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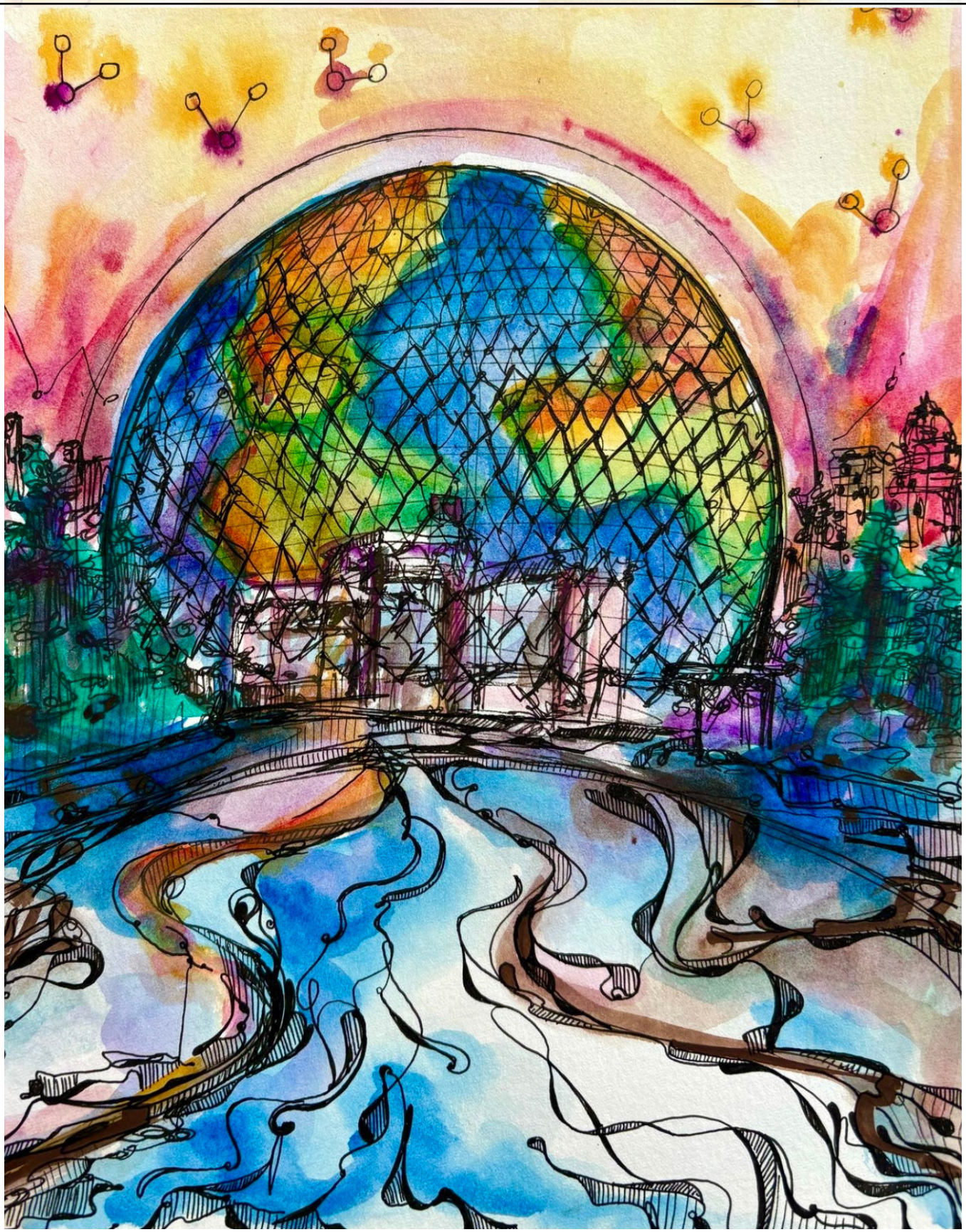

Factors Associated with Sexual Behaviour among Women Aged 15-49 in South African Low-Income Communities

Daniel N. Elakpa[*1,2], *Sbonelo Charles Chamane*[3], *Sinothando Samukele Dlamini*[4], *Fezeka Luzelwande Hlubi*[5], *Timothy Oluwatomi Olusanya*[2], *Mfundo Mandla Masuku*[6]

[1]Ingram School of Nursing, McGill University, Montreal, QC, Canada
[2]Faculty of Pharmacy, University of Port Harcourt, East West Road, Rivers State, Nigeria
[3]Public Health, Societies and Belonging Division, Human Sciences Research Council, Pretoria, South Africa
[4]National Health Laboratory Service, National Institute for Communicable Diseases, Johannesburg, South Africa
[5]University of South Africa, Pretoria, South Africa
[6]School of Built Environment and Development Studies, University of KwaZulu-Natal, KwaZulu-Natal, South Africa

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***Correspondence**: Daniel N. Elakpal, Email: daniel.elakpa@mail.mcgill.ca

Abstract

Introduction: South Africa faces disproportionately high rates of sexually transmitted diseases (STDs), especially in low-income communities. Understanding how demographic, socioeconomic, and knowledge-based factors influence sexual behaviour is critical for targeted public health interventions. Therefore, this study examined the relationships between socioeconomic status (SES), education, ethnicity, marital status, STD awareness, and sexual behaviour among women aged 15 – 49 in low-income South African communities. **Methods and Materials:** We conducted a cross-sectional study utilizing data from the South Africa Demographic and Health Survey 2016 (SADHS 2016). Key variables included sexual behaviour (safe versus risky), SES, education, place of residence, ethnicity, marital status, and awareness of STDs. Bivariate and multivariable analyses were used to assess associations between sexual behaviour and the aforementioned variables. **Results:** Among 8,513 respondents, 22.3% (95% CI: 21.1–23.5) engaged in risky sexual behaviour. Higher SES was associated with increased odds of risky behaviour, as were White, Coloured, and Indian/Asian ethnicities compared to Black Africans. Conversely, higher education levels, being married or cohabiting, and STD awareness (having heard of AIDS) significantly reduced risky sexual behaviour. Urban residence had no significant effect. These findings highlight the influence of socioeconomic and educational factors on sexual health outcomes. **Conclusion:** Sexual behaviour may be influenced by a number of factors, and behavioural patterns vary across groups. Public health strategies and intersectional approaches to sexual health should be considered to enhance education and STD awareness to reduce risky behaviours and improve sexual health outcomes in different population groups.

Keywords: Sexual behaviour; STI; Socioeconomic status; Education; Ethnicity

Introduction

Sub-Saharan Africa (SSA) experiences a substantial share of the worldwide sexually transmitted infection (STI) cases, accounting for approximately 40% of the global total [1-2]. Approximately 19 million new STI cases are reported annually in the region, around 50% of infections occur in individuals aged 15 – 24 [3]. As of 2020, approximately 7.7 million people in South Africa were living with HIV. While STIs and HIV affect both sexes, young women in Sub-Saharan Africa face significantly higher biological, social, and economic risks [4]. Moreover, gender differences in HIV risk behaviours in South Africa have been linked to socioeconomic status, intimate partner violence, and psychosocial factors [5]. It is hereby essential to understand the factors influencing young women's sexual behaviour to create effective human immunodeficiency virus (HIV) prevention measures.

The literature indicates that age is a significant demographic factor that is associated with unsafe sexual practices, with younger females (15–24 years) more likely to engage in unprotected sex with multiple partners [6], this heightened vulnerability is due to a lack of awareness, societal influences, and limited access to sexual and reproductive health services [7]. Socioeconomic factors, including poverty, low education levels, and unemployment, are strongly linked to a rise in the risk of HIV infection [8]. Of the two million adolescents living with HIV/AIDS globally, 82% reside in sub-Saharan Africa, and each day, 460 adolescent girls become infected with HIV in eastern and southern Africa. South Africa, with the world's highest HIV prevalence (13.5%, affecting 7.7 million people), also faces high rates of early adolescent pregnancies, which further increases the risk of HIV transmission [9-10].

Around 14 million young people die each year from sexual and reproductive health problems, despite the known benefits of safe sex practices [8, 11]. Adolescents' sexual risk behaviours may be shaped by their social and economic conditions,

including intimate partner violence, caregiver support, and access to basic needs [12]. The relationship between income or wealth and HIV risk remains complex and requires further investigation. Some studies suggest that socioeconomic stressors might push individuals of lower socioeconomic status (SES) towards riskier sexual behaviours, such as engaging in transactional sex. However, more evidence is needed to understand better how socioeconomic indicators impact People Living with HIV (PLWHIV) in South Africa, especially when accounting for behavioural and demographic factors [13-14].

The DREAMS initiative by President's Emergency Plan for AIDS Relief (PEPFAR), launched in 2015, uses 12 evidence-based interventions to tackle social and economic factors and improve HIV prevention in young women in sub-Saharan Africa [15]. Despite these efforts, high rates of STDs persist in South Africa's low-income communities, reflecting systemic challenges such as poverty, limited healthcare access, and inadequate sexual health education. This research aims to investigate how demographic factors, socioeconomic status (SES), and sexually transmitted diseases (STD) knowledge influence sexual behaviour among females aged 15 to 49 in these communities. Understanding these factors is key to developing interventions that address root causes and support informed sexual health decisions. By focusing on the demographic disparities and socioeconomic inequities, this research has the potential to inform policy and practice, strengthen health systems, and reduce health disparities in South Africa and beyond.

Methods and Materials

2.1 Dependent Variable

This study used sexual behaviour as an outcome variable generated using Multiple Correspondence Analysis (MCA). Risky sexual behaviours comprised actions that increased the likelihood of adverse health outcomes such as STIs and unplanned pregnancies. Specifically, this included unprotected sex (vaginal, oral, or anal), having multiple sexual partners, early sexual debut, engaging in sex with high-risk partners (e.g., those who inject drugs, those with other multiple sexual partners), and alcohol/substance use during sexual encounters. To achieve this, a set of categorical variables related to sexual behaviour were identified as input variables for MCA. These variables captured different aspects of sexual behaviour, including condom use, number of sexual partners, history of transactional sex, and history of sexually transmitted infections (STIs). By applying MCA, the multi-dimensional data were reduced into a single composite score that represents an individual's sexual behaviour pattern. Principal coordinates were assigned to each response category. Through this process, individual observation was positioned along a continuum from safe to risky sexual behaviour based on their MCA scores. To create a binary variable, the MCA scores were split into two equal quantiles (median split approach).

The binary outcome variable was coded as 0 = safe sexual behaviour and 1= risky sexual behaviour. Additional file 1 showed the list of variables used to generate sexual behaviour variable.

2.2 Independent Variables

The explanatory variables included were socioeconomic status (high SES and low SES), highest education level (no education, primary, secondary and higher education), locality type (urban and rural), ethnicity (Black/African, White, Coloured and Indian/Asian), marital status (never in union, married/living with partner and widow/divorced/separated, ever heard of STI (no and yes), and Ever heard of AIDS (no and yes). In the South African context, the term Coloured refers to a distinct, officially recognized population group of mixed ancestry, with its own cultural, linguistic, and historical identity. This classification stems from apartheid-era racial categorization and differs significantly from its usage in other contexts, such as the United States. Socioeconomic status is a composite variable representing different levels of socioeconomic standing. It was constructed using MCA, following the same approach as the dependent variable. Additional file 2 showed the list of variables used to generate the socio-economic status.

2.3 Statistical Analysis

The statistical analyses were carried out using STATA 18 (Standard Edition). Survey weights were used in all statistical analyses. Descriptive statistics were employed to summarise sample characteristics. Two distinct models were used. Model I: Univariate analyses were performed to explore the relationship between sexual behaviour and each independent variable. Variables determined statistically significant were included in multivariable logistic regression models to identify characteristics risky sexual behaviour. Model II was fitted using a backward stepwise logistic regression, with variables retained based on a p-value exclusion threshold of 0.2. The strength, direction, and level of statistical significance were established using adjusted odds ratios (aOR), 95% confidence intervals (CI), and p-values < 0.05. A coefficient plot was also utilised to show the estimates from the two models. The stepwise regression approach was chosen to simplify the model by eliminating non-significant variables. Although stepwise regression may raise concerns about overfitting, the sample size was adequate in this study.

2.4 Ethical Clearance

No formal ethical approval was sought for this study, as the study utilised open-source data available from Statistics South Africa (Stats SA) via the following link: https://dhsprogram.com/methodology/survey/survey-display-390.cfm. The dataset includes a range of characteristics, from sociodemographic, maternal and child health, as well as knowledge of HIV/AIDS and HIV transmission collected from a nationally representative sample. The data is publicly available for research purposes and has been anonymized to protect the privacy and confidentiality of the respondents.

The use of this data complies with the terms and conditions set by Statistics South Africa (Stats SA), which allows for its use in academic and policy research. The researchers acknowledge Stats SA for providing access to this valuable data [17].

Results

The sample consisted of n = 8,513 participants. Over half of the sample were from high SES (54.0%), 77.1% had completed secondary school, over two thirds (67.3%) lived in urban areas and 86.8% were Black/African. Moreover, most of the participants were never married (58.6%), and over 90% had ever heard of an STI (96.5%) and AIDS (95.6%). Of 8,513 participants, 22.3% (95% CI: 21.1–23.5) engaged in risky sexual behaviour. A higher prevalence of risky sexual behaviour was observed among participants from high SES, those with primary education, rural residents, the Coloured ethnic group, those who never married, and those who never had an STI or AIDS.

Table 1. Sample Characteristics

Variables	Sample	Risky		P value
	n	%	95% CI	
Total	**8513**	**22.3**	**21.1–23.5**	
Socioeconomic status				
High SES	4304	23.4	21.9-25.0	0.036*
Low SES	3931	21.1	19.4-22.8	
Highest educational level				
No education	190	21.5	15.0-29.7	0.001*
Primary	862	24.7	20.8-29.1	
Secondary	6581	22.9	21.6-24.3	
Higher	880	16.4	13.8-19.5	
Type of place of residence				
Urban	4804	21.6	20.2-23.1	0.080
Rural	3709	23.7	21.9-25.7	
Ethnicity				
Black/African	7358	21.3	20.1-22.6	0.005*
White	214	22.8	16.5-30.7	
Coloured	848	29.8	26.6-33.3	
Indian/Asian	88	35.2	19.4-55.1	
Marital Status				
Never in union	5134	32.6	30.9-34.4	<0.001*
Married/Living with partner	2840	3.8	3.0-4.8	
Widow/Divorced/Separated	539	32.2	27.5-37.2	
Ever heard of STI				
No	267	33.3	27.8-39.4	<0.001*
Yes	8246	21.9	20.7-23.1	
Ever heard of AIDS				
No	332	32.9	27.7-38.6	<0.001*
Yes	8181	21.8	20.6-23.0	

* Indicate significance at 95%

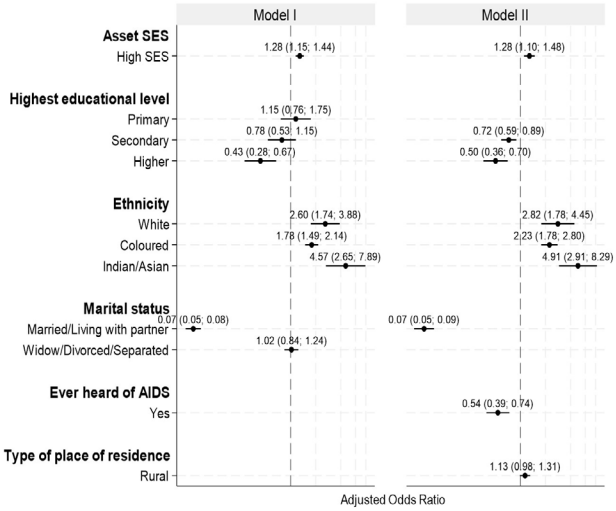
3.1 Bivariate Analysis

The bivariate analysis results evaluating sexual behaviour against each independent variables were added as additional files. Further, additional file 3 showed a bivariate association between sexual behaviour and each independent variable. The following section focuses solely on coefficient plots for significant variables included in the Multivariable model.

3.2 Multivariable Analysis

In the first model (Model I), the odds of risky sexual behaviour were significantly higher among those from high SES compared to low [Adjusted odds ratio (aOR) = 1.28 (95% CI: 1.15–1.44), p = <0.001], and also significantly higher among Whites [aOR=2.60 (95% CI: 1.74–3.88), p = <0.001], Coloured people [aOR=1.78 (95% CI: 1.49–2.14),

Figure 1. Coefficient Plot of Factors Associated with Risky Sexual Behaviour



p = <0.001] and Indian/Asians [aOR=4.57 (95% CI: 2.65–7.89), p = <0.001] than Black Africans. However, the odds of risky sexual behaviour were significantly lower among those with higher education compared to those without formal education [aOR = 0.43 (95% CI: 0.28–0.67), p = 0 <0.001]. The odds of risky sexual behaviour were also significantly lower those who were married or living with a partner compared to those who were never in union [aOR = 0.07 (95% CI: 0.05–0.08), p = <0.001]. In the second model (Model II), the odds of risky sexual behaviour were significantly higher among those from high SES compared to low [aOR = 1.28 (95% CI: 1.10–1.48), p = 0.001], and also significantly higher among Whites [aOR = 2.82 (95% CI: 1.78–4.45), p = <0.001], Coloured people [aOR = 2.33 (95% CI: 1.78–2.80), p = <0.001] and Indian/Asians [aOR=4.57 (95% CI: 4.91–8.29), p = <0.001] than Black Africans. However, the odds of risky sexual behaviour were significantly lower among those with secondary education [aOR = 0.72 (95% CI: 0.59–0.89), p = 0.003] and higher education [aOR = 0.50 (95% CI: 0.36–0.70), p = <0.001] compared to no those without formal education. The odds of risky sexual behaviour were also significantly lower those who had heard of AIDS before compared to those who had never [aOR = 0.54 (95% CI: 0.39–0.74), p = <0.001].

Discussion

This study investigated the associations of demographic factors, socioeconomic status, and STD/HIV knowledge with sexual behaviour among females aged 15 to 49 in low-income communities in South Africa. Understanding the factors influencing young women's sexual behaviour is crucial for designing effective prevention strategies. Our study revealed that although females who engage in safe sexual behaviours form a larger proportion, a significant number still engage in risky sexual behaviours. Overall, this study found that individuals with high socio-economic status, White people,

Coloured people, and Indians were significantly associated with engaging in risky sexual behaviours. Conversely, individuals with secondary or higher education, those who are married or cohabiting, and those aware of AIDS were less likely to engage in risky behaviors.

This study found a significant association between high SES and risky sexual behaviours. This aligns with a previous study which identified a positive association between high SES and engagement in risky sexual behaviours [18, 19], suggesting that these individuals may be likely to participate in risky behaviours due to access to resources, and different social norms or expectations compared to individuals with lower SES who may be less exposed socially. On the other hand, low SES individuals face barriers to safe practices due to financial constraints and limited access to prevention resources. A study in Durban, South Africa, confirmed that poverty and unemployment hinder access to HIV prevention [20]. Overall, both high and low SES present distinct sexual health challenges, necessitating tailored interventions. A meta-analysis in sub-Saharan Africa found that 75% of sexually active male youths engaged in high-risk sex with girls usually within the same age brackets as themselves [21]. Uchidi et al. linked multiple sexual partnerships to factors like young age, urban residence, higher education, media exposure, and working away from home. These findings highlight the need for targeted interventions. [22]. The finding that higher socioeconomic status (SES) was associated with increased risky sexual behaviours, while higher educational attainment appeared protective, highlights a complex dynamic. It is possible that girls from higher SES households may experience greater exposure to socially permissive environments where risky behaviour is more normalized and increased access to unsupervised leisure or peer group influence, which could facilitate engagement in risk behaviours. In contrast, higher education may be associated with improved knowledge, empowerment, and access to sexual and reproductive health resources, fostering more informed and protective decision-making.

Our study further found that individuals with secondary or higher education levels are less likely to engage in risky sexual behaviour compared to those with lower or no higher education. These findings are consistent with existing literature [23]. Studies have examined the impact of secondary and higher education on risky sexual behaviours, including early sexual debut, having multiple partners, and inconsistent condom use. Studies show that adolescents with secondary education tend to delay sexual debut, have fewer partners, and use condoms more consistently than those with only primary or limited education [24-30]. Schools may be thought to provide structured environments with sexual education programs, which further reinforce safe practices. Rather than the number of sexual partners alone, it is possible that the nature of those relationships, including condom use, equality in decision-making, and mutual consent, plays a more critical role in determining sexual health risk for young girls. For instance, an individual with multiple partners who consistently uses protection may face less risk than someone in a monogamous relationship with a partner engaging in unprotected sex with others. The results also showed that married or cohabiting individuals generally appeared to be less likely to engage in risky sexual behaviours compared to those who had never been in a union. A recent study also supported this, indicating that factors such as longer-term relationships and stable partnerships contribute to lower engagement in risky sexual activities. However, inconsistent condom use remains a concern among married and cohabiting individuals [31-33].

Our study found that those who had heard of AIDS were significantly less likely to engage in risky behaviours compared to those who had not. This finding aligns with multiple studies conducted in South Africa, which confirm that HIV knowledge is associated with increased condom use and safer sexual practices [31, 34 – 36]. These emphasize the critical role of awareness and knowledge in influencing sexual behaviour. Lastly, our analysis also showed that living in rural areas was a significant factor. Individuals living in rural areas were slightly more likely to engage in risky behaviors due to limited access to sexual health services, sex education, STI awareness, and prevention resources. Cultural and social norms in rural areas may also discourage contraceptive use while promoting early marriage. Economic disparities contribute to transactional sex and multiple partnerships for financial support [37 – 39]. Another study conducted by Eaton and colleagues in South Africa highlighted the significant influence of both proximal (interpersonal relationships and physical/organizational environments) and distal (cultural and structural) contexts on sexual behaviour. Economic deprivation was identified as a pervasive factor contributing to risky sexual practices. Social norms that perpetuate women's subordination within sexual relationships were found to exacerbate unsafe sexual behaviours [40].

Research highlights that socioeconomic and community factors strongly influence sexual behaviour in low-income settings. Poverty, inadequate healthcare services, and weak social cohesion increase engagement in risky behaviours. A systematic review found that negative peer influences and gender power imbalances exacerbate unsafe sexual practices [40 – 42]. Neighbourhood-level studies further emphasize the role of peer attitudes and economic hardship in shaping young women's sexual behaviours. Comparisons with other African countries reveal similar patterns, reinforcing the need for comprehensive sexual education, family-based health programs, and economic empowerment initiatives to promote safer sexual practices [43].

These findings highlight the urgent need for targeted interventions, including comprehensive sexual education, community-and family-based health programs, and

economic empowerment initiatives, to promote safer sexual practices among women in low-income communities within South Africa and sub-Saharan Africa in general.

Our study has some limitations. We used an outcome variable derived from a composite of self-reported indicators of sexual behaviour, such as history of STIs and condom use during the most recent sexual encounter. Relying on self-reported data introduces the potential for recall bias, where participants may inaccurately remember or report their behaviours due to social desirability bias or memory lapses. This limitation could affect the accuracy and reliability of the findings, as participants may underreport risky behaviours or overstate adherence to safe practices. Additionally, the cross-sectional design of the study limits causal inference regarding the relationships observed between demographic factors, socioeconomic status, STD/HIV knowledge, and sexual behaviours. The inability to establish temporal sequences prevents definitive conclusions about causality, highlighting the need for longitudinal studies to better understand the dynamics influencing sexual behaviour in low-income South African communities over time. While the study included a large sample size of over 8,000 participants, the variability in the data may have contributed to wider confidence intervals for some estimates, with certain intervals exceeding a range of 3 in the final models. This suggests that there may be substantial uncertainty around these specific estimates, which could be due to heterogeneity in the population or the variability in certain factors. However, the large sample size ensures that the results are generally robust, and the wider confidence intervals should be interpreted as reflecting inherent data variability rather than limitations in sample size. Lastly, while the role of partner violence in shaping sexual behaviour is well-documented, particularly in contexts where power imbalances limit women's sexual autonomy, our dataset did not include sufficient responses to questions that are directly related to intimate partner violence. This is a limitation, and future research should incorporate GBV-related measures to better understand how structural and interpersonal violence intersect with sexual risk, especially among adolescent girls and young women. Furthermore, as SES was measured using a self-reported composite index, it may not accurately reflect income or economic stability, which could limit the precision of interpretations drawn from SES-related patterns in sexual behaviour.

4.1 Implications and Policy Recommendations

Implications: The persistence of risky sexual behaviours among females in low-income communities underscores the need for targeted education and intervention programs. Tailoring educational efforts to the socio-economic and cultural realities of these communities is essential for influencing behaviour change and reducing risk. The association between high socio-economic status (SES) and risky sexual behaviours highlights the diverse influences on sexual health. Public health strategies should acknowledge SES-driven disparities, ensuring that individuals with high SES receive appropriate education rather than assuming they already possess adequate knowledge. For those with lower SES, interventions must tackle barriers such as poverty and limited healthcare access to facilitate safer sexual practices. Interventions should not focus solely on Black/African individuals but consider the distinct needs of other racial groups. Cultural sensitivity is key, ensuring interventions align with diverse beliefs and norms. Addressing healthcare access disparities across racial groups is crucial for improving health outcomes and mitigating risk.

The protective effect of secondary or higher education against risky behaviours reinforces the importance of improving educational access in low-income communities. Public health policies should prioritize comprehensive sexual education in schools, equipping individuals with the knowledge and skills to make informed sexual health decisions. The lower likelihood of risky sexual behaviours among married or cohabiting individuals suggests that promoting stable relationships could be a viable public health strategy. Programs fostering relationship stability and mutual responsibility may reduce high-risk practices. Conversely, interventions for single individuals should emphasize safe sex education and access to healthcare services. Ensuring condom accessibility and promoting proper usage awareness in social settings can enhance safe sex practices. Policies advocating for condom availability in public and private spaces, alongside community engagement initiatives, can create supportive environments for safer behaviors. The study's finding that AIDS awareness reduces risky behaviors underscores the importance of public health campaigns and community outreach. Efforts should focus on accurate, widespread information dissemination, particularly in high-risk and low-income communities. Community health workers can play a vital role in delivering culturally appropriate education and facilitating healthcare access. Regular monitoring and evaluation will ensure interventions remain effective and responsive.

Recommendations: Effective interventions must address the interplay of demographics, SES, and STD/HIV knowledge among females aged 15 to 49 in low-income South African communities. Strategies should include school-based comprehensive sex education, community-driven initiatives led by peer educators and local leaders, and healthcare-centred programs ensuring accessible counselling and resources in clinics and hospitals. Programs should be stratified by SES, addressing healthcare access, education, and financial constraints that shape sexual behaviours. Given South Africa's history of racial health disparities, interventions should be ethically designed to prevent stigma while engaging communities in equitable implementation. Addressing gender norms is crucial, requiring empowerment programs that strengthen women's negotiation skills for safer sex, promote gender equality, and engage men in challenging

harmful stereotypes. Economic dependence and limited legal protections must also be addressed through supportive policies that enhance female autonomy and safety.

Conclusion

This study provides insights into the complex relationships between demographic factors, socioeconomic status, and STD/HIV knowledge and their impact on the sexual behaviour of females aged 15 to 49 in low-income South African communities. The findings highlight the importance of targeted educational interventions aimed at increasing awareness of HIV/AIDS and other STDs, promoting safe sexual practices, and addressing cultural and socioeconomic barriers that influence sexual behaviours differently across racial groups. Despite limitations such as reliance on self-reported data and the cross-sectional study design, the results highlight critical areas for public health intervention. Moving forward, longitudinal research and comprehensive, culturally sensitive programs are essential to sustainably reduce risky sexual behaviours and improve sexual health outcomes in these vulnerable populations. By addressing these challenges systematically, stakeholders can develop more effective strategies that empower individuals to make informed decisions about their sexual health and well-being.

Conflict of Interests: Authors declare no conflict of interests
Data availability: https://dhsprogram.com

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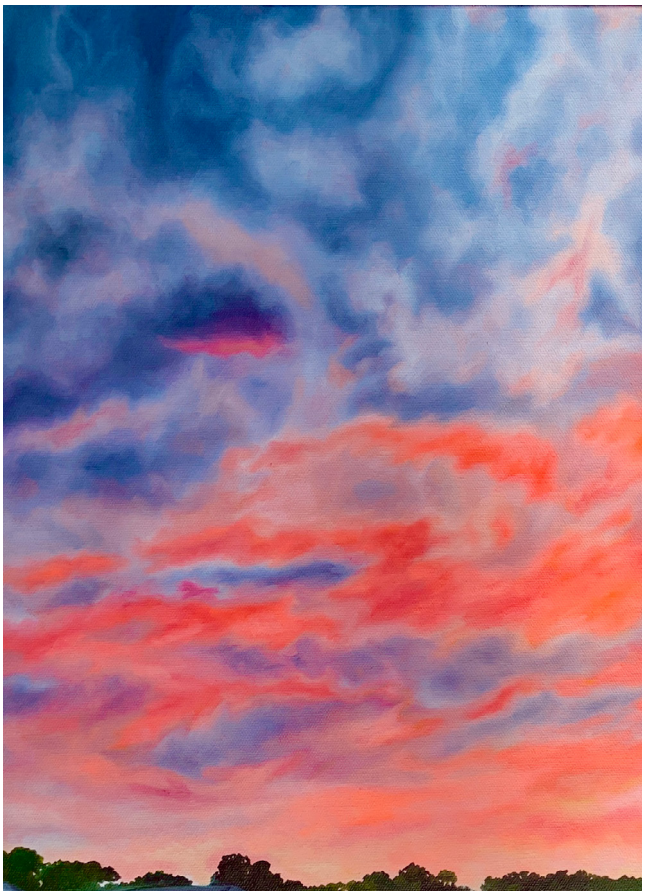

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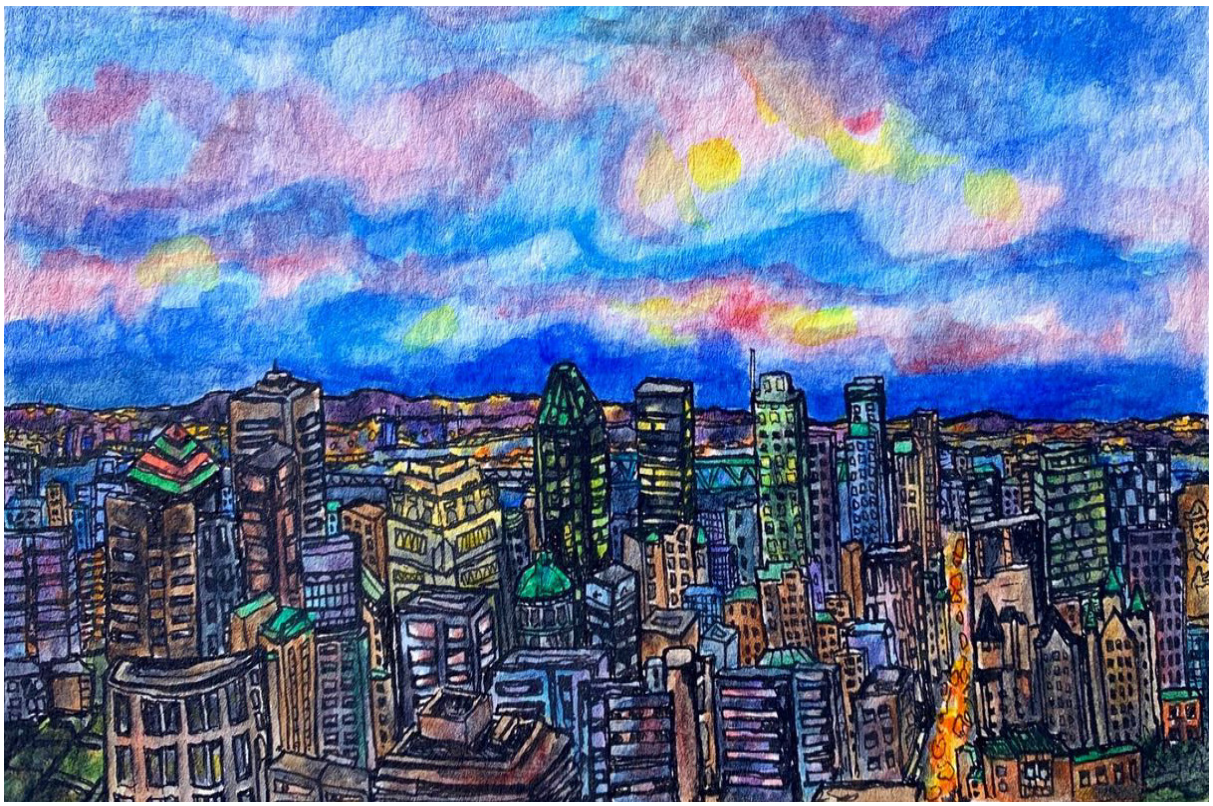

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