HIV-related behaviours and socio-demographic determinants of HIV status among sexually active young people in South Africa.

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Brief background

The World Health Organisation (WHO) reported an approximate number of 38.4 million people living with HIV, with 1.5 million people becoming newly infected in 2021 globally (WHO, 2021). Sub Saharan Africa accounts for approximately 40% of the total HIV infections in the world (Odimegwu and Ugwu, 2022), with young people aged between 15 and 24 accounting for around 33% of the global infections that have been anticipated to increase annually by 13% leading to an estimation of 3.5 million new infections by 2030 (Mbengo et al., 2022). This region has a median age at first sex of between 16-18 years with high reported cases of Sexually Transmitted Infections (STIs), yet the uptake of contraceptives is still low (Manu et al., 2022, Odimegwu and Ugwu, 2022). South Africa is no stranger to the high levels of the HIV infections. In 2016, approximately 2000 young women of this country were infected with HIV every week (SANAC, 2017). Along with the large concentration of HIV infections, low age at sexual debut and low contraceptive uptake, every year, developing regions (including SA) has approximately 21 million of girls aged 15-19 becoming pregnant (WHO, 2020). These pregnancies can have a negative impact on their educational progress and future career prospects which may also results in these young women being less educated and poorer than women without early and unplanned pregnancies (Mutinta, 2022, Chukwunyere and Stella, 2019).

The occurrence of risky sexual behaviour by young people seems to be higher in Sub Saharan African countries (Odimegwu and Ugwu, 2022, Stokłosa et al., 2021). Worldwide, this region has a constant growing number of young people who have a higher likelihood of experimenting with sexual intercourse and being involved in risky sexual behaviours such as multiple sexual partnerships, not using condoms during sex, early sexual debut and casual sex before marriage (Manu et al., 2022). Young people do not only engage in sexual behaviours in the context of committed relationships, they also engage in these behaviours outside of committed romantic relationships in the form of friends-with-benefits, one-night stands, sex buddies and other types of sexual partnerships. These types of sexual relations have been growing rapidly over the past decades, especially among young people (Boislard et al., 2016). This phase of exploring can however be a time where the risk of unintended pregnancy and sexually transmitted diseases (STDs), including HIV/AIDS is heightened along with several sexual and reproductive health problems (Manu et al., 2022, Boislard et al., 2016).

Risky sexual behaviour is becoming a critical health, social and demographic concern in the world (Stokłosa et al., 2021, Perera and Abeysena, 2018). Moreover, it is recognised as a significant public health concern among young people, due to its high prevalence of HIV/AIDS and STIs among this age group (Mamo et al., 2016, Stokłosa et al., 2021, Perera and Abeysena, 2018). Young women aged 15-24 years continue to be more affected by HIV with 63% of the region's new HIV infections in 2021, three times higher males of the same age (UNAIDS, 2022). Although young women are more vulnerable to HIV, males of the same age have a higher prevalence of risky sexual behaviours (Mokgatle et al., 2021, Kaggwa et al., 2022). Even when they appear to be in better health than other age groups, young people, are faced with health risks that may be detrimental to their wellbeing and future. Despite the evidence of practicing safe sex proving to be beneficial to their health and wellbeing, estimates show that approximately 14 million young people die each year from Sexual and Reproductive Health (SRH) challenges (Odimegwu and Ugwu, 2022). Young people who grow up in countries carrying the global burden of infectious diseases such as HIV/AIDS are more susceptible to adverse health consequences from a variety of health risky behaviours (Govender et al., 2019b). For young people, the transition from being a child to an adult is a critical period where intimate relationships are formed, where young people mature and start to be intimate, explore their desires, and negotiate sexual relationships (Boislard et al., 2016). There are several factors of risky sexual behaviour associated with the spread of HIV; however, this study will focus on age at first sex, condom use and number of sexual partners among young people in South Africa.

Factors such as such drug and alcohol abuse, high prevalence of sexual initiation among peers, financial problems in the family, large family size, minority group status, unstable family environment and low maternal education have been attributed to risky sexual behaviours (Durowade et al., 2017). It is suggested that males have more than one sexual partner because of the assumption that they will have more sexual gratification, to prove their manhood and social power, while women embrace multiple sexual partnerships as a way to have a financial, economic and social support for them and their dependents (Mushwana and Ngonyama, 2015). Studies have indicated that the use of condoms among young people remains inconsistent and low, which might suggest the adoption of unsafe sexual practices (Duby et al., 2021a, Ajayi et al., 2022, Odimegwu and Ugwu, 2022). Age disparate relationships and transactional sex is also indicated to be a factor influencing risky sexual behaviours among young people (Mabaso et al., 2018). Young women in South Africa were found to have elevated risk of HIV-acquisition when in age disparate relationships and engaging in transactional sexual relationships (Maughan-Brown et al., 2020, Mampane, 2018, Duby et al., 2021b), which might highlight that young women engage in sexual activities with older partners for material and financial benefit. In addition, the use of alcohol and substance have been identified as an important determinant of risky sexual behaviour among young people (Reis et al., 2021, Cho and Yang, 2023, Carels et al., 2023). The use of substance can affect the

thinking capacity and ability to make responsible choices with regards to sexual practices (Mavhandu-Mudzusi and tesfay Asgedom, 2016).

South Africa still continues to have the highest rates of people living with HIV/AIDS and the numbers continues to increase (Zuma et al., 2022, WHO, 2021). There is even a higher percentage among the young people (UNAIDS, 2022). It is important that South African literature takes a central position on sexual behaviour of young people in order to inform the public, health institutions and researchers of its dangers to the population. This area is especially crucial in the global pursuit of the third Sustainable Development Goal (SDG), particularly target 3.7, which aims to ensure universal access to sexual and reproductive health-care services, including family planning, education, and the integration of reproductive health into national strategies (United Nations, 2015). Ongoing research into the sexual behavior of young people could play a key role in enhancing the sexual health services provided to them, especially given the rising rates of STIs and unplanned pregnancies. The findings of the study will shed light on the factors influencing the prevalence of risky sexual behaviours among university students. As such, the study will contribute to research on youth reproductive health issues, particularly on the risky sexual behaviour literature. In so doing, the results of this study will add to the body of existing research on the spread and ways to reduce HIV.

Methods

Data source(s)

The study used secondary data from the 2016 South Africa Demographic and Health Survey (SADHS). This study followed a descriptive-correlational study design. The SADHS is a nationally representative data source with information on demographic and health indicators. The survey used a two-stage stratified cluster sampling design. The first stage involved a selection of 750 Enumeration Areas (EAs) using systematic random sampling, with probability proportional to size. The second stage involved the selection of 20 dwelling units in each cluster (EA), again using systematic random sampling. In the final analysis, a nationally representative sample of over 15,000 dwelling units was selected and 11,083 households were interviewed. Of those interviewed, there were 8,514 women aged 15-49, and 3,618 men aged 15-59 (National Department of Health and ICF, 2019). The female (ZAIR71FL), male (ZAMR71FL) and the HIV (ZAAR71FL) data files were merged for the study. For purposes of this study, the study population will comprise 873 men and 1645 women aged 15-24 years who have had sexual intercourse and are unmarried.

Proposed study variables

Dependent variable(s)

The outcome variable of this study is HIV status. This variable is categorised into HIV positive and HIV negative where 0= Negative and 1=Positive.

Independent variable(s)

The independent variables of this study are sociodemographic and behavioural factors. The sociodemographic variables of the study included

Method of analysis

The study will use Stata version 16 software and the data will be analysed using univariate, bivariate and regression analysis. Firstly, the descriptive analysis was done to examine the distribution of the study variables. Secondly, the chi-square test was used to assess the association between HIV status and each independent variable. This method was conducted by cross tabulating the dependent (HIV status) with the independent (sociodemographic, and behavioural) variables, with the significant level being at $p<0.01$ and $p<0.05$. Thirdly, multivariate binary logistics regression was used to identify factors associated with HIV status by considering sociodemographic, and behavioural variables.

Analysis

Relationship between HIV status and background variables

The distribution of respondents and the relationship between HIV status and background factors is presented in Table 1.

HIV-related and socio-demographic characteristics

A sample of 1256 sexually active males and females aged 15-24 was included in this study. The results showed that most young people (i) were aged 20-24 years (62.9%), (ii) were males (52.3%), (iii) were from the black population, (iv) had secondary or higher level of education (91.4%), (v) have used a condom (57.2%), (vi) had one sexual partner (72.4%), (vii) have had first sex at 16 years and above, (viii) have tested for HIV, (ix) resided in the urban areas (61.4%) and in the Gauteng province.

Table 1: Distribution of respondents and the relationship between HIV status by HIV-related and sociodemographic factors.

Variables	HIV status				Number (%)	*X2*	
	Negative		Positive				
	%	CI	%	CI		Value	p-value
Age in 5-year groups						10.7	0.001
15-19	95.2	[92.9,96.8]	4.8	[3.2,7.1]	466 (37.1)		
20-24	89.7	[86.3,92.3]	10.3	[7.7,13.7]	790 (62.9)		
Sex						53.7	0.000
Male	97.4	[95.8,98.4]	2.6	[1.6,4.2]	657(52.3)		
Female	85.5	[81.3,88.9]	14.5	[11.1,18.7]	599(47.7)		
Population group						0.1	0.752
Black	91.4	[89.0,93.3]	8.6	[6.7,11.0]	1186(94.4)		
Non-Black	97	[91.5,99.0]	3	[1.0,8.5]	70(5.6)		

Educational level						0.4	0.554
Primary or less	90	[81.0,95.0]	10	[5.0,19.0]	108(8.6)		
Secondary and Higher	91.9	[89.6,93.7]	8.1	[6.3,10.4]	1148(91.4)		
Condom use						3.1	0.079
No	90	[85.8,93.1]	10	[6.9,14.2]	538(42.8)		
Yes	93	[90.1,95.1]	7	[4.9,9.9]	718(57.2)		
Number of sexual partners						1.7	0.189
One sexual partner	90.9	[87.9,93.1]	9.1	[6.9,12.1]	909(72.4)		
Two or more sexual partners	94	[90.8,96.1]	6	[3.9,9.2]	347(27.6)		
Age at first sexual intercourse						0.4	0.543
<16 years	91.1	[87.1,93.9]	8.9	[6.1,12.9]	428(34.1)		
16+ years	92.1	[89.2,94.2]	7.9	[5.8,10.8]	828(65.9)		
Ever been tested for HIV						7.3	0.007
No	96.8	[94.2,98.2]	3.2	[1.8,5.8]	283(22.5)		
Yes	90.3	[87.5,92.5]	9.7	[7.5,12.5]	973(77.5)		
Type of place of residence						3.3	0.068
Urban	91.2	[87.7,93.8]	8.8	[6.2,12.3]	771(61.4)		
Rural	92.5	[90.3,94.3]	7.5	[5.7,9.7]	485(38.6)		
Province						29.6	0.000
Western Cape	95.8	[84.7,99.0]	4.2	[1.0,15.3]	81(6.4)		
Eastern Cape	89.5	[84.4,93.0]	10.5	[7.0,15.6]	173(13.8)		
Northern Cape	94.4	[83.8,98.2]	5.6	[1.8,16.2]	23(1.8)		
Free State	90.2	[83.3,94.5]	9.8	[5.5,16.7]	61(4.9)		
KwaZulu-Natal	83.3	[76.3,88.6]	16.7	[11.4,23.7]	244(19.4)		
North West	94.8	[89.6,97.5]	5.2	[2.5,10.4]	83(6.6)		
Gauteng	97.1	[89.8,99.2]	2.9	[0.8,10.2]	320(25.5)		
Mpumalanga	85.7	[73.9,92.7]	14.3	[7.3,26.1]	118(9.4)		
Limpopo	97.5	[94.4,98.9]	2.5	[1.1,5.6]	154(12.3)		
Total	**91.7**	**[89.5,93.5]**	**8.3**	**[6.5,10.5]**	**1256(100)**		

Note: $p<0.05$; CI = confidence interval

HIV prevalence among young people in South Africa

The results of the relationship between HIV-related and socio-demographic factors and HIV status are presented in Table 1. The results indicate a signification association between HIV status with age, sex, ever been tested for HIV, and province. The results showed that having a positive HIV status increased with age. A higher prevalence of HIV among young people aged 20-24 years [10.3%, 95% CI: 13.4-21.5] as compared to those aged 15-19 years. Sex was found to be associated with HIV status as females [14.5%, 95% CI: 11.1-18.7] were found to have a higher HIV prevalence as compared to their male [2.6%, 95% CI: 1.6-4.2] counterparts. Additionally, young people who have tested for HIV [9.7%, 95% CI: 7.5-12.5] were found to have a high prevalence of a positive HIV status as compared to those who have not had an HIV test. Moreover, the findings showed that there was a high prevalence of HIV in KwaZulu-Natal, Mpumalanga and the Eastern Cape. Young people who reside in KwaZulu-Natal [16.7%, 95% CI: 11.4-23.7], Mpumalanga [14.3%, 95% CI: 7.3-26.1] and the Eastern Cape [10.5%, 95% CI: 7.0-15.6] had a higher prevalence of HIV as compared to the other provinces.

Factors associated with HIV status among young males and females in South Africa.

Table 2 presents the results of multivariate analyses of factors associated with HIV status using logistic regression modelling for young men and women. The results summarised in Table 2 indicates that age, sex, age at first sexual intercourse and province were factors associated with HIV status among young people of South Africa.

Table 2: HIV related and socioeconomic factors associated with HIV status among young people

Variables	**Ratio**	**Linearized Std. Err.**	**t**	**P> |t|**	**[95% Conf.Interval]**	
					Upper	*Lower*
Age in 5-year groups						
15-19	1					
20-24	2.32	0.61	3.21	0.001	1.38	3.88
Sex						
Male	0.14	0.04	-6.41	0.000	0.08	0.26
Female	1					
Population group						
Black	1					
Non-Black	0.56	0.35	-0.94	0.346	0.16	1.89
Educational level						
Primary or less	1					
Secondary and Higher	0.82	0.26	-0.63	0.527	0.44	1.53
Condom use						
No	1					
Yes	1.03	0.31	0.10	0.922	0.57	1.87
Number of sexual partners						
One sexual partner	1					
Two or more sexual partners	1.03	0.29	0.12	0.908	0.60	1.78
Age at first sexual intercourse						
<16 years	1.94	0.60	2.14	0.033	1.05	3.58
16+ years	1					
Ever been tested for HIV						
No	1					
Yes	1.77	0.66	1.52	0.130	0.84	3.69
Type of place of residence						
Urban	1					
Rural	0.65	0.17	-1.64	0.101	0.38	1.09
Province						
Western Cape	0.20	0.16	-2.06	0.040	0.04	0.93
Eastern Cape	0.63	0.21	-1.36	0.175	0.32	1.23
Northern Cape	0.35	0.24	-1.53	0.127	0.09	1.35
Free State	0.46	0.21	-1.73	0.084	0.19	1.11
KwaZulu-Natal	1					
North West	0.25	0.12	-3.01	0.003	0.10	0.62
Gauteng	0.10	0.07	-3.33	0.001	0.02	0.38
Mpumalanga	0.80	0.31	-0.57	0.566	0.37	1.73
Limpopo	0.13	0.07	-3.96	0.000	0.05	0.36

_cons	0.16	0.09	-3.33	0.001	0.06	0.47

Note: * = *p<0.05*; ** = *p<0.01*; *** = *p≤0.001*; † = reference category; AOR = adjusted odds ratio; CI = confidence interval

The results showed higher odds of being HIV positive among the older young people than the younger age group. The results showed that young people aged 20-24 years were 2.32 ([95% CI 1.38-3.88]) times more likely to be HIV positive as compared to those aged 15-19 years. The finding also found that sex has a significant association with HIV status among people. Males were 0.14 ([95% CI 0.08-0.26]) times less likely to be HIV positive as compared to their female counterparts. Age at first sexual intercourse was found to have a significant association with HIV status. Young people who have had their first sexual intercourse before the age of 16 years had significantly higher odds of having a positive HIV status as compared to those who had their first sexual intercourse at age 16 years and above (aOR 1.94 [95% CI 0.047-0.544]). Furthermore, the findings also showed that province is a significant predictor of women's intention to use contraception.Young people from the Western Cape, North West, Gauteng and Limpopo had lower odds (aOR 0.02 [95% CI 0.04-0.93]; aOR 0.25[95% CI 0.10-0.62]; aOR 0.10 [95% CI 0.02-0.38]; and aOR 0.13 [95% CI 0.05-0.36]) of having of having a positive HIV status as compared to those in KwaZulu-Natal.

Discussions

Factors associated with HIV status among young males and females in South Africa.

The study aimed to examine the HIV related and sociodemographic factors associated with HIV status among sexually active young people in South Africa. The results indicated that age, sex, age at first sexual intercourse and province were factors associated with HIV status among young people of South Africa. The results showed higher odds of being HIV positive among the older young people than the younger age group. A study on a systematic review of risk factors in Africa found the same results (Bossonario et al., 2022) which confirm the results of this study. At the age of 24 years, HIV infections are more likely to dramatically increase among males (Govender et al., 2019a) while females acquire HIV earlier in life than their male conterparts (Bhushan et al., 2024), particularly in South Africa.

The finding also found that sex has a significant association with HIV status where young males were less likely to be HIV positive as compared to their female counterparts. This is of particular concern as HIV-related deaths among young females are estimated to be around 3900 annually (Govender et al., 2022, Simbayi et al., 2019). Females still account for the majority of HIV infections compared to their male counterparts, thus these results are not surprising since women are more vulnerable to HIV infections because of their physiological makeup, gender inequality, gender based violence among other things (Bommer et al., 2021, Bossonario et al., 2022). The vulnerability of women to HIV infections in South Africa in particular stems from women being born in inequality characterised by low social status, violence against women, unfavorable economic position, male dominancy in sexual relationships which

could result in the inability of women to insist on having protected sex, thus the heightened risk of HIV infections (Ackermann and Klerk, 2002). Age disparate relationships among females also exacerbates the HIV infections among females because older men are more likely to have HIV positive results yet be unaware of their status (Zuma et al., 2022, Govender et al., 2022). Age disparate relationships are also linked to transactional sex, sexual intercourse without a condom and multiple sexual partnerships (Stoner et al., 2019).

Age at first sexual intercourse was found to have a significant association with HIV status where young people who have had their first sexual intercourse before the age of 16 years had significantly higher odds of having a positive HIV status as compared to those who had their first sexual intercourse at age 16 years and above. These results coincide with other studies (Bommer et al., 2021, Obeagu et al., 2023, Bossonario et al., 2022). An early age at first sex has been associated with increased number of sexual partners, sexual intercourse without a condom and risk of unfavourable sexual and reproductive health outcomes including sexually transmitted diseases and a risk of HIV infection (McClinton Appollis et al., 2022, Becker et al., 2018). Engaging in sexual intercourse at an early age is particularly risky for young women as it heightens their chances of being infected with an STI due to their biological vulnerability, including the increased suscestibility of the immature cervix to infections when exposed (Olesen et al., 2012).

Furthermore, the findings also showed that province is a significant predictor of having a positive HIV status among young people. Compared to Kwa-Zulu Natal , young people from the Western Cape, North West, Gauteng and Limpopo had lower odds of having of having a positive HIV status. Kwa-Zulu Natal is mainly characterised by rural areas and is mostly made up of dense rural settlements and villages (Naidoo and Ogra, 2023). This is not surprising, as Kwa-Zulu natal is known as the epicenter for the HIV epidemic in South Africa, the most affected province in the country (Desai et al., 2024). This province is also charactirised by deeply rooted cultural norms that exacerbate gender inequality, power imbalances and certain aspects of masculinity, contributing to the higher HIV infection rates (Dolamo, 2019). The growing trend of transactional sex in Kwa-Zulu Natal is also a problem, suggesting that young peope may overlook the health risk of HIV transmissions in pursuit of economic benefits (Smith, 2024). These findings explains how cultural and economic dynamics may be driving the heightened HIV risk among young people in Kwa-Zulu Natal.

Conclusion

HIV related behaviours and sociodemographic factors play a huge role in the HIV prevalence of young people, especially among females, those aged 20-24, those who had an early sexual debut and those residing in the Kwa-Zulu Natal province. There is a need to strengthen the existing interventions that seek to reduce HIV prevalence among young people. These findings highlight the need for active

healthcare facilities that provide HIV testing and the integration of comprehensive HIV and sex education programs in schools to encourage early testing and safe sex behaviours. Targeted interventions should focus on younger women, addressing the needs of this target population. Future research should focus on conducting studies in Kwa-Zulu Natal that HIV related data on young people and the challenges they face in accessing HIV services in the province .

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Authors' contributions
GM conceptualised this study. GM worked on data acquisition, data cleaning, and analysis. GM wrote the manuscript. The author read and approved the manuscript.

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Data availability
The data used in this study is available from the DHS Program website; one needs to register and be given access to download and use the data. The data can be accessed using https://dhsprogram.com/data/available-datasets.cfm, and requires registration.

Ethics approval and consent to participate
Not applicable as this is a secondary data analysis. For more information about the ethical processes used by the DHS; see https://dhsprogram.com/Methodology/Protecting-the-Privacy-of-DHS-Survey-Respondents.cfm.

Declaration of conflicting interests
The authors declare no conflicts of interest.

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