Postpartum Depression and Prevention of Mother-to-Child Transmission of HIV (PMTCT) in Kenya

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A thesis

submitted in partial fulfillment of the

requirements for the degree of

Master of Public Health

University of Washington

2018

Committee:

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Program Authorized to Offer Degree:

School of Public Health

University of Washington

Abstract

Postpartum Depression and Prevention of Mother-to-Child Transmission of HIV (PMTCT) in Kenya

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Background: The relationship between postpartum depression and prevention of mother-to-child transmission (PMTCT) outcomes within low- and middle-income countries (LMICs) is understudied.

Methods: Data were analyzed from a cross-sectional survey of mother-infant pairs attending 6-week and 9-month immunization visits at 141 maternal child health (MCH) clinics across Kenya conducted June-December 2013. Depression was assessed using the Patient Health Questionnaire (PHQ)-9 and defined as a PHQ-9 score $\geq$8. We determined prevalence of depression among HIV-infected postpartum mothers and evaluated the association of maternal depression and PMTCT outcomes (uptake of antiretrovirals for PMTCT among mothers and infants, and infant HIV positivity).

Results: Among 498 HIV-infected mothers surveyed, median age was 28 years (IQR 24-32) and 17% were unmarried. Overall, 31/498 (6%) of HIV-infected mothers had PHQ-9 scores ≥8; 14/260 (5%) of those attending 6-week visits and 17/238 (7%) attending 9-month visits. Compared to mothers without depression, intimate partner violence was reported more frequently among mothers with depression (12% vs 39%, p<0.001). The likelihood of having an HIV-positive infant was 4-fold higher among women with depression (odds ratio [OR]=3.89, 95% CI 1.24-12.25, p=0.021). Mothers with depression were also more likely to have infants who did not receive ARVs for prophylaxis (13% vs 2%, odds ratio [OR]=6.14, 95% CI 1.76-21.64, p=0.005). We did not detect differences in uptake of maternal ARVs between mothers with and without depression.

Conclusions: Depression was associated with increased likelihood of MTCT and lower likelihood of infant receipt of ARV prophylaxis.

Introduction

Depressive disorders are among the top ten causes of the global burden of disability-adjusted life-years (DALYs)[1]. People living with HIV (PLHIV) are more likely to experience depression than HIV-uninfected people[2–4]. Several individual studies and meta-analyses link depression to adverse HIV-related outcomes among PLHIV, including lower antiretroviral therapy (ART) uptake and adherence and reduced overall health status [4–6]. Few studies have assessed the relationship of postpartum depression (PPD) and prevention of mother to child transmission (PMTCT) outcomes among HIV-infected mothers[1,2]. Even less data are currently available on PPD among mothers living with HIV in low and middle-income countries (LMICs)[6]. Therefore, the impact of PPD among HIV-infected mothers on PMTCT outcomes within LMICs is not well understood.

PPD can decrease a mother's engagement in health promotion activities[7,8]. Among HIV-infected mothers, this could negatively influence uptake of and adherence to PMTCT services (including antenatal care attendance, HIV testing and ARVs) which, in turn, could increase MTCT. The impact of PPD on PMTCT outcomes could have significant implications, particularly in regions with high maternal HIV burden and where MTCT persists as a public health challenge. To date, few studies have reported the prevalence of PPD in Kenya and none have evaluated the relationship of PPD and PMTCT outcomes among HIV-infected mothers[9].

We assessed the prevalence of PPD among HIV-infected postpartum mothers in Kenya and evaluated the relationship between PPD and PMTCT outcomes, including uptake of maternal and infant antiretrovirals (ARVs) for PMTCT and MTCT.

Methods

Study Design and Data Sources

We conducted a secondary analysis using data from a large cross-sectional survey of mother-infant pairs[10]. The parent survey was conducted in 141 MCH clinics across Kenya between June and December 2013 and collected data from mother-infant pairs attending clinic for 6-week and 9-month infant immunizations. The overall aim of the parent study was to evaluate prevalence of HIV among postpartum mothers and MTCT. Facility selection, sampling, and survey methods have been previously described[3]. Briefly, probability proportionate to size (PPS) sampling was used to randomly sample facilities and all eligible mother-infant pairs attending selected facilities during a fixed 5-day recruitment period were recruited. For the current analyses, we restricted the dataset to only HIV-positive mothers.

Standardized questionnaires were administered by study nurses to obtain information on socio-demographic characteristics, obstetric history, and maternal and infant health indicators. Maternal HIV status and ARV use by mothers and infants was self-reported by mothers and verified by the women's Maternal & Child Health Booklet. Dimensions of HIV-related stigma and discrimination were assessed using a validated toolkit developed to assess blame/judgment and moral values of shame[11,12]. Experience of intimate partner violence (IPV) within the past 6 months was assessed using Hurt, insulted, Threatened with Harm and Screamed (HiTS) domestic violence screening tool[4]. Maternal depression was assessed using the Patient Health Questionnaire (PHQ)-9 which has been validated for use in Kenya [13]. According to Kroenke and Spitzer (2002), moderate depression is defined as a PHQ-9 score >10[14]. A meta-analysis of PHQ-9 utilization determined that an optimal cutoff score range between 8 and 11 yielded no

differences in the diagnostic performance (sensitivity or specificity)[15]. We defined depression as a having a PHQ-9 score ≥8.

Laboratory procedures have previously been described in detail[3]. Briefly, infant HIV testing was conducted using dry blood spot (DBS) specimen DNA polymerase chain reaction (PCR). DBS were sent to KEMRI-CDC national laboratory and PCR results were returned to clinics who then provided results to mothers per national guidelines. Support services and HIV care referrals were made for mothers whose infants tested positive[10].

Statistical Analysis

Analyses included only HIV-infected mothers. Descriptive statistics were used to identify differences between postpartum mothers with and without depression. Logistic regression models were used to determine the association between depression and each respective dichotomized outcome (infant HIV-positivity [yes/no] at 6 weeks, 9 months and either; uptake of maternal ARVs at pregnancy, birth and breastfeeding [yes/no]; receipt of infant ARVs [yes/no]). All models accounted for clinic-level clustering. We also performed sensitivity analyses by repeating the primary analysis using cutoff of PHQ-9 >10 to reduce potential misclassification.

Results

Overall, 498 mothers met inclusion criteria and were included in this analysis; 52% were attending 6-week postnatal visits and 48% 9-month visits. The median age of mothers was 28 years (IQR 24-32), 17% of women were unmarried, and the median relationship length among those with male partners was 5 years (IQR 3-10). The average years of completed education was 8 (IQR 7-11). Women had a median of 3 (IQR=2-4) living children. Overall, 6% of women had PHQ-9 scores ≥8; 5% among women attending 6-week visits and 7% attending 9-month visits. Women who experienced IPV in the past 6 months were more likely to have depression than

women who did not experience IPV (39% vs 12%, respectively, p<0.001). We did not detect differences in other demographic, relationship, or clinical characteristics between women with and without depression (Table 1).

Stigma and Discrimination

One-fourth (26%) of women agreed with the statement "HIV is a punishment from God". Women with depression more frequently agreed with the statement, "People living with HIV are promiscuous", than women without depression (28% vs 11%, p=0.032). We did not detect differences between women with and without depression in the frequency of other measures of externalized and internalized HIV stigma (Table 1). Overall, frequency of experiencing discrimination within the last year because of one's HIV status was <10% for all acts of discrimination assessed. Women with depression were significantly more likely to experience acts of discrimination due to their HIV status than women without depression, including being abandoned by family members (p=0.004), excluded from family and social gatherings (p=0.002), losing employment (p=0.001) or housing (p<0.001) and standing in community (p=0.027) (Table 1). Among women with depression, the most frequently reported acts of discrimination were losing jobs/customers (26%), being abandoned by their spouse (23%), being excluded from social gatherings (19%), and losing standing within the family or community (19%).

PMTCT Outcomes

Among all women, 81% of women reported use of maternal ARVs during all time points (pregnancy, labor, and breastfeeding). We did not detect differences between maternal uptake of ARVs during pregnancy, labor, or breastfeeding among women with and without depression (Table 2).

Overall, 4% of infants attending 6-week immunization visits were HIV-positive and 5% of infants attending 9-month visits were HIV-positive. The likelihood of having an HIV-positive infant was 4-fold higher among women with depression than among women without depression (odds ratio [OR]=3.89, 95% CI 1.24-12.25, p=0.021). Women with depression were also more likely to have infants who did not receive ARVs for prophylaxis than women without depression (13% vs 2%, odds ratio [OR]=6.14, 95% CI 1.76-21.64, p=0.005). Of the four HIV-positive infants who had depressed mothers, three did not receive ARV prophylaxis and were diagnosed with HIV during study procedures; one 9-month old infant was diagnosed with HIV prior to the survey. Analyses using a cutoff of PHQ-9 >10 data produced results that were very similar to our primary models, though statistical power was limited (data not shown).

Discussion

In this study, 6% of HIV-infected women surveyed at 6 weeks or 9 months postpartum had moderate depression. Maternal depression was significantly associated with externalized stigma and discrimination but not internalized stigma. Maternal depression was also associated with non-use of infant antiretroviral prophylaxis and higher likelihood of infant HIV infection. To our knowledge, no other studies to date have evaluated the relationship between postpartum depression and MTCT. Our results highlight the need for additional research and mental health services for HIV-infected mothers experiencing depression, especially within the context of LMICs where MTCT persists as a public health problem.

LMIC settings have limited resources for mental health care as few practitioners are trained on screening and treating mental health issues[16]. PPD affects women at a critical period in the lives of both mothers and infants and is common, with some studies reporting rates of PPD between 5-35% in LMICs[5]. In HIV-uninfected populations, PPD has been associated with risk of

poor infant outcomes, including poor postnatal growth, obesity, and neurocognitive delays [6-8]. PPD among HIV-infected mothers has previously been associated with adverse outcomes such as increased infant withdrawal symptoms, higher rates of infant wheezing, and lower rates of exclusive breastfeeding [23,24]. HIV-infected individuals may experience nearly twice the rate of depression compared to HIV-uninfected individuals[2–4]. In the context of LMIC settings with high HIV burden, this could translate to a substantial burden of PPD and sequelae among HIV-infected mothers and underscores the need for improving PPD screening and treatment services for this population.

Using the PHQ-9 tool, we found that prevalence of PPD was <10% among postpartum women across 141 clinics in Kenya. To date, only one small study has evaluated PPD among HIV-infected women in Kenya, finding that 48% of attendees at the Kenyatta National Hospital PMTCT clinic, located in Nairobi, screened positive for depressive symptoms using the Edinburgh Postnatal Depression Scale (EPDS) [9]. The EPDS has not been previously validated in Kenya and the study was solely based in one large, urban facility, which may account for the differences in PPD prevalence. Future validation studies that assess the PHQ-9 and EPDS within the same study population could be useful to understanding the most culturally appropriate and valid tool for PPD screening in Kenya.

We found that depressed women more frequently experienced acts of discrimination because of their HIV status, similar to other studies[12]. This included substantial losses—being abandoned by one's partner and family, isolation, losing houses, property, jobs, and social standing. Unlike other studies, we did not detect differences in internalized or externalized stigma between mothers with and without depression[25,26]. This could be due to our sampling which only included mother-infant pairs attending scheduled immunization appointments at

MCH clinics. It is possible that stigmatized mothers may be less likely to attend clinic. Despite ongoing global efforts to reduce HIV-related stigma and discrimination, our results indicate that additional programs are needed with nearly one-fourth of depressed women reporting they had been abandoned by their spouse due to their HIV status. Consistent with findings in other parts of sub-Saharan Africa, we also found an association between IPV and PPD [27,28]. Screening for both IPV and PPD within the context of PMTCT programs could help identify postpartum women in greatest need of interventions.

Our study has limitations. We used cross-sectional data and therefore MTCT could have occurred before mothers' depressive symptoms and led to maternal depression. However, 3 of the 4 cases were detected after the diagnosis of depression at the survey, making this unlikely. Although the PHQ-9 depression-screening tool has been validated in Kenya, other screening tools, such as the EPDS, may yield different results. Additionally, statistical power was limited due to the relatively small number of infant HIV infections, therefore we did not conduct multivariate statistical models.

In conclusion, PPD was associated with increased likelihood of MTCT and lower likelihood of infant receipt of ARV prophylaxis for PMTCT. Postpartum mothers with depression were also more likely to experience discrimination. Our results underscore the need for continued efforts to reduce HIV-related stigma and discrimination. Our findings also support expanding depression screening and psychosocial services within the context of PMTCT clinical settings to improve both maternal mental health and infant outcomes.

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Table 1. Characteristics of HIV-infected mothers, by postpartum PHQ-9 score (n=498)[1]

		N (%) or Median (IQR)			Logistic Regression Models	
			PHQ-9 score			
	N	Overall (n=498)	<8 (n=467)	≥8 (n=31)	Odds Ratio (95% CI)	p-value
Demographics						
Age (years)	498	28 (24-32)	28 (24-32)	26 (24-32)	0.98 (0.92-1.04)	0.508
Unmarried	498	86 (17%)	82 (18%)	4 (13%)	0.70 (0.24-2.02)	0.501
Relationship duration (years)	420	5 (3-10)	5 (3-10)	4 (2-10)	0.96 (0.90-1.03)	0.281
Education (years completed)	498	8 (7-11)	8 (7-11)	8 (6-10)	0.92 (0.83-1.01)	0.084
Currently employed[1]	492	207 (42%)	193 (42%)	14 (45%)	1.14 (0.56-2.22)	0.689
Partner/relationship characteristics						
Partner age (years)[2]	349	35(30-40)	35 (30-40)	34 (30-36)	1.00 (0.94-1.06)	0.976
Partner HIV status unknown[2]	420	104 (25%)	94 (24%)	10 (37%)	0.53 (0.22-1.28)	0.159
Partner HIV-infected[2,3]	316	228 (75%)	216 (72%)	12 (71%)	0.92 (0.26-3.24)	0.898
Disclosed HIV status to partner[2]	498	411 (83%)	389 (83%)	22 (71%)	0.49 (0.18-1.30)	0.151
Experienced IPV in past 6 months[4]	498	66 (13%)	54 (12%)	12 (39%)	4.83 (2.30-10.16)	**<0.001**
Obstetric history						
Current postpartum visit						
6-week	498	260 (52%)	246 (53%)	14 (45%)	0.74 (0.36-1.54)	0.415
9-month	498	238 (48%)	221 (47%)	17 (55%)		
Number of living children	492	3 (2-4)	3 (2-4)	2 (2-4)	0.88 (0.71-1.09)	0.238
≥4 ANC visits[5]	498	273 (54%)	257 (54%)	16 (53%)	0.85 (0.40-1.82)	0.680
Health facility delivery[5]	498	411 (83%)	387 (83%)	24 (77%)	0.71 (0.30-1.66)	0.423
Stigma and discrimination						
Externalized stigma						
HIV is a punishment from God	480	124 (26%)	113 (25%)	11 (38%)	1.83 (0.73-4.58)	0.195
HIV is a punishment for bad behavior	483	118 (24%)	109 (24%)	9 (31%)	1.42 (0.56-3.61)	0.452

Prostitutes spread HIV	480	99 (21%)	91 (20%)	8 (28%)	1.51 (0.62-3.68)	0.364
PLWHIV are promiscuous	485	59 (12%)	51 (11%)	8 (28%)	3.03 (1.10-8.30)	**0.032**
Internalized stigma						
I am ashamed of being infected with HIV	492	65 (13%)	59 (13%)	6 (19%)	1.64 (0.57-4.68)	0.356
I would be ashamed if a person in my family has HIV	491	46 (9%)	41 (9%)	5 (16%)	1.97 (0.66-5.82)	0.220
PLWHIV should be ashamed	490	28 (6%)	26 (6%)	2 (6%)	1.15 (0.244-5.39)	0.859
Discrimination due to HIV status[6]						
Excluded from a social gathering	498	25 (5%)	19 (4%)	6 (19%)	5.67 (1.90-16.88)	**0.002**
Abandoned by spouse/partner	498	39 (8%)	32 (7%)	7 (23%)	3.37 (1.41-8.07)	**0.007**
Abandoned by family/sent away	498	16 (3%)	12 (3%)	4 (13%)	5.62 (1.76-17.93)	**0.004**
Isolated in household	498	18 (4%)	14 (3%)	4 (13%)	4.79 (1.46-15.70)	**0.010**
No longer visited by family/friends	498	21 (4%)	15 (3%)	6 (19%)	7.23 (2.57-10.36)	**<0.001**
Teased or sworn at	498	41 (8%)	37 (8%)	4 (13%)	1.72 (0.54-5.49)	0.355
Lost customers/job	498	47 (9%)	39 (8%)	8 (26%)	4.09 (1.76-9.50)	**0.001**
Lost housing	498	9 (2%)	5 (1%)	4 (13%)	13.69 (3.91-47.86)	**<0.001**
Denied religious rites/services	498	7 (1%)	6 (1%)	1 (3%)	1.67 (0.33-8.38)	0.530
Had property taken away	498	10 (2%)	7 (1%)	3 (10%)	7.04 (1.84-27.01)	**0.005**
Gossiped about	498	31 (6%)	27 (6%)	4 (13%)	1.58 (0.82-3.05)	0.171
Lost standing within family/community	498	37 (7%)	31 (6%)	6 (19%)	2.90 (1.13-7.42)	**0.027**
Threatened with violence	498	17 (3%)	14 (3%)	3 (10%)	3.47 (0.88-13.71)	0.076

IPV=intimate partner violence; ANC=antenatal care

[1] Employed defined as currently generating income through salaried or self-employment.

[2] Among women who currently have a partner

[3] Among women who know their male partner's HIV status

[4] IPV defined as having a score ≥10.5 on HITS scale

[5] During the most recent pregnancy

[6] Experienced in the last year

Table 2. Association of maternal postpartum depression with PMTCT uptake and outcomes [1]

	N	N (%)			Odds Ratio (95% CI)[4]	p-value
		Overall (n=498)	PHQ-9 <8 (n=467)	PHQ-9 ≥8 (n=31)		
Maternal ARV use						
ARV use (ART or PMTCT)						
During pregnancy	450	426 (95%)	400 (94%)	26 (100%)	-	
During labor	494	445 (90%)	419 (90%)	26 (87%)	0.69 (0.24-2.05)	0.509
During breastfeeding	498	433 (87%)	408 (87%)	25 (81%)	0.60 (0.21-1.74)	0.345
All time points	491	399 (81%)	375 (82%)	24 (77%)	0.78 (0.30-2.03)	0.603
Infant outcomes						
HIV positivity						
6-weeks	244	10 (4%)	9 (4%)	1 (8%)	2.06 (0.23-18.53)	0.516
9-months	233	11 (5%)	8 (4%)	3 (18%)	5.57 (1.48-21.02)	**0.012**
6-weeks or 9-months	477	21 (4%)	17 (4%)	4 (13%)	3.89 (1.24-12.25)	**0.021**
Did not receive ARV prophylaxis	498	15 (3%)	11 (2%)	4 (13%)	6.14 (1.76-21.38)	**0.005**

ARV=antiretroviral; ART=antiretroviral therapy; PMTCT=prevention of mother-to-child transmission of HIV
[1] Postpartum depression defined as a PHQ-9 score ≥8
[2] Among infants attending 6-week immunization visit
[3] Among infants attending 9-month immunization visit
[4] All models adjust for clinic-level clustering