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Authors

Tuthill, Emily L
Maltby, Ann
Conteh, Jalang
et al.

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Persistent food insecurity, but not HIV, is associated with depressive symptoms among perinatal women in Kenya: a longitudinal perspective

Emily L. Tuthill[1], **Ann Maltby**[1], **Jalang Conteh**[2], **Lila Sheira**[2], **Joshua D. Miller**[3], **Maricianah Onono**[4], **Sheri D. Weiser**[2], **Sera L. Young**[3,5]

[1]Department of Community Health Systems, School of Nursing, University of California San Francisco, San Francisco, CA, USA

[2]Division of HIV, Infectious Disease, and Global Medicine, Department of Medicine, University of California San Francisco

[3]Department of Anthropology, Northwestern University, Evanston, IL, USA

[4]Kenya Medical Research Institute- Center for Microbiology Research, Nairobi Kenya

[5]Institute for Policy Research, Northwestern University, Evanston, IL, USA

Abstract

Food insecurity (FI) is an understudied risk factor for depression among perinatal women in sub-Saharan Africa. We therefore explored the longitudinal relationship between FI and depressive symptoms among a cohort of perinatal women of mixed HIV status (n=371) in Kenya (NCT02974972, NCT02979418). Using longitudinal linear and logistic regressions with random effects, we assessed bivariate and adjusted associations between FI and depressive symptoms. HIV status was also assessed as a potential effect modifier. At baseline, 58% of pregnant women had probable depression (CES-D score >16) and 84% were severely food insecure. In adjusted analyses, severely food-insecure women had 5.90 greater odds (95% CI: 2.32, 15.02, p<0.001) of having probable depression and scored 4.58 points higher on the CES-D (SE: 1.04, p<0.001) relative to food-secure women. HIV status did not modify the association between FI and depressive symptoms. Interventions to reduce FI may reduce perinatal depression, benefiting mothers and their infants.

Corresponding Author: Sera L. Young, 1819 Hinman Ave., Evanston, IL 60208, +1(847)467-2174, sera.young@northwestern.edu.

Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent: Informed written consent was obtained for all individual participants included in the study.

Conflicts of Interest: The authors have no conflicts of interest to declare.

Resumen

La inseguridad alimentaria es un factor de riesgo del estrés en el periodo de posparto entre mujeres en África Sub-sahariana que es poco estudiado. Por lo tanto exploramos la relación entre la seguridad alimentaria y las síntomas de depresión con un estudio longitudinal entre un cohorte de mujeres en diferentes etapas perinatal y con diferentes estatus de VIH (n=371) en Kenia (NCT02974972, NCT02979418). Se evaluaron asociaciones bi-variadas y asociaciones ajustadas entre la inseguridad alimentaria y las síntomas de depresión usando regresión lineal y logística con efectos aleatorios. El estatus de VIH también se evaluó como modificador de efecto. Al inicio del estudio el 58% de mujeres embarazadas tenían depresión probable (CES-D score >16) y el 84% tenían un nivel de inseguridad alimentaria severa. Mujeres con un nivel de inseguridad alimentaria severa tenían mayores posibilidades del 5.90 (95% IC: 2.32, 15.02, p<0.001) de depresión probable y una puntuación mas alta del 4.58 en el CES-D (EE: 1.04, p<0.001) en comparación a las mujeres con un nivel de inseguridad alimentaria seguro. El estatus de VIH no modifico la asociación entre la inseguridad alimentaria y la síntomas de depresión. Intervenciones destinadas para mitigar la inseguridad alimentaria podrían reducir la depresión en el periodo perinatal, proporcionando beneficios a las mamas y sus bebes.

Keywords

prenatal depression; postnatal depression; food security; food insecurity; depressive symptoms; longitudinal; HIV; Kenya; CESD

Keywords

Depresión en el periodo perinatal; depresión en el periodo de postparto; seguridad alimentaria; inseguridad alimentaria; síntomas de depresión; longitudinal; VIH; Kenia; CESD

Introduction

Perinatal depression (i.e., depression occurring during pregnancy and/or postpartum) contributes substantially to morbidity globally (1). The prevalence of depression in sub-Saharan Africa (SSA) has been estimated to be between 10% to 48% during pregnancy and 4% to 43% postpartum (2), although mental health services are limited and depression during pregnancy and postpartum often goes undiagnosed and untreated (3,4). Symptoms of perinatal depression include apathy towards life, anxiety, suicidal ideations, poor infant bonding, and extreme fatigue (5). These symptoms are in turn associated with poor nutrition (6), reduced engagement in prenatal care, low birth weight and preterm births (2,7), poor or unsafe parenting behavior (6), as well as long-term health and behavioral problems for the child (8). Understanding the risk factors for perinatal depression is thus a public health priority given its considerable and multifaceted consequences for mothers, infants, and their families (2,9,10).

Food insecurity is an understudied risk factor for depression among pregnant and postpartum women. Food insecurity, defined as unreliable access to adequate amounts of safe and nutritious food (11), is widespread in SSA; an estimated 24% of the population in SSA

experienced severe food insecurity in 2017 (12). Pregnant and postpartum women in low-resource settings are particularly vulnerable to food insecurity given their increased nutritional demands and economic instability (13–15). Many women leave the workforce during pregnancy or after childbirth and rely solely on partners or family to provide food for themselves and their dependents. This can lead to increased vulnerability, disempowerment, and depressive symptoms (16). Moreover, experiencing food insecurity may lead to increased physical and emotional stress, which has also been associated with an increased risk for depressive symptoms (17).

Few studies have investigated the longitudinal impacts of food insecurity on depression across the perinatal transitional period. Even fewer studies have concurrently considered the role of HIV, despite the known pathways between food insecurity and HIV (18), as well as the high prevalence of HIV in SSA (19). During pregnancy and postpartum, depression is associated with HIV treatment nonadherence (20), reduced antenatal clinic attendance (6), and suboptimal infant feeding practices (7,21,22), all of which potentiate the risk of mother-to-child transmission of HIV (23). Importantly, the relationship between HIV and depression may also be bidirectional among perinatal women. For mothers living with HIV, stress or anxiety related to the risk of perinatal HIV transmission, fear of disclosing HIV status, and the experience of disease-related stigma (24) may all increase the risk of depressive symptoms (25).

Understanding risk factors, especially highly prevalent modifiable factors, is key to developing holistic interventions that reduce maternal and infant morbidity related to depression. Furthermore, the perinatal period that extends from pregnancy through postpartum is a critical time for both maternal and child health outcomes and may impact health differently throughout this transitional period yet current longitudinal evidence is lacking. To fill this gap, we sought to better understand the relationship between food insecurity and depressive symptoms among a cohort of pregnant and postpartum women of mixed HIV status in western Kenya. We hypothesized that 1) women experiencing food insecurity would be more likely to have reported depressive symptoms compared to food-secure women and 2) those living with HIV would have more severe depressive symptoms compared to HIV-uninfected women.

DATA AND METHODS

Study population and data collection

Data are drawn from Pith Moromo, a longitudinal observational cohort study of 371 pregnant women in Kenya (NCT02974972). Participants still in Pith Moromo at 9 months postpartum were enrolled into Pii Ngima, and followed through 21 months postpartum (NCT02979418). Study procedures have been described at length elsewhere (26–28). Briefly, women were recruited between September 2014 and June 2015 from seven rural, peri-urban, and urban Family AIDS Care and Educational Services (FACES) antenatal clinics in the former Nyanza region, Kenya. Women were eligible for participation if they were less than 30 weeks gestational age and did not plan to move outside the region during the study period.

Quota sampling was used in order to achieve equal numbers of pregnant women with and without HIV (confirmed using colloidal gold rapid tests) by food insecurity tertiles, as assessed using the nine-item Individual Food Insecurity Access Scale (IFIAS) (low: 0–9, moderate: 10–18, and severe: 19–27).

Survey data were collected by local clinic-based study nurses using paper forms and tablet-based electronic surveys at nine in-person interviews (at approximately six and eight months pregnancy and seven times postpartum) and two telephone surveys (at 1 week and 6 months postpartum) (Figure 1). Of the 371 women enrolled, three person-visits were deleted at baseline due to technical issues, such that a total of 3,174 person-visits across the eleven study encounters were available. The median number of study visits attended was 10 (interquartile range [IQR]: 7, 11).

Independent variable: food insecurity

Food insecurity (range 0–27) in the prior month was assessed at all visits (i.e., 11 study visits) using the Individual Food Insecurity Access Scale, which is an adaptation of the Household Food Insecurity Access Scale (HFIAS) and has been validated for use among pregnant women in similar East African settings (29) (Figure 1). Individuals were categorized as food secure, mildly food insecure, moderately food insecure, or severely food insecure following HFIAS guidelines (30). The internal consistency for the IFIAS was high, with a Cronbach's alpha of 0.92 at the baseline visit.

Food insecurity data were available for 3,070 person-visits (97% of available person-visits). Given the relatively small number of cases where a single scale item was missing from the 9-item scale (n=10), it was imputed using single imputation with regression. This method utilized data from the HFIAS scale to predict the missing values based on the observed values from the same scale.

Dependent variable: depressive symptoms

The outcome of interest for this analysis was depressive symptoms in the prior week, assessed using the Center for Epidemiologic Studies Depression (CES-D) scale (31). The 20-item, Likert-format screening tool asks respondents how often they experienced a particular symptom in the past week, where 0 represents "rarely or none of the time" and 3 represents "most or all of the time" (range 0–60). Higher scores indicate greater depressive symptoms.

For this analysis, depression was assessed primarily as a binary variable. Individuals were categorized as experiencing symptoms indicative of probable depression (CES-D score greater than 16) and depressive symptoms not indicative of probable depression (CES-D score less than or equal to 16). A cut-off of 16 is typically used as an indication of likely depression (32) and the CES-D has been shown to be acceptable for use among people living with HIV (33). As a sensitivity analysis, we also assessed depression as a continuous variable.

CES-D scores were collected at six of the eleven study assessments: baseline, 6 weeks, 9 months, 12 months, 15 months, and 21 months postpartum (Figure 1). Internal consistency

for the CES-D was high in the sample (Cronbach's alpha of 0.85 at baseline). Depressive symptom data were available for 1,690 person-visits out of the 1,700 person-visits at which it was measured (99% of available person-visits).

Covariates

Characteristics that have previously been found to be associated with depressive symptoms (34–37) were assessed as potential confounders of the relationship with food insecurity. Covariates assessed were ethnic group (Luo or other ethnic group), number of dependents under the age of eighteen living in the household at study baseline (continuous), maternal age (in years), education (primary or less vs greater than primary), gestational age (in weeks, based on last menstrual period), and HIV status. Household wealth (low, medium, high) was derived from a principal component analysis of self-reported household asset ownership using an adapted version of the Kenya Integrated Household Budget Survey Questionnaire (38) at 9 months postpartum and made into tertiles. Social support was measured using a ten-item scale adapted from the Duke/UNC Functional Social Support Scale and assessed two ways: as a continuous score in the regression models of depressive symptoms, where higher scores indicate greater social support, and dichotomously as a socio-demographic characteristic (a mean score of three across the ten items was classified as low social support) (39). Person-visits were excluded if data for a time-varying covariate were missing and could not be manually imputed (e.g., using previous and subsequent visit age to report age), which occurred in approximately 25% of person-visits.

Data analysis

Summary statistics of sociodemographic characteristics were assessed among all participants at their initial in-person visit. Our first objective was to understand if women who experienced food insecurity were more likely to have depressive symptoms. To do this, we explored longitudinal bivariate associations between the independent variable (food insecurity) and potential covariates on depression. Covariates that were significantly associated with depressive symptoms in the bivariate analysis (at $p<0.20$), as well as those identified *a priori* as potential confounders of the relationship between food insecurity and depressive symptoms, were then added to multivariable longitudinal linear and logistic regressions of depressive symptoms. For this analysis, visits where food security and depression were both collected were analyzed. Given that social support was not collected at all visits and thus would not leverage all available food insecurity and depression data, an additional model was run including social support separately to be able to take advantage of data from visits where social support was also measured.

To our second objective, exploring if women living with HIV had more severe depressive symptoms than those without, we ran an adjusted model including an interaction between HIV status and food insecurity to determine whether HIV status modified the association between food insecurity and depressive symptoms. Statistical significance was assessed at $p<0.05$ for all models. All analyses were conducted using Stata 14.0.

Ethical Considerations

Institutional Review Boards at Cornell University, Northwestern University, and Kenya Medical Research Institute approved study procedures. All participants provided written informed consent at enrollment.

Results

Sociodemographic characteristics

A total of 368 pregnant women with complete data at study baseline, 50% of whom were living with HIV, were included for analysis (Table I). The majority of women (86%) were Luo, and the median number of individuals under the age of eighteen in each woman's household was 0 (IQR: 0, 1). Women living with HIV were, on average, older (25.5 vs 22.5 years, $p<0.01$), earlier in gestation at enrollment (23.0 vs 24.0 weeks, $p<0.01$), and more likely to be Luo (92.2% vs 79.0%, $p<0.01$). Low social support was prevalent among both women living with (65.6%) and without HIV (64.5%). The median CES-D score at baseline was 18 (IQR: 12, 23); 58% of pregnant women at baseline had CES-D scores indicative of probable depression. Additionally, 85% of women reported severe food insecurity at baseline.

Longitudinal relationships between food insecurity and depressive symptoms

In longitudinal bivariate analyses, food insecurity was significantly associated with depressive symptoms (Table II). Women with severe food insecurity had 5.18 greater odds (95% confidence interval [CI]: 2.45, 10.95, $p<0.001$) of screening positive for probable depression and were predicted to score 4.42 points higher on the CES-D (standard error [SE]: 0.95, $p<0.001$) than food-secure women.

In longitudinal models adjusting for education, wealth, number of dependents, maternal age, social support, and HIV status, experiencing severe food insecurity was associated with greater odds of depressive symptoms (adjusted odds ratio [AOR]: 5.90, CI: 2.32, 15.02, $p<0.001$) and higher CES-D scores (beta: 4.58, SE: 1.04, $p<0.001$) compared to being food secure (Table III). Given the 25% attrition in the models due to missing covariate data across the study period, we compared sociodemographic characteristics between those who were retained in the analytic sample and those who were not. Women not retained in the sample were more likely to be non-Luo, in the highest wealth tertile, and have completed primary education or greater (compared to less than primary). HIV status did not modify the association between food insecurity and depressive symptoms (Supplementary Table 1).

Discussion

The primary objectives of this study were to better understand the longitudinal relationship between food insecurity and depressive symptoms among 368 pregnant and postpartum women in western Kenya and to assess whether this relationship differed by HIV status. We hypothesized that pregnant and postpartum women experiencing greater levels of food insecurity will have increased levels of depressive symptoms, and indeed, found that women experiencing severe food insecurity were more likely to have symptoms indicative of

probable depression throughout the perinatal period. Our second hypothesis, that these relationships would differ by HIV status, was not supported. The prevalence/severity of depressive symptoms (over 50% of women had depressive symptoms indicative of probable depression at baseline) did not differ by HIV status.

In this same population, we previously found that food insecurity, water insecurity, and HIV co-occur and interact multiplicatively at 18 months postpartum to increase the likelihood of maternal depressive symptoms at 21 months postpartum (40). Our study expands upon these findings by demonstrating that the negative psychosocial impacts of food insecurity persist throughout pregnancy and the postpartum period. Interestingly, when including data across the entire perinatal period, HIV no longer had a main effect on depression; this may be due, in part, to the more limited sample size we previously used to explore the role of water insecurity in depression symptoms. Previous research in other low- and middle-income countries has similarly found food insecurity to be associated with depression during the perinatal period, up to 12 months postpartum (41–44). Only three studies, however, have explored the relationship between food insecurity and depression throughout the transition from pregnancy to postpartum, all of which were conducted in South Africa (36,37,45). For instance, Garman and colleagues found that the odds of having depressive symptoms antenatally and at 12 months postpartum were 2.5 times greater for women who reported severe food insecurity compared to food-secure women (46). Our study supports these findings and adds additional information by using a longitudinal design that extends from pregnancy through 21 months postpartum with a large sample size and considers modifiable factors of influence including social support, to demonstrate that the relationship between food insecurity and depressive symptoms persists through 21 months postpartum (Table III).

Given that over 80% of women in our cohort were experiencing severe food insecurity and over 50% had symptoms indicative of probable depression at baseline, the implications on long-term child growth and development are substantial. For instance, Rotherman-Fuller and colleagues found that greater maternal depressive symptoms negatively impacted child growth at 36 months postpartum (37). Furthermore, a recent review has found that persistent perinatal depression is associated with worse health and behavioral outcomes for children (47).

Social support may mitigate the negative impacts of depressive symptoms of maternal and infant health. In an additional finding, we found that women with high levels of social support had half the odds of reporting depressive symptoms (Table IV). This finding complements other studies conducted in low-resource settings that have found that the role of social support buffered against depressive symptoms (48,49). Our measurement of social support was general, indicating that support may be through conversations with friends, family, or partners; economic support; and/or love and affection. Thus, our finding shows the importance that support (experienced from myriad sources) has for protecting women's mental health during this vulnerable perinatal period, including from the persistent stress of food insecurity.

In contrast to our second hypothesis, HIV was not associated with higher likelihood of having depressive symptoms. This diverges from previous systematic reviews and meta-

analyses that have found that pregnant or postpartum women living with HIV have significantly higher odds of perinatal depression compared to women without HIV (50, 51). One explanation could be that the women who participated in this study were effectively engaged with the FACES clinics where they received HIV care and medications. The care and resources accessible to women at the clinic could mitigate the known pathways between HIV and depression; for example, by providing women with the knowledge and resources to prevent vertical transmission, thereby reducing the fear and stress associated with it. Indeed, Turan and colleagues found that women living with HIV at 6 weeks postpartum who were not engaged in HIV treatment had greater depressive symptoms and internalized stigma than postpartum women engaged in HIV treatment throughout their pregnancy and postpartum (52).

Limitations

Strengths of this study include the longitudinal design among a cohort with mixed HIV status, the duration of the study extending from pregnancy to 21 months postpartum, and the collection of multiple potential confounders. In addition, we explored depression as both a continuous and dichotomous outcome, and that results were similar across both models. There are also several limitations. One limitation is the potential role of other covariates not included in our study such as prior history of depression. Another limitation of this study (and many other studies of perinatal women) is that we are only capturing the experiences of women who are regularly accessing healthcare services, and excluding women who may also be suffering from food insecurity and depression but who are not engaged in care (either due to personal choice or lack of access). In addition, given that most of our participants were severely food insecure, our findings may not be as generalizable to less food-insecure populations. Finally, incomplete data and missing visits in cohort studies can cause a biased sample. Those who missed visits, however, were of the wealthiest tertile and more educated than those who were retained (i.e. those who are generally less likely to have probable depression). This differential visit attendance has the potential to overestimate the effect of food insecurity on depression, as wealthier and more education women may be less likely to be food insecure. Nevertheless, our study shows a consistent relationship over time between two highly prevalent problems affecting perinatal women in western Kenya.

Public Health Implications

This study demonstrates that food insecurity is strongly associated with depressive symptoms across the perinatal period among women in western Kenya, regardless of HIV status. Despite the severe morbidities associated with perinatal depressive symptoms, a paucity of resources in this region often leaves perinatal depression undiagnosed and untreated. Multi-component interventions that target both food insecurity and depression in this region could simultaneously address the syndemic effects of food insecurity and maternal and child suffering related to perinatal depression.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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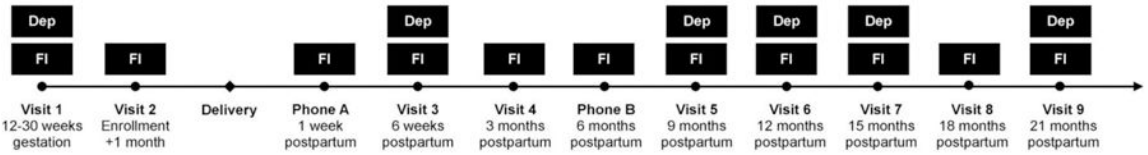

Figure 1:

Time points at which depressive symptoms and food insecurity data were collected among women in the Pith Moromo and Pii Ngima cohort study (n=371).

Table I:

Sociodemographic characteristics of Pith Moromo participants at baseline (n=368).

	HIV− (n=184)	HIV+ (n=184)
Depressive Symptoms Score (CES-D), median (IQR)	18.0 (12.0, 22.0)	19.0 (12.0, 25.0)
Probable depression (CESD >16), (%)		
No depression	80 (43.7%)	72 (39.8%)
Likely depression	103 (56.3%)	109 (60.2%)
Individual Food Insecurity Access Score, median (IQR)	15.0 (8.0, 20.0)	15.0 (9.0, 20.0)
Food insecurity, (%)		
Food secure	14 (7.6%)	4 (2.2%)
Mildly food insecure	1 (0.5%)	5 (2.7%)
Moderately food insecure	19 (10.3%)	14 (7.7%)
Severely food insecure	150 (81.5%)	160 (87.4%)
Maternal age (years), median (IQR)	22.5 (20.0, 26.0)	25.5 (22.0, 30.0)
Gestational age at enrollment (weeks), median (IQR)	24.0 (21.0, 27.0)	23.0 (19.0, 26.0)
Ethnic group, (%)		
Luo	143 (79.0%)	165 (92.2%)
Other ethnic group	38 (21.0%)	14 (7.8%)
Education, (%)		
≤Primary	74 (56.5%)	87 (65.4%)
>Primary	57 (43.5%)	46 (34.6%)
Social support scale, median (IQR)	2.8 (2.0, 3.3)	2.6 (2.0, 3.1)
Low social support (%)	118 (64.5%)	120 (65.6%)
Number of dependents under 18, median (IQR)	0.0 (0.0, 0.0)	0.0 (0.0, 1.0)
Wealth, (%)		
Low	53 (39.8%)	61 (45.9%)
Medium	37 (27.8%)	28 (21.1%)
High	43 (32.3%)	44 (33.1%)

Table II:

Longitudinal bivariate logistic and linear regressions of depressive symptoms across 6 study visits among women enrolled in Pith Moromo (n=249).

	Screening for likely depression			Continuous CES-D score		
	OR	95% confidence interval	p-value	β	Standard error	p-value
Food security score, continuous	1.13	1.11, 1.16	<0.001	0.39	0.03	<0.001
Food insecurity (food secure ref)						
Mildly food insecure	1.42	0.55, 3.66	0.46	1.28	1.21	0.29
Moderately food insecure	1.68	0.78, 3.62	0.19	0.51	0.97	0.60
Severely food insecure	5.18	2.45, 10.94	<0.001	4.42	0.95	<0.001
Ethnic group (Luo ref)						
Other ethnic group	0.90	0.60, 1.35	0.61	−0.74	0.84	0.38
Education (≤primary ref)						
>Primary	0.73	0.54, 1.00	0.05	−1.02	0.59	0.08
Wealth (low ref)						
Medium	0.89	0.61, 1.28	0.52	−0.85	0.72	0.24
High	0.57	0.40, 0.81	<0.001	−2.68	0.66	<0.001
Maternal age, (years)	1.02	0.99, 1.04	0.25	0.00	0.06	0.94
Gestational age at enrollment	0.99	0.95, 1.04	0.92	0.035	0.10	0.72
Number of dependents under 18	0.62	0.53, 0.72	<0.001	−2.51	0.21	<0.001
Mean social support score	0.48	0.39, 0.58	<0.001	−2.88	0.32	<0.001
Social Support (high/normal ref)						
Low social support	2.31	1.77, 3.01	<0.001	2.64	0.45	<0.001
HIV seropositivity (HIV− ref)	1.19	0.91, 1.55	0.21	0.88	0.56	0.11

Table III:

Adjusted longitudinal logistic and linear regressions of depressive symptoms across 6 study visits among women enrolled in Pith Moromo (n=249).

Characteristics	Screening for likely depression			Continuous CES-D score		
	AOR	95% confidence interval	p-value	β	Standard error	p-value
Food insecurity (food secure ref)						
Mildly food insecure	1.73	0.55, 5.41	0.35	2.15	(1.27)	0.09
Moderately food insecure	1.97	0.76, 5.10	0.16	1.11	(1.04)	0.29
Severely food insecure	5.90	2.32, 15.02	<0.001	4.58	(1.04)	<0.001
Education (≤primary ref)						
>Primary	1.02	0.70, 1.49	0.93	−0.21	(0.63)	0.74
Wealth (low ref)						
Medium	1.05	0.68, 1.61	0.82	−0.14	(0.73)	0.84
High	0.73	0.48, 1.13	0.16	−1.86	(0.71)	0.01
Number of dependents under 18	0.61	0.52, 0.72	<0.001	−2.41	(0.22)	<0.001
Maternal age (years)	1.04	1.00, 1.08	0.03	0.13	(0.06)	0.05
HIV seropositivity (HIV− ref)	1.23	0.86, 1.77	0.25	1.07	(0.59)	0.07
Observations	1,280			1,280		

Table IV:

Adjusted longitudinal logistic and linear regressions of depressive symptoms, including social support, across 5 study visits among women enrolled in Pith Moromo (n=249).

Characteristics	Screening for likely depression			Continuous CES-D score		
	AOR	95% confidence interval	p-value	β	Standard error	p-value
Food insecurity (food secure ref)						
Mildly food insecure	1.55	0.48, 5.00	0.47	2.30	(1.42)	0.10
Moderately food insecure	1.42	0.53, 3.78	0.48	0.53	(1.15)	0.65
Severely food insecure	4.21	1.63, 10.90	<0.001	4.03	(1.14)	<0.001
Education (≤primary ref)						
>Primary	1.04	0.70, 1.55	0.83	0.02	(0.63)	0.97
Wealth (low ref)						
Medium	1.07	0.68, 1.67	0.77	0.14	(0.73)	0.85
High	0.79	0.50, 1.24	0.31	−1.48	(0.71)	0.04
Number of dependents under 18	0.69	0.58, 0.81	<0.001	−1.87	(0.22)	<0.001
Maternal age (years)	1.04	1.00, 1.08	0.05	0.10	(0.06)	0.10
HIV seropositivity (HIV− ref)	1.19	0.82, 1.73	0.37	0.88	(0.59)	0.14
Social support score	0.63	0.49, 0.80	<0.001	−1.78	(0.36)	<0.001
Observations[1]	1,070			1,070		

[1]Data for social support was collected at one fewer visit than for depression and food security (Table III), thus there are fewer person-visits