
Material Deprivation Affects High Sexual Risk Behavior among Young People in Urban Slums, South Africa

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ABSTRACT *Young people in urban slums adopt HIV risk behaviors influenced by their neighborhood factors. Three critical factors in urban slums of Southern and Eastern Africa—the region most affected by the HIV epidemic in the world—are unmet needs of housing, food, and health care, which are associated with HIV sexual risks. Yet, there has been limited attention on how the combination of unmet needs of housing, food, and health care—i.e., material deprivation—relates to sexual risk behavior among young people in urban slums. Cross-sectional data were extracted from the LoveLife survey in South African four provinces—KwaZulu Natal, Mpumalanga, Eastern Cape, and Gauteng, to examine the association between material deprivation and sexual risk behavior among young people aged 18–23 years (263 males, 267 females) in urban slums. Adjusted logistic regression models showed that material deprivation was significantly associated with increased odds of high sexual risk taking for young men (adjusted OR=1.20; 95 % CI=1.10, 5.58) and young women (adjusted OR=1.43; 95 % CI=1.35, 3.28). Financial difficulty—a proxy for other deprivations—was the most salient influence on young women’s high sexual risk taking (adjusted OR=2.11; 95 % CI=1.66, 2.70). Localized behavioral HIV prevention interventions should target young people in deprived households.*

KEYWORDS *Urban slums, Material deprivation, HIV risk behavior, Young people, South Africa*

INTRODUCTION

Southern and Eastern Africa has the highest rate of urbanization in the world and is expected to be two thirds urbanized by 2050.¹ Urbanization in this region is accompanied by rapid growth of urban slums, where approximately 60 % of the current urban population lives.¹ The rapid growth of urban slums in the region is a cause for concern because of their association with HIV.^{2–7} Limitations of current interventions in the region are partly due to the failure to address the social context of HIV sexual risks, which includes poverty.^{8–11}

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A vast body of literature spanning various continents shows that poverty is a key driver of HIV sexual risks in urban slums.^{3,5,7,12-16} The bulk of this research has assessed broad measures of economic deprivation—such as income, employment, education or lack of access to opportunity structures—to predict the likelihood of slum residents, particularly women and girls, in sexual risk taking. While this research is valuable, increasingly attention in sub-Saharan Africa has been devoted to predicting sexual risk taking using critical aspects of urban poverty that best represents individuals' living experiences.¹⁷⁻²⁰ Greif's¹⁷ and Burns and Snow¹⁹ outlined several reasons for this trend. Both these authors identify that previous research is not sufficiently equipped to inform localized HIV prevention strategies. Supporting this view, two reviews of studies in Southern and Eastern Africa showed that behavioral HIV prevention interventions in the region have had weak outcomes, especially among young people.^{9,11} The two reviews conclude that an emerging generation of structural interventions is needed to challenge the wider drivers of the HIV epidemic, including unmet basic needs of housing, food, and health care access. Our review of the literature confirms that, surprisingly, the combination of the three unmet basic needs—housing, food, and health care—is infrequently used in studies of disadvantage and HIV risk among young people living in urban slums. This paper uses the concept of material deprivation to examine the relationship between the three unmet basic needs—food, housing, and health care—and sexual risk behavior among young people in urban slums in South Africa.

The idea that material deprivation and health behavior are related is well-established, especially in the literature on high-income countries. Several studies on high-income countries have found a strong association between material deprivation and health behavior.^{17,21-24} However, there is no consensus to date on what constitutes material deprivation and the research output on such relationships on low-income countries is relatively limited. Moreover, Burns and Snow¹⁹ argue that commonly used constructs of deprivation in high-income countries do not adequately represent the conditions and realities of low-income countries. Acknowledging this view, Greif¹⁷ conceptualized deprivation with local constructs of unmet basic needs of housing, health care, and food, and found a positive association with women's likelihood of engaging in sexual risk behavior (transactional sex and multiple sexual partners) in Nairobi slums, Kenya. Their effects were at least as strong as broad measures of economic deprivation. Focusing solely on women is one of the limitations of Greif's¹⁷ study because responses to deprivation are likely to be gendered.^{17,20} Thus, the extent to which Greif's¹⁷ findings can be extrapolated to men is limited.

We extend Greif's¹⁷ work by focusing on young men and young women in South Africa urban slums. South African slums, locally referred to as informal settlements, are home to 8.7 % of the total population aged 2 years or more.²⁵ A large proportion of slum residents live without access to basic services.^{18,26-28} Both HIV prevalence and incidence is much higher in slum settings. One in five residents (21.6 %) are estimated to be living with HIV and just under a third of new infections nationally per year (29.1 %) occur in slum areas.²⁵

Based on previous research,^{17,19} we hypothesized that young people in materially deprived households in urban slums have a greater likelihood of reporting high sexual risk taking than their counterparts in non-materially deprived households. The hypothesis is based on the premise that specific social, economic, and physical characteristics of the urban environment—for example, urban slums—influence a

wide variety of health behaviors.^{29–31} Although neighborhood effects cannot be directly tested in the current study (due to data limitations), we control for disadvantageous neighborhood conditions by examining only slum residents.

METHODS

Data and Sample

This paper contains findings from a cross-sectional analysis of secondary data from the 2011 LoveLife Evaluation Survey (LLES) of young people (18–23 years) in South African households of four provinces—KwaZulu Natal, Mpumalanga, Eastern Cape, and Gauteng—approved by the Human Sciences Research Council (HSRC) Research Ethics Committee (Protocol Number REC 2/16/02/11). The survey used a multi-stage disproportionate, stratified cluster sampling and was collected by HSRC. The household and interview response rates to the survey were 93.58 and 96.42 %, respectively. Our focal variables had less than 3 % missing values and sensitivity analysis showed that the exclusion of respondents with missing values resulted in almost identical findings as those reported in this paper.

In generating the analytical sample for this paper—young people in urban slums—the full LLES sample of 3,123 young people was used. A proxy indicator was used based on the type of dwelling through the item in the survey which assessed the structural integrity of the wall materials: “what type of wall does your dwelling have?” Those who responded by indicating “corrugated iron or cardboard” were considered in this paper as living in urban slums. Our proxy indicator only has face validity and based on definitions used in previous research on housing and risk behavior in the South African urban context.¹⁹ Analyses were further restricted to unmarried black residents because they were a majority (98.1 %) in urban slums. This translated to a sample of 267 young women and 263 young men. We did not exclude respondents based on the length of stay in urban slums because the data did not have these items.

Measures

Sexual Risk Taking The dependent variable, sexual risk taking, was defined by three other variables: multiple sexual partnerships, transactional sex, and condom use during last sexual intercourse. Specifically, respondents were asked whether they used condoms at last sexual intercourse, had multiple sexual partners in the last 12 months, and exchanged sex for money or goods in the last 12 months. Variables from these measures were dichotomous, indicating whether a respondent used condoms or not, had two or more sexual partners or not, and exchanged sex for money or goods in the last 12 months or not. Given this information, a new variable called sexual risk taking was created as a three-level ordinal variable as follows.

Respondents who had not experienced sex are put in a latent class called “No sexual risk taking.” Respondents who reported using condoms at last sexual intercourse, maintaining only one sexual partner and no transactional sex in the last 12 months are categorized under “Low sexual risk taking.” All respondents who reported that they had not used condoms at last sexual intercourse or transactional sex are categorized under “High risk taking,” irrespective of the number of sexual partners they had. Those who reported use of condoms at last sexual intercourse, but had more than one sexual partner were added to this class. The outcome

variable was coded as 0=No sexual risk, 1=Low sexual risk, and 2=High sexual risk. The steps are then replicated for female sexual risk taking. The use of sexual risk taking as a three-level ordinal variable reduces concerns of how multiple sexual risk practices might combine to influence risk.²⁰ We carried out separate analyses for males and females based on the assumption that sexual risk taking is somehow different for males and females. For example, the variable on transactional sex could involve the giving of cash or goods for males and receiving for females.

Material Deprivation In this study, material deprivation was defined to include three dimensions of self-assessments of food, healthcare, and housing by young people. Food and healthcare deprivations were dichotomous variables coded 0=no and 1=yes. This paper defined housing deprivation by two implicit indicators: location (by considering urban slums only) and housing quality (corrugated and cardboard walls of dwellings); one explicit indicator, number of people in a dwelling, a dichotomous variable coded 0=no crowding, 1=overcrowding. The LLES did not measure the number of rooms per dwelling. Therefore, our measure of housing deprivation is based on the assumption that the majority of urban slums in South Africa are single rooms based on previous studies.

The food deprivation measure used the following question: "In the past week, how often have you gone without food to eat?" Crowdedness was measured with an item that asked respondents, "How many persons or family members (including yourself), live in this household?" The respondent was coded as experiencing housing deprivation if this question was answered with a number of 4 or greater. Health care deprivation was measured with one item that asked respondents, "In the past week, how often have you gone without medicines or medical treatment that you needed?" Our composite material deprivation indicator combined information from housing, food and medical care to create a dichotomous measure that indicated the presence of 1 or more hardships. Lastly, a general category of deprivation was defined by self-reporting of "financial difficulty." Our measure of financial difficulty included two questions: "Did you receive any income from any source in the last month?" and "How many people in this household receive a grant?" Financial difficulty was used as a proxy for other deprivations not associated with food, housing, or medical care.

Statistical Analyses

The analyses were conducted in two parts using Stata software (version 12.0). First, descriptive statistics were conducted to provide profiles of the participants, sexual risk behaviors, and indicators of material deprivation. Second, separate multivariable logistic regression models for young men and young women were fitted to examine the association between material deprivation and sexual risk taking, adjusted for age, education, employment, and staying with parents. For these models, we first combined the two categories of sexual risk taking variables (no and low sexual risk taking) to allow examining the association between material deprivation and high sexual risk taking using logistic regression models. Then, we checked inter-correlations between the three deprivation variables. Finally, a stepwise procedure (backward elimination) was chosen to select variables to be entered into the final multivariable logistic regression model that examined an aggregate measure of material deprivation and sexual risk taking. We used $p < 0.05$ to define statistical significance for all analyses and pseudo R-squared statistics to check the model fit.

RESULTS

Table 1 presents summary statistics of socio-demographic characteristics of the respondents. Of the 530 respondents, 49 % were male and 51 % female. The average age of the respondents was 20.66 years (SD=2.90) for males and 20.42 years (SD=2.87) for females. About 44 % of male respondents were between 18 and 19 years compared to 46 % for females. About 86 % of males had received secondary or higher education compared to 90 % of the females. About 75 % of males reported staying with at least a parent or relative compared to 70 % of females. About 65 % of males reported being employed (or self-employed) and 49 % of females reported being employed. Notably, in Table 1, females had higher educational attainment level ($\chi^2=13.40$, $p<0.05$) and lower level of employment than their male counterparts ($\chi^2=12.76$, $p<0.05$).

Table 2 presents the results of the descriptive statistics of self-reported sexual risk behaviors and material deprivation in a sample of 530 unmarried youth in urban slums in South Africa. With regard to condom use, 20.3 % of the youth reported that they did not use a condom during their last sexual intercourse and there was no significant gender difference detected on this issue. With regard to multiple sexual partners, 46.3 % reported that they had two or more sexual partners in the past 12 months, and males reported a higher prevalence than females (64.1 versus 28.7 %, $\chi^2=17.90$, $p<0.001$). A small percentage of the youth engaged in a transactional sex in the past 12 months (8.3 %), surprisingly with males more likely to report transactional sex (11.2 versus 5.5 %, $\chi^2=8.06$, $p<0.01$). About 41.3 % of the youth were in the high sexual risk category, with more males likely to be in the high sexual risk category (50.0 versus 33.0 %, $\chi^2=16.81$, $p<0.001$) and more females in the low sexual risk category (42.7 versus 27.3 %, $\chi^2=6.52$, $p<0.05$).

Differences of self-reported sexual risk behaviors and material deprivation between males and females are also presented in Table 2. In addition, there are

TABLE 1 Socio-demographic characteristics of the study sample (N=530)

Variable	Male	Female	Total	Chi-square or T tests
N	263	267	530	
Mean age (mean \pm SD)	20.66 \pm 2.90	20.42 \pm 2.87	20.40 \pm 2.89	1.20
Age (years)				0.54
18–19	44.2	45.9	45.0	
20–23	55.8	54.1	55.0	
Highest educational level				13.40*
Grade 8 or less	14.5	10.5	12.5	
Grade 9 or higher	85.5	89.5	87.5	
Family structure				0.37
Mother/father/both present	74.7	66.5	70.2	
Others: parents not present	25.3	33.5	29.8	
Employment status				12.76*
Employed/self employed	64.9	49.0	57.0	
Not employed	35.1	51.0	43.0	
Household size (mean occupancy)	4.0	4.0	4.0	1.14

* $p<0.05$

TABLE 2 Self-reported sexual risk behaviors and indicators of material deprivation in a sample of 530 unmarried youth in urban slums in South Africa

	Male	Female	Total	Chi-square tests
Sexual risk behaviors				
No condom use last sexual intercourse (<i>n</i> =74)	19.5	21.3	20.3	1.37
Two or more sex partners in the past 12 months (<i>n</i> =171)	64.1	28.7	46.3	17.90***
Transactional sex in the past 12 months (<i>n</i> =30)	11.2	5.5	8.3	8.06**
Sexual risk taking				
High sexual risk taking (<i>n</i> =219)	50.0	33.0	41.3	16.81***
Low sexual risk taking (<i>n</i> =186)	27.3	42.7	35.1	6.52*
No sexual risk taking (<i>n</i> =125)	22.7	24.3	23.6	2.69
Indicators of material deprivation				
Food deprivation (<i>n</i> =112)	20.9	21.6	21.3	7.47
Medical care deprivation (<i>n</i> =115)	26.6	17.2	21.9	14.35*
Housing deprivation (<i>n</i> =350)	66.3	67.0	66.7	1.42
Material deprivation (<i>n</i> =486)	92.1	95.1	95.5	1.92
Other deprivations				
Financial difficulty (<i>n</i> =491)	86.3	91.4	89.3	5.24*

p*<0.05; *p*<0.01; ****p*<0.001

relatively low proportions of youth reporting food insecurity, as well as medical deprivation, in urban informal settlements in South Africa. However, consistent with the literature, both males and females reported high levels of housing deprivation.

Table 3 presents the results of bivariate tests of independence between high sexual risk taking and selected independent variables. Separate results are presented for males and females. There were significant associations between most independent measures and high sexual risk taking for both males and females. Individual measures of material deprivation are not included in Table 3 because they did not attract much interpretive attention here.

Table 4 presents the results of the associations between material deprivation and covariates with sexual risk taking in a multiple logistic model. The table displays two separate models for each sex. As shown in Table 4, females in materially deprived households had almost one and a half times the odds of sexual risk taking (adjusted OR=1.43; 95 % CI=1.35, 3.28) compared with females from non-deprived households. A slightly weaker association was found between material deprivation and male sexual risk taking (adjusted OR=1.20; 95 % CI=1.10, 5.58). Financial difficulty remained the most salient influence on female risk taking (adjusted OR=2.11; 95 % CI=1.66–2.70) after correcting for covariates.

DISCUSSION

This paper sets out to examine the association between material deprivation (unmet basic needs related to housing, food, and health care) and sexual risk taking by sex among young people in South African urban informal (slum) settlements. The major findings in this study are that material deprivation is significantly associated with

TABLE 3 Gender stratified results of bivariate tests of independence between selected independent variables and high sexual risk taking in urban informal settlements, South Africa (N=530)

	High sexual risk taking					
	Male			Female		
	No (N=132)	Yes (N=131)	<i>p</i> Value	No (N=179)	Yes (N=88)	<i>p</i> Value
Material deprivation (%)						
No	10	8		13	7	
Yes	90	92	0.000***	87	93	0.000***
Financial difficulty (%)						
No	85	86		88	83	
Yes	15	14	0.678	12	17	0.000**
Age (years) (mean)	20	20	0.741	20	20	0.952
Family type (%)						
Mother/father/both	73	83		76	86	
Others/parents not present	27	17	0.324	24	14	0.303
Mother's education (%)						
Low	73	83		70	81	
Secondary or higher	27	17	0.405	30	19	0.671
Employed/self-employed (%)						
No	25	21		47	51	
Yes	75	79	0.100**	53	49	0.000***
Education level (%)						
Grade 8 or low	15	16		89	88	
Grade 9 or higher	85	84	0.004***	11	17	0.000**

Two-sided *t* test for means; chi-square tests for categorical variables

p*<0.05; *p*<0.01

increased odds of high sexual risk taking for both young men and young women who reside in urban slums. However, financial difficulty—which was used as a proxy for other deprivations—was the most salient influence on young women's high sexual risk taking in urban slums.

Other quantitative studies among young people in Cape Town, South Africa^{19,20} suggest that young people are more likely to engage in sexual risk behavior (multiple sexual partners and low condom use) if they reside in slum households characterized by a high concentration of material disadvantage—which was measured by physical housing characteristics. In the slums of Nairobi, Kenya, Greif¹⁷ found a significant association between single-item indicators of housing, food, and medical needs and sexual risk behavior (multiple sexual partners and transactional sex). The current study found that an aggregate measure of material deprivation is associated with sexual risk taking for both young men and young women. We propose that this significant association, particularly for young men, needs further research using comprehensive measures of material deprivation.

Our results support the idea that the social context has not been adequately taken into account in understanding and respond to the HIV risk factors in slum settings. Additionally, the findings support the argument from previous studies that

TABLE 4 Association between material deprivation and covariates with high sexual risk taking in a multivariable logistic regression: separate results for males and females

	AOR [95 % CI]			
	High female sexual risk taking		High male sexual risk taking	
	Model 1	Model 2	Model 1	Model 2
Material deprivation				
Non-deprived	1.00	1.00	1.00	1.00
Deprived	1.59 [1.01–4.71]**	1.43 [1.35–3.28]*	1.30 [1.01–5.30]*	1.20 [1.10–5.58]*
Financial difficulty				
No	1.00	1.00	1.00	1.00
Yes	2.17 [1.56–2.72]**	2.11 [1.66–2.70]**	1.86 [1.66–2.70]*	1.61 [0.60–2.83]
Age (years)	1.17 [1.09–1.25]	0.89 [0.78–1.02]	1.20 [0.93–1.49]	1.15 [0.98–1.35]
Family type				
Both parents	1.00	1.00	1.00	1.00
Other/parents not present	1.79 [1.01–1.84]	1.31 [1.49–3.01]	1.15 [1.01–1.30]	1.09 [0.64–1.91]
Mother's education				
Secondary or higher	1.00	1.00	1.00	1.00
Primary	1.35 [1.05–26.22]	1.20 [1.85–4.11]	1.99 [0.58–6.85]	1.74 [0.80–5.11]
Education level				
Grade 8 or less		1.00		1.00
Grade 9 or higher		0.52 [0.38–0.69]*		0.67 [0.44–0.71]*
Employed/self-employed				
Yes		1.00		1.00
No		1.24 [1.12–9.31]		3.92 [0.76–4.86]

AOR adjusted odds ratio

* $p < 0.05$, ** $p < 0.01$; 95 %CI=95 % confidence interval

explanations, as well as interventions, of HIV risk factors that do not engage with the social context are inadequate.^{14,20} There is an urgent need for locally appropriate behavioral HIV prevention interventions to engage with housing, food, and healthcare needs among young people in urban slums.

Along with material deprivation, our study showed that financial difficulty, used in this study as a proxy for other deprivations, was the most salient influence on female risk taking. This finding contradicts the notion that deprivation, being a function of shortage in financial capital, should be a more proximate indicator of risk than income.^{24,32} Disparities in findings might be a result of the lack of data for measuring financial difficulty in the LoveLife data set, an important limitation.

There were several limitations to our study. Firstly, most of the information for the focal independent and dependent variables was collected through face-to-face interviews, and it is possible that this data collection method led to overestimations or underestimations with respect to the associations observed between the independent and dependent variables. The analysis was also hampered by a relatively low proportion of females, in particular, who reported transactional sex (5.5 % for transactional sex). This study did not have statistical power to detect differences in models including interaction terms, nor

were sex and education-level stratified multivariable logistic regression models robust. Therefore, this paper is unable to test the extent to which level of education modified the relationship between measures of material deprivation and sexual risk taking in using multivariable logistic regression models. Secondly, as an exploratory cross-sectional study design, our results are unable to make any claims about the causal direction of these relationships. This limits the capacity to understand the extent to which material deprivation influences sexual risk taking. Thirdly, the present study did not have information to control for variables such as migration status, religion, length of residence, or number of children in the household. Lastly, the data in the LoveLife survey might be subject to social desirability bias, resulting in over-reporting and underreporting of our focal variables because of the mode (face-to-face interviews) that was employed to collect data.

Further research is warranted on how multiple measures of material deprivation might influence sexual risk practices among various sub-populations of young people who are in school or out of school in urban slum settings. Further research should also compare this measure of material deprivation to traditional measures of socio-economic status or conduct construct validity analysis of material deprivation. The current study did not implement this analysis because of limitations in the secondary data. Future research should also address the appropriate operationalization of sexual risk taking. Our study, like previous studies in the field of HIV sexual risks among young people^{19,20,33}, defined sexual risk taking by including non-use of condoms during sexual intercourse, which may not represent sexual risk taking in specific sexual relationship contexts.

Despite the limitations, the proxy measure—which only has face validity—enabled the investigation of intra-urban differences of sexual risk taking between young people in materially deprived and non-materially deprived slum households. The results affirmed the importance of analyzing disaggregated data to uncover significant relationships that are often concealed within aggregate statistics.¹¹

In conclusion, the findings confirm high sexual risk taking among young people in urban slums in South Africa. The results suggest that policy makers should consider localized behavioral HIV prevention interventions to address HIV in the country. More attention should be paid to marginalized subgroups of young people residing in urban slums.

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