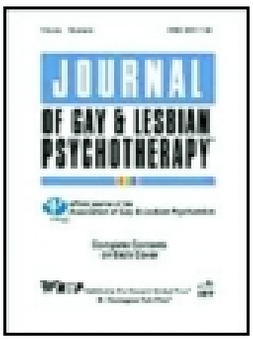

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Association between risky sexual behavior and a psychosocial syndemic among Nigerian men who have sex with men

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ABSTRACT

Background: The HIV epidemic among men who have sex with men (MSM) is reinforced by a psychosocial syndemic, but this has not been investigated in sub-Saharan Africa. This study investigated the psychosocial syndemic and its relationship with risky sexual behavior among Nigeria MSM. *Methods*: Eighty-one MSM and 81 heterosexual men were compared for risky sexual behavior and psychosocial adversity variables—childhood adversity, intimate partner violence, depressive symptoms, suicidal ideation, substance use, and a derived psychosocial syndemic score. The association between syndemic scores and risky sexual behavior was examined among MSM. *Results*: MSM had significantly higher rates of individual psychosocial adversities except substance use. There were significant interrelationships between the variables, and syndemic scores were associated with higher-risk sexual behavior. *Conclusion*: This is the first study to investigate the psychosocial syndemic and its relationship with HIV risk among African MSM. The findings highlight the role of psychosocial adversities in exacerbating the HIV epidemic among MSM in developing countries.

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MSM; Nigeria; psychosocial adversity; risky sexual behavior; syndemic

Men who have sex with men (MSM) are disproportionately affected by the HIV epidemic globally. For example, while the rates among American MSM were found to be stabilizing, they currently account for 56% of people living with HIV in the United States and 70% of new infections (Centers for Disease Control and Prevention, 2017). Nigeria accounts for about 60% of new infections in the combined Western and Central African regions, and reported the second largest HIV epidemic in 2015 (UNAIDS, 2016). The prevalence rate of HIV infection among Nigerian MSM

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increased from 13.5% in 2007, through 17.2% in 2010, to 22.9% in 2014; making MSM the largest at-risk group for HIV infection in Nigeria (Federal Ministry of Health, 2007, 2010; National HIV/AIDS & STIs Control Programme, 2014). Risky sexual behavior, including receptive anal sex, has been reported to explain the disproportionately high burden of HIV infection among MSM (Beyrer et al., 2012; Julio et al., 2015; Myers, Javanbakht, Martinez, & Obediah, 2003). These indices highlight the importance of fully understanding the determinants of risky sexual behavior in Nigerian MSM.

Social adversity and risky sexual behavior

Risky sexual behavior in MSM is driven by social adversities faced by MSM. Okanlawon, Adebowale, and Titilayo (2013), in a qualitative study of Nigerian MSM, found that MSM who had been disowned by their family members were more likely to engage in transactional sex as a source of livelihood. Similar findings have been reported in developed countries, including the United States (Bauermeister, Eaton, & Stephenson, 2016). Other social adversities associated with risky sexual behavior in MSM include childhood adversity and intimate partner violence. Thompson et al. (2017), in a prospective study of youth followed up from ages 4 through 18 years, found that childhood neglect and emotional maltreatment were significant predictors of risky sexual behavior. The association between intimate partner violence and risky sexual behavior has been well-described among heterosexual women (Decker et al., 2009; Jewkes et al., 2006). A recent systematic review also reported a similar relationship in MSM (Finneran & Stephenson, 2013). However, all of the included studies were carried out in developed countries.

Psychological adversity and risky sexual behavior

Higher rates of adverse mental outcomes have been consistently demonstrated among MSM. A meta-analysis showed that gay/bisexual men were 2–4 times more likely to be depressed and suicidal, and 2–3 times more likely to misuse alcohol and other psychoactive substances compared to heterosexual men (King et al., 2008). However, relatively few studies in sub-Saharan Africa have investigated these mental health disparities (Cook, Sandfort, Nel, & Rich, 2013; Oginni, Mosaku, Mapayi, Akinsulore, & Afolabi, 2017; Secor et al., 2015), and many of these did not compare MSM with heterosexual men.

There is evidence for relationships between increased risky sexual behavior and psychiatric morbidity. Bancroft, Janssen, Strong, and Vukadinovic (2003) found that some gay and bisexual men with higher levels of

depressive symptoms were more likely to engage in risky sexual behavior compared to those with lower levels of depressive symptoms. Similarly, MSM with substance use problems have been found to be more likely to have multiple sexual partners and to use condoms inconsistently (Keogh et al., 2009). Ferlatte, Dulai, Hottes, Trussler, and Marchand (2015) also found that suicidal ideation was associated with a significantly higher likelihood of condomless anal intercourse among Canadian gay and bisexual men.

The HIV-psychosocial adversity syndemic

The interactions between individual psychosocial adversities among non-heterosexual men and the cumulative effect of these factors on the increased risk for HIV infection are captured by the syndemic theory first proposed by Stall et al. (2003). It proposes that individual epidemics of psychosocial problems in gay and bisexual men reinforce each other, and cumulatively increase the likelihood of other adverse health outcomes. In their study, Stall et al. (2003) demonstrated significant relationships between poly drug use, depression, childhood sex abuse, and partner violence among American MSM. They also showed a dose-response relationship between psychosocial adversity and high-risk sex and HIV prevalence, such that increasing numbers of the psychosocial adversity variables were associated with corresponding increased likelihood of risky sexual behavior and HIV infection. Since the initial description, several studies have replicated their findings, along with other variables such as childhood victimization, suicidality, discrimination, and internalized homophobia (Dyer et al., 2012; Ferlatte et al., 2015; Herrick et al., 2013). Many of these studies were carried out in high-income countries, and relatively few in developing countries (Jie, Ciyong, Xueqing, Hui, & Lingyao, 2012). However, considering the burden of HIV in sub-Saharan Africa, especially among MSM, it is noteworthy that no studies have investigated the role of the psychosocial syndemic in the risk for HIV among MSM in this region. Detecting and unraveling this relationship may indicate strategies towards halting the HIV epidemic among Nigerian MSM as well as MSM in the wider sub-Saharan region.

The specific objectives of this study were therefore: (1) to detect individual psychosocial epidemics among Nigerian MSM by comparing the rates of psychosocial adversity and risky sexual behavior among Nigerian MSM and heterosexual men; (2) to demonstrate a psychosocial syndemic by investigating the relationships between early life adversity, intimate partner violence, and mental health problems (depression, suicidality, and lifetime substance use) among Nigerian MSM; and (3) to determine the relationship

between the psychosocial adversity syndemic and risky sexual behavior among Nigerian MSM.

Methods

Participants

Participants were male students of a Nigerian tertiary institution—the Obafemi Awolowo University, Nigeria. They consisted of 81 MSM and 81 age- and sex-matched heterosexual controls. Ethical approval was obtained from the Ethics and Review Board of the Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife, Nigeria.

Procedure

MSM were recruited via snowballing. Initial seeds were recruited via an online-based Nigerian Lesbian Gay Bisexual and Transgender (LGBT) organization—Queer Alliance; the interviews took place at prearranged venues on the university campus. The heterosexual controls were recruited from the sites of interviews with MSM. Controls were initially asked about their ages and sexual orientation to ensure matching with the MSM, and to ensure correct classification as controls, respectively. Informed consent was obtained from both groups of participants after the study objectives had been explained to them.

Measures

Sociodemographic information

This included the participants' ages, level of study, and dating status. Participants whose monthly allowance was less than the mean, and who worked to supplement their monthly allowance, were classified as having financial difficulty.

Social adversity

Childhood adversity: Childhood neglect and physical abuse (occurring before the age of 18 years) were each ascertained by single questions. The responses to both questions were "Yes" or "No." Participants who answered yes to at least one question were classified as having experienced childhood adversity.

Intimate partner violence was ascertained using the HARK questionnaire which consists of four questions (Sohal, Eldridge, & Feder, 2007), which assessed having been Humiliated and Afraid (emotional abuse), Raped (sexual abuse), or Kicked (physical abuse). The questionnaire was

developed from the 30-item Abuse Assessment Screen (McFarlane, Parker, Soeken, & Bullock, 1992; Sohal et al., 2007). The responses to each item were "Yes" (1) and "No" (0). Using a cutoff of 1, sensitivity of 81% and specificity of 95% have been reported (Sohal et al., 2007) (in this study, $\alpha = 0.61$).

Psychiatric morbidity

Depression was assessed using the Zung's Self-Rating Depression Scale, which is a 20-item self-administered questionnaire graded on a 4-point Likert scale (Zung, 1965). Participants were classified as depressed or not depressed using a cutoff of 40 (Campo-Arias et al., 2006). Using this cutoff, the sensitivity and specificity have been found to be 88.6% and 74.8%, respectively (Campo-Arias et al., 2006). The instrument has been found to be satisfactory for use in Nigeria (Fatoye, Adeyemi, & Oladimeji, 2004; Jegede, 1978).

Suicidal ideation was assessed using the negative subscale of the Positive and Negative Suicide Ideation Inventory (PANSI) (Osman, Gutierrez, Kopper, Barrios, & Chiros, 1998). The subscale consists of eight items which rate suicidal thoughts over the past two weeks and each item is rated on a 5-point Likert scale. The mean scores were determined and participants were classified as having suicidal ideation if their mean score was higher than 1.63 (Osman et al., 2003). This has been used in Nigeria with an internal consistency of 0.93 (Oginni et al., 2017).

Psychoactive substance use: Participants were asked to indicate psychoactive substances they had ever used. Options included alcohol, tobacco, cannabis, opiates, cocaine, and any other unspecified substances. The total number of psychoactive substances used was then derived and used in subsequent analyses. Participants were further dichotomized into those who had never used any psychoactive substances and those who had used at least one psychoactive substances in their lifetimes.

A composite score for psychiatric morbidity was derived by summing the dichotomized categories for depression, suicidal ideation, and substance use. Participants were thus categorized into those with at least one psychiatric morbidity and those without.

Composite psychosocial syndemic variable

This was derived as a total of the dichotomized social adversity variables (childhood adversity and intimate partner violence) and psychiatric morbidity variables (depression, suicidal ideation, and substance use) present in each participant. This score ranged between 0 and 5.

Risky sexual behavior

This was assessed using the sexual behavior section of the HIV Risk-taking Behaviour Scale (Ward, Darke, & Hall, 1990). This subscale consists of five items assessing risky sexual behavior in the past month. This includes number of sexual partners, casual sex, transactional sex, anal sex, and frequency of condom use. Each item is scored on a 6-point Likert scale with higher options indicating higher-risk behavior. The internal consistency has been reported as 0.70, and the test-retest reliability as 0.86 (Darke, Hall, Heather, Ward, & Wodak, 1991). The internal consistency in this study was 0.85. Total scores were used in multivariate analyses; however, specific forms of risky sexual behavior were also described.

Statistical analyses

Data analyses were carried out using Stata version SE 14.1 (StataCorp, LP, College Station, TX). Descriptive and inferential statistics were carried out and data were summarized using proportions, means, and standard deviations. Univariate regressions were used to investigate relationships between sexual orientation and sociodemographic variables, social adversity, psychiatric morbidity, and risky sexual behaviors. Univariate regressions were also carried out to investigate the interrelationships between individual psychosocial adversity factors among MSM. Univariate linear regression was further used to investigate the relationships between the individual social adversity, psychiatric morbidity, and the composite syndemic variable (predictors) and the risky sexual behavior score (outcome), while controlling for sociodemographic characteristics (age and financial difficulty). Univariate logistic regressions were used to investigate the relationships with the predictors and the individual components of risky sexual behavior. The univariate regression analyses which involved risky sexual behavior as the outcome variables were carried out only among participants who were sexually active; and as only 14 heterosexual participants reported being sexually active in the prior month, these analyses were only carried out among MSM. The level of significance was taken as $p < .05$ at all levels of analyses.

Results

Sociodemographic, psychosocial variables, and risky sexual behavior among MSM and heterosexual men

Study participants who were MSM were 3.6 times as likely as heterosexual men to experience financial difficulty (95% CI: 1.51–8.68) (Table 1). They

Table 1. Sociodemographic factors and psychosocial adversity in heterosexual participants and MSM.

	Heterosexual		MSM				
Variables	$n = 81$	%	$n = 81$	%	Odds ratio	95% CI	
Sociodemographic							
Age (Mean ± SD)	26.1	6.79	25.9	5.69	−0.23[a]	−2.20	1.69
Financial difficulty							
Yes	8	9.9	23	28.4	**3.62****	**1.51**	**8.68**
No	73	90.1	58	71.6			
Dating status							
Dating	31	38.3	42	51.9	1.74[b]	0.93	3.25
Not dating	50	61.7	39	48.1			
Religion							
Christian	68	84.0	73	90.1	1.74	0.68	4.47
Non-Christian	13	16.0	8	9.9			
Social adversity							
Childhood adversity							
Yes	4	4.9	13	16.0	**3.68***	**1.15**	**11.82**
No	77	95.1	68	84.0			
Intimate Partner Violence							
Yes	14	17.3	30	37.0	**2.82****	**1.35**	**5.85**
No	67	82.7	51	63.0			
Psychiatric morbidity							
Depression							
Present	11	13.6	32	39.5	**4.16*****	**1.91**	**9.03**
Absent	70	86.4	49	60.5			
Suicidal ideation							
Suicidal	9	11.1	25	30.9	**3.57****	**1.54**	**8.26**
Not suicidal	72	88.9	56	69.1			
Substance use							
Yes	17	21.0	21	25.9	1.32	0.63	2.73
No	64	79.0	60	74.1			
Any psychiatric morbidity							
Yes	27	33.3	48	59.3	**2.91****	**1.53**	**5.52**
None	54	66.7	33	40.7			
Composite Psychosocial syndemic score							
0	47	58.0	20	24.7	(ref)***		
1	22	27.2	27	33.3	**0.31**[a]	−0.12	0.74
2	5	6.2	19	23.5	**1.75**[a]	**1.23**	**2.26**
3	5	6.2	7	8.6	**2.73**[a]	**2.11**	**3.34**
4	2	2.5	5	6.2	**3.62**[a]	**2.85**	**4.39**
5	0	0.0	3	3.7	**4.88**[a]	**3.66**	**6.11**

[a]Regression coefficient stated.
[b]$p < 0.1$,
*$p < 0.05$,
**$p < 0.01$,
***$p < 0.001$.

were also marginally more likely than heterosexual men to be in dating relationships.

MSM were 3.7 times more likely to report childhood adversity (95% CI: 1.15–11.82) and 2.8 times more likely to report intimate partner violence (95% CI: 1.35–5.85). They were also 2.9 times more likely to experience at least one psychiatric morbidity than heterosexual men (95% CI: 1.53–5.52). Specifically, they were 4.2 times more likely to report depressive symptoms (95% CI: 1.91–9.03), and 3.6 times as likely to report suicidal ideation (95% CI: 1.54–8.26). The difference in substance use was not statistically

Table 2. Risky sexual behavior (RSB) in heterosexual men and MSM.

	Heterosexual		MSM				
Variables	$n = 14$	%	$n = 60$	%	Odds ratio	95% CI	
Sexually active in last month[a]							
Yes	14	17.3	60	74.1	**13.67****	**6.39**	**29.26**
No	67	82.7	21	25.9			
No of partners							
1	8	57.1	24	40.0	2.00	0.62	6.49
>1	6	42.9	36	60.0			
Casual partners							
Yes	12	85.7	50	83.3	0.83	0.16	4.31
No	2	14.3	10	16.7			
Condom use							
Consistent	6	42.9	16	26.7	2.06	0.62	6.87
Inconsistent	8	57.1	44	73.3			
Been paid for sex							
Yes	12	85.7	35	58.3	4.29[c]	0.88	20.86
No	2	14.3	25	41.7			
Anal sex							
Yes	2	14.3	52	86.7	**39.00*****	**7.33**	**207.55**
No	12	85.7	8	13.3			
RSB score (Mean ± SD)	5.93	3.65	7.93	3.39	2.00[b,c]	−0.03	4.04

[a]$n = 162$, all participants; subsequent analyses are based on participants in both groups who were sexually active.
[b]Regression coefficient stated.
[c]$p < 0.1$,
*$p < 0.05$,
**$p < 0.01$,
***$p < 0.001$.

significant. MSM were significantly more likely than heterosexual men to cumulatively experience more psychosocial adversities (Table 1).

MSM in this study were 13.7 times more likely than heterosexual men to be sexually active (95% CI: 6.39–29.26) (Table 2). They were more likely than heterosexual men to have been paid for sex, to have more than one sexual partner, and to use condoms inconsistently; however, these relationships were not statistically significant. The mean risky sexual behavior score was also marginally higher among MSM compared to heterosexual men (Cohen's d = 0.57).

Relationships between social adversity variables and psychiatric morbidity in MSM

There were positive relationships between all of the individual psychosocial variables; however, not all of these relationships attained statistical significance (Table 3). MSM with depressive symptoms were 7.7 times more likely to report suicidal ideation (95% CI: 2.67–22.31). MSM who experienced childhood adversity were 4.4 times more likely to report depressive symptoms (95% CI: 1.22–15.48) and five times more likely to experience intimate partner violence (95% CI: 1.39–18.21).

Table 3. Interrelationships between social adversity variables and psychiatric morbidity in heterosexual men and MSM.

	MSM			
Variables	Childhood adversity OR (95% CI)	Intimate partner violence OR (95% CI)	Depressive symptoms OR (95% CI)	Substance use OR (95% CI)
Intimate partner violence	**5.04* (1.39–18.21)**	—	—	—
Depression	**4.40* (1.22–15.84)**	1.29 (0.51–3.23)	—	—
Substance use	2.03 (0.58–7.09)	1.82 (0.66–5.00)	2.04 (0.75–5.59)	—
Suicidal Ideation	3.24[a] (0.96–10.94)	0.73 (0.27–1.97)	**7.71*** (2.67–22.31)**	2.72[a] (0.97–7.69)

Note. Variables in the columns were entered into each univariate regression model as predictor variables, while variables in the rows were entered as outcome variables.
[a]$p < 0.1$,
*$p < 0.05$,
**$p < 0.01$,
***$p < 0.001$.

Factors associated with risky sexual behavior in MSM

MSM who experienced financial difficulty were 3.6 times more likely to have more than one sexual partner (95% CI: 1.01–12.61), as shown in Table 4. Each additional increase in the number of psychosocial adversities experienced was associated with a higher likelihood of engaging in sexual activity (OR: 1.80, 95% CI: 1.06–3.07), a higher likelihood of having been paid for sex (OR: 1.56, 95% CI: 1.04–2.33), and an increase in the risky behavior score by 0.8 units.

The risky sexual behavior score was 2.5 (95% CI: 0.25–4.64) units higher in MSM who had experienced childhood adversity compared to those who had not. MSM who experienced intimate partner violence were 4.9 times (95% CI: 1.32–18.06) more likely to be sexually active compared to those who had not experienced it.

MSM who had at least one psychiatric morbidity were 2.3 times more likely to have been paid for sex (95% CI: 1.27–4.07); their risky sexual behavior scores were also 1.12 units higher compared to those who had no psychiatric morbidity (95% CI: 0.33–1.91). None of the relationships between risky sexual behavior indices and depression and substance use attained statistical significance. MSM with suicidal ideation were 12 times more likely (95% CI: 3.32–43.74) to have been paid for sex. Their risky sexual behavior scores were also 3.3 units higher (95% CI: 1.67–4.92) compared to those who did not have suicidal ideation.

Discussion

Psychosocial adversity and risky sexual behavior in MSM and heterosexual men

Consistent with findings from other studies, MSM in this study were significantly more likely to experience individual epidemics of childhood

Table 4. Relationship between risky sexual behavior and psychosocial adversity in MSM.

	Sexual activity			No. of partners			Casual partners			Inconsistent Condom use			Been paid for sex			Anal sex			RSB score		
Variables	OR	95% CI		OR	95% CI		OR	95% CI		OR	95% CI		OR	95% CI		OR	95% CI		Coef	95% CI	
Age	1.12[c]	1.00	1.25	1.05	0.96	1.15	1.04	0.92	1.18	1.00	0.91	1.10	1.09[c]	0.99	1.19	1.05	0.91	1.20	0.12[c]	−0.02	0.27
Financial difficulty	1.97	0.58	6.65	**3.57***	**1.01**	**12.61**	2.06	0.39	10.80	0.48	0.15	1.59	1.41	0.47	4.21	3.71	0.42	32.52	0.95	−0.94	2.83
Childhood adversity[a]	2.15	0.41	11.20	3.91	0.73	20.95	[b]			5.57	0.59	52.27	2.36	0.59	9.51	0.59	0.10	3.57	**2.45***	**0.25**	**4.64**
Intimate Partner Violence[a]	**4.89***	**1.32**	**18.06**	2.26	0.68	7.48	1.52	0.34	6.79	1.44	0.39	5.28	0.59	0.19	1.86	0.91	0.19	4.45	0.03	−1.88	1.93
Depression[a]	0.92	0.32	2.70	1.20	0.38	3.79	0.81	0.19	3.46	1.41	0.40	4.92	2.99[c]	0.96	9.28	[b]			1.00	−0.83	2.84
Suicidal Ideation[a]	2.98[c]	0.77	11.56	2.27	0.69	7.42	[b]			2.22	0.59	8.35	**12.04*****	**3.32**	**43.74**	4.51	0.50	41.05	**3.29*****	**1.67**	**4.92**
Substance Use[a]	4.08[c]	0.83	19.97	1.57	0.48	5.16	4.79	0.56	41.37	1.65	0.44	6.18	1.28	0.41	4.00	1.32	0.23	7.49	1.14	−0.73	3.02
Any psychiatric morbidity[a]	1.62	0.87	3.01	1.35	0.79	2.31	2.12[c]	0.87	5.15	1.41	0.77	2.57	**2.27****	**1.27**	**4.07**	2.66[c]	0.86	8.19	**1.12****	**0.33**	**1.91**
Composite psychosocial Syndemic Score[a]	**1.80***	**1.06**	**3.07**	1.44[c]	0.94	2.23	1.96[c]	0.96	4.03	1.40	0.88	2.23	**1.56***	**1.04**	**2.33**	1.49	0.76	2.93	**0.80****	**0.21**	**1.39**

[a]Adjusted for age and financial difficulty.
[b]All MSM who had experienced childhood adversity had casual partners and had been paid for sex; all MSM who had suicidal ideation had casual partners.
c$p < 0.1$,
*$p < 0.05$,
**$p < 0.01$,
***$p < 0.001$.

adversity, intimate partner violence, and at least one psychiatric morbidity—specifically, depression and suicidal ideation—as well as a cumulative syndemic (Andersen & Blosnich, 2013; Marshal et al., 2011; Plöderl & Tremblay, 2015; Stall et al., 2003; Tjaden, Thoennes, & Allison, 1999). These higher rates have been attributed to minority stress (Meyer, 2003).

Similarly, MSM in this study were significantly more likely to be sexually active compared to heterosexual men (Boladale, Olakunle, Olutayo, & Adesanmi, 2015; Holmberg & Blair, 2009). It has been suggested that violating an important sexual taboo may make non-heterosexual individuals more permissive with respect to sexual matters (Holmberg & Blair, 2009). MSM in this study also had higher overall risky sexual behavior scores, which is consistent with findings from previous studies (Julio et al., 2015; Myers et al., 2003). Higher-risk sexual behavior in MSM in this study was driven by anal sex and transactional sex. Anal sex is more commonly practiced by MSM (Holmberg & Blair, 2009), and it is responsible for the higher rates of HIV infection among MSM (Beyrer et al., 2012). Relatedly, the discrimination faced by MSM in Nigeria may place them at socioeconomic disadvantage, which may in turn increase their likelihood of engaging in transactional sex (Bauermeister et al., 2016; Okanlawon et al., 2013). These findings highlight the importance of understanding the dynamics of sexual behavior among MSM in developing countries.

Interrelationships between psychosocial variables

The significant relationships found between the individual psychiatric and social adversity variables among MSM in this study are consistent with findings from other studies (Dyer et al., 2012; Ferlatte, Hottes, Trussler, & Marchand, 2014; Herrick et al., 2013; Stall et al., 2003), and support the presence of a psychosocial syndemic among Nigerian MSM. Childhood adversity is associated with disruption of the developing stress-regulatory systems, thereby increasing the likelihood of mental health problems (Edalati & Krank, 2016; Heim, Newport, Mletzko, Miller, & Nemeroff, 2008; Radtke et al., 2015). The non-significant relationships with suicidal ideation and substance use in this study may be due to the small sample size. The relationship between childhood adversity and adult intimate partner victimization has been found to be mediated by the adoption of maladaptive strategies (McIntyre & Spatz Widom, 2011), although this was not in a sexual minority cohort. Strategies such as running away may be protective in the short term, but detrimental to maintaining functional longer-term relationships later in life. These associations need to be further explored among MSM in developing countries.

As expected, depressive symptoms showed a positive relationship with suicidal ideation (Ferlatte et al., 2015). Though the relationships between intimate partner violence, depressive symptoms, and substance use were not statistically significant, the direction of effects was similar to those in other studies (Finneran & Stephenson, 2013). This suggests the need for larger samples in future studies.

Risky sexual behavior and psychosocial adversity

Overall, risky sexual behavior was associated with childhood adversity, the presence of at least one psychiatric morbidity, suicidal ideation, and the syndemic variable, which is consistent with findings from other studies (Ferlatte et al., 2014; Herrick et al., 2013; Jie et al., 2012; Stall et al., 2003).

The relationship between childhood adversity and risky sexual behavior was consistent with the finding by Thompson et al. (2017), who also found that this relationship was mediated by trauma symptoms secondary to childhood adversities. Studies have shown that risky sexual behavior is a means of regulating negative affect resulting from childhood adversity (Bancroft et al., 2003; Thompson et al., 2017). However, these mechanisms need to be further explored among Nigerian MSM.

MSM who experienced intimate partner violence were more likely to be sexually active, which suggests that such violence occurs in the context of sexual relationships. However, in contrast to findings from other studies (Decker et al., 2009; Finneran & Stephenson, 2013; Jewkes et al., 2006), intimate partner violence was not significantly associated with risky sexual behaviors. This may also reflect the need for larger sample sizes.

Having at least one psychiatric morbidity was significantly associated with increased overall risky sexual behavior and being paid for sex. This was consistent with findings from studies in the general population (Ramrakha et al., 2013) and among MSM (Ferlatte et al., 2014). The use of sex to regulate negative affect has been highlighted, while mental health morbidity may also be associated with reduced efficacy in negotiating safety behaviors in sexual relationships (Miltz et al., 2017). Transactional sex may also be associated with shame and feelings of worthlessness among MSM in developing countries, including Nigeria. Of the individual psychiatric morbidities, only suicidal ideation was significantly associated with risky sexual behavior. This may suggest that risky sexual behaviors are part of a broader spectrum of self-destructive tendencies associated with suicidality (Houck et al., 2008). It is also possible that both risky sexual behaviors and suicidality in MSM are secondary to shared risk factors such as social difficulty (Okanlawon et al., 2013) or minority stress (Newcomb & Mustanski, 2011). Considering the high levels of homophobia (Kohut, 2013;

Okanlawon, 2017), Nigerian MSM may be particularly prone to these adverse interrelationships.

Cumulative psychosocial adversities were significantly associated with a higher likelihood of engaging in risky sexual activity, which is consistent with findings among American (including ethnic minorities) (Dyer et al., 2012; Herrick et al., 2013; Mustanski, Garofalo, Herrick, & Donenberg, 2007), Canadian (Ferlatte et al., 2015), and Chinese MSM (Jie et al., 2012). This is the first study to investigate the relationship between a psychosocial syndemic and risky sexual behavior among MSM from sub-Saharan Africa. These relationships may reflect the underling impacts of minority stress (King et al., 2008; Marshal et al., 2011; Meyer, 1995, 2003; Oginni et al., 2017; Plöderl & Tremblay, 2015; Roberts, Rosario, Slopen, Calzo, & Austin, 2013), maladaptive coping strategies (Sornberger, Smith, Toste, & Heath, 2013), and emotional and behavioral dysregulation (Hatzenbuehler, 2009; Rendina et al., 2017). However, these pathways would need to be tested statistically in Nigerian and sub-Saharan MSM.

Study limitations

While this study has among its strengths the utilization of standardized questionnaires for most of the variables studied, the following limitations must be borne in mind. The cross-sectional design of this study limits inference of causation; future studies may be improved by utilizing prospective designs. The MSM participants were recruited using a non-random sampling technique which may increase the likelihood of selection bias. However, considering the prevailing homophobia in the Nigerian context (Kohut, 2013), non-random sampling strategies remain the best option. The sample size used in this study was small, which resulted in large confidence intervals. Future studies can be improved by utilizing larger samples.

Specific minority stress variables such as internalized homophobia were not included in this study; it would be informative to investigate the specific roles of such factors in the Nigerian context. The current high level of homophobia in the country (Kohut, 2013; Mapayi, Oginni, Akinsulore, & Aloba, 2016) provides a unique opportunity to investigate the effects of minority stress. For example, a recent meta-analysis showed an attenuation of the relationship between internalized homophobia and risky sexual behavior over time (Newcomb & Mustanski, 2011). Similarly, it would be useful to investigate the role of resilience factors in ameliorating the syndemic effect of psychosocial adversity among MSM in developing countries.

Conclusions

This study provided evidence for the existence of individual psychosocial epidemics and a syndemic among Nigerian MSM. It also demonstrated the cumulative effect of psychosocial adversity on risky sexual behavior among MSM in a developing country. The findings from this study suggest that psychosocial interventions may be a useful strategy in combating the HIV epidemic among Nigerian MSM. Thus, identifying and providing support for MSM with any psychosocial adversities may serve as a first-line intervention for reducing the risk, and ultimately the prevalence, of HIV infection among MSM in developing countries.

Disclosure

The authors declare that they have no conflicts of interest. All procedures were reviewed and approved by the institutional review board of the corresponding author's institution.

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