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Postpartum depression and prevention of mother-to-child transmission of HIV in Kenya

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Keywords

depression; HIV; maternal health; postpartum; prevention of mother to child transmission (PMTCT)

Depressive disorders are among the top 10 causes of the global burden of disability-adjusted life-years (Global Burden of Disease Study 2013 Collaborators, 2015). People living with HIV (PLWH) are more likely to experience depression than uninfected people (Boarts, Buckley-Fischer, Armelie, Bogart, & Delahanty, 2009; Endeshaw et al., 2014; Nyirenda, Chatterji, Rochat, Mutevedzi, & Newell, 2013). Several individual studies and meta-analyses link depression to adverse HIV-related outcomes among PLWH, including lower antiretroviral therapy (ART) uptake, lower ART adherence and reduced overall health status (Boarts et al., 2009; Endeshaw et al., 2014; Kingori, Haile, & Ngatia, 2015; Yotebieng, Fokong, & Yotebieng, 2017). Few studies have assessed the relationship of postpartum depression (PPD) among mothers living with HIV and prevention of mother-to-child HIV transmission (PMTCT) outcomes beyond the uptake of services and breastfeeding practices (Hartley et al., 2010; Tuthill, Pellowski, Young, & Butler, 2017; Yotebieng et al., 2017).

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Even fewer data are currently available on PPD and PMTCT outcomes among mothers living with HIV in low and middle-income countries (LMICs; Hartley et al., 2010; Tuthill et al., 2017; Yotebieng et al., 2017). Therefore, the impact of PPD among mothers living with HIV on clinical PMTCT outcomes in LMICs is not well understood.

PPD can decrease a mother's engagement in health promotion activities (Madeghe, Kimani, Stoep, Nicodimos, & Kumar, 2016; Rahman, Bunn, Lovel, & Creed, 2007). Among mothers living with HIV, this could negatively influence uptake of and adherence to PMTCT services (including antenatal care attendance, HIV testing, and antiretrovirals [ARVs]), which, in turn, could increase mother-to-child transmission (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 mothers living with HIV (Yator, Mathai, Vander Stoep, Rao, & Kumar, 2016).

We assessed the prevalence of depressive symptoms among postpartum mothers living with HIV in Kenya and evaluated the relationship between maternal depressive symptoms and PMTCT outcomes, including uptake of maternal and infant ARVs for PMTCT, MTCT, and maternal health.

Methods

Study Design and Data Sources

We conducted a secondary analysis using data from a large cross-sectional survey of mother-infant pairs (McGrath et al., 2018). The parent survey was conducted in 141 maternal-child health clinics across Kenya between June and December 2013 and collected data from mother-infant pairs attending clinic for 6-week or 9-month infant immunizations. The overall aim of the parent study was to evaluate PMTCT programmatic effectiveness by administering questionnaires to determine prior maternal HIV testing and ARV use and conducting HIV virologic testing of infants to determine HIV status. Facility selection, sampling, and survey methods have been previously described (McGrath et al., 2018). Briefly, probability proportionate to size sampling was used to randomly sample facilities. All eligible mother-infant pairs attending selected facilities during a fixed 5-day period were recruited.

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 and Child Health Booklet. Dimensions of HIV-related stigma and discrimination were assessed using a validated tool developed to assess blame/judgment and moral values of shame (Kohler et al., 2014; Turan & Nyblade, 2013). Experience of intimate partner violence (IPV) within the past 6 months was assessed using the Hurt, insulted, Threatened with Harm, and Screamed (HiTS) domestic violence screening tool (Sherin, Sinacore, Li, Zitter, & Shakil, 1998). IPV was defined as a HiTS score higher than 10 (Sherin et al., 1998). Maternal depressive symptoms were assessed

using the Patient Health Questionnaire (PHQ)-9, which has been validated for use in Kenya (Monahan et al., 2009). According to Kroenke, Spitzer, and WIlliams (2001), having symptoms of moderate depression is indicated by a PHQ-9 score higher than 10. A meta-analysis of PHQ-9 utilization determined that an optimal cutoff score range between 8 and 11 yielded no differences in diagnostic performance for moderate depressive symptoms (sensitivity or specificity; Manea, Gilbody, & McMillan, 2012). We defined having moderate depressive symptoms as a PHQ-9 score greater than or equal to 8.

Laboratory procedures have previously been described in detail (McGrath et al., 2018). Briefly, infant HIV testing was conducted using a dry blood spot specimen for DNA polymerase chain reaction. Dry blood spot samples were sent to Kenya Medical Research Institute-Centers for Disease Control and Prevention national laboratory, and polymerase chain reaction results were returned to clinics, which then provided results to mothers per national guidelines. Support services and HIV care referrals were made for mothers whose infants tested positive (McGrath et al., 2018).

Ethical Approval

This study was approved by the Kenya Medical Research Institute's Scientific and Ethics Review Unit, the U.S. Centers for Disease Control and Prevention Office of the Associate Director for Science, and the Committee on Human Research of the University of Washington.

Statistical Analysis

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

Results

Overall, 498 mothers were included in our analysis; 52% were attending 6-week postnatal visits and 48% 9-month visits. The median age of the mothers was 28 years (interquartile range [IQR] 24–32); 17% of the women were unmarried, and the median relationship length in those with male partners was 5 years (IQR 3–10). The average years of completed education was 8 (IQR 7–11). The women in the sample had a median of 3 (IQR 2–4) living children. Overall, 6% of the women had PHQ-9 scores of at least 8, 5% in women attending 6-week visits and 7% in those attending 9-month visits. Women who had experienced IPV in the past 6 months were more likely to have moderate depressive symptoms 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 moderate depressive symptoms (Table 1).

Stigma and Discrimination

One-fourth (26%) of the women agreed with the statement, *HIV is a punishment from God*. Women with depressive symptoms more frequently agreed with the statement, *People living with HIV are promiscuous*, than women without moderate depressive symptoms (28% vs. 11%, $p = 0.032$). We did not detect differences between women with and without moderate depressive symptoms 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 less than 10% for all acts of discrimination assessed. Women with moderate depressive symptoms were significantly more likely to report that they experienced acts of discrimination due to their HIV status than women without moderate depressive symptoms, including being abandoned by family members ($p = 0.004$), being excluded from family and social gatherings ($p = 0.002$), and losing employment ($p = 0.001$), housing ($p < 0.001$), or standing in community ($p = 0.027$; Table 1). Among women with moderate depressive symptoms, the most frequently reported acts of discrimination were losing jobs/customers (26%), being abandoned by a spouse (23%), being excluded from social gatherings (19%), and losing standing within the family or community (19%).

PMTCT Outcomes

Overall, 81% of the women in our study reported use of maternal ARVs during all time points (pregnancy, labor, breastfeeding). We did not detect differences between maternal uptake of ARVs during pregnancy, labor, or breastfeeding among women with and without moderate depressive symptoms (Table 2). Women with moderate depressive symptoms were more likely to have infants who did not receive ARVs for prophylaxis than women without moderate depressive symptoms (13% vs 2%, *odds ratio* [OR] 6.14, 95% CI 1.76–21.64, $p = 0.005$). Overall, 4% of infants attending 6-week immunization visits were HIV infected and 5% of infants attending 9-month visits were HIV infected. The likelihood of having an infant with HIV was 3.89-fold higher for women with moderate depressive symptoms than for women without moderate depressive symptoms (OR 3.89, 95% CI 1.24–12.25, $p = 0.021$). Of the four infants living with HIV who had mothers with moderate depressive symptoms, 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 greater than 10 produced results that were very similar to our primary models, although statistical power was limited (data not shown).

Discussion

In our study, 6% of women living with HIV surveyed at 6 weeks or 9 months postpartum had symptoms of moderate depression. Having moderate depressive symptoms was significantly associated with externalized stigma and discrimination but not internalized stigma. Maternal depressive symptoms were also associated with non-use of infant ARV 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 mothers living with HIV and experiencing depressive symptoms, especially within the context of sub-Saharan Africa 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 (Almond, 2009). 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% and 35% in LMICs (Adewuya, Ola, Aloba, Mapayi, & Okeniyi, 2008). In uninfected populations, PPD has been associated with risk of poor infant outcomes, including poor postnatal growth, obesity, and neurocognitive delays (Adewuya et al., 2008; Ciesla & Roberts, 2001; Gold, Spangenberg, Wobil, & Schwenk, 2013; Guo et al., 2013). PPD among mothers living with HIV has been associated with adverse outcomes such as increased infant withdrawal symptoms, higher rates of infant wheezing, and lower rates of exclusive breastfeeding (Hartley et al., 2010; Tuthill et al., 2017). In general, PLWH experience nearly twice the rate of depression compared to uninfected individuals (Bernard, Dabis, & de Rekeneire, 2017; Boarts et al., 2009; Ciesla & Roberts, 2001; Endeshaw et al., 2014; Nyirenda et al., 2013). In the context of high HIV burden, this could translate to a substantial burden of PPD and sequelae among mothers living with HIV and underscores the need for improving PPD screening and treatment services for this population (Bernard et al., 2017).

Using the PHQ-9 tool, we found that prevalence of PPD was less than 10% among postpartum women across 141 clinics in Kenya. To date, only one small study has evaluated PPD among women living with HIV 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; Yator et al., 2016). The EPDS has not been 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 in the same study population could help to understand the most culturally appropriate and valid tool for PPD screening in Kenya.

We found that women with moderate depressive symptoms more frequently experienced acts of discrimination because of their HIV status than women without depression, consistent with other studies (Kohler et al., 2014). This included substantial losses: being abandoned by one’s partner and family, isolation, and losing houses, property, jobs, and social standing. However, unlike other studies, we did not detect differences in internalized or externalized stigma between mothers with and without depression (Goodin et al., 2018; Onyebuchi-Iwudibia & Brown, 2014). This could be due to our sampling, which only included mother-infant pairs attending scheduled immunization appointments at maternal-child health clinics. It is possible that stigmatized mothers were less likely to attend clinic. Despite ongoing global efforts to reduce HIV-related stigma and discrimination, our results indicate that additional programs are needed. Nearly one-fourth of women with depressive symptoms reported they had been abandoned by a spouse due to their HIV status. Consistent with findings in other parts of sub-Saharan Africa, we found an association between IPV and PPD (Goodin et al., 2018; Mahenge, Stöckl, Mizinduko, Mazalale, & Jahn, 2018; Rogathi et al., 2017). Screening for both IPV and PPD within the context of PMTCT programs could help identify postpartum women in greatest need of interventions.

Our study had limitations. We used cross-sectional data and, therefore, MTCT could have occurred before the mothers’ depressive symptoms and led to maternal depression. However,

three of the four cases of infant HIV among women with depression were detected after the assessment of depressive symptoms 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 could not conduct multivariate statistical models.

Conclusion

Moderate depressive symptoms among postpartum mothers living with HIV were associated with lower likelihood of infant receipt of ARV prophylaxis for PMTCT and increased likelihood of MTCT. Postpartum mothers with moderate depressive symptoms 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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Disclaimer

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Table 1

*Characteristics of Mothers Living with HIV, by Postpartum PHQ-9 Score (*n *= 498)*

		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 living with HIV[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%)	ref	
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

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		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
Prostitutes spread HIV	480	99 (21%)	91 (20%)	8 (28%)	1.51 (0.62–3.68)	0.364
PLWH 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
PLWH 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

Note. PHQ = Patient Health Questionnaire; IPV = intimate partner violence; ANC = antenatal care; PLWH = people living with HIV.

[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	**Overall (*n* = 498)**	**PHQ-9 < 8 (*n* = 467)**	**PHQ-9 ≥ 8 (*n* = 31)**	**Odds Ratio (95% CI)[4]**	***p*-value**
Maternal or infant ARV use						
Maternal 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 did not receive ARV prophylaxis	498	15 (3%)	11 (2%)	4 (13%)	6.14 (1.76–21.38)	**0.005**
Infant outcomes						
HIV infection						
6-weeks[2]	244	10 (4%)	9 (4%)	1 (8%)	2.06 (0.23–18.53)	0.516
9-months[3]	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**

Note. PHQ = Patient Health Questionnaire; 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 adjusted for clinic-level clustering.