

Multilevel modelling of factors influencing higher-risk sex among the youth in South Africa

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Abstract

Background: HIV is one of the biggest health challenges in many developing countries, particularly in sub-Saharan Africa. Although there have been advances in HIV treatment, this group tends to have a higher prevalence of higher-risk sexual behaviour. This study aimed to examine the multilevel factors influencing higher-risk sex among the youth in South Africa.

Methods: We used a multilevel logistic regression analysis based on data from the 2016 South Africa Demographic and Health Survey.

Results: We found that those aged 25-29 years, those from the coloured population group, those whose sexual debut was at an early age, those from households with 1-3 members, and those from the Northern Cape province had higher odds of engaging in higher-risk sex.

Conclusions: Certain populations of young people had higher odds of higher-risk sex; as such, there is a need for targeted interventions that seek to reduce higher-risk sex among those groups.

Introduction

Human immunodeficiency virus (HIV) remains one of the main health challenges faced by many countries globally, especially developing countries. Amidst advances in the treatment of HIV by deliberately making antiretroviral therapy accessible in Africa, youth continue to face inadequate knowledge, a negative attitude toward HIV, and high-risk sexual behaviour (Tarkang et al., 2019). Even after international and national commitments and interventions to avoid higher-risk sex, a considerable proportion of young people in South Africa actively engage in higher-risk sexual behaviour. Thus, an understanding of sexual health behaviour is important in population health because such knowledge can be used to lower HIV infections and other sexually transmitted infections. Young people are at greater risk of STIs and unwanted or early pregnancies due to higher-risk sex (Galappaththi-Arachchige et al., 2018). Higher-risk sexual behaviour such as multiple sexual partnerships, low consistent condom use and early sexual initiation underscore the spread of HIV and other sexually transmitted infections among the youth in South Africa (Kenyon et al., 2016). The estimated risk of contracting HIV through multiple sexual partnerships was 79% among the youth in South Africa (Zuma et al., 2010). There is evidence of low consistent condom use among the youth in sub-Saharan Africa (Ajayi et al., 2019; Moyo et al., 2008; Zuma et al., 2016). Various factors have been highlighted as determining higher-risk sex across various developing countries.

The government of South Africa has committed to reducing risky sexual behaviour among young people; this behaviour has been identified as one of the factors determining HIV and STIs (South

African National AIDS Council, 2017; Zuma et al., 2010). One of these commitments was the introduction of the National Integrated Sexual & Reproductive Health and Rights Policy. The National Integrated Sexual & Reproductive Health and Rights Policy aims to give people (especially the youth) tools to make important decisions about their sexual and reproductive health and rights (SRHR), to ensure that young people, amongst others, can access proper SRHR without the stigmatisation and judgement that often goes with it (National Department of Health, 2019). Although there is a commitment from the government and relevant stakeholders to reducing higher-risk sex among young people, South Africa has been under the siege of HIV, therefore, a study that is designed to stir policy debates on higher-risk sexual behaviour among the youth is timely. Therefore, this study seeks to investigate the multilevel factors determining higher-risk sex among the youth in South Africa. An understanding of the social context, together with the individual factors, is important when determining the factors associated with higher-risk sex among the youth.

Methods

Data source

We used secondary data from the 2016 South Africa Demographic and Health Survey (SADHS). The SADHS is a cross-sectional survey conducted on selected households in South Africa. In the survey, a total of 8514 women aged 15-49 and 3618 men aged 15-59 were successfully interviewed (National Department of Health et al., 2019). However, this study focused on 6223 youths (1740 male and 4483 female) aged 15-35 years.

Description of variables

The outcome variable used in this study is higher-risk sex. We defined higher-risk sex as youths who reported that they had sexual intercourse, in the past twelve months preceding the survey, with a person who was not their spouse nor boyfriend or girlfriend or fiancé and did not live with them. We used dichotomous coding for this variable in this study.

We used ten explanatory variables in this study. The individual/household-level factors include age group, sex, population group, marital status, education level, age at sexual debut, number of household members, and household wealth. The community factors include the place of residence and province.

Statistical analysis

We used Stata version 17 for the analysis (StataCorp, 2021). The analyses were based on bivariate analysis (with a χ^2 test), and multilevel logistic regression analysis. A weighted sample of 6223 youths was included in this study.

Results

Factors associated with higher-risk sex

The findings showed that age, sex, marital status, age at sexual debut, number of household members, place of residence, and province were significantly associated with higher-risk sex among the youth ($p < 0.05$).

Random effects and model comparison

As shown in Table 1, the empty model (model 0) shows some variations in higher-risk sex across the clusters ($\sigma^2 = 0.308$ [95% CI: 0.17 to 0.56]). The ICC in the empty model implied that 8.56% of the total variation in higher-risk sex was attributed to the difference between clusters. The findings from the MOR confirmed the evidence of community factors in shaping the odds of higher-risk sex.

In model one, a negative PCV value was obtained because the variance increased (rather than decreased) after adding the individual-level factors. Twenty-five per cent of the variability in higher-risk sex among the youth was explained by the full model. Moreover, model three had an AUC of 0.70, suggesting a fair predictive performance. Furthermore, the values of the AIC were the lowest in model three, compared to the other models, indicating that this model fits the data well.

Determinants of higher-risk sex

Table 2 (*not shown here*) shows the multilevel logistic regression results of the individual/household and community-level determinants of higher-risk sex. After adjusting for multilevel factors, we found higher odds of higher-risk sex among the youth aged 25-29 years (aOR 1.45 [95% CI 1.12-1.88]) compared to those aged 20-24 years. Females had lower odds of higher-risk sex (aOR 0.15 [95% CI 0.12-0.18]) compared to males. Youth from the coloured population group had higher odds of higher-risk sex (aOR 1.65 [95% CI 1.05-2.58]) compared to youth from the black population group. Concerning marital status, youths who were no longer married had higher odds of higher-risk sex (aOR 1.61 [95% CI 1.00-2.59]) compared to those who were never married. However, youths who were married (aOR 0.15 [95% CI 0.09-0.26]) and those who were cohabiting (aOR 0.14 [95% CI 0.08-0.24]) had lower odds of higher-risk sex compared to those who were never married. Youth with secondary or higher education had higher odds of higher-risk sex (aOR 1.64 [95% CI 1.08-2.50]) compared to those with primary education.

Moreover, higher-risk sex decreases with age at sexual debut, where youths who started engaging in sexual activities at a young age had higher odds of higher-risk sex. Youths who had their sexual debut below the age of fifteen (aOR 1.87 [95% CI 1.18-2.98]) and those who had their sexual debut at age 15-19 (aOR 1.72 [95% CI 1.16-2.55]) had higher odds of higher-risk sex compared to those whose sexual debut was from age twenty years and older. Furthermore, youths from smaller households (1-3 household members) had higher odds of higher-risk sex (aOR 1.41 [95% CI 1.08-1.85]) compared to youth from households with 4-5 household members. Concerning the province, youths from the Northern Cape province had higher odds of higher-risk sex (aOR 1.67 [95% CI 1.02-2.73]) compared to youths from the Limpopo province. However, youths from the Mpumalanga province had lower odds of higher-risk sex (aOR 0.47 [95% CI 0.30-0.76]) compared to youths from the Limpopo province.

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Table 1: Random effects and model comparison for factors determining higher-risk sex among the youth

Random effects result	Model 0	Model 1	Model 2	Model 3
PSU variance (95% CI)	0.308 [0.17-0.56]	0.329 [0.17-0.64]	0.196 [0.08-0.46]	0.232 [0.1-0.55]
ICC %	8.56	9.09	5.61	6.58
MOR	1.70	1.73	1.52	1.58
PCV %	®	-6.82	36.36	24.68
Model fitness				
-2LL	3647	3005	3606	2963
AIC	3651	3043	3628	3019
AUC (95% CI)	0.82 [0.81-0.84]	0.86 [0.84-0.87]	0.72 [0.70-0.75]	0.85 [0.83-0.86]
PSU	695	695	695	695

Note: ® = reference; ICC = intra-cluster correlation coefficient; MOR = median odds ratio; PCV = proportional change in variance; -2LL = deviance [-2 log-likelihood]; AIC = Akaike Information Criterion; AUC = Area under the curve; PSU = Primary Sampling Unit