

The Prevalence of HIV Testing and Associated Factors Among Young Women in South Africa: An Analysis of 2016 South Africa Demographic and Health Survey data

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DOI: <https://doi.org/10.52403/ijhsr.20240116>

ABSTRACT

Background: HIV is a significant public health issue around the world. HIV testing is critical for controlling and preventing the spread of the virus, as well as improving the lives of HIV-positive people. The aim of this study was to assess the extent of HIV testing and factors associated with HIV testing among young women in South Africa.

Method: Secondary data analysis was performed using data from the Demographic and Health Surveys (DHS) program drawn from the South Africa Demographic and Health Survey (SDHS) 2016. A total of 3422 young women (15 to 26 years) from South Africa were included in this study. Descriptive statistics, bivariate analysis and multivariate logistic regression analysis were performed to test the magnitude of association between the outcome variable (HIV testing) and independent variables. Data extraction and cleaning were done using Statistical Package for the Social Sciences (SPSS, IBM version 26). All data analysis was done using the complex sample analysis procedure of SPSS.

Result: The findings from this study demonstrate that 72.1% of young women from South Africa had ever been tested for HIV. The results show that age, place of residence, region, educational level, occupation, ethnicity, age at first sex, condom use, and number of sex partners were associated with ever being tested among young women in South Africa. Women aged 24 to 26 years (AOR=3.11, 95% CI=1.15-5.71), those who were urban dwellers (AOR=1.51, 95% CI=1.02-2.23), those who had secondary education (AOR=1.70, 95% CI=0.75-5.87), who were from Gauteng province (AOR=1.72, 95% CI=0.56-3.0), those who were literate (AOR=4.67, 95% CI=2.51-3.65), age at first sex at 15 to 17 years (AOR=4.81, 95% CI=2.41-6.09), those who have had three or more total lifetime number of sex partners (AOR=2.3, 95% CI=1.08-3.78) showed significantly higher odds of being tested for HIV than their counterparts.

Conclusion: The study concludes that a high number of young women in South Africa are more likely to get tested for HIV, but they also practice high-risk sexual behaviours. The findings from this study suggest the need for comprehensive health education about the dangers of high-risk sexual behaviour among young South African women. The government of South Africa must also intensify

efforts to improve health education for young women in rural areas. Improving rural women's access to HIV testing could help increase the use of HIV testing services in rural areas.

Keywords: HIV testing, Sexual behaviour, Women, South Africa, Prevalence

INTRODUCTION

HIV testing and counselling are essential measures in preventing HIV transmission, treatment, care, and other HIV-supportive services (1). Most importantly, HIV testing should be optional, which means that everyone has the freedom to decline testing. Coercion to undergo HIV testing by a health care practitioner, authority, or partner is unacceptable because it undermines good public health practice and violates human rights (2). The effects of HIV/AIDS globally are catastrophic, with more than 39 million HIV/AIDS-related deaths and 36 million people now living with HIV. Despite the great strides in Antiretroviral therapy (ART) and global progress with the introduction of treatment-as-prevention programmes in many countries, 2 million people get newly infected with HIV yearly (3).

South Africa faced a severe and most high-profile HIV epidemic globally, with an estimated 7.7 million people living with HIV in 2018 (4). Early detection of HIV infection, and prompt start of antiretroviral therapy (ART) after diagnosis can maximize individual health benefits and avoid further transmission (5). South Africa has made outstanding strides towards achieving the UNAIDS 95-95-95 targets, particularly in HIV testing and viral load suppression (6). In 2019, around 92% of PLHIV knew their HIV status, 75% were on treatment, and 92% of those diagnosed and on treatment had their viral load suppressed. The prevalence of HIV is still high, with 19 % of PLHIV (1 in 5) (4, 6). However, the prevalence varies distinctly throughout the provinces, from 12.6 % in Western Cape to 27 % in KwaZulu-Natal (4).

HIV testing is an important step toward reducing HIV-related morbidity and mortality while potentially improving the patient's well-being (7, 8). A long-standing

and effective way of identifying people living with HIV (PLHIV) is the provision of annual repeat testing of negative people and association with HIV prevention programs (9). HIV programs in South Africa use strategic combination means of promoting universal and equal access to HIV Testing Services (HTS) (9).

With the world's fourth highest adult HIV prevalence (19%) and the second highest number of HIV-related deaths (10, 11), South Africa needs a comprehensive HIV response. As a response, the government initiated mass HIV testing campaigns and runs the world's largest antiretroviral (ART) program, with ART accessibility continuing to expand (12). Data from the most recent national survey (which included HIV-testing) show that only 91% of HIV-positive men and 94% of HIV-positive women in South Africa were aware of their HIV status (6), despite significant improvements in HIV testing (12). There is an immediate need for improved HIV testing uptake and frequency because a significant proportion of new infections are transmitted by people who are unaware of their HIV status (13, 14). People living with HIV (PLHIV) who are aware of their HIV status can optimize the advantages of early treatment for HIV and limit the risk of further transmission of the disease (15). In addition, among PLHIV, knowing one's status has been linked to the willingness to engage in lower risk behaviours (16).

Most studies in South Africa have concentrated on generalized HIV testing for both genders, some on HIV testing among MSM, while others focused on HIV testing among males alone (12, 17-19), with little emphasis on HIV testing among young women. As a result, the purpose of this study was to investigate the factors associated with HIV testing among young women in South Africa. With the present

forums in South Africa promoting women's empowerment, women are potentially able to influence the control of crucial factors for HIV prevention and care, therefore, a thorough understanding of the factors influencing HIV testing uptake among young women is necessary to develop strategies for improving HIV testing among this population, prevent further HIV transmission, and encourage timely linkage to HIV treatment and care.

MATERIALS & METHODS

This study is based on secondary data analysis using data from the Demographic and Health Surveys (DHS) program. Demographic and Health Surveys (DHS) are nationally representative household surveys that provide data for a wide range of monitoring and impact evaluation indicators in areas of population, health, HIV, and nutrition. The Demographic and Health Surveys (DHS) Program is a program funded by the U.S. Agency for International Development (USAID).

Data source and population

This study uses DHS data collected from 27 June 2016 to 4 November 2016 in South Africa.

Statistics South Africa (Stats SA), in collaboration with the South African Medical Research

Council (SAMRC) conducted the South Africa Demographic and Health Survey 2016 (SADHS 2016), and the DHS Program provided technical assistance in this survey. The primary objective of the SADHS 2016 is to provide up-to-date estimates of fundamental demographic and health indicators. DHS questionnaires conducted in South Africa were adapted from template survey instruments developed by the DHS program to reflect the South African population and its health issues. After the preparation of the questionnaires, it was then translated from English to 10 South African indigenous languages (Afrikaans, **isiZulu**, **isiXhosa**, isiNdebele, **siSwati**, **Setswana**, **Sepedi**, **Sesotho**, **Tshivenda**,

and Xitsonga). A nationally representative sample of households (women aged 15-49 and men aged 15-59) was eligible for individual interviews that were performed separately. Both the women and men questionnaires collected different types of information from the respondents on sociodemographic characteristics, sexual behaviour, HIV/AIDS-related knowledge, HIV/AIDS-related stigma, HIV Testing coverage and HIV prevalence, but the information of importance in this study was HIV testing rates and its associated factors among young women. A total of 3422 young women from South Africa ranging from the age of 15 to 26 years across all the nine provinces of South Africa were included in this study. Using the SADHS 2016 data, the researcher aimed to unpack the prevalence of HIV testing and associated factors among young women aged 15-26 years in South Africa across the nine provinces.

Sample design

The DHS survey samples were obtained using a stratified two-stage sample design in which.

women of reproductive aged 15-49 years and men aged 15-59 years were interviewed separately. The sampling frame used for the SADHS 2016 is the Statistics South Africa Master Sample Frame (MSF), which was developed using Census 2011 enumeration areas (EAs). In the MSF, EAs of reasonable size were treated as primary sampling units (PSUs). The sampling frame contains information about the geographic type (traditional, urban, or farm) and the estimated number of residential dwelling units (DUs) in each PSU. South Africa is divided into nine provinces. The sample for the SADHS 2016 was designed to provide estimates of key indicators for the whole country, for urban and non-urban areas separately, for each province, and to make sure that the survey precision is comparable across the nine provinces of South Africa.

Study variables

Dependent/Outcome variable

For this study, the outcome variable was Self-reported HIV testing among young South African women. In SADHS 2016, information on HIV testing was measured by asking the respondents this question, 'if they have ever tested for HIV', and the responses were written as yes or no. The 'yes' category included young women who had ever tested for HIV in their lifetime prior to the survey, and the 'no' category included young women who had never tested for HIV in their lifetime.

Independent Variables

The selected independent variables from SADHS 2016 dataset were as follows: age (15-26 years), occupation (employed, self-employed and non-employed), marital status (Never married, married, living together, Divorced/separated, Widowed), residence (urban vs. non-urban), province (Western Cape, Eastern Cape, Northern Cape, Free State, KwaZulu-Natal, North West, Gauteng, Mpumalanga and Limpopo), education level (No education, Primary, Secondary, Higher), covered by health insurance (yes or no), age of first sexual intercourse (no sex, less than 14 years, 15-17 years, 18-20 years, 21-23 years, 24 and above years) and Wealth Index (Poorest, poorer, middle, richer, richest).

STATISTICAL ANALYSIS

Data extraction and cleaning was done using Statistical Package for the Social Sciences (SPSS, IBM version 26) for the SADHS 2016 data. The SPSS complex sample analysis procedure was used for all analyses. Descriptive statistics were done to describe the characteristics of young women included in this study, and the results were presented in tables and described in texts. For bivariate analysis, Pearson chi-square test was used to test the association between each independent variable with the outcome variable (HIV testing). Multivariate logistic regression was used to establish the

magnitude of associations. All variables that were significant in bivariate analysis were included in the multiple logistic regression model. Adjusted odds ratios with 95% confidence intervals (95% CI) were estimated. A *P-value* < 0.05 was considered statistically significant. Population size adjusting for sampling weights were also included during the analysis. This was performed in SPSS by computing weights, the researcher weighted the cases by inserting variables which was women's individual sample weight (V005), and the unweighted women sample was divided by a million to produce a proper representation of the whole population. Adjusting of sampling errors was also done, this included preparing for analysis of complex samples and creating a plan file, then designing of variables was performed, this was done by inserting variables in strata, cluster, and sample weight categories. The strata variable was sample strata for sampling errors (V022), the cluster variable was primary sampling unit (V021), and sample weight variable was women's individual sample weight (V005). Then the researcher pasted the syntax file on SPSS and ran it for analysis.

RESULT

Demographic characteristics of young women in South Africa

Table 1 shows that most of the women in this study ranged from 24-26 years of age, which accounts for 25.9 % of the whole women population in this study. Majority of the women in this study were rural dwellers, 65.4 % were from rural areas, while 34.6 % were from urban areas. Most women were from Gauteng province, which constituted of 25.7 % of the whole study population, the least being the Northern Cape with 1.9 % of the study population. 8.3 % were from Mpumalanga province, 5.8 % were from Northwest, and 10.5 % were from the Western Cape. Kwazulu-Natal province made up 20.9 % of the study population, while Free State made up 5.1 %, and 11.6 % were from Eastern Cape, and Limpopo

made up 10.2 % of the whole study population. In terms of education level, only 0.3 % of women were uneducated, 6.5 % had primary education, while 84.4 % had secondary education, and the remaining 8.8 % were able to reach higher educational levels. In terms of ethnicity, most of the study populace were black women, which consisted of 89.2 %, while 2.2 % were white women, with 7.5% coloured and 1.1 % were Indian women. When it comes to literacy level, 90.8 % were able to read the whole sentence, 2.2 % were not able to read at all, 7 % were only able to read parts of the sentence and only one woman had no card with required language. The wealth index of women index is a measure of their living standard, which was calculated based on ownership of selected assets, like televisions, materials used for housing construction, types of water access and sanitation facilities they have. On the wealth Index scale 21.3 % of women in this study were categorized as the poorest, while the poorer accounted for 21.4 % of the study population, 20.9 % were in the middle class

of the wealth index, with 20.7 considered to be richer and 15.7 % were regarded as the richest. The majority of the study population (89.7 %) were covered by health insurance in this study, while the other 10.3 % were not covered under health insurance. In terms of marital status, only 5.7 % of women were married, while 93.8 % were never married, 0.1 % were divorced, and only two women were widows. Regarding the respondent's current occupation, a majority of the young women were not working (81.1 %), and 3.7 % fell under the Professional/technical/managerial positions. The clerical category consisted of 4.6 % women, while 0.5 % were from the Agricultural-unskilled section. 1.1 % of the women were domestic workers, while 3.3 % provided services as means of occupation, and 0.8 % were skilled manual labours, 3.2 % were unskilled manual labour, while the remaining 1.6 did not know about their occupation. 72.1 % of the young women in South Africa reported to have tested for HIV, while 27.9 % have never tested for HIV.

Table 1: Demographic Characteristics of young women (15-26 years), SADHS 2016.

Demographic characteristics	Women	
	N	%
Age Group (years)		
15-17	857	25.1
18-20	848	24.8
21-23	830	24.3
24-26	886	25.9
Mean (\pm SD) age (years)	20.56 \pm 3.45	
Residence		
Rural	2240	65.4
Urban	1183	34.6
Region		
Western cape	358	10.5
Eastern cape	398	11.6
Northern cape	65	1.9
Free state	174	5.1
Kwazulu-Natal	714	20.9
North west	199	5.8
Gauteng	880	25.7
Mpumalanga	285	8.3
Limpopo	350	10.2
Education level		
No education	10	0.3
Primary	222	6.5
Secondary	2889	84.4
Higher	302	8.8
Ethnicity		
Black/African	3053	89.2
White	75	2.2
Coloured	258	7.5
Indian/Asian	37	1.1
Literacy		

Cannot read at all	76	2.2
Able to read only parts of the sentence	238	7.0
Able to read the whole sentence	3107	90.8
No card with required language	1	0.0
Wealth Index		
Poorest	731	21.3
Poorer	731	21.4
Middle	715	20.9
Richer	709	20.7
Richest	536	15.7
Covered by health insurance		
No	1516	89.7
Yes	174	10.3
Marital status		
Never married	3221	93.8
Married	196	5.7
Widowed	2	0.0
Divorced	4	0.1
Respondent's occupation		
Not working	2777	81.1
Professional/technical/managerial	126	3.7
Clerical	158	4.6
Agricultural-unskilled	19	0.5
Household and domestic	36	1.1
Services	113	3.3
Skilled manual	28	0.8
Unskilled manual	110	3.2
Do not know	55	1.6
Ever had an HIV test		
No	955	27.9
Yes	2468	72.1

Table 2 summarizes that the prevalence of HIV testing among young women in South Africa increases with age, as the age group (24-26 years) had a high prevalence (23.3%) compared to the other age groups, while the age group (15-17 years) had the least HIV testing prevalence of 9.6%. The place of residence was also a factor in HIV testing, as a high prevalence is seen in Urban areas (47.7%) as compared to rural areas (24.4%). In terms of regions, the HIV testing prevalence varies across the provinces of South Africa. Gauteng province had an HIV testing prevalence (18.3%) among young women, followed by Kwazulu-Natal province with an HIV testing prevalence of 14.5%. Northern Cape had the lowest HIV testing prevalence (1.3%) compared to all the other provinces. In terms of educational level, those who had secondary education displayed a shooting prevalence in HIV testing, with a 60.4% prevalence. Those who had no education had the lowest HIV testing prevalence (0.1). Respondents with primary education had a prevalence of 4.2%, and respondents with higher education had a prevalence of 7.4%.

Ethnicity is also seen as a factor in terms of HIV testing, as black women in South Africa had a high HIV testing prevalence (65.4%), followed by coloured women with a prevalence of 5.1%. Indian young women had the least HIV testing prevalence (0.4%), while young white women had a prevalence of 1.2%. In terms of literacy, those who could read a whole sentence had the highest HIV testing prevalence (66.2%), while those who could not read at all had an HIV testing prevalence of 1.4%. Those who could only read part of the sentence had a prevalence of 4.5%. There was not much difference in HIV testing rates with respect to wealth index as the poorest had an HIV testing prevalence of 14.9%, while the poorer were sitting on 16.2%, the middle class had a prevalence of 16.1%, while the richer had a prevalence of 15.5%, and the least were the richest with an HIV testing prevalence of 9.4%. In terms of coverage by health insurance, the results show that those who are not covered by health insurance are have a higher HIV testing prevalence (65.9%). On the other hand, those who are covered by health insurance had a lower HIV testing

prevalence (6.9). Marital status was also a determining factor for HIV testing, as these results show that those who have never been married test more for HIV compared to those who are married and otherwise. Unmarried young South African women had an HIV testing prevalence of 66.6%, while those who are married had an HIV testing prevalence of 5.3% and the divorced were sitting on 0.1%, while only two widowed women tested for HIV. Occupation was also

seen as a determining factor in HIV testing among young women in South Africa, as those who were not working had the highest prevalence (55.4%), while the who were professionals and in managerial positions had an HIV testing prevalence of 3.2, the least were Agriculture unskilled labour with a prevalence of 0.5%. Domestic workers had an HIV testing prevalence of 1%, while those who were providing services had a prevalence of 3.1%.

Table 2: The prevalence of HIV testing by Demographic characteristics among young women in South Africa, SADHS 2016.

Demographic characteristics	HIV testing	
	Prevalence n(%)	95 % CI
Age Group (years)		
15-17	328(9.6)	7.6-11.9
18-20	612(17.8)	15.1-21.2
21-23	726(21.2)	18.2-24.8
24-26	800(23.3)	20.1-27.3
Residence		
Rural	834(24.4)	22.4-26.4
Urban	1634(47.7)	45-50.4
Region		
Western cape	256(7.5)	6.2-9.1
Eastern cape	312(9.1)	7.8-10.6
Northern cape	44(1.3)	1.1-1.6
Free state	124(3.6)	3.1-4.3
KwaZulu-Natal	498(14.5)	12.5-16.9
North west	148(4.3)	3.5-5.3
Gauteng	626(18.3)	15.7-21.1
Mpumalanga	221(6.5)	5.5-7.6
Limpopo	238(7)	6-8.1
Education level		
No education	4(0.1)	0-0.3
Primary	142(4.2)	3-5.8
Secondary	2068(60.4)	56.1-64.9
Higher	254(7.4)	6.2-8.9
Ethnicity		
Black/African	2239(65.4)	62.9-67.8
White	39(1.2)	0.7-1.8
Coloured	175(5.1)	4-6.6
Indian/Asian	14(0.4)	0.1-1.1
Literacy		
Cannot read at all	47(1.4)	0.8-2.3
Able to read only parts of the sentence	155(4.5)	3.7-5.6
Able to read the whole sentence	2264(66.2)	63.7-68.5
No card with required language	0(0)	0-0
Wealth Index		
Poorest	509(14.9)	12.6-17.4
Poorer	554(16.2)	14.2-18.4
Middle	551(16.1)	14.1-18.2
Richer	532(15.5)	13.4-18
Richest	322(9.4)	7.7-11.5
Covered by health insurance		
Yes	116(6.9)	5.1-9.2
No	1114(65.9)	62.5-69.2
Marital status		
Never married	2281(66.6)	62.7-71.1
Married	181(5.3)	4.3-6.5
Widowed	2(0)	0-0.2
Divorced	4(0.1)	0-0.3
Respondent's occupation		
Not working	1895(55.4)	53.2-57.6
Professional/technical/managerial	109(3.2)	2.4-4.3

Clerical	137(4)	3.1-5.1
Agricultural-unskilled	18(0.5)	0.3-0.9
Household and domestic	33(1)	0.7-1.4
Services	105(3.1)	2.4-3.9
Skilled manual	26(0.8)	0.5-1.3
Unskilled manual	97(2.8)	2.1-3.7
Do not know	48(1.4)	1-2

Factors associated with HIV testing among young women in South Africa

In Table 3, this study indicates that women who ranged from 24 to 26 years of age had higher odds of HIV testing than the other age groups, the 21 to 23 years' age group were 1.85 times more likely to test for HIV. On another note, young South African women who reside in urban areas are more likely to test for HIV than those in rural areas. Young women from Gauteng province had higher odds (1.72) of getting tested for HIV, while those who lived in North West had the lowest odds (0.70) of being tested for HIV. Women who lived in Eastern Cape were 1.23 times likely to get tested for HIV, and those from Free State were 1.06 more likely to get tested, while women from Kwazulu-Natal were 1.24 times more likely to get tested for HIV. In terms of educational level, young women who had secondary education had higher odds (1.70) of being tested for HIV, while those who had primary education had the lowest odds (0.18) of being tested. Women with higher education were 1.33 times more likely to get tested for HIV. When it comes to ethnicity, black women were more likely to get tested for HIV, while white women were less likely to get tested for HIV in South Africa. In terms of literacy, the odds of being tested in young women who were able to read a whole sentence were 4.67, relatively higher than of those who could read only parts of the sentence and those who could not read at all. On the other hand, the poorest had the lowest odds of HIV testing, while the middle class were more likely to be tested for HIV. The richer were 2.18 times more likely to get tested for HIV, while the richest were 1.67 more likely to get tested for HIV. Contrary to popular belief, young women who were not covered under health insurance had higher odds of

being tested for HIV compared to those who were covered under the health insurance. In terms of occupation, the odds of being tested for HIV among young women who were in clerical occupation were 2.41 higher compared to the other occupations, while the odds of testing for women in managerial positions were 2.22. Agricultural unskilled labours were the less likely to test for HIV, while those who provided services as an occupation were 1.78 times likely to test for HIV. Domestic workers were 1.13 times more likely to test for HIV, while unskilled manual labour were 1.55 times likely to test, and skilled manual labour were 1.09 likely to test for HIV. In term terms of HIV testing knowledge, young women who had ever heard of HIV/AIDS were more likely to test for HIV compared to those who had never heard of HIV/AIDS. Furthermore, women who knew a place to get an HIV test were also highly likely to get tested for HIV. Women who knew but have never used tested with HIV test kits had high odds (1.21) of being tested, while those who have tested with HIV test kits had the lowest odds (0.38) of being tested for HIV. On the other hand, when it comes to sexual behaviour, young South African women who started having sexual intercourse at the age range of 15 to 17 years had higher odds (4.81) of being tested for HIV. Those who started having sex between the age of 18 to 20 years were 2.37 times more likely to get tested for HIV, while those who started having sexual intercourse below the age of 14 years 0.72 time likely to get tested for HIV. Women who started having sex at an older age (24 to 26 years) were less likely to get tested for HIV. Women who have had one sexual partner in the last 12 months had higher odds (3.93) of being tested for HIV, and those who had two or more sexual partners in the past 12 months were 1.34

likely to get tested for HIV. When it comes to the total number of lifetime sex partners, young South African women who had three or more lifetime sex partners were highly likely to get tested for HIV, and those who have had two lifetime sex partners were 1.43 likely to get tested for HIV, while those who did not know the number of lifetime sex partners they have ever had were less likely to get tested for HIV. Young South

African women who were sexually active in the last four weeks had higher odds (2.52) of being tested compared to those who were not sexually active in the last four weeks, similar to those who have used a condom in the last sexual encounter, they had higher odds being tested for HIV compared to those who did not use a condom in their last sex.

Table 3: Factors associated with HIV testing among young women in South Africa, SADHS 2016.

Characteristics	HIV testing		P-value
	Adjusted Odds Ratio (AOR)	95 % CI	
Age Group (Years)			
15-17	1		
18-20	0.46	0.22-0.96	p<0.000
21-23	1.85	0.81-4.2	p<0.051
24-26	3.11	1.15-5.71	p<0.030
Residence			
Rural	1		
Urban	1.51	1.02-2.23	p<0.053
Region			
Western Cape	1		
Eastern Cape	1.23	0.60-2.54	p<0.545
Northern Cape	0.73	0.35-1.51	p<0.052
Free State	1.06	0.37-2.57	p<0.09
KwaZulu-Natal	1.24	0.67-2.28	p<0.042
North West	0.70	0.43-1.12	p<0.13
Gauteng	1.72	0.56-3.0	p<0.07
Mpumalanga	0.75	0.44-1.28	p<0.20
Limpopo	1.18	1.0-3.02	p<0.167
Education Level			
No Education	1		
Primary	0.18	0.02-1.60	p<0.07
Secondary	1.70	0.75-8.87	p<0.044
Higher	1.33	0.77-2.29	p<0.038
Ethnicity			
Black/African	1		
White	0.46	0.06-1.59	p<0.12
Coloured	0.81	0.06-1.91	p<0.35
Indian/Asian	0.56	0.08-0.93	p<0.58
Literacy			
Cannot read at all	1		
Able to read only parts of the sentence	1.56	0.82-2.44	p<0.09
Able to read the whole sentence	4.67	2.41-6.09	p<0.023
No card with required language	0	0-0	-
Wealth Index			
Poorest	1		
Poorer	1.71	1.0-2.95	p<0.08
Middle	2.24	1.33-3.78	p<0.008
Richer	2.18	1.25-3.81	p<0.04
Richest	1.67	1.03-2.69	p<0.037
Covered by health insurance			
No	1		
Yes	0.83	0.52-1.34	p<0.39
Marital status			
Never married	1		
Married	0.76	0.1-1.67	p<0.17
Widowed	0	0-0	-
Divorced	0.43	0.02-1.18	p<0.91

Respondent's occupation			
Not working	1		
Professional/technical/managerial	2.22	0.98-4.32	p<0.052
Clerical	2.41	1.07-3.97	p<0.046
Agricultural-unskilled	0.88	0.09-1.88	p<0.75
Household and domestic	1.13	0.28-2.76	p<0.063
Services	1.78	0.50-3.55	p<0.037
Skilled manual	1.09	0.43-2.66	p<0.52
Unskilled manual	1.55	0.82-3.21	p<0.07
Do not know	0.96	0.10-2.10	p<0.57
Ever heard of HIV/AIDS			
Yes	1		
No	0	0-0	-
Know a place to HIV test			
Yes	1		
No	0	0-0	-
Knowledge and use of HIV test kits			
Never heard of HIV test kits	1		
Has tested with HIV test kits	0.38	0.04-1.11	p<0.14
Knows test kits but never tested with them	1.21	0.32-2.95	p<0.09
Age at first sex			
Not had sex	1		
≤14	0.72	0.15-1.99	p<0.081
15-17	4.81	3.23-8.46	p<0.032
18-20	2.37	1.12-4.75	p<0.05
21-23	0.91	0.3-2.10	p<0.09
24-26	0.26	0.02-0.97	p<0.53
Number of sexual partners in the last 12 months			
0	1		
1	3.93	1.95-7.12	p<0.043
2+	1.34	0.54-2.89	p<0.076
Total lifetime number of sex partners			
1	1		
2	1.46	0.67-3.14	p<0.0086
3+	2.3	1.08-3.78	p<0.06
Do not know	0	0-0	-
Recent sexual activity			
Never had sex	1		
Active in last 4 weeks	2.52	1.17-5.61	p<0.037
Not active in last 4 weeks	2.31	1.33-4.64	p<0.051
Condom used during last sex			
Yes	1		
No	0.93	0.13-2.21	p<0.085

AOR adjusted odds ratio, CI confidence interval.

DISCUSSION

HIV has become a global health issue, affecting millions of people in all regions of the world, especially developing countries, primarily the Sub-Saharan African region. This study was based on secondary data analysis from the South Africa Demographic and Health Survey, with a sample size of 3422 young women from South Africa between the ages of 15 and 26 years. The main aim of this study was to investigate HIV testing and associated factors among young women in South Africa.

The findings from this study demonstrate that 72.1% of young women from South Africa had ever been tested for HIV. This finding may be influenced by different factors which may be related but not limited to demographic, behavioural and health services usage. Women are the highest consumers of health services, therefore, they are more likely to test for HIV. A study conducted in Brazil also reveals that women are frequent visitors to health centres as their prevalence of physician visits was 77% (20). The frequent visits of women to health centres makes it easy for health workers to

suggest and educate women about the importance of knowing their HIV status which in turn influences their uptake of HIV testing services.

Young women's age was also associated with being tested for HIV. Women aged 24 to 26 years had a higher prevalence of HIV testing than those who ranged from 15 to 17 years of age. This study is in line with a study conducted in Malawi, which revealed that age was a factor associated with HIV testing, as participants who were aged 20 years or older were more likely to have had HIV testing compared to adolescent participants (21). Another study conducted in Tajikistan proved that age is a determining factor in terms of HIV testing in women, as women aged 15 to 24 years of age had an HIV testing prevalence of 26%, while those who ranged from 25 to 34 years had a prevalence of 43% (22). The low prevalence of HIV testing among women aged 15 to 17 years in this study may be caused by several factors. Adolescent women may have limited HIV-related knowledge and access to healthcare services, including HIV testing services, which may hinder their uptake of HIV diagnostic services. Furthermore, women aged 24 to 26 years may participate in more sexual activities and thus consider themselves to be at a higher risk of contracting HIV, which contributes to their high use of HIV testing services.

The present study shows that place of residence was associated with ever being tested for HIV among young women in South Africa. Women from rural areas had a lower prevalence of being tested for HIV (24.4%), while women from urban areas had the highest prevalence (47.7%) of being tested for HIV. This finding is in accordance with a study done in the United States of America, which reported that lifetime HIV testing frequencies among people residing in centre cities of metropolitan areas (urban areas) was higher compared to people living in non-metropolitan regions (rural areas) (23). Poverty, limited resources, and difficulty accessing HIV services can all

contribute to lower HIV testing rates in rural areas. Rural communities may also struggle to maintain essential services, including public transportation, making it difficult for people in rural areas to access HIV testing services.

This study also reveals that being educated is highly associated with ever being tested for HIV. Young women with secondary and higher education had higher odds of being tested for HIV. Educated young women might be exposed to HIV-related information, well knowing about the advantages of HIV testing, making them to have a firm stand in deciding to go for HIV testing compared to their less educated counterparts. According to a study conducted in the Democratic Republic of Congo, educated respondents were over five times more likely than those without education to be tested for HIV (24). This emphasizes the importance of education programs to increase HIV testing among young women in South Africa who are less educated. Combining education with novel techniques like HIV self-testing could help to increase HIV testing rates even more.

Young South African women who were literate had 66.2% HIV testing prevalence, in comparison to those who were illiterate had (1.4%), which shows that in the current study the level of literacy had more impact on the HIV testing uptake in young South African women. This study is in accordance with another study conducted in South Africa, where most literate participants knew their HIV status compared to illiterate participants (25). This study shows that literate young women could read, understand, and apply healthcare knowledge to make sound health decisions compared to their illiterate counterparts. Contrary to popular belief, this study revealed that being covered under health insurance was not associated with being tested for HIV, as young women who were not covered by health insurance had 65.9% HIV testing prevalence. This may be because a lot of South Africans are paying less at public hospitals, and they do not see the need to

have a health insurance when they can access basic healthcare services at a lower cost. This finding contradicts a study done in Haiti, which found that people with health insurance were more likely to be tested for HIV than those without health insurance (26).

The results further indicate that HIV testing among young women was positively associated with the wealth index. The middle class and richer women were more than two times likely to get tested for HIV compared to the poorer and the poorest. The possible explanation for this association is that most richer and middle class South Africans have enough financial resources to access healthcare. This finding concurs with a study conducted in Bangladesh, which reported that being rich correlates with the level of HIV knowledge, where the rich and richest women scored high in terms of HIV knowledge (27). Having knowledge on HIV can also improve HIV testing as this improves comprehension on the advantages of knowing one's HIV status.

This study revealed that occupation was also associated with ever being tested for HIV. Young South African women who were in managerial and clerical occupations were more than two times more likely to get tested for HIV compared to the other occupations, this may be due to the fact that occupants of the mentioned positions usually enjoy employment benefits from their companies, with medical insurance included. Having medical insurance may increase the likelihood of doing medical check-ups, including testing for HIV. The workplace is advocated as an ideal environment for health promotion. Workplace HIV testing has been used in areas where HIV prevalence is extremely high, such as Sub-Saharan Africa, and in key industries that employ populations that may be particularly vulnerable to HIV (28).

The study indicates that HIV testing among young women in South Africa was not associated with being married. Women who were unmarried were more likely to have ever been tested for HIV than women who

were married, with an HIV testing prevalence of 66.6%. The possible explanation for this is that the Ministry of Health in South Africa promotes women's health empowerment, especially among adolescent girls who are not married, by encouraging them to participate in reproductive health and other healthcare services, which in turn may land them in for HIV testing. In contrast, a study conducted in Malawi found that participants who were married or had previously been married were more likely to have been tested for HIV than those who had never been married (21).

The data in the current study indicate that having knowledge of HIV and its diagnosis was highly associated with ever being tested. Young South African women who have ever heard of HIV/AIDS, who knew a place to get HIV test, and those who knew about HIV test kits were more likely to get tested for HIV than those who had no knowledge about HIV and its diagnosis. This might be because South Africa has implemented the Life Orientation program in secondary schools to raise awareness about Sexually Transmitted Infection prevention and the importance of HIV testing, thus growing young women's knowledge about HIV testing. Several studies in South Africa have shown the effect of HIV knowledge and attitudes toward HIV testing, where stigma and low risk perception have been identified as major barriers to HIV testing. In addition to the influence of behaviours on HIV testing, lack of knowledge hinders HIV test acceptance (29).

The current study results also show that sexual behaviour is associated with ever being tested for HIV in young South African women. Women who started having sex at the age of 15 to 17 years were 4.81 times more likely to get tested for HIV compared to the other age groups. Young women who had one sexual partner in the last 12 months had higher odds of being tested for HIV, while women who had three or more lifetime sex partners were 2.3 times

more likely to get tested for HIV than those who had less than three lifetime sex partners. Women who happened to use a condom in their last sexual encounter had the highest prevalence of HIV testing compared to those who did not use a condom in their last sexual encounter. This study shows that these risky sexual behaviours among young women in South Africa are the driving force for young women to get tested for HIV, as a high number of sexually active young women in South Africa get tested for HIV. Sexually active young women may perceive themselves at higher risk, therefore resorting to knowing their HIV status as means of trying to control their risk of contracting the virus. The finding is backed up by a study conducted in Britain in which a majority of men and women believed they were at high risk of contracting HIV due to their current sexual behaviours. As people's perceptions of the risk of HIV grew, so did their willingness to test for HIV. High sex partner numbers, concurrent sex partners, same sex partners, not using a condom at first sex with a new partner, and two or more partners without a condom were all linked to high risk perception. A large proportion of those who had been screened for HIV in the previous year did not mention having a high risk perception or engaging in risky sexual behaviours (30). Risky sexual activities, such as multiple sex partners or sex without a condom, raise the risk of HIV transmission. Women and groups considered to participate in such risky sexual behaviours are at an elevated risk of HIV and other sexually transmitted infections (31).

Conclusion

This study provides nationally representative statistics on HIV testing and sexual behaviour among young women aged 15 to 26 years in South Africa. The study concludes that a high number of young women in South Africa are more likely to get tested for HIV, but they also practice high risk sexual behaviours. The findings

from this study suggest the need on comprehensive health education about the dangers of high-risk sexual behaviour among young South African women at every level of engagement with young people, from health centres, schools, community projects, political campaigns, and awareness programs occasions. More attention should be focused on the age group 15 to 17 years, where several young South African women had their sex debut.

CONCLUSION

Recommendations

The government of South Africa must intensify efforts to improve health education for young women in rural areas. More investment in healthcare infrastructure in rural areas will also increase access to HIV testing services. Furthermore, encouraging young people to attend health facilities is critical for increasing the number of young women who get tested for HIV.

Strengths and limitations of the study

The strength of this study was the use of a weighted large sample size of nationally representative SADHS data. The findings can also give program managers and policymakers crucial information to develop effective public health interventions at the regional and national levels because they were based on data from a national survey. This research has certain limitations: Firstly, recall bias can occur because the DHS survey relied on participant's self-reports of their HIV Testing. Secondly, it is unable to determine the temporal relationship between outcome and explanatory variables because this research was based on the cross-sectional nature of DHS.

Abbreviations

AOR: Adjusted Odds Ratio

AIDS Acquired Immune-Deficiency Syndrome

CI: Confidence Interval

DHS: Demographic and Health Survey

HIV: Human-Immunodeficiency Virus

SADHS: South Africa Demographic and Health Survey

SAMRC: South African Medical Research Council

Stats SA: Statistics South Africa

Declaration by Authors

Ethical Approval: This study did not require ethical approval or participant consent because it was a secondary data analysis of publicly available survey data from the MEASURE DHS program. The data for this study was downloaded from <http://www.dhsprogram.com> after the authors asked permission from the DHS Program. No names or addresses of households were included in the data files. The survey received ethical approval from the South African Medical Research Council (SAMRC).

Acknowledgement: The authors sincerely thank the Indian Council for Cultural Relations (ICCR) for the financial support (Scholarship) through the Government of India, the Central University of Tamil Nadu (CUTN), Thiruvavur, Tamil Nadu, India, for the opportunity to conduct this study, and the MEASURE DHS Program for permitting us to use the South African DHS data.

Source of Funding: This work was supported by the Indian Council for Cultural Relations (ICCR) through the Government of India, and the Central University of Tamil Nadu (CUTN), Thiruvavur, Tamil Nadu, India.

Conflict of Interest: The authors declare no conflict of interest.

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How to cite this article: Samkeliso Gift Shongwe, Neena Elezebeth Philip, Emily Wanja Kaburu, Thomas Matenjwa Kamau. The prevalence of HIV testing and associated factors among young women in South Africa: an analysis of 2016 South Africa demographic and health survey data. *Int J Health Sci Res.* 2024; 14(1):119-134. DOI: [10.52403/ijhsr.20240116](https://doi.org/10.52403/ijhsr.20240116)
