

# HIV prevalence and associated factors among orphaned adolescents and youth aged 12-24 years in South Africa

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## Short Report

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# Abstract

## Objectives

The aim of this study examines the HIV prevalence and associated factors orphaned adolescents and youth in South Africa using the 2017 population based national survey.

## Results

Of 1 978 orphaned participants aged 12–24 years. The overall HIV prevalence was 7.8% (95% CI: 6.3–9.6). HIV was higher among females (9.2%) compared to males (6.4%). HIV prevalence was significantly ( $p < 0.05$ ) higher among Black Africans than other race groups (8.2% versus 1.4%), unemployed compared to those who are employed (8.2% versus 1.3%), no condom use at last sex act (13.8% versus 5.8% who used a condom), had high self-perceived risk of HIV infection (11.4% versus 5.7% with low perception), and those who ever had an HIV test (9.5% versus 5.3% never tested). In the final multivariate model, the odds of HIV infection were significantly higher among female than males [AOR = 2.9 (95%CI: 1.1–7.8),  $p = 0.032$ ] and those residing in rural informal/tribal areas than urban areas [AOR = 2.9 (95% CI: 1.1–7.7),  $p = 0.031$ ]. The findings suggest a need for intervention to create employment opportunities, promote protective sex, address perceived susceptibility to HIV and encourage routine testing. Prioritising orphaned female adolescents and youth and those residing in rural informal/tribal areas.

## Background

The United Nations Children’s Fund (UNICEF) defines an ‘orphan’ as a minor who is below the age of 18 that has lost one or both biological parents to death [1]. Globally as at year 2022, there is approximately 14.9 million orphan children aged 0–17 years with 11.2 million living in sub-Saharan Africa and 960 000 in South Africa [2]. Children aged 0–18 years living in sub-Saharan Africa have been negatively affected by the HIV epidemic due to being orphaned at a tender age [3, 4]. Literature has shown that adolescent orphans are at an increased risk of contracting HIV compared to their non-orphaned counterparts [5]. Data from 19 countries suggest that they are two to three times more likely to contract HIV during adolescence compared to non-orphans [6].

In South Africa, orphanhood among adolescents aged 15–19 years living with HIV (ALHIV) declined from 55.7% in 2012 to 43.7% in 2017, respectively [7]. With the highest rate of orphans being paternal orphans at 17.4% and maternal orphanhood at 13.4% in 2017 [4, 7, 8]. However, the impact of adult mortality on orphanhood in South Africa remains to be seen. Estimates of orphanhood among children younger than 18 years of age using data for 21 countries over a one-year period between 2020–2021, found that South Africa ranked among the top six countries with regards to orphaned children [9]. Literature has shown that adolescent orphans are at an increased risk of contracting HIV. Orphans are often victims of sexual exploitation and are at an increased risk of being physically or sexually exploited by the neighbours, relatives, caregivers, or guardian [5, 7, 10, 11]. They are often coerced to engage in high-risk behaviours at a young age such as unprotected sexual intercourse, early sexual debut, having multiple sexual partners,

age disparate sexual relationship, and sex in exchange for money, goods, or other favours [12] which also results in an increased risk of contracting HIV [13].

The mode of contracting HIV among young orphans is not only through risky sexual behaviour, but also through mother to child transmission [14–16]. Some HIV positive orphans are undiagnosed due to the challenge of connecting HIV positive orphans to universal test and treat programs because these programs are not targeted to orphans [17]. This results in an increased number of orphans who are either not diagnosed or initiated on antiretroviral therapy (ART) or are diagnosed and initiated on ART late compared to non-orphaned children [17, 18].

Orphanhood also increases psychological vulnerability with data showing that, ALHIV who have lost their parents to AIDS tend to show symptoms of depression and post-traumatic stress disorder (PTSD) compared to non-orphaned adolescents, and this manifests itself in poor physical and mental health [3, 7, 19]. In addition to the trauma of losing their parents, orphans face many obstacles that can be attributed to the effects of the epidemic. A great number of orphans become the heads of households, are forced to look after themselves and siblings, and are vulnerable to many forms of abuse which affect their psychological well-being [3].

Evidence shows that the combined social vulnerability due to economic hardship, mental distress, and sexual victimization predispose orphans to greater sexual risk taking and exposure to HIV risk [20]. Reducing risk behaviours in this population is crucial to prevent the spread of HIV to achieve an AIDS-free generation. Improved understanding of factors associated with HIV in this population is important for developing tailored and targeted interventions. While there is a growing number of studies that looked at the factors associated with HIV among young people in the general population, fewer have focused on the orphan population [15]. This study aims to examine HIV prevalence and associated factors among reported orphaned adolescents aged 12–24 years in South Africa using the 2017 National HIV Prevalence, Incidence, Behaviour and Communication Survey.

## Methods

This study is a secondary data analysis and utilises data from the 2017 nationally representative population-based household survey on HIV prevalence, incidence, behaviour, and communication survey [5]. The methodology is described in detail in Simbayi et al 2019 [5]. The survey was conducted using a multi-stage random sampling design involving both stratification and clustering. Different questionnaires were administered to children aged 12–14 years and 15+ years. The main outcome of interest in these analyses was HIV serostatus (HIV positive = 1 and HIV negative = 0) among orphans. Orphanhood status is based on responses to two questions; Is your biological mother alive? Is your biological father alive? Responses were pooled and dichotomised into a binary outcome (yes = 1 and no = 0) indicating orphanhood status.

Explanatory variables included socio-demographic, behaviours, health, and HIV related factors. Socio-demographic factors included age (12–19 years, 20–24 years), sex (male and female), race (Black

African and other including White, Coloured, and Indian population groups), level of education (no education or up to primary school, secondary school and tertiary), employment (unemployed and employed), locality type (urban, rural informal/ tribal area and rural formal/farm areas), disability (no and yes).

Socio-behavioural variables included age of sexual debut (had sex before the age of 15 years, had sex aged 15 years and older), age of sexual partner (partner more than five years younger, partner within five years of age, partner more than five years older), number of sexual partners in the last 12 months (one partner, two or more partners), condom use at last sex (yes, no). Including risky behaviour such as alcohol use using alcohol Abuse Disorder Identification Test (AUDIT) score (abstainers, low risk (with scores ranging from 1–7), risky/ hazardous level (8–15), high risk/harmful (16–19), very high risk (20+) [21].

HIV related factors: correct HIV knowledge and myth rejection (no and yes) based on responses from the following questions (Can AIDS be cured? Can a person reduce the risk of HIV by having fewer sexual partners? Can a healthy-looking person have HIV? Can a person get HIV by sharing food with someone who is infected? Can a person reduce the risk of getting HIV by using a condom every time he/she has sex?), self-perceived risk of contracting HIV infection (no and yes). Self-perceived risk of HIV infection (no and yes), ever tested for HIV (no and yes) and awareness of HIV status (no and yes).

## Statistical analysis

Descriptive statistics were used to summarize characteristics of study participants and HIV prevalence. Chi-square tests were used to assess differences among categorical variables. An adjusted multivariate logistic regression model using backward stepwise selection method was fitted to determine factors associated with HIV prevalence. Adjusted odds ratios (AOR) with 95% confidence intervals (CIs) and  $p < 0.05$  were used to determine direction of the relationship and statistical significance. All analysis were conducted in Stata version 15.0 [22]. Coefficient plots were used to display the results of the final models.

## Results

### Characteristics of the study participants

Table 1 shows socio-demographic, socio-behavioural and HIV related characteristics of the study sample ( $n = 1\ 978$ ). Most orphaned young people were aged 12–19 years (83.6%) and were black Africans (93.8%). Half of the participants were males (50.2%). Most participants had high school educational level (96.5%). Over half of the participants (53.1%) reported a low socio-economic status and most participants were unemployed (96.5%), lived in urban areas (54.9%). Most participants had sexual debut at age 15 years and older (92.2%), had a sexual partner within five years of their age (80.2%), reported having one sexual partner (81.2%), used a condom at last sex (66.1%), inconsistent condom use (98.5%), and abstained from alcohol (85.4%). A high proportion of participants did not have correct knowledge of HIV and did not reject myths about HIV (70.2%). A high proportion of orphans also had a low self-

perceived risk of HIV infection (84.8%). Just above half of the participants had never tested for HIV (52.3%).

Table 1

Characteristics of the study sample (adolescents and youth aged 12–24 years), South Africa 2017 survey

| <b>Variables</b>               | <b>Total</b> | <b>%</b> |
|--------------------------------|--------------|----------|
| <b>Age groups in years</b>     |              |          |
| 12–19                          | 1677         | 83.6     |
| 20–24                          | 301          | 16.4     |
| <b>Sex</b>                     |              |          |
| Male                           | 878          | 50.2     |
| Female                         | 1100         | 49.8     |
| <b>Race groups</b>             |              |          |
| African                        | 1808         | 93.8     |
| Other                          | 170          | 6.2      |
| <b>Education level</b>         |              |          |
| No education/Primary education | 51           | 11.5     |
| Secondary education            | 318          | 84.5     |
| Tertiary education             | 14           | 4.0      |
| <b>Employment Status</b>       |              |          |
| Unemployed                     | 1349         | 96.5     |
| Employed                       | 63           | 3.5      |
| <b>Asset based SES</b>         |              |          |
| Low SES                        | 1039         | 53.1     |
| HIGH SES                       | 747          | 46.9     |
| <b>Locality type</b>           |              |          |
| Urban areas                    | 884          | 54.9     |
| Rural informal/tribal areas    | 946          | 42.1     |
| Rural/farms areas              | 148          | 3.0      |
| <b>Age at sexual debut</b>     |              |          |

Not all sub-totals add to the overall totals due to non-response and missing data; Not all sub-totals add to the overall totals due to non-response and missing data., SES socio-economic status, AUDIT Alcohol Use Disorder Identification Test

| <b>Variables</b>                                                                                                                                                                                                                                 | <b>Total</b> | <b>%</b> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|----------|
| <b>Age groups in years</b>                                                                                                                                                                                                                       |              |          |
| Younger than 15 years                                                                                                                                                                                                                            | 105          | 7.8      |
| 15 years and older                                                                                                                                                                                                                               | 1314         | 92.2     |
| <b>Age disparate sexual relationships (partner age)</b>                                                                                                                                                                                          |              |          |
| Within 5 years                                                                                                                                                                                                                                   | 364          | 80.2     |
| Younger than 5 years                                                                                                                                                                                                                             | 3            | 1.0      |
| Older than 5 years                                                                                                                                                                                                                               | 107          | 18.8     |
| <b>Number of sexual partners in the last 12 months</b>                                                                                                                                                                                           |              |          |
| One partner                                                                                                                                                                                                                                      | 400          | 81.2     |
| Two and more partners                                                                                                                                                                                                                            | 77           | 18.8     |
| <b>Condom use at last sex act</b>                                                                                                                                                                                                                |              |          |
| No                                                                                                                                                                                                                                               | 174          | 33.9     |
| Yes                                                                                                                                                                                                                                              | 311          | 66.1     |
| <b>Consistent condom use</b>                                                                                                                                                                                                                     |              |          |
| No                                                                                                                                                                                                                                               | 472          | 98.5     |
| Yes                                                                                                                                                                                                                                              | 10           | 1.5      |
| <b>AUDIT score</b>                                                                                                                                                                                                                               |              |          |
| Abstainers                                                                                                                                                                                                                                       | 1620         | 85.4     |
| Low risk alcohol drinkers (1–7)                                                                                                                                                                                                                  | 159          | 10.2     |
| High risk alcohol drinkers (8–19)                                                                                                                                                                                                                | 60           | 4.2      |
| Hazardous alcohol drinkers (20+)                                                                                                                                                                                                                 | 4            | 0.1      |
| <b>Correct knowledge of HIV and associated myth rejection</b>                                                                                                                                                                                    |              |          |
| No                                                                                                                                                                                                                                               | 1366         | 70.2     |
| Yes                                                                                                                                                                                                                                              | 608          | 29.8     |
| <b>Self-perceived risk of HIV</b>                                                                                                                                                                                                                |              |          |
| Low                                                                                                                                                                                                                                              | 1643         | 84.8     |
| Not all sub-totals add to the overall totals due to non-response and missing data; Not all sub-totals add to the overall totals due to non-response and missing data., SES socio-economic status, AUDIT Alcohol Use Disorder Identification Test |              |          |

| Variables                                                                                                                                                                                                                                        | Total | %    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------|
| <b>Age groups in years</b>                                                                                                                                                                                                                       |       |      |
| High                                                                                                                                                                                                                                             | 270   | 15.2 |
| <b>Ever had an HIV test</b>                                                                                                                                                                                                                      |       |      |
| Yes                                                                                                                                                                                                                                              | 917   | 47.7 |
| No                                                                                                                                                                                                                                               | 1022  | 52.3 |
| <b>Awareness of HIV status</b>                                                                                                                                                                                                                   |       |      |
| Yes                                                                                                                                                                                                                                              | 686   | 35.5 |
| No                                                                                                                                                                                                                                               | 1259  | 64.5 |
| Not all sub-totals add to the overall totals due to non-response and missing data; Not all sub-totals add to the overall totals due to non-response and missing data., SES socio-economic status, AUDIT Alcohol Use Disorder Identification Test |       |      |

## Hiv Prevalence Among Orphans

Table 2 shows HIV prevalence by socio-demographic, socio-behavioural and HIV related factors among study participants. Overall, the HIV prevalence was 7.8% among orphaned adolescents and youth aged 12–24 years in 2017. Although not statistically significant HIV prevalence was higher among females (9.2%) compared to males (6.4%). HIV prevalence was only significantly ( $p < 0.05$ ) higher among Black Africans (8.2% versus 1.4%) and those who were unemployed (8.2% versus 1.3%). HIV prevalence by socio-behavioural and HIV related factor among study participants. HIV prevalence was significantly higher among those who reported no condom use at last sex act (13.8% versus 5.8%), those with high self-perceived risk of HIV infection (11.4% versus 5.7%), and those who had ever tested for HIV (9.5% versus 5.3%).



Table 2

HIV prevalence by socio-demographic, socio-behavioural and HIV related factors among adolescents and youth aged 12–24 years, South Africa 2017 survey

|                                | <b>N</b> | <b>%</b> | <b>95% CI</b> | <b>p-value</b> |
|--------------------------------|----------|----------|---------------|----------------|
| <b>Age groups in years</b>     |          |          |               |                |
| 12–19                          | 1677     | 7.9      | 6.2–9.9       | 0.818          |
| 20–24                          | 301      | 7.4      | 4.7–11.5      |                |
| <b>Sex</b>                     |          |          |               |                |
| Male                           | 878      | 6.4      | 4.4–9.2       | 0.112          |
| Female                         | 1100     | 9.2      | 7.1–11.7      |                |
| <b>Race groups</b>             |          |          |               |                |
| African                        | 1808     | 8.2      | 6.6–10.1      | 0.039          |
| Other                          | 170      | 1.4      | 0.2–9.4       |                |
| <b>Education level</b>         |          |          |               |                |
| No education/Primary education | 51       | 10.6     | 4.2–24.3      | 0.636          |
| Secondary education            | 318      | 10.1     | 6.0-16.6      |                |
| Tertiary education             | 14       | -        | -             |                |
| <b>Employment status</b>       |          |          |               |                |
| Unemployed                     | 1349     | 8.2      | 6.4–10.6      | <b>0.001</b>   |
| Employed                       | 63       | 1.3      | 0.3–4.4       |                |
| <b>Asset SES</b>               |          |          |               |                |
| Low SES                        | 1039     | 7.5      | 5.6–9.9       | 0.790          |
| High SES                       | 747      | 7.9      | 5.6–11.2      |                |
| <b>Locality type</b>           |          |          |               |                |
| Urban                          | 884      | 7.1      | 5.0-9.9       | 0.485          |
| Rural informal (tribal areas)  | 946      | 8.7      | 6.7–11.1      |                |
| Rural (farms)                  | 148      | 9        | 4.4–17.2      |                |
| <b>Age at sexual debut</b>     |          |          |               |                |

Not all sub-totals add to the overall totals due to non-response and missing data, SES socio-economic status, CI confidence intervals. AUDIT Alcohol Use Disorder Identification Test

|                                                        | N    | %    | 95% CI   | p-value |
|--------------------------------------------------------|------|------|----------|---------|
| <b>Age groups in years</b>                             |      |      |          |         |
| Less than 15 years                                     | 105  | 5.5  | 2.3–12.6 | 0.372   |
| 15 years and older                                     | 1314 | 8.2  | 6.3–10.6 |         |
| <b>Age disparate sexual relationship</b>               |      |      |          |         |
| Within 5 years                                         | 364  | 7.8  | 4.7–12.7 | 0.434   |
| Younger than 5 years                                   | 3    | -    | -        |         |
| Older than 5 years                                     | 107  | 13.4 | 7.1–23.9 |         |
| <b>Number of sexual partners in the last 12 month?</b> |      |      |          |         |
| One partner                                            | 400  | 9.4  | 6.1–14.3 | 0.489   |
| Two and more partners                                  | 77   | 6.5  | 2.4–16.5 |         |
| <b>Condom use last sex act</b>                         |      |      |          |         |
| No                                                     | 174  | 13.8 | 7.5–24.0 | 0.025   |
| Yes                                                    | 311  | 5.8  | 3.6–9.3  |         |
| <b>Consistent condom use</b>                           |      |      |          |         |
| No                                                     | 472  | 8.6  | 5.7–12.7 | 0.863   |
| Yes                                                    | 10   | 10.2 | 1.3–49.2 |         |
| <b>AUDIT score</b>                                     |      |      |          |         |
| Abstainers                                             | 1620 | 8.1  | 6.5–10.1 | 0.260   |
| Low risk drinkers (1–7)                                | 159  | 3.7  | 1.7–7.9  |         |
| High risk drinkers (8–19)                              | 60   | 14.0 | 4.1–38.3 |         |
| Hazardous drinkers (20+)                               | 4    | -    | -        |         |
| <b>Correct knowledge of HIV and myth rejection</b>     |      |      |          |         |
| No                                                     | 1366 | 8.1  | 6.2–10.4 | 0.635   |
| Yes                                                    | 608  | 7.2  | 5.0-10.4 |         |
| <b>Self-perceived risk of HIV</b>                      |      |      |          |         |
| Low                                                    | 1643 | 5.7  | 4.3–7.5  | 0.008   |

Not all sub-totals add to the overall totals due to non-response and missing data, SES socio-economic status, CI confidence intervals. AUDIT Alcohol Use Disorder Identification Test

|                                                                                                                                                                                       | N    | %    | 95% CI   | p-value |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|----------|---------|
| <b>Age groups in years</b>                                                                                                                                                            |      |      |          |         |
| High                                                                                                                                                                                  | 270  | 11.4 | 7.3–17.4 |         |
| <b>Ever had an HIV test</b>                                                                                                                                                           |      |      |          |         |
| No                                                                                                                                                                                    | 1022 | 5.3  | 3.7–7.5  | 0.009   |
| Yes                                                                                                                                                                                   | 917  | 9.5  | 7.2–12.5 |         |
| <b>Awareness of HIV status</b>                                                                                                                                                        |      |      |          |         |
| No                                                                                                                                                                                    | 1259 | 6.4  | 4.7–8.7  | 0.055   |
| Yes                                                                                                                                                                                   | 686  | 9.7  | 7.2–13.1 |         |
| Not all sub-totals add to the overall totals due to non-response and missing data, SES socio-economic status, CI confidence intervals. AUDIT Alcohol Use Disorder Identification Test |      |      |          |         |

## Factors Associated With Hiv Prevalence Among Orphans

The final model (Fig. 1) shows that the odds of HIV infection were significantly higher among females than males [AOR = 2.9 (95%CI: 1.1–7.8), p = 0.032]. The odds were also significantly higher among those residing in rural informal/tribal areas compared to urban areas [AOR = 2.9 (05% CI: 1.1–7.7), p = 0.031].

## Discussion

This nationally representative study revealed that the overall HIV prevalence among orphaned adolescents and youth aged 12–24 years in South Africa was 7.8%. HIV prevalence among orphaned adolescents aged 12–19 years was higher (7.9%) compared to those observed in the general population (4.1%) [23, 24]. Several explanations have been advanced for the observed disparities in HIV infection between orphaned and non-orphaned adolescents, and these include marked differences in socio-economic and sexual victimization vulnerabilities [6, 25]. However, in South Africa, more studies are needed to interrogate this difference and pre-disposing factors.

In this study, HIV prevalence was significantly higher among the unemployed orphaned youth, and this probably reflects the generational social vulnerability sustained by pervasive poverty in the country [26]. These observations suggest a need for social support beyond income grant for families of orphaned youth. Others have observed that empowerment of orphaned youth through social support such as cash transfers [27, 28] vocational and life skills training create self-sufficiency and opportunities for employment and reduce vulnerability [29–31].

HIV prevalence was significantly higher among orphaned youth who did not use a condom at last sex. This data supports existing evidence of heightened infection rate and high sexual risk behaviour among youth who are orphans [32, 33]. This is contrary to suggestions that maternal transmission is a more likely explanation, than sexual transmission for heightened HIV infection among orphans [25]. Nevertheless, maternal transmission still accounts for a number of HIV infections among ALHIV including orphans, previous studies suggest that the HIV virus progresses gradually in some infants, and a sizable percentage of HIV-positive children live until adolescence and beyond [25]. In South Africa more research is needed to distinguish between maternally and sexually acquired HIV and some research is being conducted in the country [34]. Nevertheless, national HIV programmes and interventions for sexual risk-reduction strategies and behaviour change communication should also be prioritized for sexually active orphaned adolescents and youth.

In addition, HIV prevalence was significantly higher among those who perceived themselves as being at high risk of HIV. Evidence shows that high HIV risk perception is associated with high risky sexual behaviour and high risk of contracting HIV [17]. Therefore, risk assessment should be implemented as part of HIV prevention programs among sexually active orphaned adolescent and youth to identify those who perceived themselves as being at an increased risk acquiring HIV towards risk reduction.

This study also showed that the HIV prevalence was significantly higher among those who ever had an HIV test. These findings also underscore the need to encourage positive prevention and appropriate HIV risk reduction and behaviour change through HIV testing and counselling services among orphaned adolescents and youth). HIV testing campaigns should encourage testing for all adolescent and youth, regardless of sexual behaviour [35].

The final multivariate model showed that orphaned females were more at risk of acquiring HIV than their male counterparts. The association between HIV infection and sex is well established, with evidence that the risk of HIV infection is higher among both orphan and non-orphaned female adolescent and youth [24]. Numerous factors that increase vulnerability of HIV among orphaned females have been advanced, these include among others transactional sex due to pressure to generate household income or assume adult responsibilities coupled with gender power dynamics and inability to negotiate safe sex especially where adolescent girls are sexually coerced by older men who exploit them for sex or early marriages including polygamy [6, 33, 36–38].

The final model also showed that orphans residing in rural informal/tribal areas were more at risk of acquiring the HIV virus than those residing in urban areas, this has been observed by other researchers elsewhere [24, 39]. Generally, the observed urban-rural disparities have been attributed to the complex relationship between HIV infection and poverty [39]. High HIV prevalence in rural areas has been associated with substantially greater barriers to care related to poor access to prevention and treatment services [40]. Orphans as a group are disadvantaged and vulnerable and should be prioritised and considered in the context of general poverty in rural areas.

## Conclusions

This study described HIV prevalence and associated socio-demographic, socio-behavioural and HIV related factors. The findings suggest a need for intervention that address the social and structural drivers of HIV in this population. The intervention should also be aimed at creating independence by increasing employment opportunities, promoting protective sex, address perceived susceptibility to HIV, encourage routine testing and foster positive prevention and behaviour change among those who are test positive towards risk reduction. Such intervention should be tailored and targeted to the most vulnerable groups especially orphaned female adolescents, youth and those residing in rural informal/tribal areas. Future research should distinguish HIV infection acquired primarily through sexual and maternal transmission to design timely and highly specific interventions in the lives of orphaned adolescents and youth.

## Limitations

The study is based on data from a cross-sectional survey and therefore cannot infer causality. The analysis used self-reported reported information which is prone to recall and social desirability bias. There may also be other unmeasured important risk factors for HIV prevalence that were not accounted for in the analysis. Nevertheless, probability sampling ensures that the current findings can be generalized for among orphaned adolescents and youth aged 12–24 years in South Africa.

## Abbreviations

ALHIV

Adolescents living with HIV

ART

Antiretroviral therapy

UNICEF

United Nations Children's Fund.

## Declarations

### Acknowledgements

We appreciate the contribution of the survey participants in the survey waves as well as the ALHIV and youth project team.

### Authors' contributions

PN drafted the manuscript, conducted the data analyses. MM supervised the data analyses and reviewed the manuscript drafts. IN and NV contributed to the review of the manuscript drafts. NZ secured funding and contributed to writing the manuscript. All authors read and approved the final manuscript.

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## Availability of data and materials

The dataset used is available through the Human Sciences Research Council data research repository via the following link: <http://curation.hsrc.ac.za/Datasets-PFAJLA.phtml>.

## Ethical approval and consent to participate

Ethical approval for the 2017 National HIV Prevalence, Incidence, Behaviour and Communication Survey (SABSSM) was approved the Human Science Research Council Research Ethics Committee (REC 4/18/11/15). Data collection processes adhered to the ethical guidelines.

## Consent to participate

Not applicable.

## Consent for publication

Not applicable.

## Competing interests

The authors declare that they have no competing interests.

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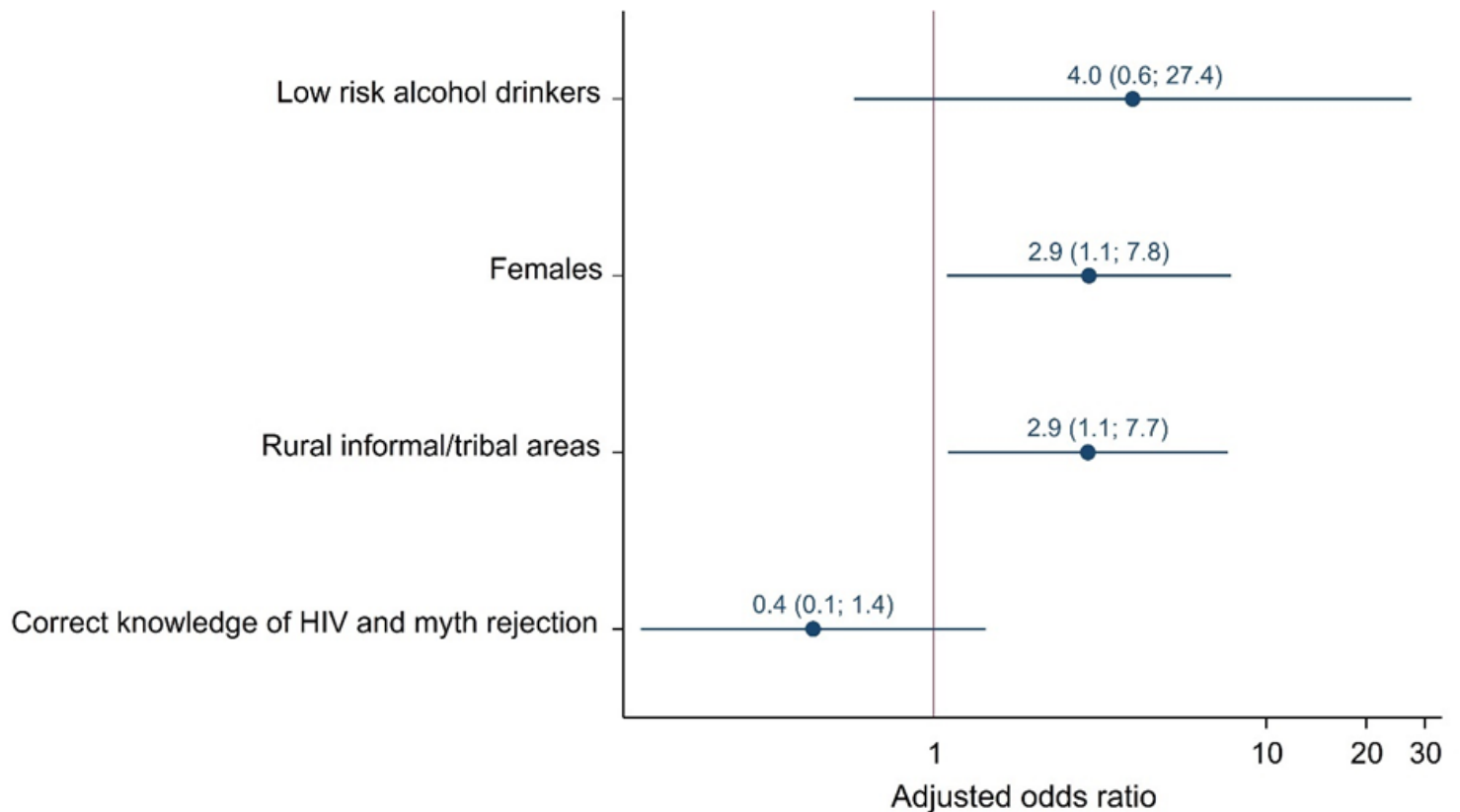
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## Figures



## Figure 1

Multivariate model of factors associated with HIV prevalence among orphaned adolescents and youth aged 12-24 years, South Africa 2017 survey