

The Influence of Work Patterns, Social Support, and Sociodemographics
on Stress, Anxiety, and Depression
Among Socioeconomically Advantaged Women with Young Children

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University of Washington

Abstract

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Introduction: Although motherhood is often associated with increased stress, anxiety, and depression, limited research exists on the prevalence and predictors of these conditions beyond the immediate postpartum period.

Methods: This cross-sectional survey assessed the impact of work patterns, sociodemographic factors, and social support on stress, anxiety, and depression in U.S. mothers of children aged 6-48 months.

Results: Respondents (N=244) were recruited via an advertisement in a national magazine. Mean respondent age was 35 years; most were married/partnered, Caucasian, and reported high educational levels and household income. A total of 11.4%, 3.7%, and 5.3% of respondents, respectively, reported severe stress, anxiety, or depression. There were no statistically significant associations between the work, social support, or demographic variables tested and anxiety and depression, or between work and social support variables and stress. Among the demographics examined, respondent age (older [≥ 41

years] and younger [≤ 30 years]; $P < 0.0001$) was associated with heightened stress, as was a prior self-reported diagnosis of depression or anxiety ($P = 0.001$).

Conclusion: This study found that 1 in 9 mothers reported severe stress. Stress was higher in the oldest and youngest age groups and among women with a history of depression or anxiety.

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INTRODUCTION

Little doubt exists that motherhood is associated with increased levels of personal stress, anxiety, and depression. Illustrative of this, an internet search conducted in early 2014 using the key words "motherhood, stress," returned almost 7 million pages, linking to professional resources, media articles¹⁻³ and books⁴⁻⁶ describing this phenomenon.

Although the pressures of motherhood have established a foothold in popular media and culture, the majority of literature assessing maternal stress, anxiety, or depression as a societal concern deals with short-term postpartum depression, typically in the 3 to 6 months following delivery,⁷⁻¹¹ where prevalence estimates range from 6.5% to 12.9%.^{7,8} A 2006 study by Miller and colleagues is one of few to assess the presence of postpartum stress, anxiety, and/or depression, and found an overall prevalence of 28.9% among a convenience sampling of 325 primiparous women with children aged 6 weeks to 6 months of age.¹¹

Research focused on mothers of older children has largely evaluated the impact of maternal stress, anxiety, and/or depression on parenting ability and/or children's emotional, behavioral, and physical health outcomes.¹²⁻¹⁶ Some exceptions exist, but this literature primarily evaluates the maternal impact of caring for a child with a chronic illness, disability, or behavioral problems.¹⁷⁻¹⁹ Illustrative of this, a U.S. cohort study of over 200 mothers of children aged 3 to 5 years with and without developmental disabilities aged found that maternal stress was high for mothers with developmentally disabled children, but declined once children reached 6 years of age.¹⁷ A somewhat similar study of otherwise healthy children mirrors these temporal findings. This cross-sectional analysis evaluated first-time Swedish parents (N=258) at 3 time points (child age 6 months, 4 years, and 8 years of age) for their Sense of

Coherence (SOC).^{a 20} Researchers found that SOC declined for both parents over time, but affected mothers in particular when their child was 4 years old and normalized by 8 years of age.²¹

Likewise, only limited and sometimes conflicting research exists regarding the impact of socioeconomic or demographic factors on maternal stress. One study (N=185) from the United Kingdom found that early antenatal stress was greater in parents with higher levels of education, and in older mothers.²² A U.S. cross-sectional population survey of over 3,000 women with children found that both low income and higher education were associated with greater stress.²³ However, a Swedish questionnaire-based study found that low education was a predictor of maternal stress.²⁴ Last, A Swedish cohort study evaluating more than 2,000 maternal pairs found that socioeconomically advantaged mothers had higher SOC, but this finding was not statistically significant when results were adjusted for sociodemographic characteristics.²⁵

On the other hand, the positive relationship between social support (both functional and informal) and maternal psychological health has been evaluated by several studies, with time frames ranging from the immediate post-partum period to substantial longitudinal follow-up.²⁶⁻³¹ A 2013 literature review of 37 studies found an inverse association between maternal social support and postpartum depression and stress symptoms.²⁶ In addition, a 2012 longitudinal study of 913 Norwegian mothers (median follow-up 14.5 years) found that the strongest predictors of maternal depression and anxiety were a maternal/temperamental history of stress and/or anxiety, followed by child-related stressors. In this study, social support received from the partner, family, and friends was a significant inverse predictor of maternal depression and anxiety.²⁷

^a According to Anton Antonovsky, a Sense of Coherence is: "A global orientation that expresses the extent to which one has a pervasive, enduring though dynamic feeling of confidence that (a) the stimuli deriving from one's internal and external environments in the course of living are structured, predictable and explicable; (b) the resources are available to one to meet the demands posed by these stimuli; and (c) these demands are challenges, worthy of investment and engagement."

Last, the majority of research on the impact of maternal work patterns on mental health has focused on the impact of maternal work and/or work-related stress, anxiety, or depression on children's outcomes (eg, child obesity, child behavior, infant size for gestational age).³²⁻³⁶ Less attention has been paid to the effect of maternal work patterns on maternal well-being.^{34,37} This is an important area of study, however, because the percentage of U.S. mothers who work outside the home has increased steadily over the past 50 years,³⁸ with a recent report indicating that in 2011, 65% of married women with children worked at least part-time and 40% of these working mothers were the primary earner in U.S. households with children.³⁹ In particular, women who are socioeconomically advantaged (ie, middle-class vs. working class) are more likely to maintain ongoing employment while raising children^{37,40}.

Relevant to work outside the home, a Swedish interview study of more than 6,000 mothers found that working more than 40 hours per week was associated with additive maternal stress and fatigue.⁴¹ Additionally, one U.S. study followed 541 women for 18 months following childbirth. In this case, women who reported higher work spillover into the home environment (including women who had "flexible" work schedules) had significantly lower mental health scores than women who reported less spillover.⁴²

In summary, the prevalence and some predictors of maternal depression, anxiety, and stress have been documented for the immediate post-partum period. What is less clear is the impact of maternal stress, anxiety, and depression on mothers of children older than 6 months of age. Studies to identify the triggers and effects of these conditions on mothers of older children have shown mixed findings. Furthermore, these outcomes have been overshadowed by research focused on the impact of maternal mental health on children. This cross-sectional survey research project was designed to assess the impact of work patterns, sociodemographic factors, and social support on maternal stress, anxiety, and depression. The hypothesis was that stress, anxiety, and/or depression in women with young children would correlate inversely with the degree to which they were unhappy with or had inflexible work environments and/or perceived their work commitments as excessive. Likewise, it was hypothesized that

stress, anxiety, and/or depression would have an inverse relationship with low levels of perceived social support (defined as spousal, familial, and friendship support).

METHODS

Population

The population for this cross-sectional survey research study was U.S. residents who were mothers of at least one young child (aged 6 to 48 months of age). The sample was limited to these women based on the following rationale: a) most mothers make the decision to work or not work postpartum by the time their child is 6 months old;⁴³ b) children older than 4 years of age may be eligible for pre-school programs, which could effectively mark a transition period for mothers who chose to not work earlier in their child's development; and, c) women who do not live in the U.S. are likely to have different national maternal leave policies than non-U.S. residents. Therefore, the study exclusion criteria were: male gender, women with no children in the appropriate age range, and non-U.S. residence.

Survey Instrument

A self-report survey instrument was developed to assess the impact of work patterns, social support, and sociodemographic factors on maternal stress, anxiety, and depression. The survey instrument included 2 validated, existing instruments (the 21-question Depression Anxiety and Stress Scale [DASS-21] and a 4-question adaptation of the Medical Outcome Study Social Support Survey [MOS-SSS]), 14 sociodemographic questions, and 13 questions related to respondent work patterns developed and validated specifically for this project.

The development and validation process for the survey, in particular the 13 questions developed for this project, consisted of 3 steps comprising a literature review, qualitative research, and extensive pilot testing.

Step 1: Literature Review

The author conducted an extensive review of available, relevant literature on maternal health. Simultaneous with this, the author took a graduate course at the University of Washington specific to survey design in health services. Based on this, a detailed draft survey research instrument was developed, premised on the hypothesis that maternal stress, anxiety, and depression correlate inversely with: a) demanding, time-consuming, and/or inflexible maternal work patterns, and b) low levels of perceived social support (spousal, familial, and friendship support). Every effort was made to ensure that the survey draft was easy to access and complete, based on Dillman's Tailored Design Method/Theory of Social Exchange, specific to internet/online surveys.⁴⁴

Step 2: Qualitative Research

To explore the validity of posited stress triggers, as well as to identify meaningful and previously unconsidered maternal stress triggers, the author conducted a qualitative research study as part of a graduate course at the University of Washington. To accomplish this, 6 detailed interviews based on phenomenologic/grounded theory^{45,46} were conducted with mothers of young children who resided in the Seattle, WA or New York, NY metropolitan areas. Information obtained was used to validate and/or adjust existing survey items and/or develop new survey items. To streamline the interview process, and to avoid potential stigma associated with the terms "anxiety" and "depression," this qualitative research focused on the topic of maternal "stress." Table 1 shows the interview questionnaire used for the qualitative segment.

Step 3: Pilot Testing

Pilot testing to maximize response and instrument comprehensibility was conducted with 3 groups: a) personal acquaintances who were working mothers (n=6); b) acquaintances who were non-working mothers (n=3), and; c) other female friends who were not parents (n=7). The working and non-working mothers were instructed to take the survey based on their own life experience, while those who were not parents were provided with unique, detailed "motherhood profiles," that outlined a set of fictional circumstances. In all cases, pilot respondents were asked to provide input on the following: any survey

information/question that was confusing; whether respondents experienced any difficulties answering questions (eg, vague language) or completing the survey (eg, problems with skip patterns); whether any questions incurred social desirability bias (ie, were there any questions that respondents would have preferred to overlook or not answer accurately?); and, whether any questions seemed incomplete and/or inaccurate.

Additionally, the time required by respondents to complete the questionnaire was tracked, with the goal of achieving a 15-minute average response time for the survey. Several academic experts from the University of Washington (Colleen Huebner, PhD MPH; Diane Martin, PhD; Hendrika Meishke, PhD, MPH) reviewed and provided input on the survey in its various stages of development. Last, a professional medical editor reviewed the survey for any grammatical or narrative errors or inconsistencies.

The final survey questions, with details on how data were measured and coded, with construct labels for each variable, are provided in Table 2 and described below.

Following a brief introductory section (2 qualifying questions) designed to identify ineligible respondents, the survey consisted of 4 sections that gathered information on respondent demographic factors; work patterns; social support systems; potential confounding factors; and current levels of stress, anxiety, and depression.

1. *Sociodemographic Information* (14 questions) included respondents': total number of children, age, race, marital status, educational level, household income, U.S. geographic region, prior history of anxiety and/or depression, average amount of daily sleep, use of childcare, happiness with existing childcare arrangement, and having a child with a disability (physical, mental, or emotional).

2. *Work Patterns* (13 questions) were assessed by collecting the following information: whether or not respondents had paid employment; respondents' personal reasons for working or not working;

respondents' self-reported work burden (ie, hours per week devoted to work and commuting); and respondents' self-assessed workplace flexibility and job satisfaction/happiness. Data were also collected on the number of jobs a respondent had; spousal work patterns; and respondent time devoted to other commitments such as personal schoolwork, elder care, and volunteerism (this time commitment did not include time spent on childcare or housework).

2. *Social Support Levels* (1 question, 4 sub-questions) were assessed based on respondents' perceptions of support provided by their spouse/partner, family, and friends. The questions included in this survey were from the MOS-SSS,⁴⁷ an 18-question, multi-dimensional social support survey covering 4 measures of social support (emotional/informational, tangible, affectionate, and positive social interaction). Respondents used a 5-point Likert scale to indicate the degree to which specific social support was available. The MOS-SSS was designed and validated for use in a large range of patient populations. The 4 questions used for this survey were selected based on a confirmatory factor analysis conducted by Gjesfjeld and colleagues⁴⁸ which found that the abbreviated MOS-SSS covered all 4 measures of social support and was psychometrically sound and appropriate in situations where very brief surveying is preferred.

3. *Stress, Anxiety, and Depression* (3 questions, 21 sub-questions) was measured using the DASS-21 short form. The DASS-21 is a set of 3 self-report scales (7 questions per scale). Respondents use 4-point severity/frequency scales to rate the extent to which they had experienced each state (stress, anxiety, depression) over the past week.⁴⁹ The DASS-21 has been validated and applied in multiple settings, including postpartum women and clinical and non-clinical populations.^{11,49-55} Although the DASS is not a diagnostic tool, it does have good validity when compared with more comprehensive instruments designed to assess depression, anxiety and/or stress.^{11,49,50} Permission to use the DASS-21 was obtained from the School of Psychology, The University of New South Wales, Australia.⁴⁹ Detailed information regarding the DASS and DASS-21 scales, their validation, content, and scoring can be found in **Error!**
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Following testing and validation, the survey was conducted online between May 28 and November 4, 2008 using the University of Washington's *Catalyst* program. Respondents were recruited via an online ad placed on the web site of a national magazine (*Brain Child*, readership 36,000) as well as via a full-page ad run in the magazine's Spring 2008 issue. *Brain Child* provided this link and advertisement free of charge, and no financial incentive was provided to respondents. All participation was voluntary; no individuals were contacted or recruited directly and all responses were anonymous.

A copy of the *Brain Child* advertisement used to recruit respondents is provided in **Error! Reference source not found.** Some demographic characteristics of the magazine's readership (based on information obtained from the 2007 *Brain Child* media kit) include the following: readers had a median household income of \$125,000; 95% were married or partnered; average age was 31-45 years; and, 96% were college graduates (66% attended or completed a post-graduate program).

IRB, HIPAA, and Ethical Considerations

Since identifying information was not requested by this survey, and because highly sensitive questions were not asked, the University of Washington's Human Subjects Division Institutional Review Board determined this research was exempt from institutional review.

Data Analysis Plan

Maternal stress, anxiety, and depression, as measured by the DASS-21 instrument, were analyzed as dependent variables. As an initial analysis, respondents' 3 DASS-21 scale scores (for stress, anxiety, and depression) were evaluated against the independent variables summarized in Table 2 using Pearson's chi square analysis. To streamline this process, the DASS-21 scoring categories of normal, mild, moderate, severe, extremely severe were combined to form 3 categories (1. Normal [normal], 2. mild and moderate [moderate], 3. severe and extremely severe [severe]). Independent variables were compared with DASS-21 scores to determine which had a statistically significant relationship to the primary dependent

variables, with the goal of reducing the number of independent variables to be evaluated in the final analysis.

To control for survey non-response, respondents were omitted from the analyses in the following cases:

1) Non-response to any of the 3 qualifying questions; 2) Non-response to the primary/dependent variable (DASS-21); 3) and/or substantial item non-response (>2 items). In cases where limited nonresponse was encountered (1-2 items), imputation procedures were used (described in *Results* section).

As a final step, the analysis plan called for independent variables identified as statistically significant based on chi-square analysis ($P < 0.05$) to be incorporated into one or more logistic regression models.

RESULTS

Survey Sample

The total number of respondents was 248; of these, 4 were eliminated due to substantial unit nonresponse or a response of "no" to 1 of 3 qualifying survey questions. The final sample was 244.

Overall, there were minimal missing data. However, 23 respondents skipped 1 ($n=22$) or 2 ($n=1$) items. Because the total sample was small, imputation procedures were performed where possible to maintain the sample size. **Error! Reference source not found.** provides a detailed explanation of cases where imputation was applied, and the specific methods used to conduct this imputation.

Respondent Characteristics

Respondent characteristics are shown in Table 3. Mean respondent age was 35 years (range: 23 to 46 years); this was also respondents' median age. The majority of respondents had 1 or 2 children (42.8% and 46.9%, respectively) and 9.9% had ≥ 3 children. Most respondents (94.3%) did not report having a child with disability. Most respondents (64.5%) reported having 6-7 hours of sleep per night, while 11.4% had fewer than 6 hours of sleep, and 24.1% had ≥ 8 .

More than 97% of respondents indicated that they were married or living with a partner. Approximately 63% were employed, and 90.5% had a spouse or partner who was employed full-time. Respondents were evenly distributed (within 3 percentage points) across the 5 geographic U.S. regions and were primarily of white/Caucasian ethnicity (92.2%). Educational attainment was high in this group, with 99% reporting at least some college education, and 60.5% reporting graduate-level education. Last, respondent income was high, with nearly 50% reporting annual household incomes exceeding \$100,000.

These respondent characteristics are concordant with the overall *Brain Child* readership profile, described in the "Methods" section of this document.

Employed Respondents

As shown in Table 4, most (88.3%) of the 154 respondents who reported being employed had one job and were likely to spend ≤ 40 hours/week at work (83.1%). Almost one-half of respondents worked part-time (≤ 30 hours per week), while 16.9% worked > 41 hours per week. Commuting time contributed substantially to some respondents' time away from home, at ≥ 30 minutes per day for approximately 40% of employees. However, the majority of respondents had minimal (< 30 minutes/day; 36.4%) or no (22.7%) commute time. A small proportion of respondents (8.2%) were currently in school.

The large majority of respondents indicated that they were very" or "somewhat" happy with their current job (87.1%), and that their workplace was "very" or "somewhat" flexible (85.7%) in terms of respondents' ability to change their work schedule as needed.

Employed respondents were asked, "Which of the following statements are good descriptions of the reasons for why you work?" One hundred fifty-four employed respondents responded to this section, shown in Table 5. The majority (56.5%) indicated that they had to work to support their family, while 41.6% indicated that they did not have to work, but that the extra income improved their families' quality

of life. Just over 56% responded that if they stopped working they would lose too much career momentum. The most common reason for respondents to work was because they enjoyed their work or the independence that their work provided (85.1%).

Unemployed Respondents

Table 6 shows the reasons provided by non-employed respondents for not working. The large majority (67.8%) indicated that they did not work because financially, their family did not need them to work. An even greater proportion of non-employed respondents (86.7%) indicated that they were taking time off from work to care for children. Nearly three-quarters indicated that they had been working, but voluntarily left their job. One-half of respondents agreed that any job they could get would not pay enough to justify the additional childcare expenses.

A low proportion of respondents (11.1%) indicated that they would like to work, but could not find a good job, and only 3.3% said they had been working but lost their jobs. A small proportion of non-employed respondents (5.6%) indicated that they were not working because they were currently in school or a training program.

Childcare Utilization

As shown in Table 7, 56% (n=136) of respondents reported currently using childcare services. Of these, 94.1% were very or somewhat happy with their existing childcare arrangement.

Medical Outcome Study Social Support Survey (MOS-SOS)

Table 8 shows respondent outcomes to the modified MOS-SOS. For all 4 questions, the majority of respondents reported a high degree of social support most or all of the time. Areas where respondents were least likely to experience social support were with help with daily chores if they were sick (29.1% reported having such support none or a little of the time) or having someone to do something enjoyable with (11.0% reported none or a little of the time).

DASS-21 Scores

As noted previously, the DASS-21 was scored using 3 levels (normal, moderate, and severe) As shown in Table 9, the majority of respondents had normal scores on all 3 DASS-21 scales (range: 65.6% to 86.9%). A total of 11.4% of respondents had DASS-21 stress scores in the severe range. For anxiety and depression, 3.7% and 5.3% of respondents had severe scores, respectively.

History of Depression or Anxiety

Respondents were also asked whether a medical professional had ever told them they had depression or an anxiety disorder. As shown in Table 10, 36.1% of respondents answered yes to this question.

Chi-square Analysis Results

In chi-square analysis, scores indicating severe anxiety or depression, based on the DASS-21, showed no significant relationships with any independent variables. Therefore, all substantive analyses reported are for stress levels based on DASS-21 scores.

In chi-square analysis of all independent variables, only respondent age ($P < 0.0001$) and a prior diagnosis of anxiety and/or depression ($P = 0.001$) were statistically associated with heightened stress. In terms of respondent age (Table 11), both younger- (≤ 30 years, $n = 40$) and older-age (≥ 41 years, $n = 25$) mothers had a significantly higher likelihood of having severe stress (rates of 27.5% and 20.0%, respectively) than women between 31-40 years of age (6.7% prevalence). Additionally, having a child with a mental/physical/learning disability approached statistical significance ($P = 0.063$); this lack of statistical significance was likely due to the small number of sample respondents ($n = 12$) who reported having a child with a disability.

In light of these minimal findings of statistical significance using chi-square analysis, the decision was made to not conduct a regression analysis or further data analyses.

DISCUSSION

Summary of Findings

This cross-sectional survey evaluated the impact of work, social support, demographic, and other factors on stress, anxiety, and depression among 244 socioeconomically advantaged mothers of young children. Because of the limited prevalence of anxiety and depression in the sample, chi-square analysis to identify statistically significant dependent variables was limited to respondents with high levels of stress. A significant association was found between maternal stress and: a) younger (≤ 30 years) or older (≥ 41 years) maternal age, and b) a self-reported prior diagnosis of anxiety or depression. Having a child(ren) with a disability approached statistical significance. Other factors evaluated, such as maternal education, work patterns, and social support, were not associated with reported stress.

Related to maternal age, an existing United Kingdom interview study of first-time mothers found a correlation between antenatal stress and older maternal age.²² The current study found higher stress levels among both younger (≤ 30 years of age) and older (≥ 41 years) mothers. It is worth noting that these women represented a minority of the overall survey population (16.4% and 10.2% of respondents were ≤ 30 and ≥ 41 years of age, respectively). This suggests that older and younger mothers might benefit from enhanced outreach and/or support, although this finding is not strong enough to draw specific conclusions.

Additionally, high rates of maternal stress were reported by the 36.1% of respondents who indicated a prior professional diagnosis of anxiety or depression; this finding is supported by at least one prior study.²⁷ This sample's historical prevalence of anxiety/depression is high compared with overall lifetime U.S. diagnosis rates for anxiety and depression, reported by the U.S. Centers for Disease Control and Prevention (CDC) at 12.3% and 16.1% in 2008, respectively.⁵⁶ However, when respondents' current stress, anxiety, and depression rates (11.4%, 3.7%, and 5.3%, respectively) were compared with annualized U.S. rates, incidence in this sample was relatively low for all conditions but anxiety.

Specifically, the American Psychological Association found that, in 2008, 30.0% of U.S. residents reported experiencing “extreme stress.”⁵⁷ According to the CDC, the annual U.S. incidence of generalized anxiety disorder in women was 2.8% (2005 data),⁵⁸ while the annual incidence of depression in non-pregnant women was 11.0% (2005-2009 data).⁵⁹ Although any comparison of these data is inexact, this finding of higher-than-average lifetime rates of anxiety and depression alongside non-elevated rates of recent stress and depression is paradoxical. Put simply, survey respondents had experienced prior, high rates of anxiety or depression, but for the most part were not experiencing these problems at a high rate at the time this survey was conducted.

Although this study did not identify maternal education, social support, and work patterns as being associated with maternal stress, prior research suggests that these relationships may exist. At least 2 prior studies have identified a link between higher education and increased maternal stress,^{22,23} while other research has found a clear inverse relationship between received social support and maternal stress and depression levels.^{26,27} Last, research indicates that mothers who work more than 40 hours per week experience increased stress and fatigue,⁴¹ and that those whose work “spills over” into the home environment have reduced mental health scores.⁴²

Prior research confirms that having a child with a disability is predictive of elevated maternal stress,¹⁷⁻¹⁹ however, the number (n=12) of respondents in the current survey who reported having a child with a disability was too small to draw conclusions or conduct deeper investigation.

Study Strengths and Limitations

The primary limitation of this study is that it did not target a random or more diverse sample; therefore, the sample was limited in terms of respondent race, educational, and income levels. This distribution also greatly affects the ability to generalize this study’s findings to other populations of mothers of young children.

The advantage of the sampling approach applied is that it provided uncomplicated access to a more homogenous group of respondents than could be achieved through other methods. Coverage error would be a concern if the sample obtained had different characteristics from the true population (eg, a different ethnic and/or educational level distribution). Ultimately, this was unlikely, as the final survey sample closely matched the demographic characteristics of *Brain Child* readership.

Non-response error was a consideration in cases where survey respondents did not answer one or more survey items. In cases of item non-response, imputation was applied to ensure adequate respondent data. Imputation can lead to wide variance when the subgroups requiring imputation are large.⁴⁴ However, based on the very low item non-response rates observed, this should be of limited concern for this study.

Respondent self-selection bias is a potential study limitation. For example, respondents might have chosen to participate in this research because they had higher levels of stress, anxiety, and/or depression. Efforts were made during participant recruitment to avoid this type of bias. Specifically, respondents were not informed of the survey's primary outcomes. Instead, the *Brain Child* advertisement described it as "A brief survey to identify issues and concerns that are most important to you" and "...Research [to] expand current understanding of the experience of being a mother of small children in the U.S." Similar language, emphasizing maternal experience and not mental health, was used in the introduction to the survey instrument. However, these precautions do not eliminate the possibility of secondary self-selection bias: ie, that *Brain Child* readers were more likely than the general population to have a history of anxiety and/or depression.

It is important to note that no safeguards were placed on participants taking the web-based survey more than once. This was required to maintain respondents' anonymity. Although there is no reason to suspect that respondents would have done this, the possibility cannot be overlooked.

Last, all survey projects are subject to potential measurement error (the degree to which survey responses obtained were inaccurate due to variables not taken into account in survey design or execution).⁴⁴ Since this web-based project did not involve direct communication with respondents, and since it targeted computer-literate respondents, the primary source of potential measurement error was from the survey instrument itself. As described earlier, substantial effort was made to minimize this limitation via the utilization of expert survey review and extensive pilot testing prior to project implementation.

This project's minimal findings may be an effect of limited variability in the dependent variables, and are not necessarily a reflection of the utility or validity of the survey instrument. Specifically, the DASS and DASS-21 instruments have shown high internal consistency and meaningful discrimination in multiple settings (including among post-partum women) for the 3 dimensions of stress, anxiety, and depression.^{11,49,50,60-68} The MOS-SSS was designed and validated for use in a large range of patient populations,⁴⁷ and the 4-question version used in this survey has been assessed in confirmatory factor analysis.⁴⁸

Implications For Further Research

In a 2006 study, Miller and colleagues¹¹ noted that although postnatal depression has received considerable research and clinical attention, postpartum anxiety and stress have been relatively overlooked. Their study of 325 first-time mothers of infants ≤ 6 months of age used the DASS-21 instrument and applied a different scoring system than that used in the current research. These investigators combined all 3 DASS categories (stress, anxiety, and depression) into a single measure called "postnatal distress." This new measure included all women with stress, anxiety, or depression classified as mild, moderate, severe, or extremely severe based on DASS-21 results. Using this approach, the overall prevalence of postnatal distress was 28.9% (corrected for respondents who fulfilled more than 1 category). It is interesting to note that, if this more conservative approach to DASS scoring were applied to the current study, 34.4% of respondents would have been considered stressed, 13.1%

anxious, and 22.9% depressed. It may be reasonable to conduct future research using this scoring methodology. In fact, this approach might be desirable as the co-occurrence of the stress, anxiety, and depression may be substantial in this population, suggesting value in approaches designed to assess all 3 conditions.

It is also interesting to note that the current study's data collection dates (May 28 through November 4, 2008) correspond closely to the start of the 2008 financial crisis.⁶⁹ Therefore, it would be reasonable to expect that similar research conducted at a later date might identify higher rates of maternal stress, anxiety, and depression due to new financial pressures. For example, some mothers who previously did not have to work to support their families might have experienced a reversal in this situation. In this case, their work patterns could potentially be associated with higher levels of stress or other conditions.

Conclusion

This cross-sectional survey found that 1 in 9 mothers (11.4%) of relatively high socioeconomic advantage reported severe stress. Stress was higher in mothers younger than 30 years of age and older than 41 years of age. Stress was higher also among women with a prior self-reported diagnosis of depression or anxiety.

The majority of existing research on maternal stress, anxiety, and depression has been limited to the immediate postpartum period.⁷⁻¹¹ In studies where children are not infants, research has focused on analyzing the effect of maternal work patterns on children's outcomes,¹²⁻¹⁶ although a recent analysis of 2,540 mothers, using data first obtained in 1979, found that continuous maternal employment following birth is associated with improved long-term maternal health (measured at age 40)³⁷. This paucity of research has contributed to an unfortunate byproduct: public debate on maternal mental health continues to fixate primarily on the 6 months following childbirth, and limited attention is paid to the needs of postpartum mothers returning to work. Data from the current study of socially advantaged

women suggest that these conditions can persist beyond the 6-month timeframe, and indicates a need for increased attention to maternal mental health beyond the early postpartum period.

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