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Associations between mobility, food insecurity and transactional sex among women in cohabitating partnerships: an analysis from six African countries 2016-2017

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A.K. and A.L. conceived the study. A.J.H., C.G., A.S.H., S.Y.H., M.F.J., W.L.K., L.M., G.S.M., L.A.M., P.M., N.M., P.N., A.S., J.W., AND A.L. designed the surveys, data collection tools or data products. A.K. performed the data analysis with input from S.F., E. M., J.E.M., A.H., N.P. and A.L. All authors contributed to analysis, interpretation, and writing of the manuscript.

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Abstract

Background: Mobile women are at risk of HIV infection in sub-Saharan Africa, though we lack evidence for HIV risk among women in mobile partnerships, especially in the context of household food insecurity, a growing concern in the region.

Setting: Women aged 15-59 years with a cohabitating male partner and who participated in Population-based HIV Impact Assessment surveys in Eswatini, Lesotho, Namibia, Tanzania, Uganda, and Zambia

Methods: We evaluated the association between women's and their partner's mobility (being away from home for over one month or staying elsewhere) and transactional sex (selling sex or receiving money or goods in exchange for sex). We examined associations for effect measure modification by food insecurity level in the household in the past month. We used survey-weighted logistic regression, pooled and by country, adjusting for individual, partner and household-level variables.

Results: Among women with a cohabitating male partner, 8.0% reported transactional sex, ranging from 2.7% in Lesotho to 13.4% in Uganda. Women's mobility (aOR 1.35 [95% CI 1.08 – 1.68]), but not their partner's mobility (aOR 0.91 [0.74 – 1.12]), was associated with transactional sex. Food insecurity was associated with transactional sex independent of mobility (aOR 1.29 [1.10 – 1.52]). Among those who were food insecure, mobility was not associated with an increased odds of transactional sex.

Conclusion: Food insecurity and women's mobility each increased the odds of transactional sex. Since transactional sex is associated with HIV risk, prevention programs can address the needs of mobile and food-insecure women, including those in cohabitating relationships.

Keywords

HIV; sexual behavior; sex work; transients and migrants; emigration and immigration; food insecurity

Introduction

Mobility is a key driver of the HIV epidemic in sub-Saharan Africa.¹⁻³ Across various settings, mobile populations are more likely to acquire HIV compared to more permanent residents, often through increased rates of sexual risk behaviors and expanded sexual networks.⁴⁻⁷ These high-risk behaviors and elevated rates of HIV infection have been most commonly found among specific mobile groups, such as truck drivers, miners and seasonal workers in formal industries.⁸⁻¹³ However, there is a dearth of research on mobility and HIV risk among women,^{14,15} especially those in cohabitating partnerships. Moreover, the particular needs of mobile populations are often not considered in HIV programs.²

Mobility research, particularly that of short-term travel away from home does not always consider relevant environmental drivers.¹⁴ For example, food insecurity may motivate people to move, and is rising in eastern and southern Africa due to increasing severity of droughts

and other climate change events.¹⁶ Women are more likely than men to experience food insecurity in the region,¹⁷ and food-insecure women may be more likely to migrate relative to their food-secure counterparts.¹⁷⁻¹⁹ In the face of economic vulnerability, women often travel to seek economic opportunities. Their economic circumstances and limited labor opportunities while traveling may prompt them to exchange sex for material support.²⁰⁻²² Transactional sex is prevalent among mobile women,²² and is associated with a two-fold risk of HIV acquisition due to its effect on gender power dynamics that weaken women's negotiating power for safer sex.²⁴ Few studies to date have examined differences in the relationship between mobility and risky sexual behaviors due to structural vulnerabilities like household food insecurity.

The mechanisms underlying the relationship between mobility and HIV risk are elusive.³ The network-pathway framework suggests that mobility impacts HIV transmission through three distinct but co-occurring pathways.²⁴ While the *bridging* pathway explains HIV transmission through sexual network dynamics, the *intrinsic risk* and *community displacement* pathways explain how mobility may relate to an individual's risky sexual behaviors. First, the *intrinsic risk* pathway posits that mobile persons are at higher risk of infection due to some factor that independently causes both mobility and risky sexual behavior. One such intrinsic risk may be food insecurity. While food insecurity has been shown to cause both mobility^{19,25,26} and transactional sex behavior,^{17,27-29} current research does not capture how the association between mobility and risky sexual behaviors differs by levels of food insecurity. Second, the *community displacement* pathway posits that sexual behaviors can change among those in sending communities who stay behind. However, research on the effects of women's partner's mobility on her risky sexual behaviors remains unclear. In Tanzania, partners who stayed at home engaged in more risky sexual behaviors than those without mobile partners, but in Kenya a woman's partner's mobility was not associated with an increased risk of HIV acquisition.³⁰ In Lesotho, a country with significant circular migration¹¹, women's mobility resulted in higher rates of extramarital partnerships among men, but was not associated among women with mobile husbands.³¹

Our study aims to examine the association between mobility in cohabitating partnerships and transactional sex among women partners. We also assess whether household-level food insecurity confounds or modifies the association between partnership mobility and transactional sex among female partners, as migration under desperate economic circumstances may be more likely to result in compensatory sexual behaviors.^{17,32,33} Our analysis uses nationally-representative samples from population-based HIV impact assessments (PHIAs) to reflect patterns in the general populations of six eastern and southern African countries. PHIAs are cross-sectional household surveys designed to monitor the epidemic response in sub-Saharan countries and Haiti.³⁴⁻³⁶

Methods

Study design and participants

We conducted a secondary analysis of PHIA data collected between 2016 and 2017 in Eswatini, Lesotho, Namibia, Tanzania, Uganda and Zambia, the first six countries to collect population-based survey data on mobility and food insecurity. All PHIAs employed a

two-stage cluster sampling design and were powered to estimate national HIV incidence among adults aged 15-59 years with a relative standard error of 30%.³⁶ At each household, the consenting household head answered questions about the household and completed a roster of all members. Each adult aged above 17 years provided informed consent before completing an interview using a validated instrument, while those aged 15-17 years provided assent after receiving permission from their parent or guardian. Questions reflected sociodemographic, behavioral and health-seeking factors related to HIV prevention and treatment (Variables are described in the Supplement; survey materials are available at <https://phia.icap.columbia.edu/resources/>). The design and implementation of PHIA surveys have been described elsewhere.³⁶⁻³⁷

Analysis was restricted to women aged 15-59 years who completed the adult questionnaire and reported being married or living with a male partner. Partners were defined as men who were identified as a woman's marital or cohabitating partner on the household roster, and whose relationship status was confirmed during the woman's interview. No women in same-sex partnerships were reported. We applied survey weights to account for differential probabilities of household selection and non-response.³⁸

The PHIA protocol for each country was approved by the US Centers for Disease Control and Prevention Institutional Review Board (IRB), a national IRB (Eswatini National Health Research Review Board, Lesotho National Health Research and Ethics Committee, Namibia MoHSS Research Steering Committee, Tanzania National Institute for Medical Research and Zanzibar Medical Research and Ethics Committee, Uganda National Council for Science and Technology and UVRI, and Zambia TDRC Ethical Review Committee), and the IRBs at Columbia University Irving Medical Center and University of California San Francisco in the case of Namibia.

Exposure and outcome measurement

Transactional sex—We defined recent transactional sex as 1) reporting selling sex or 2) receiving money or goods in exchange for sex in the past year (Supplement, Table 3-1). Whereas selling sex typically reflects formalized sex work, having sex in exchange for material support represents those who engage in sex with regular or non-regular partners for money, food, school fees, employment, gifts/favors, transport, shelter/rent or protection. We combined the two measures here because of substantial overlap of women reporting both selling sex and having sex in exchange for material support. Women who replied “don't know” were excluded (4%).

Mobility—Mobility, considered here as a form of short-term migration, was defined in four countries as being away from home for one month or more in the past year, whereas Namibia's survey included reports of mobility within the past three years, and Lesotho's survey only measured mobility outside the country (Supplement, Table 3-2). Male partners were considered mobile if they reported mobility, or if their cohabitating female partner reported that their partners were “staying away from home.” Taking into account individual and partnership-level mobility behaviors, we created four mobility categories for women and

their partners: 1) Neither mobile, 2) Women only mobile, 3) Partner only mobile, and 4) Both mobile. Individuals who replied “don’t know” or did not respond were excluded (2%).

Food insecurity—Food insecurity was reported by the household head if anyone in the household experienced 1) hunger, 2) lack of food, or 3) going a day without eating in the past month (Supplement, Table 3-3).³⁹ We assigned each of the three variables a value of 0 if the household members had never experienced food insecurity, a value of 1 if the household had experienced food insecurity rarely (1-2 times) or sometimes (3-10 times), and a value of 2 if the household had experienced food insecurity often (more than 10 times). The composite score represented a sum of the three variables and ranged from 0 to 6. Scores of 0-1 were classified as little to no food insecurity, 2-3 as moderate food insecurity, and 4-6 as severe food insecurity. Moderate and severe food insecurity had comparable measures of association with transactional sex, so we characterized food insecurity as 1) little to no food insecurity, and 2) moderate to severe food insecurity.

Statistical analysis

Descriptive and multivariate analyses were carried out using Stata statistical software version 16.1. To determine the association between mobility of the women, their partner, or both partners and transactional sex, we first calculated survey-adjusted F-statistics to measure statistical association between each covariate and the outcome. We used a combination of these statistical tests, and Directed Acyclic Graphs (DAG) constructed based on a literature review, to inform covariate selection for an adjusted model (Supplement). Covariates that reflect multilevel determinants of women’s transactional sex behavior and of partnership mobility included household characteristics (food insecurity, economic support, household head’s gender, urbanicity and country-specific wealth quintile); partner characteristics (age, partner age difference, married/cohabitating, education and employment); and individual characteristics (age, education and employment). Methods for calculating wealth quintiles are described elsewhere.⁴⁰ We included covariates in the final model if they had a statistically significant (p-value less than 0.05) association with women’s transactional sex behavior. We applied survey weights to account for the complex survey design and for non-response.³⁸

We performed analyses by country and pooled. In the pooled multivariate analysis, we tested whether country was a significant covariate (Model 1) and whether country modified the associations on the multiplicative scale between transactional sex and mobility or food insecurity by calculating an adjusted Wald test of the interaction terms country and mobility, and country and food insecurity. In order to test food insecurity as a confounder and effect modifier, we first adjusted for food insecurity in Model 2, and then assessed the interaction effect of food insecurity and partnership mobility in Model 3. We performed goodness-of-fit tests using the F statistic to compare model fit. Reported percentages and their 95% Confidence Interval (95% CI) are weighted and reported numbers are unweighted.

Results

Participants

Across the six PHIA, 37,183 women aged 15-59 years reported a cohabitating or marital partner. Of these, 27,378 (73.6%) women were linked to their male partner in the survey dataset, and 20,616 (55.4%) women had a male partner who was an eligible participant (Table 1). The remaining 6,762 women had partners who were available but were ineligible because they refused to participate in the survey (39.8%), had not slept in the house the night before (45.6%), were over the target age of the survey (9.1%), or were not sampled (5.4%). Of these 20,616 couples, 19,317 (93.7%) had data on all covariates of interest (Table 1). The final sample of 19,317 couples (women and their linked partners) consisted of 1,117 (5.8%) from Eswatini; 1,245 (6.5%) from Lesotho; 1,541 (8.0%) from Namibia; 6,716 (34.8%) from Tanzania; 5,328 (27.6%) from Uganda; and 3,370 (17.5%) from Zambia (Supplement, Table 7-1).

Descriptive statistics

The majority of women in the sample were married (79.6% [95% Confidence Interval (CI) 78.6 – 80.5]), lived in a rural area (71.3% [68.9 – 73.6]), and completed at least primary school (54.0% [52.7 – 55.2]) (Table 1). Whereas 20.4% (19.5 – 21.4) of couples were cohabitating non-marital couples, this proportion ranged from 0.5% (0.3 – 0.8) in Zambia to 45.2% (41.2 – 49.3) in Namibia (Supplement, Table 7-1).

In 8.8% (95% CI 8.3 – 9.4) of partnerships, the woman alone was mobile, whereas in 12.6% (11.8 – 13.3), only the male partner was mobile, and in 2.3% (2.0 – 2.6), both partners were mobile (Table 1). In all countries, a higher proportion of partnerships had mobile male partners than mobile female partners. Less than 10% of partnerships consisted of both mobile partners, with the highest prevalence of both-partner mobility in Namibia (8.9% [7.4 – 10.6]) (Supplement, Table 7-1).

Overall, 8.0% (95% CI 7.4 – 8.6) of women reported transactional sex in the last year (Table 1). The prevalence of transactional sex ranged from 2.7% (1.8 – 4.0) in Lesotho to 13.4% (12.2 – 14.8) in Uganda (Supplement, Table 7-1). Although not mutually exclusive, 2.0% (1.7 – 2.4) of women reported selling sex for money and 7.3% (6.8 – 7.8) reported exchanging sex for material support. Among those who had transactional sex, 23.1% (20.2 – 26.4) reported multiple partners and 25.6% (22.6 – 29.0) reported non-regular partners in the past year (Supplement, Table 6).

Overall, 18.2% (95% CI 17.2 – 19.3) of women lived in households that experienced moderate to severe food insecurity (Table 1). The prevalence of food insecurity was above 20% in four of the six countries: Uganda (20.9% [19.5 – 22.4]), Namibia (21.9% [19.3 – 24.7]), Eswatini (24.2% [21.3 – 27.3]), and Lesotho (25.0% [22.5 – 27.6]) (Supplement, Table 7-1).

Multivariate model

In the overall unadjusted models, mobile women without (OR 1.54 [95% CI: 1.25 – 1.91]) and with (OR 1.94 [1.39 – 2.72]) mobile partners demonstrated higher odds of engaging in transactional sex in the last year compared to non-mobile women with non-mobile partners (Table 1). Also, women in households experiencing food insecurity had 1.43 (1.22 – 1.67) times higher odds of engaging in transactional sex compared to women in households with little to no food insecurity. All of the individual-level covariates were significantly associated with transactional sex, along with wealth, country, gender of the household head, and partner's age, education and employment. Unadjusted odds ratios by country are in the Supplement.

The multivariate Model 1 was adjusted for household characteristics (household head's gender, wealth quintile, country and urban residence), and individual and partner characteristics (woman and her partner's age, their partnership type, woman and her partner's education, and woman and her partner's employment) (Table 2). After adjustment, mobile women with and without mobile partners had 1.29 (95% CI 0.97 – 1.99) and 1.37 (1.10 – 1.71) times greater odds, respectively, of having transactional sex compared to non-mobile women without mobile partners. Non-mobile women with mobile partners did not have an increased odds of transactional sex (0.92 [0.75 – 1.13]).

Model 2 additionally controlled for food insecurity, which did not improve model fit (goodness-of-fit F-test p-value of 0.030 compared to 0.089) and had little impact on the association between mobility and transactional sex (Table 2). In this model, food insecurity increased women's adjusted odds of transactional sex by 1.29 (1.10 – 1.52). In Model 2, mobile women without mobile partners had 1.35 (1.08 – 1.68) times higher adjusted odds of engaging in transactional sex, and mobile women with mobile partners had statistically non-significant but 1.37 (0.96 – 1.97) times higher adjusted odds of engaging in transactional sex compared to non-mobile women with non-mobile partners. Women in partnerships where only the man was mobile did not have higher adjusted odds of engaging in transactional sex (aOR 0.91 [0.73 – 1.12]). A sensitivity analysis excluding those who sold sex from the outcome definition showed no systematic differences in the association between mobility and the outcome.

While Tanzania, Uganda and Zambia contributed more to the pooled sample, the adjusted odds ratios between mobility and transactional sex held a similar pattern across most countries in that women's mobility was generally more positively associated than her partner's mobility (Figure 1). Lesotho was unlike other countries because non-mobile women with mobile partners in Lesotho had 3.16 (95% CI 1.03 – 9.71) times the odds of engaging in transactional sex compared to non-mobile women with non-mobile partners. In addition, women's mobility was not significantly associated with transactional sex in Namibia and Tanzania.

Effect modification by food insecurity

The interaction effect of food insecurity and partnership mobility was significant, but it did not strengthen the relationship between mobility and transactional sex for any category

of partnership mobility in Model 3 (Table 2). Among those experiencing moderate to severe food insecurity, mobility of any kind was not associated with an increased odds of transactional sex (Supplement, Table 8). In this strata, the prevalence of transactional sex was similar across all mobility groups. However, among those experiencing little to no food insecurity, mobile women without mobile partners had 51% (95% CI 18% - 95%) higher odds of engaging in transactional sex compared to food-secure women in non-mobile partnerships. In this strata of partners in food-secure households, the prevalence of transactional sex was significantly higher if the woman or both partners were mobile.

Discussion

In this multinational study including over twenty thousand partner dyads, we found that women's mobility and not their partner's mobility was the strongest correlate of transactional sex. While mobile women have been shown to engage in high-risk sexual partnerships, our study extends this finding to women in cohabitating partnerships.^{14,24} Since transactional sex is a common behavioral risk factor for HIV acquisition,^{23,41} mobile women are likely to benefit from uninterrupted access to HIV prevention and treatment services that secure their own health as well as prevent onward HIV transmission.

Our study challenges the community displacement pathway because women's transactional sex behavior was not associated with their partner's mobility.²⁴ Our finding of no association is consistent with literature regarding women staying behind, which typically has shown that these women take on greater economic responsibility and may become more socially empowered, therefore potentially less likely to engage in transactional sex. The exception to the pattern of no association between partner mobility and transactional sex was observed in Lesotho, where community-level mobility rates are associated with increased sexual partnerships and partner concurrency among those who stay behind.¹¹ This may be because Lesotho's PHIA questionnaire only captured cross-border migration, which could be longer in duration than other types of mobility. Similarly, one Tanzanian study found that extramarital partnerships only increased among women who stayed behind if their husband was living elsewhere, not if their husband's mobility was short-term.⁴⁶ More country-specific research is needed to describe the risk experienced by women in mobile partnerships, as gender inequities and partner power dynamics can influence women's high-risk sexual relationships.⁴⁷ It may also be important to control for the pattern and duration of partner mobility, as seasonal or circular migration may pose different risks than longer-term absences of the partner.

Our results show that household food insecurity is independently associated with transactional sex, confirming the results of other studies demonstrating the effects of food insecurity on increased sexual risk behaviors.^{48,49} One study conducted using PHIA data found that food assistance receipt decreased the risk of both transactional sex and HIV infection in a pooled sample from African countries.⁵⁰

We found, however, that household food insecurity is not a significant confounder in the relationship between mobility and transactional sex, contrary to the intrinsic risk pathway posited by Cassels and colleagues.²⁴ It also does not exacerbate the association between

mobility and transactional sex as an effect modifier. This is because food insecure women are more likely to have transactional sex even when they stay at home. This finding may support the concept of desperation migration, in which migration can be protective against unhealthy behaviors or health outcomes that are typically caused by socioeconomic vulnerability.^{51,52} However, without knowing the food insecurity or economic situations of the partners before, during and after moving as well as the timing of transactional sex, it is impossible to discern whether women traveled out of economic desperation and then engaged in transactional sex. Future research could ask participants for reasons of their mobility and observe with greater precision the economic circumstances before and after travel to better identify how these factors affect decisions to engage in transactional sex.

Our study was limited by the cross-sectional nature of PHIA data and inconsistent reference periods for reported mobility, food insecurity and transactional sex. For this reason and others, our analysis can only show associations. In addition, we were unable to distinguish between formal sex work and transactional sex using the survey questions. It is also possible that we were unable to detect a statistically significant association between both-partner mobility and transactional sex because the number of women in “both mobile” partnerships was smaller than all other couple-level mobility categories. Finally, PHIA's do not capture mobile persons who may be away from home at the time of the survey, thus excluding a portion of the mobile population in each country. This could introduce bias if the mobile people at highest risk for transactional sex are those who travel more frequently or for longer periods and are thus less likely to be captured in the survey. Future HIV research could quantify the bias introduced by household survey methodologies.

Our study addresses the research gap on women's mobility and HIV risk behaviors because previous research has been focused on commercial sex workers,^{53,54} women transnational migrants,²¹ or men who belong to typically studied high-risk mobile groups like long-distance truck drivers⁸⁻¹⁰ and seasonal workers.^{3,15} PHIA's utilize population-based household sampling to achieve national representativeness, which made it possible to examine patterns in the general population and multinationally. PHIA's also help to address complex questions on mobility, food insecurity and transactional sex because the surveys collect data on multiple dimensions, from household vulnerability to individual risk behaviors.

As sub-Saharan African countries strive to end the HIV epidemic, these results demonstrate the need for structural interventions like food assistance programs and enhanced access to HIV prevention methods, HIV testing, and antiretroviral treatment (ART) for mobile men and women.^{2,14} Although HIV prevention programs can tailor prevention, testing and treatment services, such as through multi-month dispensing of PrEP or ART, long-acting PrEP and HIV self-testing to specific high-risk mobile groups, these services need to be extended to mobile populations more broadly, particularly to women. Local HIV programs can consider testing strategies like mHealth applications,⁵⁵ leveraging social networks,⁵⁶⁻⁵⁸ and enhanced community-based linkage to care⁵⁹ to reach mobile populations with these crucial services.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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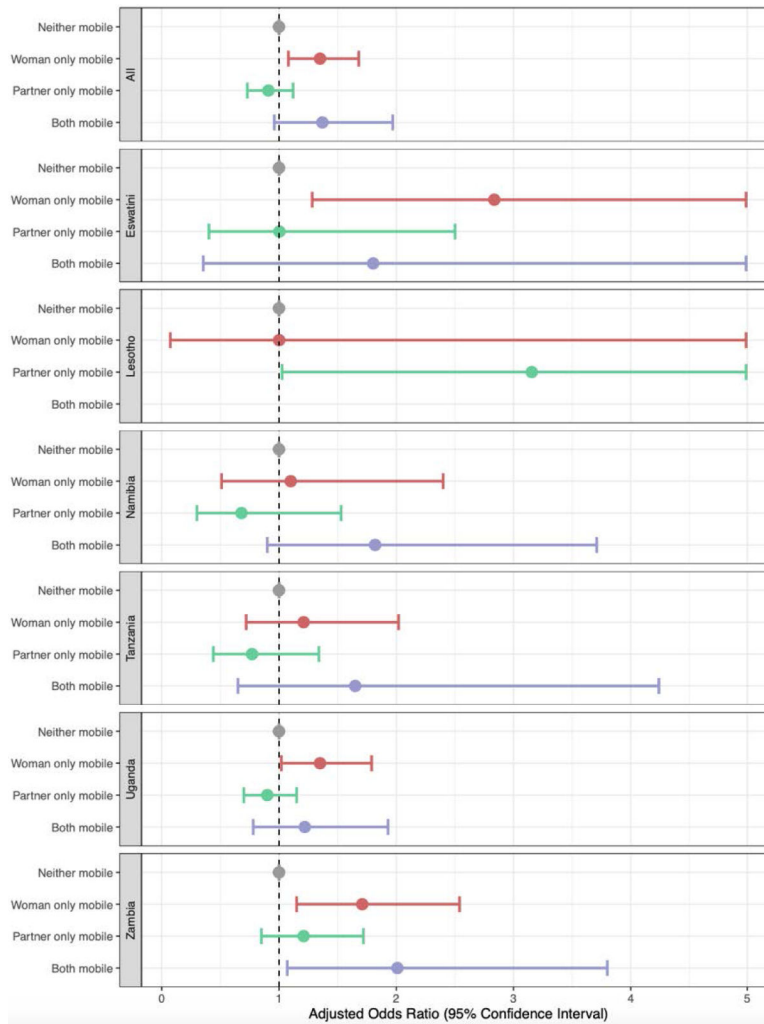


Figure 1. Adjusted odds ratios for transactional sex within the last 12 months among women aged 15-59 in a domestic or marital partnership in six sub-Saharan African countries, pooled and by country, 2016-2017, Model 2 (N = 19,317)

Note: For visualization purposes, the x-axis has been truncated to values between 0.0 and 5.0. Lesotho is missing cases of transactional sex in the “Both mobile” grouping.
aOR adjusted for covariates in Model 2: food insecurity, gender of household head, wealth quintile, urban geography, woman and partner's age, type of partnership, woman and partner's education, and woman and partner's employment
Data presented in this figure can be found in Supplement, Table 3.

Table 1.

Number, percent among those engaging in transactional sex and odds ratios for associations with transactional sex within the last 12 months among women aged 15-59 in a domestic or marital partnership in six sub-Saharan African countries, 2016-2017 (N = 19,317)

Characteristic	Number		%	Percent		OR	p-value	Odds Ratio	
	n/N			Lower	Upper			Lower	Upper
Couple-level mobility									
Neither mobile	1,122/14,586		71.0	68.1	73.8	ref			
Woman only mobile	206/1,687		12.2	10.2	14.5	1.54	0.000	1.25	1.91
Partner only mobile	221/2,465		13.0	11.0	15.3	1.12	0.267	0.92	1.38
Both mobile	76/579		3.8	2.8	5.1	1.94	0.000	1.39	2.72
Household level									
Food insecurity in the last month									
Little to none	1,226/15,482		76.5	73.7	79.1	ref			
Moderate or severe	399/3,835		23.5	20.9	26.3	1.43	0.000	1.22	1.67
Economic support in past 3 months									
No	1,492/17,440		93.8	92.0	95.2	ref			
Yes	133/1,877		6.2	4.8	8.0	1.21	0.154	0.93	1.61
Gender of head of household									
Male	1,456/17,454		90.8	88.7	92.5	ref			
Female	169/1,863		9.2	7.5	11.3	1.77	0.000	1.38	2.25
Wealth quintile									
Q1	516/4,743		29.2	25.9	32.9	ref			
Q2	381/4,359		22.8	20.0	25.9	0.73	0.002	0.60	0.89
Q3	347/4,180		21.3	18.5	24.3	0.72	0.003	0.58	0.89
Q4	229/3,219		16.0	13.5	19.0	0.65	0.001	0.50	0.84
Q5	152/2,816		10.7	8.3	13.5	0.48	0.000	0.36	0.65
Country									
Eswatini	32/1,085		0.3	0.2	0.4	ref			
Lesotho	29/1,216		0.3	0.2	0.5	0.77	0.351	0.45	1.33
Namibia	106/1,435		1.0	0.7	1.3	2.53	0.000	1.61	3.98
Tanzania	281/6,435		30.2	26.7	34.0	1.38	0.115	0.92	2.07

Characteristic	Number		Percent		Odds Ratio			
	n/N	%	Lower	Upper	OR	p-value	Lower	Upper
Uganda	760/4,568	52.0	48.3	55.7	4.72	0.000	3.18	6.99
Zambia	417/2,953	16.2	14.2	18.5	4.13	0.000	2.76	6.18
Individual level								
Age group								
15-24	546/4,586	36.1	32.9	39.5	2.60	0.000	2.05	3.29
25-34	554/6,832	33.1	30.0	36.4	1.69	0.000	1.34	2.13
35-44	356/4,712	21.9	19.2	24.9	1.71	0.000	1.32	2.21
45-59	169/3,187	8.8	7.3	10.7	ref			
Geography								
Rural	1,267/13,770	77.6	73.6	81.1	ref			
Urban	358/5,547	22.4	18.9	26.4	0.70	0.000	0.58	0.85
Type of partnership								
Married	1,253/15,555	74.0	70.8	77.1	ref			
Living together	372/3,762	26.0	22.9	29.2	1.37	0.000	1.15	1.62
Educational level								
None	610/5,435	41.0	37.7	44.3	ref			
Primary	738/9,330	48.6	45.4	51.8	0.67	0.000	0.58	0.77
Secondary or greater	277/4,552	10.5	8.8	12.4	0.51	0.000	0.41	0.64
Employed in past 12 months								
No	964/12,586	58.0	54.6	61.4	ref			
Yes	661/6,731	42.0	38.6	45.4	1.42	0.000	1.23	1.65
Partner level								
Age group								
15-24	212/1,486	14.9	12.6	17.4	2.32	0.000	1.84	2.92
25-34	537/5,924	33.2	30.2	36.5	1.26	0.017	1.04	1.53
35-44	470/5,673	27.9	25.1	31.0	1.17	0.091	0.98	1.40
45-59	361/5,081	21.1	18.7	23.7	Ref			
60+	45/1,153	3.0	2.0	4.4	0.48	0.001	0.30	0.75
Age difference								
<10 years	1,221/14,727	73.3	70.2	76.2	ref			

Characteristic	Number		Percent		Odds Ratio				
	n/N		%	Lower	Upper	OR	p-value	Lower	Upper
10+ years older	404/4,590		26.7	23.8	29.8	1.02	0.766	0.87	1.20
Partner's educational level									
None	452/4,078		29.8	26.9	33.0	ref			
Primary	787/9,793		53.5	50.5	56.6	0.68	0.000	0.59	0.80
Secondary or greater	386/5,446		16.7	14.4	19.2	0.61	0.000	0.49	0.75
Partner employed in past 12 months									
No	618/7,626		35.1	32.0	38.3	ref			
Yes	1,007/11,691		64.9	61.7	68.0	1.17	0.044	1.00	1.35

TS = Transactional Sex

^xFood insecurity was analyzed as a dichotomized score based on hunger, lack of food, and not being able to eat in the past month experienced by anyone in the household.

^yWealth quintile is specific to each country and is analyzed as the relative wealth index of all households included in the survey. The wealth index is a score weighted by household assets and consumer items, such as flooring, television ownership, car ownership, toilet facilities, and drinking water source.

Table 2.

Adjusted odds ratios for associations with transactional sex within the last 12 months among women aged 15-59 in a domestic or marital partnership in six sub-Saharan African countries, 2016-2017, Models 1 - 3 (N = 19,317)

Characteristic	Model 1.			Model 2. Adjusting for food insecurity			Model 3. Adjusting for food insecurity and its interaction effect with mobility					
	aOR	p-value	Lower	Upper	aOR	p-value	Lower	Upper	aOR	p-value	Lower	Upper
Couple-level mobility												
Neither mobile	ref				ref							
Woman only mobile	1.37	0.005	1.10	1.71	1.35	0.008	1.08	1.68				
Partner only mobile	0.92	0.437	0.75	1.13	0.91	0.357	0.73	1.12				
Both mobile	1.29	0.073	0.97	1.99	1.37	0.087	0.96	1.97				
Household level												
Food insecurity (FI) in the last month												
Little to none					ref				ref			
Moderate or severe					1.29	0.002	1.10	1.52	1.42	0.000	1.17	1.71
Mobility and FI												
Neither mobile									ref			
Woman only mobile, no FI									1.53	0.001	1.20	1.95
Partner only mobile, no FI									0.95	0.618	0.74	1.19
Both mobile, no FI									1.37	0.130	0.91	2.07
Woman only mobile, FI									0.58	0.044	0.34	1.99
Partner only mobile, FI									0.85	0.501	0.53	1.36
Both mobile, FI									0.98	0.959	0.41	2.32
Gender of head of household												
Male					ref				ref			
Female	1.55	0.001	1.20	2.01	1.52	0.001	1.18	1.96	1.52	0.001	1.18	1.97
Wealth quintile												
Q1					ref				ref			
Q2	0.78	0.015	0.64	0.95	0.79	0.021	0.64	0.96	0.79	0.021	0.64	0.96
Q3	0.78	0.034	0.62	0.98	0.80	0.061	0.64	1.01	0.80	0.062	0.64	1.01
Q4	0.71	0.016	0.53	0.94	0.74	0.034	0.56	0.98	0.73	0.032	0.55	0.97
Q5	0.58	0.004	0.41	0.84	0.62	0.010	0.43	0.89	0.62	0.009	0.43	0.89

Characteristic	Model 1.			Model 2. Adjusting for food insecurity			Model 3. Adjusting for food insecurity and its interaction effect with mobility					
	aOR	p-value	Lower	Upper	aOR	p-value	Lower	Upper	aOR	p-value	Lower	Upper
Country												
Eswatini	ref				ref				ref			
Lesotho	0.75	0.295	0.43	1.29	0.74	0.289	0.43	1.29	0.74	0.288	0.43	1.29
Namibia	2.28	0.001	1.42	3.64	2.29	0.001	1.43	3.66	2.29	0.001	1.43	3.67
Tanzania	1.19	0.431	0.77	1.83	1.22	0.371	0.79	1.87	1.22	0.361	0.79	1.88
Uganda	3.54	0.000	2.29	5.46	3.62	0.000	2.34	5.58	3.64	0.000	2.35	5.62
Zambia	4.17	0.000	2.73	6.37	4.33	0.000	2.84	6.62	4.35	0.000	2.85	6.67
Geography												
Rural	ref				ref				ref			
Urban	0.97	0.813	0.77	1.22	0.96	0.713	0.76	1.20	0.96	0.715	0.76	1.20
Individual level												
Age group												
15-24	1.77	0.001	1.25	2.51	1.76	0.002	1.24	2.49	1.75	0.002	1.24	2.48
25-34	1.39	0.049	1.00	1.93	1.38	0.056	0.99	1.91	1.38	0.056	0.99	1.91
35-44	1.42	0.014	1.07	1.87	1.41	0.017	1.06	1.86	1.40	0.017	1.06	1.86
45-59	ref				ref				ref			
Type of partnership												
Married	ref				ref				ref			
Living together	1.26	0.013	1.05	1.52	1.26	0.013	1.05	1.52	1.26	0.014	1.05	1.52
Educational level												
None	ref				ref				ref			
Primary	0.99	0.870	0.83	1.17	0.99	0.878	0.83	1.17	0.99	0.880	0.83	1.17
Secondary or greater	0.79	0.104	0.59	1.05	0.79	0.116	0.60	1.06	0.79	0.113	0.59	1.06
Employed in past 12 months												
No	ref				ref				ref			
Yes	1.33	0.001	1.13	1.57	1.33	0.001	1.13	1.57	1.34	0.001	1.13	1.57
Partner level												
Age group												
15-24	1.42	0.042	1.01	1.98	1.43	0.035	1.03	2.01	1.45	0.031	1.03	2.03
25-34	0.98	0.889	0.73	1.31	0.99	0.931	0.74	1.32	0.99	0.945	0.74	1.32

Characteristic	Model 1.			Model 2. Adjusting for food insecurity			Model 3. Adjusting for food insecurity and its interaction effect with mobility					
	aOR	p-value	Lower	Upper	aOR	p-value	Lower	Upper	aOR	p-value	Lower	Upper
35-44	1.03	0.813	0.82	1.29	1.03	0.765	0.83	1.29	1.04	0.747	0.83	1.30
45-59	ref				ref				ref			
60+	0.69	0.123	0.43	1.11	0.68	0.118	0.43	1.10	0.68	0.114	0.42	1.10
Partner's educational level												
None	ref				ref				ref			
Primary	1.11	0.282	0.92	1.33	1.13	0.206	0.94	1.35	1.13	0.200	0.94	1.36
Secondary or greater	0.91	0.455	0.70	1.17	0.93	0.572	0.71	1.20	0.93	0.600	0.72	1.21
Partner employed in past 12 months												
No	ref				ref				ref			
Yes	1.04	0.612	0.89	1.22	1.05	0.576	0.89	1.22	1.04	0.598	0.89	1.22

Model 1 is adjusted for gender of household head, wealth quintile, country, urban geography, woman and partner's age, type of partnership, woman and partner's education, and woman and partner's employment

Model 2 is adjusted for food insecurity, gender of household head, wealth quintile, country, urban geography, woman and partner's age, type of partnership, woman and partner's education, and woman and partner's employment

Model 3 is adjusted for the main effect of food insecurity and the interaction effect of mobility and food insecurity, gender of household head, wealth quintile, country, urban geography, woman and partner's age, type of partnership, woman and partner's education, and woman and partner's employment