclude controls for: wife beating attitudes, occupation, and husband's occupation as these data were not collected in the Bangladesh 2014 DHS

India 2005-06 DHS (NFHS-3) does not distinguish between skilled manual and unskilled manual.

Full hazard models for Indonesia and Pakistan exclude religious afiliation as these data were not collected in the Indonesia 2012 DHS or Pakistan 2012-13 DHS.

Indonesia 2012 DHS, Cambodia 2014 DHS, and Philippines 2013 DHS do not collect data on husband's current employment status, but categorizes husband's occupation regardless of current employment status.

India 2005-06 DHS (NFHS-3) and Indonesia 2012 DHS captures husband's current employment status as a separate occupational category and categorizes husband's occupation only for husbands who are currently working.

Appendix Table 2.15. Tercile survival times to first birth in months, ever-married women age 25-49

	25th percentile	50th percentile (median)	75th percentile
South Asia			
Bangladesh	13	24	42
India	13	20	36
Nepal	15	24	41
Pakistan	12	21	40
Southeast Asia			
Cambodia	13	19	29
Indonesia	11	15	26
Philippines	10	14	24

Appendix Table 2.16. Country-specific regional categories and coefficients (time ratios) from adjusted loglogistic hazard models of the second birth interval

Bangladesh		India		Nepal		Pakistan		Cambodia		Indonesia		Philippines	
Ref=Dhaka		Ref=Uttar Pradesh and Uttaranchal		Ref=terai		Ref=Punjab		Ref=Phnom Penh		Ref=Sumatera		Ref=National Capital	
Barisal	1.022	Andhra Pradesh	1.084***	Mountain	0.981	Sindh	1.095***	Banteay Mean Chey	1.088	Java	1.435***	Cordillera	0.916
Chittagong	0.828***	Arunachal Pradesh	1.086*	hill	1.000	Khyber Pakhtunkwa	1.085***	Kampong Cham	1.033	Bali & Nusa Tenggara	1.044	I - Ilocos	0.964
Khulna	1.156***	Assam	1.184***			Balochistan	1.034	Kampong Chhnang	0.920	Kalimantan	1.178***	II – Cagayan Valley	0.984
Rajshahi	1.134**	Bihar & Jharkhand	1.088					Kampong Speu	1.002	Sulawesi	0.961	III - Central Luzon	0.95
Rangpur	0.995	Delhi	0.992					Kampong Thom	1.021	Maluku & Papua	0.921*	IVA - Calabarzon	0.93
Sylhet	0.777***	Goa	1.231***					Kandal	0.959			IVB - Mimaropa	1.047
		Gujarat	0.995					Kratie	0.963			V - Bicol	0.867**
		Haryana	0.940*					Prey veng	1.098			VI – Western Visayas	0.957
		Himachal Pradesh	0.948*					Pursat	0.954			VII – Central Visayas	1.001
		Jammu & Kashmir	1.039					Siem reap	0.917			VIII - Eastern Visayas	0.93
		Karnataka	1.069**					Svay rieng	1.128*			IX - Zambo-anga Peninsula	1.08
		Kerala	1.201***					Takeo	0.964			X – Northern Mindanao	1.01
		Madhya Pradesh	0.996					Otdar Mean Chey	1.087			XI - Davao	1.087
		Mahara-shtra	1.046					Battam-bang & Pailin	0.936			XII - Socc-skargen	1.138*
		Manipur	1.074*					Kampot & Kep	1.012			XIII - Caraga	0.984
		Meghalaya	1.110*					Preah Sihanouk & Kaoh Kong	0.929			ARMM	1.135
		Mizoram	0.977					Preah Vihear & Steung Treng	0.918				

Continued

Appendix Table 2.16—*Continued*

Bangladesh	India		Nepal	Pakistan	Cambodia		Indonesia	Philippines
Ref=Dhaka	Ref=Uttar Pradesh and Uttaranchal		Ref=terai	Ref=Punjab	Ref=Phnom Penh		Ref=Sumatera	Ref=National Capital
	Nagaland	0.945			Mondol Kiri & Ratta-nak Kiri	0.984		
	Orissa	1.153***						
	Punjab	0.942*						
	Rajasthan	0.985						
	Sikkim	1.160***						
	Tamil Nadu	1.128***						
	Tripura	1.293***						
	West Bengal	1.291***						

Notes:

*** p≤0.001; ** p≤0.01; * p≤0.05

Hazard models for most surveys control for: age at marriage, birth cohort, decision-making ability, wife beating attitudes, spousal age difference, education, occupation, household wealth quintile, rural/urban residence, region of country, husband's education, and husband's occupation

Hazard model for Bangladesh excludes controls for: wife beating attitudes, occupation, and husband's occupation as these data were not collected in the Bangladesh 2014 DHS

Hazard models for Indonesia and Pakistan exclude religious affiliation as these data were not collected in the Indonesia 2012 DHS or Pakistan 2012-13 DHS.

Chapter 3. THE SOCIAL CONTEXT OF EARLY MARRIAGE, CONTRACEPTION, AND CHILDBEARING AMONG YOUNG WOMEN IN KHULNA, BANGLADESH

3.1 BACKGROUND

Early age at marriage[18]—often defined as marriage before age 18—is socially acceptable in South Asian culture (Riley 1994), and Bangladesh has long been characterized by early marriage and high adolescent fertility. According to the 2014 Bangladesh Demographic Health Survey (BDHS), 89% of women age 20-49 were first married by age 20. In spite of increases over the last decade and a half, de facto age at marriage for women remains low, well below the legal minimum marriage age. Between 1997 and 2014, the median age increased by 2 years, from 14.2 to 16.1 (Mitra et al. 1997; NIPORT, Mitra and Associates, and ICF International 2016). Many of these marriages are arranged by the parents, with little participation by the girl (Shrestha 2002).

Marriage is the leading social and demographic indicator of exposure of women to the risk of pregnancy and a key proximate determinant of fertility (Bongaarts 1982). This is especially so in South Asia, where marriage is near universal and childbearing occurs almost entirely within marriage. In Bangladesh, the total fertility has fallen rapidly (from 3.3 in 1997 to 2.3 in 2014) and the modern contraceptive prevalence rate has risen from 42% to 52% in the same time period. Nonetheless, the probability of a first birth before age 20 has remained static since the 1990s (Nahar and Min 2008). Nearly 31 percent of adolescents have begun childbearing. Women's

[18] Although early marriage may be prevalent among men in some settings, particularly in forming marital partnerships with young women (MacQuarrie and Edmeades 2015a), demographers and public health experts have been concerned primarily with marriage age among women. In keeping with this focus, all references to early marriage or age at marriage in this study refer to *women's* age at marriage.

median age at first birth in Bangladesh is 18.4 years (NIPORT, Mitra and Associates, and ICF International 2016).

Adolescent pregnancy poses risks for a range of negative maternal and peri-natal health outcomes, with the risk increasing for the youngest girls (Cooper, Leland, and Alexander 1995; Haldre et al. 2007; de Vienne, Creveuil, and Dreyfus 2009; Goonewardene and Waduge 2009). The World Health Organization estimates that births to women younger than age 20 account for 11% of all births worldwide, but account for 23% of the burden of disease from pregnancy and childbirth among all women (Chandra-Mouli, Camacho, and Michaud 2013). In particular, girls younger than 20 have an increased risk of miscarriages, stillbirths, and neonatal deaths, as well as preterm birth and low birth weight infants.

Early marriage is associated with poor fertility control and negative reproductive outcomes (Godha, Hotchkiss, and Gage 2013; Kamal and Hassan 2015). Women who marry young are not only likely to have their first birth at a young age, but tend to have shorter birth intervals (also a health risk) and higher total fertility. Beyond health risks, adolescent mothers also have social disadvantages. They may be socially isolated, without partner or family support, and often unable to complete their education. They may transmit some degree of socioeconomic disadvantage in health outcomes and behavioral risks to their own children.

Young, recently married women enter an institution in which social norms emphasize childbearing, where they may face direct pressures to have a child, where proving one's fertility is a means to improving one's social status, and where personal decision-making is deferred to the husband or more senior women in the household (Rashid 2006; Gipson and Hindin 2007; Henry et al. 2015). Spousal communication about matters of sexuality and reproduction is likely to be

inadequate, particularly in arranged marriages, and it may be difficult for young women to articulate their fertility desires, particularly if they contravene strong social expectations. Several studies have shown that young, recently married women are less empowered than either unmarried adolescents in their natal home or older married women who have already borne children (Gage 2000; MacQuarrie 2009).

In such a context, the young woman's husband or mother-in-law may figure prominently in decisions about using contraception and the timing of childbearing (Barua and Kurz 2001; MacQuarrie and Edmeades 2015b) or the woman may begin childbearing as a way to improve her standing in the household (MacQuarrie 2009). A study in Nepal showed that a higher proportion of adolescent pregnant women (67%) live in an extended family. Of these women, just over half (51%) said their husbands had authority over conception choices in spite of the adolescents' desire to make their own decision (Sharma et al. 2002).

Young women, by fact of their age and inexperience, may also lack information and access to services they need to delay the first birth. For example, only 30% of 15-19 year old women have been exposed to any information on contraception in the preceding month (NIPORT, Mitra and Associates, and ICF International 2016). Possibly as a result of these social barriers, contraceptive use among married women age 15-19 is 47%, lower than among any age group between the ages of 20 and 44, and unmet need for family planning is higher (17%) than among women age 24-49 (12.3%) (NIPORT, Mitra and Associates, and ICF International 2013; MacQuarrie 2014, 2015). Contraception is seldom used prior to the first birth (24% of nulliparous women) (NIPORT, Mitra and Associates, and ICF International 2013).

While DHS survey data can describe the prevalence of contraceptive use and adolescent childbearing and patterns across subpopulations or time, these data do not necessarily illuminate the motivations leading to these outcomes. Therefore, the present study supplements the quantitative data with a qualitative investigation into the social context that shapes young women's fertility intentions, decisions, and contraceptive and fertility behavior in Khulna division of Bangladesh.

3.2 METHODS

3.2.1 Study Setting

Of Bangladesh's seven divisions, Khulna has one of the lowest ages at first marriage and, subsequently, ages at first birth. In 2014, the median age at first marriage among women age 20-49 was 15.5 and the median age at first birth was 18.0, well below national figures (NIPORT, Mitra and Associates, and ICF International 2016). On average, Khulna women have an interval of 30 months between marriage and first birth. This stands in sharp contrast to a median of 63.8 months between subsequent births (national median is 51.7 months) (NIPORT, Mitra and Associates, and ICF International 2016). This low age at marriage and short interval from marriage to the first birth make Khulna an ideal setting to explore the normative context that underlies these demographic behaviors. This study on early childbearing draws its sample from rural clusters in Khulna division.

3.2.2 Study Design and Instruments

This qualitative study on the social context of early childbearing is one of three qualitative studies emanating from the 2014 Bangladesh Demographic and Health Survey (BDHS). Two other studies examine the pregnancy risk and family planning needs of women with migrant husbands and women's perspectives on and experiences with antenatal care. All three qualitative studies and the quantitative Bangladesh DHS survey are supported by USAID/Bangladesh through The DHS Program (contract # AID-OAA-C-13-00095). The International Centre for Diarrhoeal Disease Research, Bangladesh (icddr,b) is the implementing organization of the study, led by two principal investigators, one from The DHS Program (the author) and one from icddr,b.

The three qualitative studies are all nested studies (Tashakkori and Teddlie 2010; Harrits 2011) embedded within the broader, quantitative BDHS. This research design allows large n quantitative and small n qualitative analysis on the same topic and using the same sample population, so that the methodologies complement each other. Specifically, this study adopts a data-linked nested research design (Schatz 2012). This design facilitates strategic sampling: namely, the qualitative study uses a sub-sample of the larger BDHS sample.

The primary data collection method was in-depth, in-person interviews. The targeted number of interviews (30) was guided by the principle of saturation (Morse 1994; Patton 2005; Guest, Bunce, and Johnson 2006). Saturation was confirmed upon the analysis stage of the study. In-depth interviews were semi-structured and guided by an interview guide of open-ended questions and possible conversational prompts and probes. Interviews began with general topics and progressed to more sensitive topics. The interview guide encouraged informants to discuss their experiences and attitudes about marrying, their fertility aspirations upon marriage, communication between the couple, knowledge of and behavior around family planning and childbearing, young women's agency and decision-making around fertility, and the influences of their spouses, parents, in-laws, and others in the community on their reproductive behavior.

3.2.3 Study Cluster Selection

The qualitative study draws its sample from among respondents to the 2014 BDHS. The 2014 Bangladesh DHS is the seventh DHS in Bangladesh. It is a nationally representative sample of 17,886 ever-married women of reproductive age (15-49 years). The BDHS achieved a response rate among eligible women of 97.9% nationally and 98.9% in Khulna division.

Figure 3.1. Map of study division and clusters

The BDHS applied a two-stage, stratified and clustered sampling design. Each division was stratified into rural and two types of urban areas (city corporations and other than city corporations). In the first stage of sample selection, 600 enumeration units were selected with probability proportional to size. Enumeration units were delineated from the 2011 population census of the People's Republic of Bangladesh. In the second stage, 30 households per cluster were selected with equal probability. All ever-married women age 15-49 who are de facto members of the selected household were eligible for interview. Details of the Bangladesh DHS

methodology can be found in the survey final report (NIPORT, Mitra and Associates, and ICF International 2016).

The BDHS data were collected between July and October 2014. The 2014 BDHS sampled 85 clusters in Khulna division—56 rural and 29 urban. The BDHS implementing organization, Mitra and Associates, provided our study team with a list of clusters containing women who had consented during the DHS interview to a follow-up interview and met the eligibility criteria of this study. From the cluster listing, we selected rural clusters with four or more eligible respondents. Our original sampling design called for these clusters to be drawn randomly. However, the eruption of political unrest and widespread *hartals* (strikes/blockades), which had the potential to become violent, caused us to adjust our sampling procedures. We prioritized geographic proximity, replacing several selected clusters that were distant from the others with new, eligible clusters that were closer. Additionally, we increased the target number of interviews per cluster and reduced the overall number of selected clusters. These changes allowed us to minimize the time our field teams spent on major highways into and out of Dhaka and better ensure their safety, while still achieving our desired sample size. Our final sample of informants is drawn from nine of the rural clusters sampled in the BDHS, spread over five districts in Khulna division (see Figure 3.1).

3.2.4 Informant Eligibility and Sampling

In this qualitative study on early childbearing, we sought to interview women age 15-22 who had married before age 18. Among those meeting these criteria, we expected parity to be highly skewed away from nulliparous women and toward parous and multiparous women. Therefore, we did not stratify our sample by parity or make this an eligibility criterion. Based on data from the 2011 BDHS (NIPORT, Mitra and Associates, and ICF International 2013), we estimated that, on

average, we would find approximately 3.6 eligible women per rural cluster. We anticipated selecting two women each in 15 clusters to reach our desired sample size of 30 women. We later relaxed the limit of two women per cluster to maximize the number of interviews that could be conducted in each cluster.

The cluster listing identified 74 eligible women in the nine clusters selected for this study. However, to protect informant confidentiality, we did not select women from the same household or *bari* (group of households) or from adjacent households or *baris*. Furthermore, another qualitative DHS study on antenatal care was being conducted in Khulna division in some of the same clusters. Women who met the eligibility criteria for both studies were included in the selection pool for the study on antenatal care and became ineligible for selection in this study. In all, fourteen women were not considered for selection because they were either dual-eligible or living in the same *bari*. The field team attempted contact with 47 of the remaining 59 women. Fourteen of these women were unavailable for interview, including three women who had temporarily or permanently moved away and three who could not be located and were, thus, lost to follow up. Two women declined to be interviewed and a final woman consented to be interviewed but was found to be ineligible for the study because she was older than 22. Thirty women who met the eligibility criteria and had provided consent were successfully interviewed and make up our informant sample. Having reached our target sample size, interviews were not attempted with the remaining 12 eligible women in the selected clusters.

3.2.5 Research Team and Training

The study team included nine members: two principal investigators, two co-investigators, four research officers, and a field assistant. The male field assistant helped the field team locate and

contact eligible informants in the field. The field team included the two co-investigators and the four research officers, all women, who hold a master's degree or higher in anthropology or sociology and have expertise in qualitative methods. This team conducted the in-depth, person-to-person interviews with study informants, transcription, translation, and coding of the data. The author led the data analysis and prepared the study report. The other principal and co-investigators provided analytical support. Namely, these members of the senior research team provided assistance with thematic summaries, responded to the lead researcher's interpretation of findings, and provided translation support.

In addition to their general expertise in qualitative research, the full study team participated in targeted 10-day training to prepare for field work. The training guided team members through the purpose of the study, built familiarity with study interview guides, and reviewed qualitative interviewing techniques that would be used in the study. It addressed the study's data collection process, sampling procedures and informant eligibility for the study, ethical procedures (including obtaining consent and maintaining privacy and confidentiality), field management, and information on health services related to maternal and reproductive health. The training emphasized skills such as building rapport and probing during interviews, note taking, transcribing, translating, preparing field notes, and recording complete and accurate demographic data on the cover sheet accompanying interview transcripts. The training included classroom discussion, role-play, practice interviews, and field-testing with the interview guide. Practice interviews were observed by senior members of the research team, who provided feedback on interview techniques. Based on experiences piloting the interview guide during the interviewer training, the guide was modified for use in main data collection. The modified interview guide was field-tested a second time before being finalized.

In addition to the training for field work, a second training was conducted with the research team on data coding and analysis.

3.2.6 Data Collection

Icddr,b was responsible for data collection, which occurred December 2014-March 2015. Prior to the arrival of the full field research team in the field, the male field assistant visited the selected clusters and, using the address information generated by the BDHS implementing agency, made initial contact with selected informants and briefed them, and key members of their family, as necessary, about the upcoming presence of the field research team. He then arranged a date and time for a member of the field research team to conduct the interview.

Interviews were conducted in a convenient space where the interviewer could do her best to maintain privacy, usually in the informant's house or yard. After consent was obtained, interviews began with general aspects of women's lives (topics the interviewer could return to should interruptions occur) and then progressed to the more detailed and possibly sensitive topics of informants' reproductive and sexual health and family dynamics. Interviews were conducted in Bangla. They generally lasted 60-90 minutes, following informal discussions of approximately 15-30 minutes. All informants agreed to have their interviews recorded after having been given the option to refuse. In addition to the informant interviews, the field research team recorded information about the cluster itself, including the overall socio-economic condition, development of infrastructure, transportation network, and health services (including community health workers) available in the area.

3.2.7 Data Management and Analysis

Research officers transcribed verbatim the recorded interviews once they were completed. Co-investigators and one principal investigator continually reviewed transcripts for interview quality and provided feedback to the field research team. Once transcribed, Bangla transcripts were translated into English. All interviews were entered into AtlasTi and coded.

As qualitative inquiry employs an iterative approach, transcripts were coded per a predetermined list of major themes, based on a priori research questions developed by the two principal investigators, and supplemented by codes for new themes and sub-themes that emerged from the informants' own narratives. The author reviewed code reports and fully coded transcripts for quality of coding, feedback was provided to the data coders, and the coding framework was updated as needed. Finally, the principal investigators and co-investigators prepared thematic summaries of each transcript.

These three types of information—coded output according to major themes; thematic summaries; and full transcripts—were used along with a content analysis framework to identify key concepts in the coded data.

Two separate analysis workshops were convened. During each, the senior research team, led by the author, analyzed one-half of the interviews applying the content analysis framework. The analysis applied a modified split-half design, borrowing from an approach common to reliability testing in statistical analysis (Furr 2010). That is, each half of the interviews was analyzed independently of one another and only once each half was analyzed in their entirety the author compared the results of the two halves for their agreement in the presence of themes and

interpretation of key findings. Since the findings of each separately analyzed half converged, the combined results are presented in this paper. Secondly, each member of the analysis team analyzed coded output for multiple themes across all transcripts and multiple complete narratives across all themes and sub-themes. This triangulation and frequent conferring about the results allowed a solid consensus on the interpretation of findings.

3.2.8 Ethical Considerations

This study received ethical clearance from the institutional review board (IRB) of ICF International and the ethical review committee (ERC) of icddr,b. Informed consent of study informants was obtained twice. First, all respondents to the quantitative BDHS, regardless of eligibility or division of residence, were asked if they would agree to a follow-up interview. At the conclusion of the DHS interview, the following consent statement was read to the respondent and verbal consent obtained:

> *Thank you for taking the time to answer these questions. I would like to inform you that additional information on family planning and antenatal care for women who gave birth in the past 5 years will be collected in the near future to find better ways to provide health services for women and families. Another member of our team may return in a few weeks to ask you a few additional questions about these topics. Do you agree to allow another member of our team to contact you about participating in a short interview? Your responses will remain confidential.*

Only women who agreed to the follow-up interview and were otherwise eligible for the qualitative study were included on the listing from which study clusters were selected. Secondly, women who

were approached for in-depth, qualitative interviews were told about the study purpose by investigators and gave their written informed consent. Two women who had initially provided consent during the BDHS interview declined to consent at the time of qualitative field work. Investigators explained to potential informants that they could decline to answer any questions with which they were uncomfortable or halt the interview at any point. Investigators also explained that informants could decline to have their interview audio-recorded; None did. Interviewers made every effort to conduct the interview in a private location and were trained in ensuring privacy and data management procedures to maintain confidentiality of the data once data were collected.

3.2.9 Challenges and Limitations

No data collection effort is without its challenges and this study is no exception. This study encountered two major challenges.

First, severe political unrest in January and February 2015 disrupted fieldwork. *Hartals* (strikes/blockades) brought the risk of violence and threatened the security of the research team. All data collection efforts ceased for 2 months. As the intensity of the unrest eased slightly, we modified field operation and sampling procedures so that data collection could resume while protecting the interviewers. First, we re-selected several study clusters, taking into consideration their proximity to one another. Secondly, we conducted a greater number of interviews in a smaller number of clusters. This allowed the field research team to reduce their number of trips from Dhaka and instead travel directly between study clusters, although it required that they stay in the field for longer stretches at a time. Third, the field research team travelled by train and hired a car at their destination point, rather than traveling by car from Dhaka. These changes minimized the time

the field research team spent on highways in and out of Dhaka, where the threat to the team's security was the greatest.

The second challenge was in reaching and securing interviews with eligible women. Though only two of 47 women refused to be interviewed outright, six women could not be located or were known to have moved away from the study area. Another eight women were absent or busy during the limited time the field research team could spend in each cluster. This challenge may have been compounded by the 2-month hiatus, lengthening the time between the BDHS interview and the qualitative study interview.

The perspectives of husbands, parents, or the in-laws of young, married women would have enhanced understanding of the social context influencing early childbearing in this division of Bangladesh. However, we were unable to involve these groups as informants in the study. The reasons are two-fold. First, interviewing the husbands or in-laws would violate the commitment of confidentiality made to the index informants during the informed consent process of the BDHS quantitative survey by de facto disclosing the index informant's participation in the BDHS. Similarly, interviewing both the index informant and a spouse or in-laws linked to her could entail personal risks to the index informant if the linked informants were to become displeased with her participating in a study on such personal and potentially sensitive topics. Secondly, we had no feasible mechanism to identify and draw an unlinked sample of "men who married adolescent women", "parents of women married as adolescents", or "in-laws of daughters-in-law". For instance, the 2014 BDHS does not interview men. Furthermore, the household listing would only identify persons in one of these groups if that information were revealed by their mutual relationship to the head of household and they were co-resident at the time of the survey.

In spite of these challenges, we were, nonetheless, able to achieve our targeted sample size well within the selected clusters and the informants provided us with rich narratives of their lives. Quality informant interviews allowed us to pursue multiple analytical themes.

Thematic areas of investigation presented in the following sections include: how young, married women think about the timing of childbearing at the time of marriage and shortly afterward; the normative environment that shapes their fertility aspirations; with whom in the household and their social network they share and do not share fertility intentions (e.g., whether young women's and their husbands' intentions align but conflict with those of the women's in-laws, or whether young women and their husbands have differing aspirations); and how young women engage "allies" to pursue their fertility aspirations. I also explore spousal communication with regard to childbearing and family planning, attitudes toward family planning and specific contraceptive methods, and perceptions about appropriate role of contraception in spacing either the first birth or second birth. Finally, I examine women's power status within their households, how they navigate household decision-making processes to try to achieve their reproductive goals, and their knowledge, access, and agency-related barriers to using contraception.

3.3 RESULTS

3.3.1 Profile of Study Informants

3.3.1.1 Marital and Reproductive Profile

Table 3.1 presents a summary of the socio-economic and demographic profile of the women in this study; Details for each informant can be found in Appendix 1. To be eligible for this study, informants were required to be age 22 or younger at the time of interview and to have married before the age of 18. At the time of the in-depth interview, the 30 informants ranged in age from 15 to 22 years, with a mean of 19.1 years, as seen in Table 3.1. Their age at marriage was, on average, 15 (range 11-18 years). Nine women were married before age 14, 16 at age 15-16, and 4 at age 17-18.

Husbands' current ages ranged from 18 to 40 (mean 27), meaning that women were, on average, married to a man 8 years their elder. Fourteen women were married to a man who was between 5 to 9 years older than they were. Among the remaining women, about half were married to a man closer to their own age and half were married to a man 10 years or older. The average duration of women's marriages was, at the time of the interview, 4 years, with a range of less than one year to 10 years. An equal number of women had been married for less than 3 years, between 3 and 4.9 years, and between 5 and 10 years.

Twenty-two of the 30 informants were living in extended households at the time we interviewed them, though an even greater number began their married lives in this arrangement.

Nearly two-thirds (18) of the sample had experienced one pregnancy; this figure includes three women who were currently pregnant for the first time. Nine women had had two or three

pregnancies. Only three women had not yet become pregnant. Two of these three had been married only for a short time—a matter of months—at the time of interview. The distribution of the number of living children is similar to that of pregnancies. Six women were nulliparous, three who had never been pregnant and three who were currently pregnant. Seventeen women had one child, including two women who had had a second pregnancy but experienced a miscarriage, menstrual regulation or termination, or child death. Seven women had two children, including three women who had had a third pregnancy but experienced a miscarriage, menstrual regulation or termination, or child death.

3.3.1.2 Socio-economic Profile

The informants generally had class 8 or less education. Two women had no education, while 10 had completed secondary school. None had higher than a secondary education. The educational profile of their husbands was similar, although seven had no education and two had higher than secondary education. In eight couples, the wife had more education than her husband and in in another eight couples, the husband had more education. The educational level was the same among four couples.

There is a relatively even distribution of household wealth across the poorest three wealth quintiles. However, there are comparably few informants in the richest wealth quintile (2) and a high concentration in the second to richest quintile (10). The most common occupations among women's husbands were farming (10), working in small businesses (7), or as a van/CNG/rickshaw driver (4). The vast majority of informants reported themselves to be housewives and did not work outside of the home.

Table 3.1. Profile of study informants: Frequency distribution across background characteristics and means (n=30)

Women's current age (mean)	19 years	**Husband's current age (mean)[6]**	27.4 years
Education		**Husband's education**	
no schooling	2	no schooling	7
primary—incomplete	12	primary—incomplete	11
primary—complete	6	primary—complete	2
secondary or higher	10	secondary or higher	10
Wealth quintile[1]		**Husband's occupation[7]**	
lowest	7	electrician	1
second	5	teacher	2
middle	6	farmer	10
fourth	10	day labor	2
highest	2	carpenter	1
		business	7
Age at marriage (mean)[2]	14.9 years	driver	4
≤14	9	jewelry maker	2
15-16	16	butcher	1
17-18	4	imam	1
		cooperative	1
Spousal age difference (mean)	8.4 years		
<5	7		
5-9	14		
≥10	9		
Marital duration (mean)[3]	4.0 years		
<3 years	10		
3-4.9	10		
5-10	10		
Household type			
extended	22		
nuclear	8		
Number of pregnancies[4]			
0	3		
1	18		
2	6		
3	3		
Number of living children[5]			
0	6		
1	17		
2	7		

[1] Household wealth quintiles are calculated by the 2014 BDHS.
[2] Includes only age at first marriage for one woman (Informant #16) who had two marriages.
[3] Includes only duration of current marriage for one woman (Informant #16) who married twice.
[4] Includes three women currently pregnant with their first pregnancy.
[5] Includes two women who had a 2nd pregnancy and three women who experienced a 3rd pregnancy but experienced a child death/termination.
[6] Husband characteristics refer to current husband for one woman who married twice (Informant #16).
[7] Includes one person who is a farmer and an imam and one who is a day laborer and a driver.

3.3.2 Knowledge of Sex, Pregnancy, and Contraception Prior to Marriage

Eleven of the 30 women[19] had no knowledge about contraception or ways to avoid pregnancy before marriage. Moreover, some women had little basic knowledge of sex and the reproductive system. One woman, who lacked such basic body literacy when she married, remarked,

> *"I didn't know that baby is born this way! I didn't know that due the physical relations I would be pregnant."* (Informant #30, age 20, age at marriage 16)

Modesty, shyness, and a norm about what matters are unsuitable for discussion among unmarried girls perpetuate this lack of knowledge. As one informant explained:

> *"Parents didn't allow us to talk to married person as we were immature to hear that information on married life. If they [married friends] would tell us about their sexual relationship we, who were unmarried, would be bad."* (Informant #8, age 17, age at marriage 15)

> *"My sisters-in-law discussed about these issues with neighbors but, as we were not matured enough, they didn't allow us to hear their discussion. So we could know little."* (Informant #25, age 18, age at marriage 16)

One woman, who was married at age 11, before menses, reported ignorance about the basics of puberty and pregnancy in addition to methods of contraception, an ignorance that extended into

[19] An additional three women did not discuss knowledge of contraception prior to marriage with the interviewer.

the early days of marriage. She explains how family members avoided conversation with her about sensitive topics because of her young age.

> *"Nobody told me anything about this [sex, conception]. I mean that day [wedding day] or within next couple of days they didn't say anything as I was not adult then. In fact I was not on that age that they could feel comfortable to discuss about the issue as I was too young."* (Informant #1, age 21, age at marriage 11)

The majority of women (16 of 30), however, did have *some* knowledge of contraception prior to marriage. Frequently, they were familiar with the pill, the most commonly used contraceptive method in Bangladesh. Some women also knew about condoms and, less frequently, a few knew about injections, implants, or copper-T IUD. Unmarried women often gained knowledge of contraceptive methods by observing their mothers or elder sisters-in-law take the pill.

> *"I knew my mother used pill [Femicon]. I knew about pill… I saw my mother take it… She took that to prevent childbirth."* (Informant #14, age 18, age at marriage 17)

Others learned from seeing television advertisements, discussions with friends and neighbors, or overhearing talk among neighbors or health workers. One well-educated woman, whose family members and a neighbor included several family planning workers, was given a book about family planning methods, but this was an anomaly.

Taboos on talking about contraception limited the informants' knowledge, even among women who knew something about contraception prior to marriage. These women largely report that their

knowledge was insubstantial at the time they married. While they were familiar with the pill and knew it would prevent pregnancy, they often did not know how to use it, where they could get it, or other details that would enable them to effectively use the pill if they so desired.

> *"I hadn't any clear idea though I read about it. What was the purpose, how to use, I didn't understand that. And I didn't take part in the discussion when women were gossiping about those. I left the place when they talked about bad things… that time I considered those as bad topic of discussion."* (Informant #3, age 21, age at marriage 13)

> *"I heard about those [injections, implants], but I do not understand whether I should do this or not. I did not find the appropriate person to ask about this…Moreover a neighboring woman inserted something on her body for 5 years [implant]. I do not know what that was. She is elder than me, so I couldn't ask her."* (Informant #24, age 19, age at marriage 17)

As a result of the imposed silence on matters of sex, fertility, and contraception for unmarried girls, women enter into marriage with inadequate information to plan or to delay a pregnancy, if that is their intention.

3.3.3 Getting Married

3.3.3.1 Decision-making and Marriage

All but two women entered into arranged marriages. These marriages are either initiated by their husband's family and accepted by the woman's family or arranged by both families jointly. Women report having no input into whether they would marry, to whom, or when. The majority

of women was unfamiliar with their future husband and did not meet him until after the marriage was planned. As one woman related:

> *"They [husband's family] came to our neighbor's house to see a girl as a bride…[but instead] saw me and chose me. At that time, my uncle who stays abroad was at home. He said that before he went abroad again, he will give me marriage. Then they came to our house and my uncle went to their house and finalized the marriage. It was very chaotic situation."* (Informant #18, age 18, age at marriage 14)

> *"At the wedding day, I saw him for the first time."* (Informant #14, age 18, age at marriage 17)

> *"The match-maker was from the same village…My sister's husband and many other people were also."* (Informant #28, age 16, age at marriage 12)

3.3.3.2 Attitudes toward Marriage Timing and Marriage Process

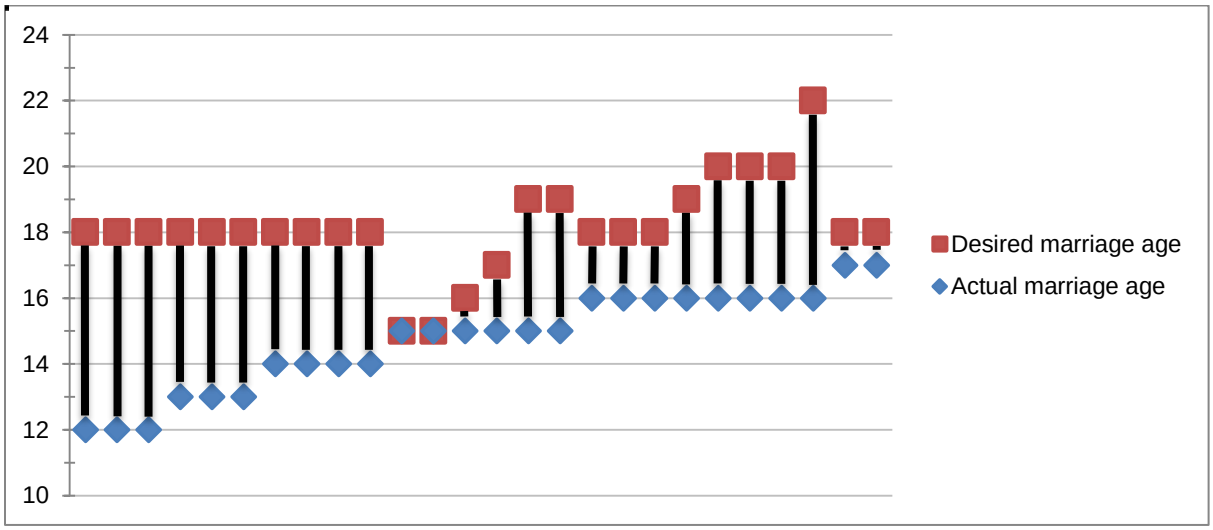
Most young women neither anticipated nor desired getting married at that time. Of the 26 informants who expressed an opinion, only 2 women were agreed it was an appropriate age to be married. Both were age 15 at the time they married. On average, those who did not want to be married when they did reported an age 3.7 years older than their actual age at marriage as their preferred age to marry. Only one woman said she preferred to marry before age 18. Fifteen said they wanted to reach age 18 before marrying and 5 women preferred an older age.

Although the young women did not anticipate marrying when they did, they were, however, resigned to the marriage because they knew they had to defer to their parents' wishes or that the marriage helped their parents' situation.

> *"It was parents' wish! What could I do if parents wanted?"* (Informant #28, age 16, age at marriage 12)

> *"What could I do? My parents are poor, so they got relief after they gave me marriage."* (Informant #18, age 18, age at marriage 14)

Figure 3.2. Preferred age and actual age at marriage among study informants[20]



[20] Four informants did not report a preferred age at which to marry.

Several women specifically articulate either a social and personal preference for arranged marriage. One woman's comments on the topic of love marriage rather than arranged marriage reflect strong social mores about both disobeying parents and women's sexuality.

> *"No, I wasn't that kind of girl. I was determined that I would marry according to my parents' will."* (Informant #19, age 18, age at marriage 14)

She elaborates on the potential negative consequences of love marriage:

> *"If I married by my own preference, then they [in-laws] will not take my responsibility after marriage. They will not stand beside me."* (Informant #19, age 18, age at marriage 14)

Meanwhile, a second informant offers a contrasting perspective,

> *"Nowadays, people can do love marriage. At past, no one could think about it. They had to marry according to the preference of their elders. I didn't see my husband before marriage."* (Informant #15, age 22, age at marriage 12)

Another woman comments on the prevalence of early marriage:

> *"It is a common practice in our society. Community people believe that early marriage is good. My parents made the mistake that they gave me early marriage… we have a lesson from our elder sister's life history. She had early marriage and got pregnant after 3 months of her marriage…From my sister's life I understood the fact that early marriage is bad.* (Informant #8, age 17, age at marriage 15)

3.3.3.3 Transition into Marriage

Marriages frequently occur within just a few days of the match being arranged. Many of the informants' narratives recount the sense of being plucked from their lives as unmarried girls and being whisked into marriage with little warning.

> *"My husband came on Eid vacation and went to our house to see me. My marriage happened on that night and he took me to my in-laws' house on next morning."* (Informant #15, age 22, age at marriage 12)

> *"Then one of my maternal uncles said to my mother that my marriage will happen that night. My mother bought some chicken from the shop and cooked for them. Then my marriage happened at 12 o'clock that night."* (Informant #28, age 16, age at marriage 12)

> *"My uncle-in-law fixed our date of marriage and our marriage occurred on the next day after fixing."* (Informant #19, age 18, age at marriage 14)

Nearly all the women in the study lived in an extended household upon marrying. Two exceptions are one woman (Informant #28) without siblings whose mother took her husband as ghor jamai (the couple lived with her mother) and another woman (Informant #1) who married before she experienced menarche; she continued to live at her natal home for another year.

Women move from their natal home into their in-laws' home quickly upon marriage. For most women, this move occurred within 1-3 days after the marriage day. Thus, the majority of women had transitioned from the role of unmarried girl in their natal home to married woman in an

extended household in the span of one week. The young women were neither familiar with their husband and his family nor given time to become acclimated to the news of their impending marriage. As a result, most informants describe having been shy and uncomfortable in the unfamiliar surroundings of their new home.

The transition into marriage is not only sudden, but it disrupts the activities unmarried girls engaged in. None of the informants in the study reported working for pay before marriage. All but five, however, were attending school. In all but a few cases, marriage interrupted women's educational aspirations. As one informant describes:

> *"My brother-in-law said, 'A good proposal came for you. I want to give you marriage here. What is your opinion?' I said him to do what they understand well for me…I wanted to continue education, but parents were poor and they couldn't bear my cost and gave marriage…I think it would be good if I could study more. It was too early to start family life. Now I have children."* (Informant #26, age 22, age at marriage 13)

One informant, whose marriage interrupted her education at class 6, describes her emotions when her arranged marriage nearly fell through:

> *"I wished to dismiss the marriage. In fact, I was happy when the marriage was dismissed…I thought, I can go to school again! It was very joyful to stay with the friends in the school. At the in-laws' house, there is only chores and chores."* (Informant #18, age 18, age at marriage 14)

Only a few women (3) were able to continue their education for a short time following marriage. One well educated informant who earned her secondary school certificate (SSC) recounts:

> *"My brain is not bad; actually, it is good. I was very much interested for study. My parents even didn't say that they [in-laws] are coming on that day to see me. When they told me that [I was to be married], I felt very bad and started crying. I couldn't accept it, I was crying and crying…Then I told them [father] that I will not marry now…I said that I will read. He said that they will support you to read. Then what could I say? I had nothing to say."* (Informant #14, age 18, age at marriage 17)

In all three cases, the woman's parents, husband, and in-laws all agreed that it would be desirable for her to continue her schooling and supported her efforts. Two of these women continued to spend considerable stretches of time living in their natal homes, interspersed with visits there by their husbands and visits to their in-laws' household, depending on their school schedule. Although marriage per se did not cause them to discontinue their education, a pregnancy occurring too early in their marriage subsequently forced two of the three women to abandon their education prematurely. None continued their education more than two years after marriage.

3.3.3.4 Discussion of Fertility Intentions before Marriage

The swiftness of girls' arranged marriages afford little opportunity for the future spouses to become acquainted or to discuss when they would like to start having children or whether to use contraception. The only couples that had such conversations are among the very few who married a week or longer after their marriages were fixed. One of these outliers, who was married 6 days after her in-laws arranged for her to marry their son, recounts how she and her husband, whom she had not yet met, managed discussion:

> *"We had our marriage after 6 days. We had phone conversation on those 6 days. He said, 'You need to take medicine [pills]. You have to collect that. Don't forget to bring that.'...as we don't want to take child…I want to continue to study and I don't want to take child immediately. He also didn't want to take child. We will take 2-3 years later."* (Informant #14, age 18, age at marriage 17)

A second informant who married 2 months after the marriage was arranged similarly reports:

> *"From the beginning he said that we will take child later. Even before marriage when we had phone conversation marriage he told that we will take child later."* (Informant #12, age 22, age at marriage 16)

However, these informants' experiences are highly unusual among this sample. There were unusual in that they managed to discuss their childbearing desires before the marriage and in that both husbands agreed with the woman that it would be desirable to delay having a child for some time.

The dominant refrain among all women, whether or not they continued schooling or whether or not they discussed childbearing before marriage, is of marriage being an abrupt transition from a familiar life to an unfamiliar one. Women recount experiencing a certain degree of distress when making this transition. Furthermore, as is shown in the subsequent sections, the lack of control women have over the marriage process carries over into the marriage itself where the majority of women exercise little control over fertility decisions.

3.3.4 First Sex within Marriage

3.3.4.1 Timing of First Sex

Although girls are thrust quickly into marriage and marriage comes with the expectation of sexual relations, girls do not experience sexual intercourse immediately upon marriage. Rather, there is a short delay, frequently ranging from several days to a week, before the couple first engages in sexual intercourse. The majority Muslim and minority Hindu informants, alike, commonly reports that it was not permitted to engage in sex on the first day/night of the marriage ceremony, a sacred time (*kaal raat* or *ful sojja raat*[21]).

There is a range across the sample as to when couples engaged in sexual relations after marriage. The timing was subject to beliefs about inauspicious days and young women's menstrual cycles. A common refrain is that sex should be avoided on certain days of the week following the ceremony to follow religious proscriptions, though which days were to be avoided varied. One informant's description is typical:

> *"At first night we couldn't have intercourse. It is called "kaal raat". Not only Kaal raat, but physical relation is forbidden on Saturday or Tuesday of just after marriage."* (Informant #12, age 22, age at marriage 16)

Secondly, an unexpectedly high number of women report experiencing menses at the time of or soon after marriage. This delayed sexual relations as intercourse during menses is described as

[21] Hindu

unclean and undesirable. One woman, who was married at age 11 before she reached menarche, did not begin having sexual intercourse with her husband until a year into their marriage.

3.3.4.2 Coercive First Sex

Reflecting perhaps both the lack of preparation to enter into marriage and their lack of agency, informants describe themselves as having had considerable angst, fear, and being reluctant during their first sexual encounters. Some young women's accounts further reveal varying levels of coercion and force. They were fully aware of husbands' expectation of sexual access, once the taboo days of *kaal raat* had passed. Occasionally, a few husbands engaged family members to aid in convincing a reluctant spouse to yield to the husbands' demand for sex. The following informants illustrate a range of experiences.

> *"I was afraid to have sex…Actually my sister-in-law [brother's wife] told me before my marriage that my husband would have physical relation with me but they didn't inform about the details of that. So I got afraid."* (Informant #11, age 22, age at marriage 16)

> *"At the first night, I was crying a lot. We did not do anything. After 3 days,…my sister-in-law [husband's brother's wife] told me it's natural to have sex with husband, they convinced me…My husband told his elder Bhabi, 'Bhabi, she yet not listen to me'. Then they told me after marriage it's natural to stay with husband…Then we did it."* (Informant #30, age 20, age at marriage 16)

> *"First, he tried to come near me. Then I said can't we do this after some days after my exam? He said no, it is not possible. You are my new wife."* (Informant #22, age 18, age at marriage 16)

3.3.4.3 Contraceptive Use during First Sex

Married sisters, sisters-in-law, or other older women frequently supplied young women directly or indirectly via their husbands with oral contraceptive pills on their wedding day. It appears from informants' accounts that they did so in anticipation of their initiation as sexually active, married women. Husbands could—and occasionally did—prevent their use at first sex. Sisters/sisters-in-law often provided perfunctory, superficial instructions about the pills' purpose and use, but did so with preparation for sex in mind and without any consideration of the women's desires for initiating or delaying childbearing. Frequently, pills or information about contraception were provided in the context of teasing brides about becoming sexually active and entering married life.

Frequently, pills or information about contraception were provided in the context of teasing brides about becoming sexually active and entering married life. There is little emphasis evident on educating young women about their bodies and sex or about assisting them to articulate or achieve their fertility intentions.

> *"I heard it from my sisters-in-law as they always tried to make fun with me after fixing the wedding date. But it was not clear to me. They always pinched me that my husband will touch me and will do something with me then I would have to take pill. I felt shy to hear those so I didn't ask them anything. They told about pill but I didn't know how it looks like or how to take it. I just heard from them."*(Informant #11, age 22, age at marriage 16)

> *"My sister-in-law came to me on my wedding day and brought Femicon pill for me. She told me that when my husband would come to have sex with me I would take the pill that night."* (Informant #8, age 17, age at marriage 15)

> *"I have a neighbor bhavi (sister-in-law) and she put a pill in my bag [at the wedding day]. She said to eat the medicine."* (Informant #14, age 18, age at marriage 17)

Like the informant above who was given a single contraceptive pill, the manner in which this woman, who received pills from her sister-in-law, used contraceptive pills in the first days of her marriage reflects the lack of instruction that accompanied the provision of contraception:

> *"I didn't know about [pills] …I took first pill on the first day of our sex and after one day we again had sex and I took pill again. That means I took pill on 4th and 6th day of my marriage."* (Informant #8, age 17, age at marriage 15)

In several instances, the contraceptive properties of the pill and understanding how to avoid pregnancy were clearly secondary to the purpose of facilitating sexual intercourse, as is demonstrated by this informant:

> *"After 6 days your husband told you to take pill?"*
>
> *"He wanted that so that my period would stop…That time I even didn't know whether pill prevent pregnancy or not. Even I didn't know why I need to take pill. I never saw my mother to take pill. And he didn't explain me anything. He just told to eat the pill."* (Informant #28, age 16, age at marriage 12)

Although the norm was to provide pills with little, if any, information at the time of marriage, sisters-in-law, aunts, and others provide more information about how to use contraception, often after the informants had been married for several months. Over time, women's contraceptive knowledge increases. The following informant illustrates the positive influence her sister-in-law had on her knowledge of the pill.

> *"Then my sister-in-law gave me two government pills, named 'Maya bori' and told me to take it. She also told me to take pill every day; she taught me how to take the pill. From then I could understand. Before that I couldn't… she said that menses will be stopped then."* (Informant #28, age 16, age at marriage 12)

In summary, girls do not exhibit any agency in marrying, engaging in sexual intercourse, or using contraception in the early days of marriage. Because first sex frequently occurs before recently married couples discuss their desires about having a child, contraceptive use at first sex is disconnected from broader decision-making about childbearing and using (or not using) contraception to plan their families.

3.3.5 Fertility Desires at Time of Marriage

Figure 3.3 presents the reproductive timelines of all 30 women in the sample. This figure serves as a companion guide for the narrative data presented in the following sections. Each timeline begins with a woman's marriage and extends to the time of the in-depth interview, with age indicated along the top axis. Women are grouped according to whether, at the time of marriage, they wanted a long delay (>2 years), a short delay (1-2 years, inclusive), or no delay (<1 year)

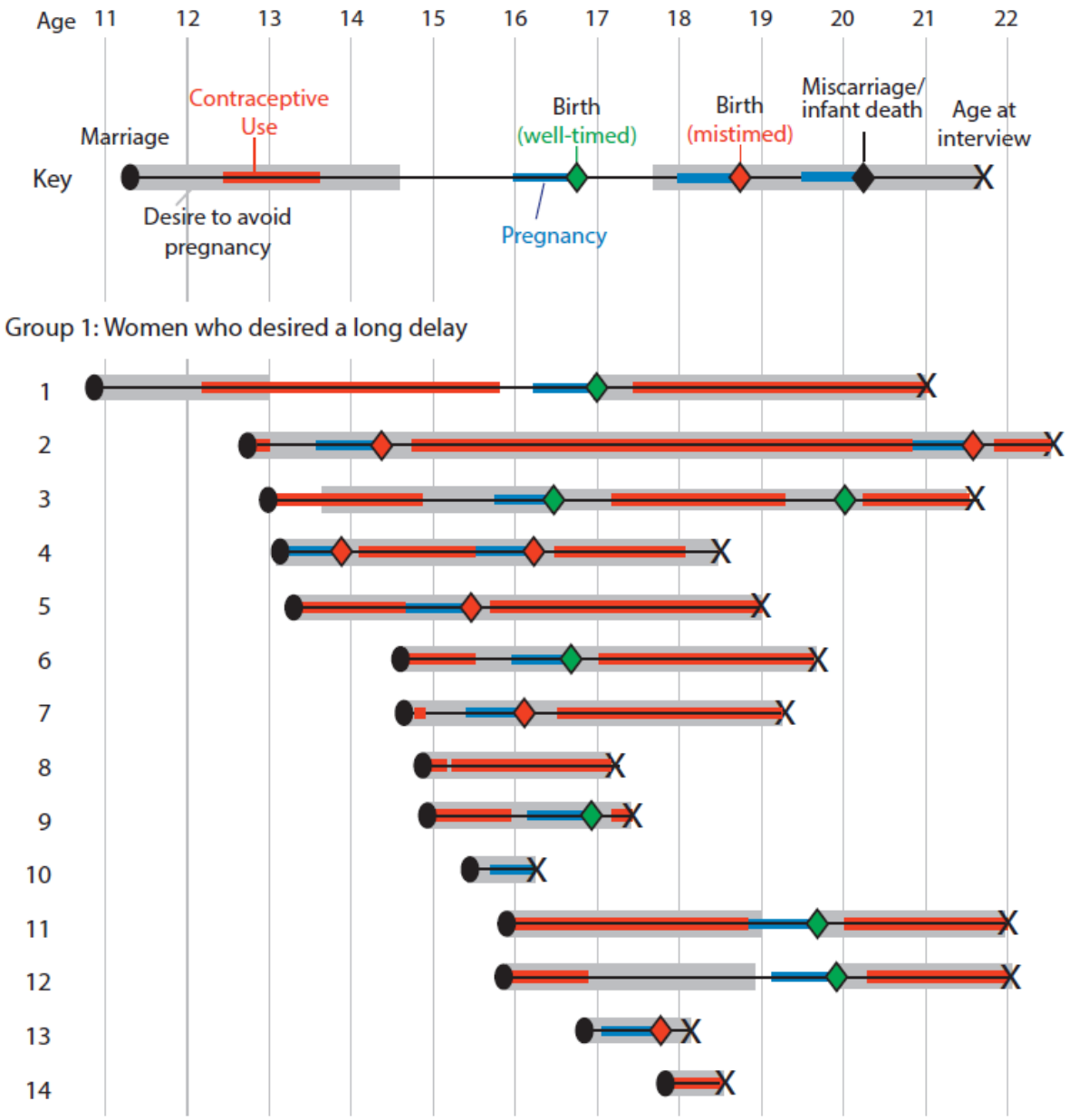
before experiencing their first pregnancy and, within each group, are listed in ascending order according to their age at marriage.

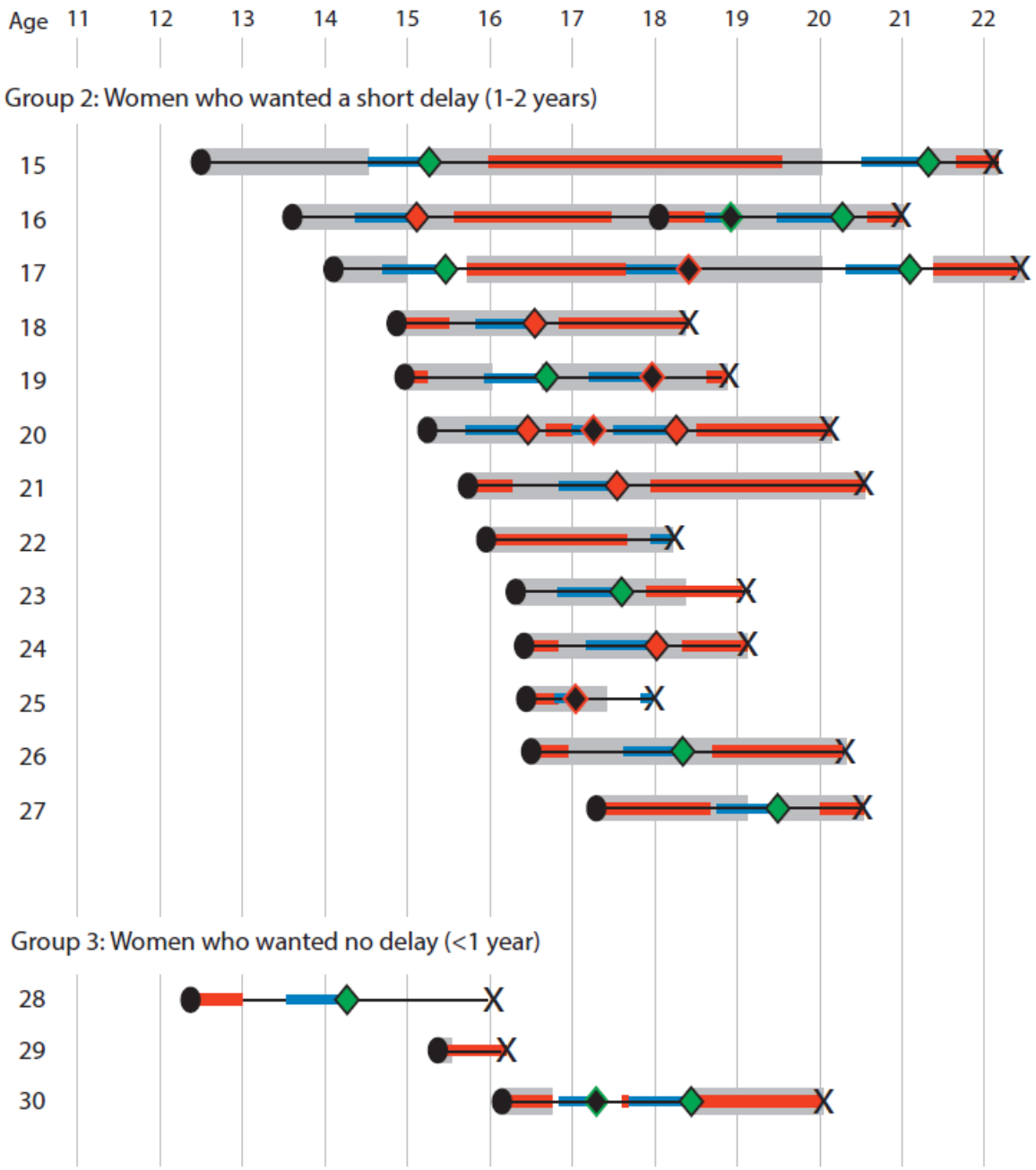
A thick, gray bar shadowing the timeline indicates the portion of women's timelines in which they wanted to avoid a pregnancy; the absence of a bar indicates they would like to become pregnant. A thin, red bar placed on the timeline indicates episodes of contraceptive use. Pregnancies are indicated with a blue bar on the timeline and end in either a red diamond, for births that were mistimed at the time of birth, or a green diamond, for acceptably-timed births. Pregnancies that end in a miscarriage, termination or infant death are indicated by a black diamond. Black diamonds are outlined in red or green depending on whether the pregnancy was mistimed or acceptably timed. A pregnancy concluded by a green diamond symbol can follow a gray bar either if (1) a woman became pregnant at precisely the time she intended to, or (2) if she initially wanted to postpone pregnancy but at some point preceding the pregnancy she changed her fertility intentions toward wanting a pregnancy sooner.

3.3.5.1 Young Women's Fertility Desires

Not surprisingly in this social context, none of the women expressed a desire to remain childless. Nonetheless, upon marriage, the great majority of girls wanted to postpone the first pregnancy. As shown in Table 3.2 on the following pages and by the grey bars in Figure 3.3, only three women wanted to become pregnant within the first year of marriage: one right away, one within a month, and the third wanted to wait 6-7 months after marriage before becoming pregnant. Almost an equal number of the remaining (majority) of women wanted a short delay as wanted a longer delay. Thirteen women wanted to wait 1-2 years before becoming pregnant; 14 women wanted to delay pregnancy for more than 2 years. None wanted to delay more than 5 years.

Figure 3.3. Women's reproductive timelines




Age 11 12 13 14 15 16 17 18 19 20 21 22
Group 2: Women who wanted a short delay (1-2 years)
15
16
17
18
19
20
21
22
23
24
25
26
27
Group 3: Women who wanted no delay (<1 year)
28
29
30

This finding is striking in that, while most want to delay the first pregnancy for a number of years after marriage, they nonetheless intend to have a pregnancy during their adolescent years. Given the young age at which the women married, even if they would realize perfectly their fertility preferences at the time of marriage, women would be, on average, at about 17 years of age at the time of their first pregnancy. Only three women would be 20 or 21 years old at the time they wanted their first pregnancy. Ten women would be 15-16 years old and twelve would be 17-18 years old at the time they wanted their first pregnancy.

Most women express their desired wait time as a range, not an exact time. The single most common response reflects a desire to delay pregnancy for 2-3 years. Most informants express the desired timing of pregnancy as a period of time (usually several years) following marriage, while some relate their desired time of pregnancy to achieving a key milestone (sitting for an exam, as one example). One informant offers her rationale for desiring a pregnancy later as follows:

> *"I want to take child one and a half years later [from the time of interview]. By this time my exam will be completed. Then I will stay one year at my in-laws' house and by this time my body will develop more. I will be fat and then I will take child."*
> (Informant #14, age 18, age at marriage 17)

It was exceedingly rare that a woman gave an age—or age range—as a targeted time to become pregnant. However, a very few women did mention that marrying before age 18 was child marriage. It appears that, generally, the benchmark of biological age plays less of a role than the life stage and circumstances of one's life in forming fertility desires.

3.3.5.2 Young Women's Reasons to Delay Pregnancy

For the three women who continued their studies after marriage, pursuing their education through their next exams or certificate was their primary motivation to postpone a pregnancy, as illustrated here.

> *I want to continue my study and I don't want to take child immediately…We will take 2-3 years later."* (Informant #14, age 17, age at marriage 15)

> *"My husband asked me, 'What if we would take a child then?' Then I said as I had been in my study, it would better to not to conceive…My intention was I would wait 5 years...everyone used to tell me I was very young."* (Informant #5, age 19, age at marriage 13)

The other women offer a range of reasons for postponing a pregnancy. Prominent among them are concerns about their physical health and development and effects on child health. Most of the young women in the study believe they were not yet fully physically matured and hold notions of when the body would be physically fit for pregnancy or childbearing. This informant explains.

> *"Both of us want to take baby after 2 years. After 2 years my body will be fit… Now 2 years passed…Now I am 18 years. For that reason I have taken baby."* (Informant #22, age 18, age at marriage 16, currently pregnant)

One woman specifically worried about having a difficult delivery at such a young age.

> *"I was young that's why I didn't want to take child, I thought I couldn't bear the child. But my husband wanted to take any time."* (Informant #26, age 22, age at marriage 13)

Several informants clearly relate the physical problems of early childbearing to the social phenomenon of early marriage:

> *"They gave me marriage before 18 years. And before 18 marriage is child marriage, before 18 one cannot take child…Mother's health and child health will be malnourished"* (Informant #14, age 18, age at marriage 17)

> *"If I got pregnant from the very beginning of my early marriage, I will lose my physical fitness and I will be sick then…In that time I should take care of myself but as I would have a baby then and I would not be able to manage time for myself…This will affect the baby and it would not get proper care and love for me."* (Informant #8, age 17, age at marriage 15)

Another common motivation, albeit a little less frequently articulated, derives from the cumulatively shifting roles that come with marriage and parenthood. Women are concerned about taking on the responsibility of childcare and role of parenthood while still familiarizing themselves with the new, marital household. The concerns are about both social acclimation and practical aspects of childcare, as reflected below.

> *"I had the desire to settle in my in-law's house, come to understand the family environment of them. Then I would take child."* (Informant #19, age 18, age at marriage 14)

> *"He [husband] sometimes asked me to take baby after 2 years of our marriage…But I was not prepared for that as I had no fascination on baby. I told him that I will take baby while my time would be to take it."* (Informant #11, age 22, age at marriage 16)

> *"No, I disagreed [with husband about having a baby right away] as I was worried about how could I take care of the child. I was so young to feed, bathe, or take all the care of a baby."* (Informant #18, age 18, age at marriage 14)

Several women also wanted to get to know their husband before becoming a parent. One woman reports that her husband agreed that they should first spend time enjoying each other's company and, in particular, fulfilling their sexual desire before taking on the added responsibilities of parenthood. This same sentiment is echoed in the advice of another informant's sister-in-law.

> *"My sister forbade taking child. She said, 'You just got married. Both of you should enjoy your time.'"* (Informant #18, age 18, age at marriage 14)

A few informants raise concerns about instigating rumors or developing a bad reputation if they were to become pregnant quickly upon marriage. Doing so might be taken as indication that the relationship was, in fact, a love marriage instead of an arranged marriage or that the woman or couple had too great a sexual appetite.

> *"People will say cutting remarks if someone becomes pregnant within 2-3 months of marriage."* (Informant #30, age 20, age at marriage 16)

> *"My mother-in-law said to take child. Father-in-law also said; but we planned to take child 1-2 years later. As we were just newly married, it will be not comfortable to go here and there with child [pregnant] and also think of what people would say if we take child so early?"* (Informant #27, age 20, age at marriage 17)

Finally, several women suggest that it would appear inappropriate to have a child before other members of their extended family who were older or who had been married longer than they were, as these two women describe.

> *"My husband said that my elder brother has no baby. How could I take baby? How would you be pregnant and how you would go in front of them with your pregnancy?"* (Informant #8, age 17, age at marriage 15)

> *"Besides, I also explained to him [husband], till then my elder brother-in law-had not taken any child. So as we are younger to them, it would not look good. Then he agreed."* (Informant #5, age 19, age at marriage 13)

3.3.5.3 Women's Reasons to Not Delay Pregnancy

Only three women wanted no delay after marriage before becoming pregnant. There are too few cases to draw conclusions about this group as a whole. One woman could not continue taking pills due to the side effects she experienced (Informant #28) but gave no reason for wanting a child right away. She did not articulate her own childbearing desires separately from those of her

husband. Rather, she simply accepted her pregnancy when it occurred. A second woman (Informant #30) similarly offered no opinions for why she wanted to become pregnant 6-7 months after marriage. She miscarried her first pregnancy and viewed the idea of becoming pregnant again quickly as an opportunity to allay concerns she feared her in-law family might have about her fertility, since she also had an older married sister who had had problems conceiving since her marriage 4-5 years earlier. The third woman (Informant #29) had a very tumultuous and traumatic entry into marriage and saw becoming pregnant as a way to secure stability in her marriage and in her new home. She was raped prior to marriage and compelled to marry her rapist as a way to resolve the incident, a solution which displeased her in-law family. With a child, she hoped it would be more difficult for elder family members to try to split up the couple or for her husband to abandon her. She explains,

> *"There are many men who become good after having child. They thought that I do not have any land property and living house, I have to earn this for my son, I have to do this for the future of my son."* (Informant #28, age 16, age at marriage 12)

Several other women who wanted a short delay (1-2 years) before becoming pregnant also mentioned having a child as a way to compel better behavior from their husband or a more hospitable attitude from the in-law family. This is the case for one woman whose husband provided little emotional and financial support.

> *"Suppose my parents take me away and give me marry again. Do anyone give me assurance that I will not be ill-treated by my new in-laws' family? Hence I took child so that it would be hard for my husband to leave me."* (Informant #19, age 18, age at marriage 14)

In summary, women's interests in the timing of their first child are about achieving life goals, such as education, stability in their marital home, becoming established in their new home, and concerns about their health and physical maturity to bear a child.

3.3.5.4 Concordance with Husbands' Fertility Desires

Table 3.2 also shows, for each woman in the study, her fertility desires, concordance of those desires with those of her husband and with those of other family members, and the resulting timing of the first pregnancy. As this table shows, one-third of the sample had fertility desires that were exactly concordant with those of their husbands, including two of the women who wanted no or a very short delay (<1 year) before becoming pregnant. Another six couples had overlapping fertility desires with, for example, one person wanting a pregnancy in 1-2 years and the other in 2-3 years, or one person wanting 2.5 years and the other 2-3 years. There was no difference in which party wanted to wait longer (3 each). This finding means that just over half the sample had the same or similar fertility desires as their husbands.

Table 3.2. Fertility desires, concordance of desires, and resulting timing of first pregnancy

ID	Age at marriage	Wife's desire for timing of 1st pregnancy	Wife/husband concordance	Family concordance	1st Pregnancy mistimed
1	11	>2 years	concordant	concordant	no
2	13	2-3 years	husband wanted sooner	concordant	yes
3	14	3 years	concordant	natal family concordant in-law family wanted sooner	no
4	13	2-3 years	husband wanted sooner	concordant	yes
5	15	5 years	concordant	in-law family wanted sooner	yes
6	14	2-3 years	loosely concordant	in-law family wanted sooner	no
7	15	2-3 years	concordant	in-law family wanted sooner	no
8	15	3-4 years	concordant	concordant	--
9	15	2-3 years	loosely concordant	in-law family wanted sooner	no
10	15	2-3 years	husband wanted sooner	concordant	yes
11	17	3 years	husband wanted sooner	natal family concordant in-law family wanted sooner	no
12	16	3 years	loosely concordant	natal family concordant in-law family wanted sooner	no
13	18	4-5 years	husband wanted sooner	natal family concordant in-law family wanted sooner	yes
14	17	2-3 years	loosely concordant	concordant	--
15	12	2 years	husband wanted sooner	in-law family wanted sooner	no
16	15.5	1.5 years	husband wanted sooner	no opinion	yes
17	13	1 year	husband wanted sooner	concordant	no
18	14	2 years	husband wanted sooner	natal family concordant in-law family wanted sooner	yes
19	14	1 year	loosely concordant	in-law family wanted sooner	no
20	15.5	1-2 years	husband wanted sooner	in-law family of mixed opinion	yes
21	15	1 year	loosely concordant	in-law family wanted sooner	yes
22	16	2 years	concordant	in-law family wanted sooner	no
23	16	2 years	husband wanted sooner	in-law family wanted sooner	no
24	17	2 years	husband wanted sooner	in-law family wanted sooner	yes
25	18	1-2 years	concordant	in-law family wanted sooner	no
26	16	1.5-2 years	husband wanted sooner	in-law family wanted sooner	no
27	17	1.5-2 years	concordant	in-law family wanted sooner	no
28	12	no delay	concordant	no opinion	yes
29	14.5	1 month	wife wanted sooner	no opinion	--
30	16	6-7 months	concordant	in-law family wanted sooner	no

Fourteen women, however, were at odds with their husbands about when to get pregnant. In thirteen of the fourteen couples, women wanted to postpone a first pregnancy longer than their husbands did. In ten of these cases, the husband was not interested in delaying childbearing at all and an eleventh husband wanted a delay of just 3 months. For the couple (Informant #13) with the largest discrepancy, the woman wanted to wait 4-5 years before becoming pregnant, but the husband wanted a child right away. In three other couples, the wife wanted a 2-3 year delay and

the husband, no delay. Thus, for many couples, there is a sizable gap in the desired timing of childbearing.

Only one woman wanted a pregnancy sooner than her husband. This is the woman (Informant #29) who was forced to marry her rapist.

Among the 14 women wanting to delay pregnancy more than 2 years, nine women were in concordance with their husbands and five were not. Couple discordance was more common among women wanting to delay pregnancy 1-2 years. Only five women in this group agreed with their husbands, while but nine did not.

3.3.5.5 Husbands' Reasons to Delay Pregnancy

Among the 14 couples who agreed it was desirable to delay the first pregnancy, the woman sometimes reports her husband having a different rationale than her own. However, as a group, husbands hold a similar set of reasons for postponing childbearing as did women. For example, women report that husbands are also concerned about the health effects of early childbearing for young women and children. This perspective is less prevalent among husbands than among women (there are fewer husbands wanting to delay pregnancy than there are women wanting to do so), but present nonetheless, as explained here.

> *"He said…we will take baby after 3-4 years as I am not fit enough for a baby."*
>
> (Informant #8, age 17, age at marriage 15)

> *"He said that if we take child immediately the child will be malnourished…He said to me to take child after 3 years, not before that."* (Informant #12, age 22, age at marriage 16)

Several women report a new reason for postponement among husbands that was not as present among their own concerns: economic considerations. As one woman details,

> *"Our economic condition is not that sound. My father-in-law has limited land. He [husband] has a small jewelry shop…That's why he was interested to earn more before take child. He said, 'We have to bring up child, more over we have to support the family, so it will be good to spend time on earning before taking child'."* (Informant #12, age 22, age at marriage 16)

3.3.5.6 Husbands' Reasons to Not Delay Pregnancy

As wanting a pregnancy soon after marriage is more common among husbands than among young women,[22] women report that husbands emphasize reasons for not delaying a pregnancy over reasons for delaying a pregnancy. According to their wives, some husbands who wanted a pregnancy early extolled the benefits for childcare of having a child while grandparents were living or before an extended household separated.

> *"He said, "It will be good to take child now, as we all live together. Taking care of the child will not be a problem, rather it will be a problem if the family separates. Everybody will take care of the child."* (Informant #18, age 18, age at marriage 14)

[22] This includes 13 husbands who wanted a pregnancy sooner after marriage than did their wives and two couples who agreed it was desirable to have a child right away.

Other husbands made it clear, women say, that having a child was their motivation for getting married and so becoming pregnant soon after marriage was to be expected. These husbands also made it clear that their own desires to start a family supersede any desires the woman may have had to delay childbearing. No women mentioned this motivation for marriage. This is consistent with women's lack of control over the decision to get married: women did not accept a marriage proposal because they wanted a child soon.

Finally, women report that husbands also expressed a concern with their wives' health as a reason for not delaying a pregnancy. Husbands suggested that becoming pregnant soon after marriage was a practical alternative to using contraception, which may have harmful health effects. This finding is elaborated in a later section on contraception.

3.3.5.7 Decision-making and Couple Discordant Desires

When a couple's fertility desires were discordant, as was the case for 14 women, women face substantial challenges to pursuing their reproductive intentions to postpone a pregnancy. A number of women with discordant goals note the futility of articulating an independent opinion when her husband wants a child soon. Such a desire is bound to go unfulfilled.

> *"I never said anything. I said to him, as your wish. As he is the male person I have to follow his word. I said to him what you want to do, you do."* (Informant #1, age 21, age at marriage 11)

> Informant: *"He said that it will be good if we take child after 6-7 month. Then we took child."*
>
> Interviewer: *"That was your husband's opinion, what did you want?"*

> Informant: *"What will be my opinion? If he wants then I have to take it."* (Informant #30, age 20, age at marriage 16)

One woman, who did have concordant desires to delay for more than 2 years, remarks on this fortuitous happenstance upon which her opportunity to pursue her desires hinged.

> *"He could say that he wants to take a child. If he said like that, then my desire will not be fulfilled. So it was a positive side that he had the same desire and he also agreed to take child later."* (Informant #14, age 18, age at marriage 17)

Other women make it clear that she would have to defer to her husband when their desires disagreed, as this informant describes.

> *"So you didn't want to take child, but your husband wanted?"*
> *"Yes, later on I also became convinced, as he wanted the child most."* (Informant #18, age 18, age at marriage 14)

Women also demonstrate this deference to their husbands even if she has other members in her family network who support her desires to delay a pregnancy, as described by these informants.

> *"He told me to take the child; I said that I will not take so early. My natal family also forbade taking a child…But he said to take the child."* (Informant #18, age 18, age at marriage 14)

> *"My mother-in-law forbade us to take a child so early. My mother also didn't agree that I would take child immediately. I had to take child only because of him. I took child as he wanted."* (Informant #10, age 16, age at marriage 15)

On the other hand, if he agrees with his wife on the timing of pregnancy, the husband can be a powerful ally against family pressures, as this woman who faced pressures from her sisters-in-law found.

> *"I think that if my husband and mother-in-law don't want baby now, so I also need not to have desire for a baby."* (Informant #8, age 17, age at marriage 15)

In summary, the husband's desires exert strong influence over women's ability to achieve her reproductive intentions. When husbands want to delay pregnancy, women believe they are able to delay per their wish, even if they face pressure from other sources to become pregnant quickly. When husbands do not want to postpone pregnancy, those intentions override her own.

3.3.5.8 In-law Family and Community Attitudes toward Fertility

Women were much more likely to disagree with their in-law family than with their husbands about the timing of the first pregnancy. As seen in Table 2, 20 women report discordant desires with their in-law family, while seven women report that their in-law family supported their desire to delay the pregnancy. (Three women reported that their in-laws expressed no opinion.[23]) As with husband-wife discordance, the in-law family most often wanted the young woman to become

[23] This includes one couple who lived with her mother (*ghor jamai*) and one woman whose in-laws died within months of her marriage.

pregnant sooner than she wanted to. This includes one case (Informant #30) where the woman wanted to become pregnant just 6-7 months after marriage.

Women who wanted to delay pregnancy for 1-2 years following marriage most frequently experienced disagreement with their in-law family: 11 women in this group had in-laws who wanted the woman to become pregnant sooner. Just one woman in this group (Informant #17) had in-laws who agreed with her desire to delay pregnancy for one year. This division was more balanced among the women who wanted to delay the first pregnancy for more than 2 years: six women had in-laws who agreed with their desired timing while eight had in-laws who wanted the pregnancy sooner. This finding perhaps confounds expectations that there would be more discordance with in-laws among the group of women who wants to postpone pregnancy the longest.

Only four women had both a husband and in-law family who agreed with her desired pregnancy timing. This count includes one woman, Informant #28, who wanted to become pregnant right away and three women who wanted a long delay of more than 2 years (informants #1, #8, and #14). All of the 13 women who wanted a short delay (1-2 years) before their first pregnancy experienced discordance with their in-law family, their husbands, or both.

In the cases of eight women (two wanting to postpone pregnancy more than 2 years; six who wanted to wait 1-2 years), both their in-laws and their husbands wanted the woman to become pregnant before she did. In six cases, the woman's husband held discordant desires but her in-law family agreed with her desires. In 12 cases, husbands agreed with the women's wishes but in-laws did not.

In most instances, the natal family's opinion agreed with the woman or they expressed no opinion. Natal family members almost never encouraged a woman to become pregnant after marriage or disagreed with her desires to postpone pregnancy. In five cases, the natal family agreed with the woman's desired timing while the in-law family wanted her to become pregnant sooner than she wanted. In three of these cases, the husband also wanted her to become pregnant sooner than she and her natal family desired, while in two cases, the woman, husband, and natal family all agreed with postponing the first pregnancy while in-law family members alone encouraged becoming pregnant sooner than she wished.

Women seldom report attitudes from neighbors and community members, be they general community norms or specific advice about the woman's/couple's behavior. Where they do, neighbors generally expressed a preference for earlier childbearing. Community attitudes are frequently invoked either by the woman to reinforce arguments in support of her desired timing or by the husband or family member in support of their perspective. They are seldom described as having a separate and independent effect on women's attitudes or behavior.

In summary, in-law family members are most likely to desire a pregnancy soon after marriage—sooner than the woman desires while natal family members are most likely to agree with the woman's desires to delay a first pregnancy. Husbands occupy a middle position, wanting a quicker pregnancy more often than do women and their natal family members but less often than women's in-law family members. Community attitudes, while leaning toward earlier pregnancy, are not particularly noticeable in the landscape of opinions that matter to women.

3.3.5.9 Family and Community Reasons to Delay Pregnancy

When in-law and natal family members preferred that a young woman postpone a first pregnancy, it was universally in situations when the woman, herself, also wanted to postpone the pregnancy. The rationales family members offer mimic women's own reasons for delaying pregnancy. One of the few women who continued her education for a time after marriage described her studies as a source of pride among her elder brothers-in-law:

> *"I was studying. I got A+ in class eight. My brothers-in-law were very happy with that. They used to say I would shine the family's name as a youngest wife. The suggested me not to take child. They wanted me to become SSC pass [secondary school certificate]. I also wanted that."* (Informant #5, age 19, age at marriage 13)

Protecting women's health and the baby's health is the most common reason family members favored postponing pregnancy. Women report that this concern was more common among their natal families than their in-law families. In-law families more frequently were concerned with protecting the woman's potential fertility. The following two quotes illustrate the differences between natal and in-law families:

> *"My mother also told [mother-in-law] to advise me not to take child immediately as I was young. In our caste, older women suggest to take child when a married woman has perfect figure to carry child. Otherwise children may have problem."* (Informant #26, age 22, age at marriage 13)

> *"My mother and parental relatives told me…that if I get pregnant at that age, it would be harmful to me and so they suggested to take time in getting pregnant. On the other hand, my marital relatives…told me that if I take time in taking baby it might happen that I would not be pregnant in future."* (Informant #11, age 22, age at marriage 16)

Issues of settling into the new household and childcare are expressed with less frequency, though present nonetheless, as these informants describe.

> *"They [in-law family] told that you are not a matured girl since you can't take care of yourself. How would you take care of a baby?"* (Informant #8, age 17, age at marriage 15)

> *"My sister forbade taking child. She said, you just got married, both of you should enjoy your time."* (Informant #18, age 18, age at marriage 14)

3.3.5.10 Family and Community Reasons to Not Delay Pregnancy

As described above, one particular concern in-law families (and, to a lesser extent, community members) express is with the young woman's childbearing capacity. This interest in young women's fertility took a particular expression that is perhaps surprising. In contrast to much of the narrative around early childbearing in Bangladesh and South Asia generally, there was no emphasis on having young girls prove their fertility as an essential part of becoming a woman or gaining status within the family. To the extent those sentiments exist, they were not expressed as such. Rather, elder family members' concern with girls' fertility assumed that girls themselves were interested in having a child at some point and was expressed—perhaps with paternalistic

overtones—as a concern for preserving their reproductive capacity, at a time when it was seen particularly vulnerable. As this woman explains,

> *"My aunt in law also expressed her anxiety that if I make delay, there is a possibility to not to have baby in future."* (Informant #8, age 17, age at marriage 15)

While this sentiment was certainly common, it did not apply equally to all women. It was often prompted by an adverse reproductive health event or experience with contraception. For example, one woman reports that her in-laws only advised her to try to become pregnant after she experienced a miscarriage. A widespread belief among in-laws and women in the community is that long-term pill use or side effects during contraceptive use could impair fertility. They did not believe that long-term pill use would be more likely to cause infertility in a nulliparous woman than a parous woman, but that it would be a more disappointing problem to experience fertility problems before a woman had the chance to bear at least one child. Informants report these fears influenced their thinking about contraception.

> *"Everyone used to tell that it [pills] harms placenta. Placenta will be dried by using it."* (Informant #19, age 18, age at marriage 14)

> *"We hear people say if women delay to take baby and use pill longer, they do not become pregnant. In village many women do not conceive."* (Informant #22, age 18, age at marriage 16)

Another, albeit less common, rationale for hastening a first pregnancy is to improve a husband's or in-laws' behavior and attachment to the young woman, as these two informants explain.

"My aunt-in-law said to me to take child urgently because of having bad manner of my in-law family members towards me…I thought that a child can change their manner." (Informant #19, age 18, age at marriage 14)

"My husband lived at Dhaka. Hence my brother-in-law also advised me to take a child to get remedy from loneliness and also to keep husband in touch always…so that my husband starts to live at home." (Informant #15, age 22, age at marriage 12)

3.3.5.11 Decision-making and Family Discordant Desires

Informants' accounts reveal that the power of in-law families and community attitudes to influence their fertility desires and behavior to be mixed. For a number of women, the in-law family's opinions and instructions clearly hold sway over women's fertility desires. This influence is exhibited more frequently when the woman's husband also does not want to postpone pregnancy. One reason women are influenced by their family members and neighbors is because of their youth and inexperience, as these two women describe.

"When all the family members said the same, I thought I have to take child soon." (Informant #30, age 20, age at marriage 16)

"I took child as everybody [in-law family and neighbors] suggested taking child soon…That time I was young, that's why I followed whatever they said. Now I am matured." (Informant #21, age 20, age at marriage 15)

In contrast, some women could resist when in-laws suggested an early pregnancy and hold to their own desires, as this informant explains.

> *"They [in-law family] told me that I should take contraceptives only after having a baby… But I didn't listen to them… I told all of them I had no plan for that and I will take time."* (Informant #11, age 22, age at marriage 16)

The data indicate that a woman is more frequently able to pursue her own desire to delay the first pregnancy when a woman and her in-law family disagrees, compared to when she and her husband disagrees. This resistance in the face of discordance with in-law family members is easier when the husband and woman's desires align. However, a minority of women note how this is not easily accomplished.

> *"I was not afraid of not listening of my husband, because he is my husband. But if you are living with other people, you need to listen to them. I am very afraid their talks."* (Informant #7, age 19, age at marriage 14)

> *"People said it is not wise to take child so early age, but I have to stay there. And if I were to take child, they wouldn't behave badly with me."* (Informant #29, age 15, age at marriage 14)

Natal family members appear, on the surface, to be natural potential allies because of how frequently they agree with young, married women's desires to delay a first pregnancy. However, it does not appear that that concordance has any real effect on outcomes for women. For instance, there is no evidence that natal family members' opinions in support of postponing pregnancy

swayed any in-law family members' opinions away from an early pregnancy. There is, however, some limited evidence that women could use natal family members' arguments for delaying to bolster her own position on the matter, but only among couples in which the husband was already agreeable to delay. These couples could use her natal family support to rebuff or withstand pressure from in-laws for some time.

3.3.6 Changing Fertility Intentions

Approximately half of the 27 women who originally wanted to delay the first pregnancy changed their minds over time and decided to get pregnancy sooner. This is perhaps not so surprising given the high proportion of women living with at least one other person—either husband or in-laws—who held contrary views on her fertility. The reasons women give for changing their minds are similar to those given by women who initially did not want to delay a pregnancy for long. These reasons include: strengthening her position in the household; improving relationships with family members, trying to convince her husband to be more responsible and committed to the family; growing concerns about fertility or side effects of pill use; and relenting in the face of ongoing pressure. One woman describes the increasing pressure she experienced as time passed.

> *"After one year, everyone started to ask me whether I use any family planning method…My sisters-in-law told me that 'if you haven't used anything then why didn't you get pregnant yet?...' My mother-in-law didn't say anything to me but when they saw 2 years passed of my marriage they again started to tell me to take child."* (Informant #15, age 22, age at marriage 12)

Similarly, concerns with the possible effects of contraceptive pill use on fertility do not always emerge at the moment when women are first deciding whether to use pills. They frequently intensify as pill use continues over time or are triggered when women experience side effects. With the occurrence of side effects, support in a woman's social network for postponing pregnancy can dissipate and be replaced with active opposition to those goals. One informant succinctly says:

> *"Pill didn't suit me. I had vertigo…Then she [mother-in-law] said take a baby."* (Informant #22, age 18, age at marriage 16)

Other women change their fertility desires in response to changing living situations. The timing they desired when first married is no longer suitable as the circumstances of their lives unfolded. This type of change in desired timing is equally likely to occur of women's own initiative and at the behest of another person.

> *"Later on he changed his decision…He said, 'look all of them [neighbors] took child…Let's take a child."* (Informant #12, age 22, age at marriage 16)

> *"I need the child. I didn't get love from him; initially I thought I will take child 6 months or one year later. But as he started to bad behave I took the child immediately."* (Informant #26, age 20, age at marriage 16)

3.3.7 Experiences with Contraception between Marriage and the First Pregnancy

More than two-thirds of the sample—23 women—used contraception at some point before their first pregnancy, as shown in Figure 3.3. This includes two of the three women who have not yet had a pregnancy and all three who are currently pregnant. All three women who continued their

education after marriage were also able to use contraception for some time. Surprisingly, all three women who wanted to become pregnant soon after marriage also used contraception for at least several months.

The widespread use of contraception stands in contrast with the broad discordance women experience with their husbands or in-law family and concerns they have with side effects and fertility impacts of contraception. However, seven women did not use contraception before their first pregnancy; for six of these women, their husbands wanted the pregnancy sooner and for the sixth, her in-laws wanted the pregnancy sooner than she wanted.

3.3.7.1 Methods Used

The contraceptive pill is by far the most commonly used method before the first pregnancy and among never-pregnant women, adopted by 19 women. Three women used a combination of withdrawal and periodic abstinence and two used condoms.

Given the limited nature of discussion occurring at the time of first marital sex and the spouses' lack of familiarity with one another, it is no surprise that the contraceptive behavior in the early days of marriage differs from that later on. Most women used some method of contraception during first sexual intercourse. Some informants who did not use anything at the first sexual encounter adopted a method soon after. Conversely, several of those who did used contraception only during this first encounter or for a few days before stopping when they learned of opposition to its use, as this woman describes.

> *"I had one pill that night [first sexual intercourse]. But further he did not allow me to take any pill…my husband did not let me take it after that saying that we need to have a child first."* (Informant #23, age 19, age at marriage 16, non-user)

Others shifted methods as they made decisions—or experienced coercion—about their fertility goals. Frequently, condoms or withdrawal were used as a short-term method as women transitioned to another method for an ongoing sexual relationship.

> *"He said that he has some friends at the bazaar, one of them said, 'you got married, you can use condom and ask your wife to explore pills which one is appropriate for her.' Then he used condom first… After marriage he told me to take pill so that he needs not to use anything… Later on we alternately use methods, one month I took pill and another month he used condom."* (Informant #12, age 22, age at marriage 16, pill and condom user)

However, other couples settled on condoms as the method of choice. The following woman recounts how her husband gladly used condoms when pills posed problems for her.

> *"Many men don't like to use condom and order wife to take pill…But my husband told me, my wife is a little girl and I don't want to make any problem to her. I will use condom. It may happen that I can't enjoy the relation fully but I am not unhappy with that since my wife is mine and she is not leaving me."* (Informant #8, age 17, age at marriage 15, condom user)

3.3.7.2 Method Choice and Desirable Attributes

Since it is the dominant method in Bangladesh's method mix, the majority of women know someone who is currently or had recently used the pill. Women prefer the pill because of the faith they place in the protection it affords.

> *"I always preferred to take pill as it is the most secure method. Pill is safe and sound. Pill avoids pregnancy."* (Informant #12, age 22, age at marriage 16, Femicon user)

However, women acknowledge that among the various pills on the market, each person needs to find the one suitable for her. Additionally, while pills are viewed as being unsuitable for extended use, some formulations are believed to be poorly suited for young, nulliparous women at all.

> *"I: Why you avoid taking Femicon?*
> *R: I heard that only after having a child should Femicon be taken. As I was newly married I shouldn't take it, as I hadn't any child. There is chance of infertility if I take Femicon before have the first pregnancy."* (Informant #14, age 18, age at marriage 17, Ovastat user)

> *"I don't take government pill [Shuki] as I was not sure whether it would suit with me or not from the beginning. I heard from neighbors that they couldn't take government pill due to side effects. That's why I even didn't try that."* (Informant #12, age 22, age at marriage 16, Femicon user)

Women are generally accepting of condoms, but see them as less reliable than pills and worry about their disposal.

> *"I have no problem to take pill. But there is a possibility of getting pregnant if the condom leaked. So I prefer pill."* (Informant #14, age 18, age at marriage 17, pill user, occasional condom user)

> *"Condom is kind of a problem… problem means, in the village everything is so open, so it is a problem to drop the used thing."* (Informant #12, age 22, age at marriage 16, Femicon user)

> *"I felt ashamed to drop off the used condom…otherwise there was no problem at house, nobody will find it if I put it in to the drawer or under the mattress."* (Informant #18, age 18, age at marriage 14, pill user)

In general, pills and condoms are viewed as suitable methods for young, nulliparous women. Withdrawal and periodic abstinence are acceptable substitutes when these other options are not feasible. However, injections and long-acting reversible contraceptive methods like implants and IUDs are less favorably viewed for this population. Fear of side effects was a consistently expressed concern.

> *"I heard that woman has to have minor operation in their hand to insert the capsule [implant]. I also heard that this method is harmful to woman… I heard that it may cause cancer."* (Informant #11, age 22, age at marriage 16, Femicon user)

"Maybe, I could feel dizzy by using injection that's why I never thought about injection." (Informant #15, age 22, age at marriage 12, non-user)

3.3.7.3 Discussion and Contraceptive Decision-making

The data from the informants clearly show that husbands are deeply involved in deciding whether and what method of contraception to use. In some cases, couples rely on information about specific methods from elder women to make this decision. Sometimes, both husbands and wives work together to determine the most suitable course of action, while other women defer to their husbands, as they do with the timing of pregnancy.

"My sisters-in-law informed me that I should take pill and if we don't have that we should use condom…Then I told it to my husband and he bought the condom." (Informant #11, age 22, age at marriage 16, pill user)

"Then I gave up using the injections thinking that since he is wanting a baby, I should be taking too. What's the point of going against him while I will have to carry out this family?" (Informant #16, age 21, age at marriage 13, injection user)

When husbands and wives agree on postponing a pregnancy, husbands can be supportive partners in effective contraceptive use, as these women's examples describe.

"He is very much cautious about it. Even if I sleep before he sleeps, he awakes me and asks me whether I have taken the pill. If I don't, then he helps me to take that." (Informant #5, age 19, age at marriage 13, pill user)

> *"From the beginning he said that we will take child later…He is very careful, he is careful more than me."* (Informant #12, age 22, age at marriage 16, pill and condom user)

In contrast to incidents of agreement, men who want a child earlier than their wives easily have the authority to prevent contraceptive use in pursuit of her desired timing, as one woman explains.

> *"My husband wanted to have children… He said first we will have a child and so he did not allow taking any pills."* (Informant #23, age 19, age at marriage 16, non-user)

3.3.7.4 Side Effects

Out of concern for young women's health, husbands and sometimes in-laws rule out certain methods for fear of side effects. This is particularly the case when long-acting reversible methods are under consideration.

> *"They [natal family] asked me to take pill, but my husband didn't allow me to take pill. He said that pill may cause cancer, it is not good to take pill."* (Informant #15, age 22, age at marriage 12, non-user)

> *"My husband said that you need not to take implant or injection since those have side effects, from which my sister-in-law is suffering. He told me that what we are using [condoms], that is right."* (Informant #8, age 17, age at marriage 15, condom and withdrawal user)

This concern for protecting women's health and fertility sometimes takes a paternalistic tone, as women are often not the ones driving the decision about whether to adopt or discontinue a given method. Other family members make this decision on her behalf.

> *"Did you ever discuss with your husband about the method for 5 years [implant]? R: Yes. He said, 'you can do what you want' but my family members forbade taking that."* (Informant #28, age 16, age at marriage 12, pill user)

> *"I heard, if you take injection next 3 months you need not to take anything…My husband forbade taking those…As he is the head of the family, I have to obey him."* (Informant #30, age 20, age at marriage 16, pill user)

Fears of side effects are not unfounded. Women frequently experience side effects, which sometimes interfere with their ability to accomplish their daily work. In total, nearly one half (11) of the women using contraception before their first pregnancy experienced side effects. Of those experiencing side effects, six women discontinued using contraception altogether and five switched to condoms, withdrawal, or periodic abstinence.

When the husband and wife agree on the timing of pregnancy, women are often able to parlay their husband's concern into support to minimize the side effects or to seek a new, better suiting method. Again, the expertise of women in their social network who have more experience with contraception is a valuable resource.

> *"Initially I had head spinning and vomiting tendency. Then I told it to my grandmother… she said that initially these will happen and gradually it will be ok.*

So I continued to taking pill and now it is ok for me." (Informant #14, age 18, age at marriage 17, Ovastat user)

"They [sisters-in-law] discussed about me with that woman [healthworker]. They informed her about my sickness due to having pill. So they preferred condom for us and that woman provided that method and still we are using that… He [husband] said that 'I should take this method to keep [his] wife healthy'." (Informant #8, age 17, age at marriage 15, condom and withdrawal user)

An interesting facet of the last example is how absent the woman, herself, is from discussion about a matter that impacts her life; others make the decision for her.

The experience of side effects is a common reason for stopping contraception or changing methods. However, only a few methods are perceived to be suitable for nulliparous women, limiting women's options if they experience side effects and need to switch. Often, women are advised to cease contracepting altogether. Other women switch to a less effective method. One woman, for example, switched from using the pill to condoms, and then from condoms to withdrawal. This pattern leaves motivated women at risk of unintended pregnancy.

3.3.8 Experience with the First Pregnancy

3.3.8.1 Timing of the first pregnancy

While Figure 3.3 presents the details of each woman's contraceptive use and pregnancy timing, a summary of these data across all women is found in Table 3. Of the 30 women in the sample, 27 had experienced a first pregnancy (including three who were currently pregnant). Eighteen women

became pregnant within one year of marriage;[24] another five women became pregnant within 2 years of marriage. Only four women experienced their first pregnancy after 2 years of marriage or more.

Sixteen women report that their first pregnancy was appropriately timed,[25] while 11 report that it was mistimed. Eight women became pregnant sooner than they had wanted to at the time they married; however, these pregnancies were not mistimed at the moment that they experienced them because their fertility desires had changed. One woman, who initially wanted to wait longer than 2 years before becoming pregnant, experienced her first pregnancy after more than 5 years of marriage, later than she had wanted.

There are no differences in the experience of well- or mistimed pregnancies according to the kind of delay women initially wanted upon marriage. Of the 11 women who experienced their first pregnancy as mistimed, five were women who wanted a long delay (more than 2 years) and six were women who wanted a short delay (1-2 years). Of the 16 women whose first pregnancy was well-timed, seven were women who wanted a long delay, seven were women who wanted a short delay, and two were among the three women who wanted no delay. Similarly, the eight women who had pregnancies sooner than they first intended but who had adjusted their fertility intentions were evenly divided among women who wanted a long and a short delay.

The 27 women, on average, were age 16 at the time they experienced their first pregnancy. There is a difference, however, in age based on the intended timing of the pregnancy. The 11 women who experienced their first pregnancy as mistimed were, on average, 15.4 years at the time they

[24] This figure refers to pregnancies in the current marriage.
[25] This figure refers to pregnancies in the current marriage.

became pregnant as compared to an average age of 17.7 years among those who experienced the pregnancy as acceptably timed. None were over the age of 20 when they experienced their first pregnancy[26]. On average, women were pregnant about 1 year earlier than they had initially wanted to become pregnant.

Table 3.3. Summary of women's contraceptive use and pregnancy timing

Contraceptive use[1]	Mistimed	Appropriately Timed	Not yet pregnant	Total
yes	5	5	2	12
no	6	11	1	18
Total	11	16	3	30

[1] Contraceptive use at the time of pregnancy, or at time of interview for those who have not experienced a pregnancy

Seventeen women were not using contraception at time they became pregnant, including six women who experienced mistimed (too early) pregnancies. Six had previously used contraception but stopped because they wanted a pregnancy. Nine women had previously used contraception but discontinued while still in need, before they were ready to become pregnant.

> *"That time we hadn't any plan to take child. In fact I want to take child more later. But I don't know how it happened. He said take a child, take a child. Then I stopped taking pill and then had the baby."* (Informant #18, age 18, age at marriage 14)

> *"Actually I was feeling sick for using pill for 3 years. I was feeling vertigo, headache and I had to take rest all the time. So I stopped taking pill for one month and then I got pregnant within that month. ...I have a problem which they called*

[26] The three women who are not yet pregnant are ages 16, 17, and 18 at the time of interview. It is, of course, unknown whether or not they will reach the age of 20 before their first pregnancy or become pregnant before this age.

> *"Badhok". Women who feel pain during menstruation they have the disease of Badhok and those women can't be get pregnant easily. That's why I thought that I also have the disease and I would not be pregnant if I don't use any contraceptives."* (Informant #11, age 22, age at marriage 16)

Ten women were using contraception up until their pregnancies, including five women who experienced mistimed pregnancies and five women who accepted the timing of their pregnancy. These women seem to have experienced contraceptive failures, although one cannot distinguish use failure from method failure in this study.

> *"After 2 years I got pregnant. I was using a method. But still with the will of Allah this baby came to my womb."* (Informant #5, age 19, age at marriage 13)

> *"We were conscious [about using pill consistently] but how did it happen, we don't know."* (Informant #26, age 22, age at marriage 13)

Another six women had stopped using contraception in the month immediately preceding their pregnancy; for four women this was because they desired a pregnancy, but two women became accidentally pregnant with a mistimed pregnancy upon stopping contraception in anticipation of switching methods.

> *"None of us wanted a child during that time. However, I did not understand that I will be getting pregnant so easily. He thought that I was taking pill, which I was not."* (Informant #10, age 16, age at marriage 15, pill user, temporarily stopped (8 days) due to side effects)

It was rare that a few women had pregnancies later than they wanted. One woman (Informant #1) experienced her first pregnancy much later than she initially wanted. Two others decided after some time that they wanted to become pregnant earlier than first planned, but had trouble becoming pregnant immediately when they tried. One woman who stopped pill use 3 months after marriage, but took another one and half year to become pregnant, told her story.

> *"He had gonorrhea (Dhatu vangto otirikto). That's why it took time for my pregnancy… I came to know it after marriage. One of my sisters-in-law informed me about his disease. … I advised him to take medicine. Then he took medicine. He cured after 2 months of taking medicine. [then got pregnant]"* (Informant #19, age 18, age at marriage 14)

3.3.8.2 Termination

Three women who experienced an unintended pregnancy contemplated terminating it,[27] but were refused, either by family members or doctors. In each case, the reason was that they did not already have children.

> *"He [husband] phoned me and then I told him I had not gotten my period. Then after 2 months I saw a doctor and doctor confirmed I had conceived. Then I asked the doctor whether I could terminate my pregnancy. But doctor said as it was the first baby so I could not terminate."* (Informant #5, age 19, age at marriage 13)

[27] While women often used a term like *baccha nosto* to refer to either menstrual regulation or terminating a pregnancy, interviewers did not probe to distinguish between these events/procedures. Therefore, I use the term "termination" to refer to all such procedures.

> *"My mother-in-law was very angry. She told me that the marriage just took place and I got pregnant! She took me to terminate the pregnancy but by the grace of Allah, it could not be terminated."* (Informant #4, age 18, age at marriage 15, non-user)

In the third case (Informant #24), everyone in the woman's family opposed her desire to terminate, as it was the first pregnancy. Her mother and in-law family members assured her they would help to care for the child so she could continue to study.

More frequently, women do not consider termination when they experience a mistimed pregnancy, as this informant succinctly describes.

> *"No, nobody thought to abort it. I also didn't want to abort. As the baby came why we would abort it?"* (Informant #26, age 22, age at marriage 13)

In summary, even considering women's revised desires, approximately half of girls' first pregnancies are mistimed. Reasons for mistimed pregnancies include couple discordance in wanting a pregnancy (and subsequent refusal to continue contraception); use failure of the contraceptive method (predominantly the pill), and discontinuation due to side effects.

3.3.9 Fertility Desires for Spacing a Subsequent Pregnancy

Following the first pregnancy, women generally want a long interval before a subsequent pregnancy, much longer than the spacing between marriage and the first pregnancy. This is not atypical, as Bangladesh, generally, has long inter-birth intervals and, within Bangladesh, Khulna

division has the longest birth intervals in the country, with births spaced at an average of 63.8 months.

A response of a desirable gap of 5-7 years is particularly common, as shown in Table 3.4. Only one woman wanted a gap of less than that, at 3 years. Five women wanted a gap of 10 years or more and one woman did not want a second child. By the time of the interview, nine women had progressed to at least a second pregnancy.[28]

Concordance around timing of the second pregnancy is also much more likely. Women's husbands and in-laws also favor a longer spacing between pregnancies than they did before first pregnancy. In one of only two exceptions (Informant #12), the couple concurred that they did not want any more children, but the woman's mother-in-law encouraged them to have a second child 3-4 years after the first child's birth. In another (Informant #3), the couple wanted to wait 7 years before another child but the mother-in-law did not want them to use any contraceptive methods. These examples contrast with the general pattern of support for an extensive delay.

The reasons given for postponing a second pregnancy are also different than for postponing the first. Few women refer to age, physical development, or emotional maturity as some had expressed as a factor in the desired timing of the first pregnancy. This is in spite of the fact that all the women are still adolescents following their first birth[29]. Rather, the factors encouraging spacing include the health benefits to mother and to child and the ability to provide and care for children that are

[28] This figure refers to pregnancies within the current marriage.
[29] Three are approaching the 20 years of age after their first birth.

well spaced. A desire not to have the second child until the first is grown is a common theme. Women report that they, their husbands, and their in-laws, alike, express this view.

Table 3.4. Fertility desires, concordance of desires, and resulting timing of second pregnancy

ID	Wife's desire for timing of 2nd pregnancy	Wife/Husband concordance	Family concordance	2nd Pregnancy mistimed
1	>10 years	concordant	concordant	--
2	7-8 years	discordant	concordant	yes
3	7 years	concordant	discordant	no
4	no more	concordant	concordant	yes
5	10 years	concordant	no discussion	--
6	3 years	--	--	--
7	8-9 years	--	--	--
8	10-12 years	--	--	--
9	6-7 years	concordant	concordant	--
10	5 years	no discussion	--	--
11	7 years	no more	concordant	--
12	no more	concordant	discordant	--
13	5-6 years	no discussion	concordant	--
14	4-5 years	--	--	--
15	5 years	concordant	concordant	no
16	6-7 years	discordant	--	no
17	7 years	concordant	no opinion	yes
18	10-12 years	concordant	--	--
19	7 years	concordant	concordant	yes
20	unspecified delay	discordant	concordant	yes

Continued

Table 3.4—

ID	Wife's desire for timing of 2nd pregnancy	Wife/Husband concordance	Family concordance	2nd Pregnancy mistimed
21	8 years	concordant	--	--
22	5-7 years	--	--	--
23	5 years	concordant	concordant	--
24	7-8 years	concordant	--	--
25	10 years	concordant	--	--
26	5-7 years	no more	--	--
27	7-8 years	concordant	--	--
28	10 years	concordant	concordant	--
29	unspecified delay	--	--	--
30	unspecified delay	concordant	concordant	no

> *"If the older child is very young, then isn't that a problem if I take another child? If I do that, it would appear that I would not be able to take care of this child properly. Therefore, the ideal way is to properly raise this child and then take another one".* (Informant #27, age 20, age at marriage 17)

One woman was concerned about the health risks and economic costs of a second delivery following a C-section.

> *"I had C-section; I might need C-section again if I become pregnant. Where will I get money? This time my parent bore the cost. I will take another child when this child is grown up, by this time if his father's [economic] condition improves"!* (Informant #28, age 16, age at marriage 12)

However, these other concerns are infrequent compared to the notion of allowing the first child to grow up before having a second child.

3.3.10 Contraception after the First Pregnancy and Subsequent Pregnancies

3.3.10.1 Patterns of Contraceptive Attitudes and Use

Contraceptive use is much more acceptable after the birth of the first child than before the first pregnancy and more options are made available. Having had a child (all but one pregnancy resulted in a live birth), women also now have access to more contraceptive knowledge and confidence to participate in discussion of these topics. Widespread preferences for long spacing between births, as described in the previous section, mean more women are supported in pursuit of their individual goals. Approximately 20 of 24 women have used contraception since the birth of their first child.

Parous women have an expanded range of methods from which to choose, including methods like injections, implants, and IUDs that had been off limits for nulliparous women. Women discuss long-acting reversible contraception with their husbands, sisters-in-law, and health workers more readily than before the first pregnancy, and the advantages of these methods align better with their lengthened desired spacing. While the pill is still a dominant method, more women are using injections, and a few use implants.

Many of the preferences (and myths) that women had held about methods before the first birth still persist. One woman described her fear of side effects with the injection:

> *"One of my brothers-in-law suggested I take injection but I didn't agree to have that method and I took pill again. Women become fat after taking that method!"*
> (Informant #11, age 22, age at marriage 16, Femicon user)

Women continue to believe that long-term pill use carries a risk of fertility problems. However, while experiencing infertility is highly problematic for nulliparous women, it is less problematic if experienced by women who already have a child.

After the first pregnancy, the concerns women express about long acting methods shift from their potential side effects to concerns about their invasive nature and religious proscriptions against altering the body. These two women remark on implants and tubal ligation:

> *"What if I die with 'kathi' [implant] in my hand. That person will not be going to heaven and therefore, why would I do something like this?" ... "What if I have a problem while doing [ligation]? Why would I cut something? Won't God be unhappy that I have cut the body so that I don't have a child?"* (Informant #3, age 21, age at marriage 13)

> *"These methods should not be used. What if you die with these? What would you say to God?... when you would die, the kathi [implant] will be in your body.* (Informant #21, age 20, age at marriage 15)

Another attribute of the implant and injections that women dislike is suppression of menstruation.

> *"She (health worker apa) said there is nothing to be afraid if there is no 'menses'. But it is good to have it, otherwise it will be problematic for the body if the dirty blood couldn't go outside from the body."* (Informant #28, age 16, age at marriage 12, injection user)

Other women, who were generally satisfied users of some of these methods, expressed displeasure with the difficulty of accessing injections or implants. This same woman who liked to use the injection described the issues she has with accessibility.

> *"She gave the date on a paper, when I need to go for [next] injection. Many days passed away but I couldn't go…. 3 months already over… if they don't go [sisters in law who also use injection], how can I go there alone? It will be good if they provide this at home."* (Informant #28, age 16, age at marriage 12)

Another concern when deciding on contraceptive methods that emerged at this point of the life course is the effect of contraception on breastmilk supply and child health for mothers who are currently breastfeeding. Women discuss this issue amongst each other, with health workers and doctors of varying expertise, and seek a method or formulation of the pill that is most compatible with breastfeeding for them. Rather than discontinuing contraceptive use, as was the case with health concerns before the first pregnancy, women are more likely to switch to another brand of pill or switch to condoms while breastfeeding.

Some women continue to experience the same types of difficulties using contraception, e.g., side effects, as they did before the first pregnancy. Women still experience opposition or discordant fertility desires in a few cases, but, as Table 3.4 indicates, this is much diminished. Yet, some women are still not using contraception in a way that corresponded with their fertility desires. One woman describes the obstacles she still faces. She had experienced a mistimed first pregnancy that was miscarried. Her second pregnancy—the first resulting in a live birth—aligned better with her desires for the timing of a first child. Although she wants a gap of 6-7 years before the next child,

her husband is not supportive of using contraception and she worries that she is at risk of another mistimed pregnancy that she would need to carry to term.

> *"If I do get pregnant, I have nothing to do but keep the pregnancy and raise the child with hardship. I don't like that [terminating the pregnancy]."* (Informant #16, age 21, age at marriage 13)

Another woman, however, describes how opposition to contraception is not the same barrier to use that it once was. Her first pregnancy was mistimed because her husband did not approve of her using the pill out of fear of side effects and she had deferred to his wishes then. The husband's approval is not as critical to a woman's ability to use contraception as it was before the first pregnancy.

> *"One day my sister in-law said that she was going to do that [have implant inserted] then I also went with her…I didn't take permission from [her husband], as I knew that he will not agree. After I came back to home when I inform him, he became angry… 'Why didn't you ask me before? How dare you do that without my consent.' I said, 'So what should I do? You didn't allow me to take pill, so I would have to deliver child in every month?' We were quarreling, and then he became calm."* (Informant #26, age 22, age at marriage 13)

3.3.10.2 Increasing Knowledge

In contrast to their descriptions of the early days of marriage, women's accounts of contraception after the first child clearly show an expansion in knowledge, as exemplified by one woman's detailed description of pill use.

> *"Every day before sleep you have to take the pill. And if you forgot one day, you have to take the pill immediately when you could remember next day. And at night you have to take the regular one…There are iron tablets there,[30] There are three rows of white tablets and a row of iron tablets on the strip of the pill. After taking the white colored pill then you need to take iron pills."* (Informant #12, age 22, age at marriage 16)

Other accounts show the process by which women learn of more methods. The experiences of other women in their social network is one of the primary means through which women acquired greater knowledge about contraception. Additionally, women gain access to health facilities and health workers that they did not know about or were able to use prior to their first pregnancy.

> *"Many women use vaccine [injection]. I didn't know about all these…Now I visit at hospital and come to know many more things like capsule [implant]. After having a child my sisters-in-law advised me, not to take another child urgently. Hence I came to know about methods."* (Informant #15, age 22, age at marriage 12)

> *"Everybody took pill here. Nobody took injection here. I didn't know that there is a capsule for 5 years; you cannot know everything at a time. Gradually you can understand many things; I also understood many things gradually."* (Informant #28, age 16, age at marriage 12)

[30] Several of the most popular pill formulations include red, non-hormonal pills that contain iron rather than being entirely inert placebos.

Nonetheless, some incorrect knowledge persists, as evidenced by the mistaken notion that red pills cause menstruation to start rather than menstruation coinciding with when white pills cease:

> *"At the last month I started with white pill then took all the red pills but my period didn't start. Then I took some more red pills from another strip to have period but it didn't work out."* (Informant #26, age 22, age at marriage 13)

Nine women in the sample of 30 had experienced a second pregnancy. Of these, about one half (5) were mistimed. Whereas family opposition to postponing a pregnancy or using contraception played a major factor in the occurrence of mistimed first pregnancies, mistimed subsequent pregnancies were largely the result of contraceptive failure or accidental pregnancies due to interruptions in contraceptive practice.

3.4 DISCUSSION AND CONCLUSIONS

This study adopted qualitative methods to complement the quantitative data of the Bangladesh DHS and sought to answer questions about why young, married women bear their first child at a young age. I find that women enter into marriage suddenly and with no advance preparation. This rush to marriage proves to be a strong deterrent to successfully planning childbearing. Women have no opportunity to adjust to the idea of being married, let alone to discuss with their husbands their desired timing of pregnancy or decide on and acquire contraception. Furthermore, women's lack of agency in the marriage process sets the tone for their early reproductive lives, with young women lacking empowerment to implement reproductive intentions. Like others, this study finds that early and sudden marriage is, therefore, associated with low decision-making and poor fertility control, as evidenced by unintended pregnancy (Godha, Hotchkiss, and Gage 2013).

The women in this study want to postpone their first pregnancy until 2-3 years following marriage on average. This finding contrasts with that of earlier studies in Sylhet, Bangladesh and elsewhere in South Asia which indicated that a majority of newly married women wanted a child immediately (Sharma et al. 2002; Henry et al. 2015). The finding that women want to delay childbearing is particularly positive for those wanting to shift childbearing from the adolescent years and into the early twenties, an age attended by lower risk of negative maternal health and birth outcomes. It suggests a strong basis for programmatic efforts that support women to achieve their fertility desires.

Women primarily are motivated to postpone a pregnancy to protect their health and secondarily to allow for a period of adjustment into an unfamiliar household and role. This latter finding contrasts with other studies in Bangladesh that found having a child soon after marriage facilitates

integration into the unfamiliar, marital household (Rashid 2006; Henry et al. 2015). Only a few women in this study express this perspective. Only a very few women continued their education after marriage; finishing school is particularly strong motivation to postpone pregnancy among these women. Education has long been identified as a factor influencing fertility and the timing of childbearing, however the typical mechanism posited is delaying marriage (Bates, Maselko, and Schuler 2007; Abedin 2011; Bhatti and Jeffery 2012).

While the young women in this study want to postpone the first pregnancy, they are often influenced by their husbands and in-law family, who frequently have opinions about timing of childbearing that conflict with their own. Husbands and in-law family members are more likely to prefer an early pregnancy than the woman, herself. Husbands and in-law family members who do want to postpone pregnancy often share the same motivations as do newly married women. Women clearly understand that bearing a child too young can be harmful both to herself and to her baby.

Husbands and in-laws often share this concern. However, their interest in protecting her health, particularly in preserving her fertility capacity, can be a powerful motivation to stop contraceptive use if she experiences side effects, thereby running the risk of pregnancy. This motivation is particularly strong among in-law family members. Thus, the health motivation operates differently for in-law families and husbands than it does for young women and leads to early childbearing. Programs to support women in achieving their fertility desires must be designed to address the different motivations of husbands and in-laws and their influence on women.

The women in this sample have a mean age at marriage of 15 years and, on average, a preference to postpone a first pregnancy for about 2 years. This finding means that most women desire a first

pregnancy that falls within their adolescent years. This finding warrants emphasis. One implication is that if the aim is to move first births beyond the adolescent years, it may be advisable for programmatic and policy efforts that assist women in achieving their fertility intentions to be complemented by continued efforts to delay marriage beyond the legal minimum marriage age.

This study shows women enter into marriage with little practical contraceptive knowledge; many lack even basic body literacy and understanding of reproduction. Taboos against talking about sex and contraception with unmarried girls bolster this lack of knowledge. Older sisters-in-law and other female relatives often step in at the time of marriage to provide young women with some cursory information about contraception. Yet, women do not know how to use contraception effectively in the early part of their marriages. Their need for education and information on sex, their bodies, and contraceptive options is clear. Programmatic efforts that seek to understand and assist women in achieving their fertility intentions should make extra effort to reach young, about-to-be or recently married women. Results from the 2014 BDHS indicate that less than one third of women age 15-19 have seen or heard anything about family planning in the media or from health workers in the preceding month (NIPORT, Mitra and Associates, and ICF International 2016). Instead, other, more experienced women partially fill this gap and provide information about contraception and reproduction.

One striking finding from this study is how many young women attempt to use contraception to postpone the first pregnancy. Twenty-three of 30 women used contraception for some time before their first pregnancy. This finding contradicts the conventional wisdom that contraception is seldom used until after the first child is born (Godha, Hotchkiss, and Gage 2013). Unfortunately,

most women were unable to use contraception continuously and effectively to realize their desired pregnancy timing.

The women in this study consistently defer decisions related to the timing of pregnancy and contraceptive use to others in the marital home. The finding that women exercise little influence over reproductive decisions echoes the relative powerlessness of recently married women identified in other studies (Sharma et al. 2002; Gipson and Hindin 2007; Acharya et al. 2010; Huda et al. 2013). Husbands and in-law families exert influence over the timing of childbearing. Their opinions both shape women's own desires at the outset of marriage or over time sway women to change their plans to have a child sooner than they first planned. Targeting interventions to husbands may be particularly useful in delaying first pregnancies.

Female relatives continue to be sources of information—and sometimes misinformation—about contraception throughout the early years of marriage. This result is consistent with other studies that point to female in-laws as the primary source of reproductive knowledge and guidance (Mumtaz and Salway 2009). The contraceptive experiences of sisters-in-law and mothers-in-law strongly influence young women's own behavior. Newly married women are limited to a narrow range of contraceptive methods (pill, condom, or traditional methods) because female relatives believe other methods such as injections and implants are unsuitable for young, nulliparous women. From among this limited set of contraceptive options, husbands often determine whether and which method will be used, a pattern of contraceptive decision-making that is consistent with existing studies (Acharya et al. 2010).

The experience of side effects while using contraception (predominantly pills) was commonplace in this study. Fear of and experiences with side effects of contraceptive methods compel some

husbands to insist that their wives stop using contraception and conceive a child. Similarly, mothers-in-law believed myths that long-term pill use and other methods could cause infertility, a finding not unique to this study (Char, Saavala, and Kulmala 2010; Henry et al. 2015). In-laws' interests in protecting a young woman's fertility potential influence young women to discontinue contraceptive use before they are ready to become pregnant.

Nearly two-thirds of the women in this study experienced their first pregnancy earlier than they had desired when they married. Discordant fertility aims and side-effect-induced contraceptive discontinuation are the two major factors contributing to mistimed pregnancies. Efforts to support current users, minimize discontinuation (Jain et al. 2013), and to correct misperceptions about contraceptive methods are critical for this population of young, inexperienced contraceptive users. Targeting this information not only to newly married women but to men and older women as well could also be beneficial.

In summary, this study has complemented the quantitative findings of the Bangladesh DHS 2014 in its investigation of how young, married women make and implement decisions about the timing of childbearing. It found that entry into marriage is an unexpected disruption of unmarried girls' lives. Spousal communication and women's decision-making are low. Women want to delay a first pregnancy, but still want a birth within 2-3 years of marriage, leading to childbirth while they are still young. Women's abilities to meet their fertility aspirations are challenged by discordant childbearing aims, limited options for contraceptive methods, and discontinuation due to side effects and concerns about infertility.

3.5 REFERENCES

Abedin, S. 2011. "Identification of Fertility Enhancing and Inhibiting Factors: A Study on Married Adolescents in Bangladesh." *Asian Social Science* 7 (5):19-196.

Acharya, D. R., Bhattarai, R., Poobalan, A., Teijlingen, V. E., and Chapman, G. 2014. "Factors Associated with Teenage Pregnancy in South Asia: A Systematic Review." *Health Science Journal* 4 (1):3-14

Barua, A., and Kurz, K. 2001. "Reproductive Health-seeking by Married Adolescent Girls in Maharashtra, India." *Reproductive Health Matters* 9 (17):53-62.

Bates, L. M., Maselko, J., and Schuler, S. R. 2007. "Women's Education and the Timing of Marriage and Childbearing in the Next Generation: Evidence from Rural Bangladesh." *Studies in Family Planning* 38 (2):101-112.

Bhatti, F., and Jeffery, R. 2012. "Girls' Schooling and Transition to Marriage and Motherhood: Exploring the Pathways to Young Women's Reproductive Agency in Pakistan." *Comparative Education* 48 (2):149-166.

Bongaarts, J. 1982. "The Fertility-inhibiting Effects of the Intermediate Fertility Variables." *Studies in Family Planning* 13 (6/7):179-189.

Chandra-Mouli, V., Camacho, A. V., and Michaud, P. A. 2013. "WHO Guidelines on Preventing Early Pregnancy and Poor Reproductive Outcomes among Adolescents in Developing Countries." *Journal of Adolescent Health* 52 (5):517-522.

Char, A., Saavala, M., and Kulmala, T. 2010. "Influence of Mothers-in-law on Young Couples' Family Planning Decisions in Rural India." *Reproductive Health Matters* 18 (35):154-162.

Cooper, L. G., Leland, N. L., and Alexander, G. 1995. "Effect of Maternal Age on Birth Outcomes among Young Adolescents." *Social Biology* 42 (1-2):22-35.

de Vienne, C. M., Creveuil, C., and Dreyfus, M. 2009. "Does Young Maternal Age Increase the Risk of Adverse Obstetric, Fetal and Neonatal Outcomes: A Cohort Study." *European Journal of Obstetrics & Gynecology and Reproductive Biology* 147 (2):151-156.

Furr, R. M. 2010. "Split-Half Reliability." In *Encyclopedia of Research Design*, edited by Neil J. Salkind, 1411-1414. Thousand Oaks, CA: SAGE Publications, Inc.

Gage, A. J. 2000. "Female Empowerment and Adolescent Demographic Behaviour." In *Women's Empowerment and Demographic Processes: Moving beyond Cairo*, edited by Harriet Presser and Gita Sen, 186-203. Oxford: Oxford University Press.

Gipson, J. D., and Hindin, M. J. 2007. "'Marriage Means Having Children and Forming Your Family, So What is the Need of Discussion?' Communication and Negotiation of Childbearing Preferences among Bangladeshi Couples." *Culture, Health & Sexuality* 9 (2):185-198.

Godha, D., Hotchkiss, D. R., and Gage, A. J. 2013. "Association between Child Marriage and Reproductive Health Outcomes and Service Utilization: A Multi-country Study from South Asia." *Journal of Adolescent Health* 52 (5):552-558.

Goonewardene, I., and Waduge, R. 2009. "Adverse Effects of Teenage Pregnancy." *Ceylon Medical Journal* 50 (3):116-120.

Guest, G., Bunce, A., and Johnson, L. 2006. "How Many Interviews Are Enough? An Experiment with Data Saturation and Variability." *Field Methods* 18 (1):59-82.

Haldre, K., Rahu, K., Karro, H., and Rahu, M. 2007. "Is a Poor Pregnancy Outcome Related to Young Maternal Age? A Study of Teenagers in Estonia during the Period of Major Socio-

economic Changes (from 1992 to 2002)." *European Journal of Obstetrics & Gynecology and Reproductive Biology* 131 (1):45-51.

Harrits, G. S. 2011. "More Than Method?: A Discussion of Paradigm Differences Within Mixed Methods Research." *Journal of Mixed Methods Research* 5 (2):150-166.

Henry, E. G., Lehnertz, N. B., Alam, A., Ali, N. A., Williams, E. K., Rahman, S. M., Ahmed, S., El Arifeen, S., Baqui, A. H., and Winch, P. J. 2015. "Sociocultural Factors Perpetuating the Practices of Early Marriage and Childbirth in Sylhet District, Bangladesh." *International Health* 7 (3):212-217.

Huda, F. A., Chowdhuri, S., Robertson, Y., Islam, N., Sarker, B. K., Azmi, A. J., and Reichenbach, L. 2013. *Understanding Unintended Pregnancy in Bangladesh: Country Profile Report*. Dhaka, Bangladesh: Centre for Reproductive Health, icddr,b.

Jain, A. K., Obare, F., RamaRao, S., and Askew, I. 2013. "Reducing Unmet Need by Supporting Women with Met Need." *International Perspectives on Sexual and Reproductive Health* 39 (3):133-141.

Kamal, S. M., and Hassa, C. H. 2015. "Child Marriage and its Association with Adverse Reproductive Outcomes for Women in Bangladesh." *Asia-Pacific Journal of Public Health* 27 (2):1492-1506.

MacQuarrie, K. L. D. 2009. *Women's Empowerment and Family Formation across the Life Course in Madhya Pradesh, India: The Influence of Time-varying and Fixed Empowerment Resources Using Structural Equations Models*. In *XXVI IUSSP International Population Conference*. Marrakech, Morocco.

MacQuarrie, K. L. D. 2014. *Unmet Need for Family Planning among Young Women: Levels and Trends*. DHS Comparative Reports No. 34. Rockville, Maryland, USA: ICF International. Available at http://dhsprogram.com/pubs/pdf/CR34/CR34.pdf.

MacQuarrie, K. L. D. 2015. *Unmet Need for Modern Contraception among Young Women: Supplement to DHS Comparative Reports No. 34*. Rockville, Maryland, USA: ICF International. Available at http://dhsprogram.com/pubs/pdf/OD68/OD68.pdf.

MacQuarrie, K. L. D., and Edmeades, J. 2015a. "Child Grooms: Prevalence and Correlates of Early Marriage among Men." In Population Association of America, San Diego, CA.

MacQuarrie, K. L. D., and Edmeades, J. 2015b. "Whose Fertility Preferences Matter? Women, Husbands, In-laws, and Abortion in Madhya Pradesh, India." *Population Research and Policy Review* 34 (4):615-639.

Mitra, S. N., Al-Sabir, A., Cross, A., and Jamil, K. 1997. *Bangladesh Demographic and Health Sruvey, 1996-1997*. Dhaka, Bangladesh and Calverton, MD: National Institute of Population Research and Training (NIPORT), Mitra and Associates, and ICF International.

Morse, J. M. 1994. "Designing Funded Qualitative Research." In *Handbook of Qualitative Research*, edited by Norman K Denzin and Yvonna S Lincoln, 220-235. Thousand Oaks, CA: Sage.

Mumtaz, Z., and Salway, S. 2009. "Understanding Gendered Influences on Women's Reproductive Health in Pakistan: Moving beyond the Autonomy Paradigm." *Social Science & Medicine* 68 (7):1349-1356.

Nahar, Q., and Min, H. 2008. *Trends and Determinants of Adolescent Childbearing in Bangladesh*. DHS Working Papers No. 48. Calverton, Maryland, USA: Macro International.

NIPORT, Mitra and Associates, and ICF International. 2013. *Bangladesh Demographic and Health Survey 2011*. Dhaka, Bangladesh and Calverton, MD: National Institute of Population Research and Training (NIPORT), Mitra and Associates, and ICF International.

NIPORT, Mitra and Associates, and ICF International. 2016. *Bangladesh Demographic and Health Survey 2014*. Dhaka, Bangladesh and Calverton, MD, USA: National Institute of Population Research and Training (NIPORT), Mitra and Associates, and ICF International.

Patton, M. Q. 2005. "Qualitative Research." In *Encyclopedia of Statistics in Behavioral Science*, edited by Brian S. Everitt and David Howell. Wiley and Sons, Inc.

Rashid, S. F. 2006. "Emerging Changes in Reproductive Behaviour among Married Adolescent Girls in an Urban Slum in Dhaka, Bangladesh." *Reproductive Health Matters* 14 (27):151-159.

Riley, A. P. 1994. "Determinants of Adolescent Fertility and Its Consequences for Maternal Health, with Special Reference to Rural Bangladesha." *Annals of the New York Academy of Sciences* 709 (1):86-100.

Schatz, E. 2012. "Rationale and Procedures for Nesting Semi-structured Interviews in Surveys or Censuses." *Population Studies* 66 (2):183-195.

Sharma, A. K., Verma, K., Khatri, S., and Kanna, A. 2002. "Determinants of Pregnancy in Adolescents in Nepal." *The Indian Journal of Pediatrics* 69 (1):19-22.

Shrestha, S. 2002. "Socio-cultural Factors Influencing Adolescent Pregnancy in Rural Nepal." *International Journal of Adolescent Medicine and Health* 14 (2):101-110.

Tashakkori, A., and Teddlie, C. 2010. *SAGE Handbook of Mixed Methods in Social & Behavioral Research.* Second edition ed. Thousand Oaks, CA: SAGE Publications, Inc.

CHAPTER 3 APPENDICES

Appendix 3.1. Study Team and Roles

Kerry MacQuarrie, Principal Investigator, The DHS Program

Overall project management and contracting; Study design and study protocol; sampling strategy; developed instruments; IRB submission; support to study team training; data management protocols; developed coding schema; quality assurance of interview transcripts and coding; led analysis team (principal investigators and co-investigators); developed and executed analysis plan; analyzed all transcripts in their English translation, code reports, and thematic summaries; prepared the majority of thematic summaries; wrote study results.

Quamrun Nahar, Principal Investigator, icddr,b

Overall project management within icddr,b; Assisted with study design; prepared study protocol; developed instruments; IRB submission; assembled co-investigators and field research teams; designed and implemented study team training; developed coding schema; quality assurance of transcript coding; participated in analysis team (principal investigators and co-investigators); clarified author's translation questions; analyzed a portion of transcripts (in English) and code reports; prepared thematic summaries (on second pregnancy experience); commented on study report.

Rasheda Khan, Co-Investigator, icddr,b

Assisted with study protocol; assisted with IRB submission; supported study ream training (specifically on interviewing techniques and quality); participated in developing coding schema; participated in field research team; quality assurance of interview quality; interviewed informants; participated in analysis team (principal investigators and co-investigators); clarified author's translation questions; analyzed a portion of transcripts (in English) and code reports; prepared thematic summaries (on contraceptive use at first sex); commented on study report.

Marzia Sultana, Co-Investigator, icddr,b

Managed field work and led field research team; participated in analysis team (principal investigators and co-investigators); analyzed a portion of transcripts (in English) and code reports; prepared thematic summaries (on contraceptive knowledge before marriage).

Syeda Nurunnahar, Sharmin Islam, Fatama Khatun, and Meghla Islam, Research Officers, icddr,b

Members of field research team; conducted the in-depth, person-to-person interviews with study informants; Transcribed and translated transcripts from Bangla into English; Entered data into AtlasTi; coded the data; produced code reports per analysis team lead's requests.

Salim Prodhania, Field Assistant, icddr,b

Member of the field research team. The male field assistant helped the field team locate, contact eligible informants in the field, and schedule interviews. Accompanied research officers and co-investigators during field work.

Appendix 3.2. Socio-demographic profile of study informants

	Women's information								Husband's Information		
ID	Age	Education	Age at marriage	No. preg.	No. of living children	Age of last child	Current pregnancy status	Type of family	Age	Education	Occupation
1	21 yrs	Class-8	11 yrs	01	01	4 yr	Not pregnant	Extended	28 yrs	Class-9	Electrician
2	22 yrs	Class-6	13 yrs	02	02	5 m	Not pregnant	Extended	35 yrs	Class-8	Business of iron
3	21 yrs	Class-8	13 yrs	02	02	1.6 yrs	Not pregnant	Extended	30 yrs	Class-10	Business (fruit)
4	18 yrs	Class-5	13 yrs	02	02	3 yrs	Not pregnant	Extended	26 yrs	Class-6	Small business (row material)
5	19 yrs	Class-8	13 yrs	01	01	16 m	Not pregnant	Extended	27 yrs	Class-7	Van driver
6	19 yrs	Class-9	14 yrs	01	01	3 yrs	Not pregnant	Extended	26 yrs	Class-5	Farmer
7	19 yrs	Class-9	14 yrs	01	01	3 yrs	Not pregnant	Extended	25 yrs	Class-7	Small business (vegetable seller)
8	17 yrs	Class-8	15 yrs	0	0	0	Not pregnant	Extended	27 yrs	Class-7	Farmer
9	17 yrs	Class-6	15 yrs	01	01	5 m	Not pregnant	Extended	26 yrs	No school	Farmer
10	16 yrs	Class-8	15 yrs	1	0	0	9 m. Pregnant	Extended	18 yrs	Class-5	Farmer
11	22 yrs	Class-8	15 yrs	01	01	2 yrs 9d	Not pregnant	Nuclear	26 yrs	Class-9	Farmer
12	21 yrs	Class-10	16 yrs	01	01	2 yrs	Not pregnant	Nuclear	32 yrs	HSC	Jewelry maker
13	19 yrs	Class-9	17 yrs	01	01	43 d	Not pregnant	Extended	25 yrs	Class-9	Business
14	18 yrs	Class-12	17 yrs	0	0	0	Not pregnant	Extended	27 yrs	B.A	Madrassa teacher
15	22 yrs	Class-5	12 yrs	02	02	9 m	Not pregnant	Extended	30 yrs	SSC	Nochimon driver
16	21 yr	Class-5	13 yr	03	02	11 m	Not pregnant	Nuclear	26 yr	Class-6	Carpenter
17	22 yrs	Class-7	14 yrs	03	02	19 m	Not pregnant	Nuclear	30 yrs	No school	Small business
18	18 yrs	Class-6	14 yrs	01	01	2 yrs	Not pregnant	Nuclear	26 yrs	Class-4	Farmer
19	18 yrs	No school	14 yr	02	01	3 yrs	Not pregnant	Extended	22 yrs	No school	Butcher
20	20 yrs	Class-7	15.5 yrs	03	02	2 yrs	Not pregnant	Extended	27 yrs	Class-7	Farmer
21	20 yrs	SSC	15 yrs	01	01	3 yrs	Not pregnant	Extended	40 yrs	M.A	Teacher
22	18 yrs	SSC	16 yrs	1	0	0	4 months pregnant	Extended	28 yrs	Class-7	Worker of jewelry shop
23	19 yrs	Class-5	16 yrs	01	01	2 yrs	Not pregnant	Nuclear	30 yrs	No school	Imam and also a farmer
24	19 yrs	SSC	16 yrs	01	01	1 yrs	Not pregnant	Extended	28 yrs	HSC	Small business of fertilizer
25	18 yrs	Class-9	16 yrs	1	0	0	Pregnant	Extended	22 yrs	Class-8	Farmer
26	20 yrs	No school	16 yrs	01	01	2 yrs	Not pregnant	Nuclear	40 yrs	No school	Auto driver
27	20 yrs	Class-3	17 yrs	01	01	11 m	Not pregnant	Extended	24 yrs	No school	Farmer
28	16 yrs	Class-4	12 yrs	01	01	18 m	Not pregnant	Nuclear	20 yrs	No school	Seasonal day labor and auto driver
29	16 yrs	Class-4	15 yrs	0	0	0	Not pregnant	Extended	19 yrs	Class-1	Day labor
30	20 yrs	Class-10	16 yrs	02	01	2 yrs	Not pregnant	Extended	32 yrs	SSC	works in a co-operative

Chapter 4. CONCLUSION

In a context of rising marriage age for women in South and Southeast Asia and a documented relationship between marriage timing and timing of the first birth, the three papers comprising this dissertation sought to illuminate the dynamics among marriage timing, gender context, and timing of births early in women's reproductive careers. The dissertation combines cross-national quantitative analyses in seven Asian countries (Bangladesh, India, Nepal, and Pakistan in South Asia and Cambodia, Indonesia, and the Philippines in Southeast Asia) and in-depth, qualitative analysis in one division of Bangladesh to do so.

The first paper titled "Trends and Factors Associated with Marriage Timing and the First Birth Interval," joins previous research documenting a trends in marriage timing (Aryal 2007; Jones 2010; Löfstedt, Ghilagaber, and Johansson 2007; Mensch, Bruce, and Greene 1998; Mensch, Singh, and Casterline 2005; Retherford, Ogawa, and Matsukura 2001) and timing of the first birth (Donaldson and Nichols 1978; Feng and Quanhe 1996; Hirschman and Rindfuss 1982), but extends this literature by offering rich description of time trends disaggregated by numerous characteristics not found in the extant literature. Variation occurred in the pace of increasing marriage age, in both South and Southeast Asia, such that differentials in marriage age grew wider over time by most characteristics in most countries. Meanwhile, disparities in the first birth interval by spousal age difference, wealth, place of residence, and husband's education narrowed over time in most study countries, but increased or remained steady for other indicators. The overall trend in the first birth interval, which became shorter in four countries, longer in two countries, and showing no significant change in one, demonstrated more heterogeneity than a near-

universal trend toward shorter birth intervals with rising marriage age identified in previous studies (Donaldson and Nichols 1978; Feng and Quanhe 1996; Hirschman and Rindfuss 1982).

A further contribution of this first study are the side-by-side comparisons of gender and socio-demographic factors associated with both outcomes—marriage timing and onset of childbearing. This first paper finds that many of these factors are associated with both age at marriage and, nearly as strongly and consistently, with the first birth interval. This suggests that multivariate analysis of the first birth interval would complement the bivariate analysis to determine if gender and socio-demographic factors operate *through* marriage age or if any observed bivariate association between marriage age and the first birth is *explained away* by gender or socio-demographic factors. This thread is taken up in the second paper, titled "The Association of Marriage Age and Gender Context with Fertility Timing in Asia."

This study assesses the influence of age at marriage and gender context on the first birth interval through a multivariate hazard model. Marriage age is found to be significantly associated with the mean duration of the first birth interval in all study countries, even where the first birth interval remained steady or increased. This finding reaffirms extant literature observing timing of marriage and first birth to be closely associated (Gipson and Hindin 2007; Jennings, Axinn, and Ghimire 2012; Jones and Gubhaju 2009; Mensch, Bruce, and Greene 1998; Rodriguez and Trussell 1980; Trussell and Reinis 1989; Trussell, Menken, and Coale 1979).

The analysis' principal finding is that this significant association between marriage age and the first birth interval remains strongly significant even in the presence of controls for the birth cohort, gender context, and socio-demographic characteristics of the woman and her husband. Meanwhile, many of the gender context and socio-demographic characteristics initially associated

with the first birth interval in the bivariate analysis of the first paper demonstrate a weakened or no significant association with the first birth interval when accounting for marriage age in this second paper. These findings provide further evidence that gender context and socio-demographic characteristics likely act on the first birth interval not directly but through marriage age. These findings are concordant with those of a Korean study using path analysis and an earlier study using OLS in five Asian countries (Hirschman 1985; Kim and Stinner 1980). A contribution of this study presented here is that it extends this analysis beyond socio-demographic factors like education, premarital work, urban/rural residence and religion to include multiple measures of the gender context, and concludes that, any influence of gender on the first birth interval is largely attenuated by marriage age.

A second finding from the first paper serves to frame the analysis in the second paper. The first paper, in analyzing trends and factors associated with the first birth interval, determined that most of the gender context and socio-demographic variables that were associated (according to a Tarone-Ware test of the difference in mean survival times) with the first birth interval maintained this association at both the current time point and the time point approximately a decade earlier. This finding suggested that changes in the first birth interval over time would likely be due to changes in the composition of the population across several of these characteristics, rather than due to changes in the effects of these characteristics upon the timing of the first birth. Indeed, the multivariate decomposition analysis presented in the second paper confirmed that the composition component is significantly associated with the change in the first birth in all six countries in which the first birth interval lengthened or shortened significantly over time. The largest proportion of change in the first birth interval can consistently be attributed to changes in the age distribution of marriage in these countries. However, changes in the effects of population characteristics

contributed to the change in the first birth interval in three countries alongside compositional changes and, in each case, changes in effects contributed more to the overall change than did changes in composition.

One additional advantage of the studies presented in the first and second papers is that they present multi-country rather than single country analysis, facilitating the identification of regional patterns. The first paper identified distinct regional marriage and first birth patterns: in the South Asian countries, marriage age was lower (during the adolescent years) and the mean duration of the first birth interval was longer (39-44 months) whereas marriage age was higher (20-22) and the first birth interval shorter (31-32 months) in the Southeast Asian countries, consistent with the expected association between later marriage age shorter first birth intervals (Amin and Bajracharya 2011; Rindfuss and Morgan 1983). However, both the first and second papers also identified substantial variation in the association of factors, particularly describing the gender context, with the first birth interval across countries. This country-wise variation begs a closer, in-depth examination of the dynamics of marriage timing, gender dynamics, and early family formation unique to each country. The third paper, "The Social Context of Early Marriage, Contraception, and Childbearing among Young Women in Khulna, Bangladesh," is one such investigation in Bangladesh.

This third paper is a qualitative study on the social context that shapes the marriage process, young women's fertility desires, and experience with contraception and early childbearing in Bangladesh. The analysis is based on in-depth interviews with 30 women age 15-22 who had married before age 18 in Khulna division, Bangladesh. Specifically, the study investigates why women who marry at a young age go on to bear a first child so soon after marriage.

The study finds that young women enter into marriage suddenly, with little participation in marriage decisions but rather acquiescing to the decisions or interests of family members. Young women want to delay a first pregnancy to protect their health and acclimate to new roles as a married woman and daughter-in-law, but still want a birth within adolescence. Women's fertility desires are frequently discordant with those of their husbands, their in-law family, or both. Spousal communication and women's decision-making are low and young women defer decisions on childbearing and contraception to others. Concerns among contraceptive decision-makers (husbands, mothers-in-law, and sisters-in-law) about side effects and infertility resulting from long term contraceptive use limit contraceptive options and promote early pregnancies, which largely occur before young women are ready.

The study furthers our understanding of the dynamics between entry into marriage and onset of childbearing because it examines the gender norms and familial versus individual control over the marriage process. Its findings showing that gender and age based power dynamics and discordant fertility desires within the household circumscribe women's options and ability to realize fertility intentions confirm general conclusions from previous studies in South Asia (Acharya et al. 2010; Gipson and Hindin 2007; Huda et al. 2013; Sharma et al. 2002). Furthermore, this study reiterates the role that premarital gender and age based power in the natal home and gender norms play in influencing the marriage process and marriage timing (Banerji and Vanneman 2011; Mensch, Singh, and Casterline 2005; Santhya et al. 2010). This lends credence to the idea that gender context influences the first birth interval through marriage. However, this third study makes clear that gender context also continues to influence options and behavior that determine the length of the first birth interval *after marriage*. This finding indicates that gender context may operate

independently and directly on the first birth interval, as well as indirectly through marriage, at least in some settings.

This third paper yields some insights on an issue raised by the analysis in the first paper. The first paper found a pervasive positive association between education and age at marriage cross-nationally. However, the analysis was unable to disentangle the causal direction and the extant literature posits both that early marriage interrupts women's education and that girls who drop out of school prematurely are subsequently at greater risk of early marriage (Lloyd and Mensch 1999; Lloyd and Mensch 2008; Steinhaus et al. 2016). Regardless of causal direction, there is widespread consensus on notion of incompatibility between marriage and education (Jones 2010; Jones and Gubhaju 2009; Nguyen and Wodon 2012; Plan 2011; Wodon, Nguyen, and Tsimpo 2016). The results of the third study in Bangladesh favors the former explanation: for most of the sample, marriage during girls' adolescent years halted their education. Rather than already out-of-school youth finding their way into marriages at a young age, girls were pulled, sometimes with very little notice, from their schooling in order to marry and move into their new in-laws' household.

A final contribution of both the second and third papers is their investigation of both the first and second births, allowing comparisons to be drawn between them. Both studies found striking differences. The hazards analysis of the second paper found numerous correlates associated with both the first and second birth intervals, but operating in opposing directions. Marriage age and measures of the gender context that were negatively associated with the first birth interval were positively associated with the second birth interval. Furthermore, gender variables are more weakly associated with the second birth interval than the first. Meanwhile, the third paper reveals

that constraints on women's contraceptive options; decision-making power; ability to formulate, express, and advocate for their fertility desires (as well as discordance with their desires); and concerns about side effects and impaired fertility that were stridently present during the first pregnancy interval all loosen during the second pregnancy interval. The combined findings from both of these studies suggest that the first birth occupies unique social meaning and is subject to controlling gender norms unlike successive childbearing.

A surprising finding in the third paper is the extent of contraceptive use, albeit episodic and largely ineffective, before the first pregnancy given the proscriptive gender context. Previous research has proffered contradictory evidence and explanations as to whether more equitable gender context operate jointly to postpone both marriage and the first birth interval, or postpones the former both hastens the latter. For example, Ansley Coale (1992) concludes that the same factors favorable to later marriage—women's autonomy, working outside of the home, less family control and more individual control over marriage decisions—are also conducive to the "voluntary control of marital fertility" that contributes to a later first birth interval. On the other hand, explanations that later marriage coincides with greater choice in marriage partner and spousal familiarity suggest either increased coital frequency (sidestepping the question of contraception altogether) or "conversion" of pre-existing romantic relationships into marriages for the purposes of childbearing as the mechanisms leading to shorter birth intervals (Fricke and Teachman 1993; Hong 2006; Rindfuss and Morgan 1983; Shrestha 1998). Further exploration into how marriage circumstances and timing and gender context combine to facilitate or deter contraceptive use within marriage and before the first birth is warranted.

4.1 REFERENCES

Acharya, D.R., R. Bhattarai, A. Poobalan, V.E. Teijlingen, and G. Chapman. 2010. "Factors Associated with Teenage Pregnancy in South Asia: A Systematic Review." *Health Science Journal* 4(1):3-14.

Amin, S., and A. Bajracharya. 2011. *Marriage and First Birth Intervals in Early and Late Marrying Societies: An Exploration of Determinants*. In *Population Association of America*. Washington, DC.

Aryal, T.R. 2007. "Age at First Marriage in Nepal: Differentials and Determinants." *Journal of Biosocial Science* 39(5):693-706.

Banerji, M., and R. Vanneman. 2011. "Does Love Make a Difference? Marriage Choice and Post-Marriage Decision-Making Power." *Indian Human Development Survey Working Paper No* 14.

Coale, A.J. 1992. "Age of Entry into Marriage and the Date of the Initiation of Voluntary Birth Control." *Demography* 29(3):333-341.

Donaldson, P.J., and D.J. Nichols. 1978. "The Changing Tempo of Fertility in Korea." *Population Studies* 32(2):231-249.

Feng, W., and Y. Quanhe. 1996. "Age at Marriage and the First Birth Interval: The Emerging Change in Sexual Behavior among Young Couples in China." *Population and Development Review* 22(2):299-320.

Fricke, T., and J.D. Teachman. 1993. "Writing the Names: Marriage Style, Living Arrangements, and First Birth Interval in a Nepali Society." *Demography* 30(2):175-188.

Gipson, J.D., and M.J. Hindin. 2007. "'Marriage Means Having Children and Forming Your Family, So What Is the Need of Discussion?'Communication and Negotiation of Childbearing Preferences among Bangladeshi Couples." *Culture, Health & Sexuality* 9(2):185-198.

Hirschman, C. 1985. "Premarital Socioeconomic Roles and the Timing of Family Formation: A Comparative Study of Five Asian Societies." *Demography* 22(1):35-59.

Hirschman, C., and R. Rindfuss. 1982. "The Sequence and Timing of Family Formation Events in Asia." *American Sociological Review* 47(5):660-680.

Hong, Y. 2006. "Marital Decision-Making and the Timing of First Birth in Rural China before the 1990s." *Population Studies* 60(3):329-341.

Huda, F.A., S. Chowdhuri, Y. Robertson, N. Islam, B.K. Sarker, A.J. Azmi, and L. Reichenbach. 2013. *Understanding Unintended Pregnancy in Bangladesh: Country Profile Report*. Dhaka, Bangladesh: Centre for Reproductive Health, icddr, b.

Jennings, E.A., W.G. Axinn, and D.J. Ghimire. 2012. "The Effect of Parents' Attitudes on Sons' Marriage Timing." *American Sociological Review* 77(6):923-945.

Jones, G. 2010. *Changing Marriage Patterns in Asia*. In *Asia Research Institute Working Paper Series*: National University of Singapore.

Jones, G.W., and B. Gubhaju. 2009. "Factors Influencing Changes in Mean Age at First Marriage and Proportions Never Marrying in the Low-Fertility Countries of East and Southeast Asia." *Asian Population Studies* 5(3):237-265.

Kim, S.-Y., and W.F. Stinner. 1980. "Social Origins, Educational Attainment and the Timing of Marriage and First Birth among Korean Women." *Journal of Marriage and the Family* 42(3):671-679.

Lloyd, C.B., and B. Mensch. 1999. “Implications of Formal Schooling for Girls’ Transitions to Adulthood in Developing Countries.” In *Critical Perspectives on Schooling and Fertility in the Developing World*, edited by Caroline H Bledsoe, John B Casterline and Jennifer A Johnson-Kuhn, 80-104. Washington, D.C.: National Academy Press.

Lloyd, C.B., and B.S. Mensch. 2008. “Marriage and Childbirth as Factors in Dropping out from School: An Analysis of Dhs Data from Sub-Saharan Africa.” *Population Studies* 62(1):1-13.

Löfstedt, P., G. Ghilagaber, and A. Johansson. 2007. “Birth-Spacing Patterns in Huaning County, Yunnan Province, Prc: Is the Adoption of a Small Family Norm Sustainable?” *Scandinavian Journal of Public Health* 35(3):257-264.

Mensch, B.S., J. Bruce, and M.E. Greene. 1998. *The Uncharted Passage: Girls Adolescence in the Developing World*. New York, NY: Population Council.

Mensch, B.S., S. Singh, and J.B. Casterline. 2005. *Trends in the Timing of First Marriage among Men and Women in the Developing World*. Vol. 202, *Policy Research Division Working Papers No. 202*. New York, NY: Population Council.

Nguyen, M.C., and Q. Wodon. 2012. *Child Marriage, Pregnancies, and the Gender Gap in Education Attainment: An Analysis Based on the Reasons for Dropping out of School*. Washington, DC: The World Bank.

Plan, UK. 2011. “Breaking Vows: Early and Forced Marriage and Girls’ Education.” *Plan UK*.

Retherford, R.D., N. Ogawa, and R. Matsukura. 2001. “Late Marriage and Less Marriage in Japan.” *Population and Development Review* 27(1):65-102.

Rindfuss, R.R., and S.P. Morgan. 1983. “Marriage, Sex, and the First Birth Interval: The Quiet Revolution in Asia.” *Population and Development Review* 9(2):259-278.

Rodriguez, G., and J. Trussell. 1980. “Maximum Likelihood Estimation of the Parameters of Coales Model Nuptiality Schedule from Survey Data.” *World Fertility Survey Technical Bulletin* 7.

Santhya, K., U. Ram, R. Acharya, S.J. Jejeebhoy, F. Ram, and A. Singh. 2010. “Associations between Early Marriage and Young Women's Marital and Reproductive Health Outcomes: Evidence from India.” *International Perspectives on Sexual and Reproductive Health* 36(3):132-139.

Sharma, A.K., K. Verma, S. Khatri, and A. Kannan. 2002. “Determinants of Pregnancy in Adolescents in Nepal.” *The Indian Journal of Pediatrics* 69(1):19-22.

Shrestha, D.P. 1998. “Socio-Economic Changes, Women’s Autonomy, and Timing of First Birth in a Semi-Urban Community in Nepal.” *Contributions to Nepalese Studies* 25:129-143.

Steinhaus, M., A. Gregowski, N. Stevanovic Fenn, and S. Petroni. 2016. *'She Cannot Just Sit around Waiting to Turn Twenty': Understanding Why Child Marriage Persists in Kenya and Zambia*. Washington, DC: International Center for Research on Women.

Trussell, J., J. Menken, and A.J. Coale. 1979. *A General Model for Analyzing the Effect of Nuptiality on Fertility*. Paper read at Nuptiality and fertility: proceedings of a seminar held in Bruges, at Liege, Belgium.

Trussell, J., and K. Reinis. 1989. “Age at Marriage and Age at First Birth.” *Population Bulletin of the United Nations* 26:127-185.

Wodon, Q., M.C. Nguyen, and C. Tsimpo. 2016. “Child Marriage, Education, and Agency in Uganda.” *Feminist Economics* 22(1):54-79.

VITA

Kerry L.D. MacQuarrie earned her doctoral degree and master's degree from the Department of Sociology, University of Washington, where she was trained as a social demographer. Her master's thesis, completed under the guidance of Drs. Samuel Clark and Jerald Herting, was titled, "Women's Empowerment and Family Formation over the Life Course in Madhya Pradesh, India," and laid the groundwork for the themes explored in her doctoral dissertation. Dr. MacQuarrie joined Avenir Health in 2012 as a Senior Research Associate with The Demographic and Health Surveys (DHS) Program. As a member of the analysis team there, she conducts analytical studies on demographic and health issues and provides training and technical assistance in data analysis to DHS Fellows and collaborators in developing countries. Prior to joining The DHS Program, she has worked with the International Center for Research on Women, the World Wildlife Fund, Save the Children, and CEDPA. Her research interests focus on the intersections among gender, reproductive health, youth, and family formation.