Comprehensive Knowledge of HIV/AIDS in Angola and Related Factors

Neida Neto Vicente Ramos * , Inês Santos Estevinho Fronteira , Maria do Rosário O. Martins

Posted Date: 17 July 2023

doi: 10.20944/preprints202307.1053.v1

Keywords: Angola; HIV; comprehensive knowledge; Health literacy; Sexuality

Article

Comprehensive Knowledge of HIV/AIDS in Angola and Related Factors

Neida Neto Vicente Ramos [1,*], Inês Fronteira [1,2] and Maria do Rosário Oliveira Martins [1]

[1] Global Health and Tropical Medicine, Institute of Hygiene and Tropical Medicine, Nova University of Lisbon

[2] National School of Public Health, Public Health Research Centre, Comprehensive Health Research Center, NOVA University of Lisbon 1249-008, Lisbon, Portugal; ifronteira@ihmt.unl.pt (I.F.); mrfom@ihmt.unl.pt (M.R.O.M.)

* Correspondence: neydaneto@gmail.com

Abstract: HIV/AIDS infection increases vulnerability to ill-health states and has a major impact on the general health status. This study aims to describe Angolan adolescents and adults' comprehensive knowledge of HIV/AIDS and its associated factors based on the 2016 demographic and health survey (DHS). Data from 19,785 individuals between the ages of 15 and 49 years old, who responded to all the DHS questions between October 2015 and March 2016 were included in this study. Multivariable analysis using logistic regression was used to compute the adjusted odds ratio and respective 95% confidence intervals. In Angola, 47.7% of the respondents had general comprehensive knowledge of HIV/AIDS. The odds of having comprehensive knowledge about HIV/AIDS were higher among individuals who watch television (aOR: 2.40; 95% CI: 2.11, 2.72) or read journals and magazines (aOR: 1.99; 95% CI: 1.72, 2.30) more than once a week and, people with primary or higher-level education (aOR: 1.83; 95% CI: 1.67, 2.00). Similarly, for people living in urban areas (aOR: 1.51; 95% CI: 1.34, 1.71). These results may reflect important inequities and can assist decision-makers in advocating to continue to invest in health literacy for HIV but also in the development of tailored interventions in this area.

Keywords: Angola; HIV; comprehensive knowledge; health literacy; sexuality

1. Introduction

The African region is more burdened by Human Immunodeficiency Virus (HIV) than other regions of the world [1] and it is responsible for about 16% of the world's new HIV infections and 21% of global Aids-related deaths [2].

Adolescents and young people between the ages of 10 and 24 carry a high burden related to HIV. HIV/AIDS and other sexually transmitted diseases (STDs) are the leading cause of death among adolescents in sub-Saharan Africa (26.12 deaths per 100,000 inhabitants) [1].

Part of this problem is based on low health literacy[3] more common in developing countries. Health literacy is directly associated with the socioeconomic status and educational level of the individuals [4].

HIV/AIDS infection makes people more vulnerable, has a major impact on their general health status, and on their social relationships. HIV/AIDS is associated with low levels of health literacy in sub-Saharan Africa, which in turn determines low adherence to the available antiretroviral treatment [5].

Many different factors seem to play a role in the disparity between the number of people diagnosed with HIV and the number of people who achieve viral suppression and greater longevity [6,7]. These include access to health care services, general literacy, family and social support, availability of antiretroviral drugs, treatment costs, adherence to HIV treatment, stigma and discrimination, substance abuse, mental illness, and relationship with health professionals [6,8–12]. However,

 doi:10.20944/preprints202307.1053.v1

inadequate health literacy may be a significant and relevant factor contributing to poor antiretroviral treatment outcomes [4,13,14].

Considering the chronic nature of HIV infection, strict medical follow-up, with emphasis on correct adherence to treatment plans and the importance of following a regular lifestyle and avoiding risky behaviors are a requirement for better and longer life expectancy, which makes the control and the survival of people living with HIV dependent on their knowledge of the disease, its mechanisms of transmission, and available treatments to make the best decisions regarding their health [6,9,15]. Medical advances in addition to correct medical follow-up and treatment, and adequate self-management within a good practice promoting health system, lead to longer life expectancy for people diagnosed with HIV and to the status of chronic patient [5,12].

However, individuals with low health literacy face a high risk of developing chronic comorbidities, experiencing polypharmacy, and disease-related complications [6]. Further social consequences include work absenteeism, unemployment, and consequently impoverishment.

Limited health literacy produces a vicious circle, which generates professional domination and patient disengagement, i.e. the patient with low health literacy establishes a top-down relationship with health practitioners [16]. Moreover, patients with inadequate health literacy are more likely to have poorer health status, lower understanding of the determinants of their health status, exhibit intentional non-adherence to prescribed medication, and show scarce ability to navigate the health system [16].

In 2020, the adult HIV prevalence in Angola was 1.8% of the general population. Around 340000 children and adults were living with HIV, with a reported 22,000 new infections per year and with 33% of infected adults and children on antiretroviral treatment [17]. Higher rates of HIV prevalence in Angolan adults can be found in female sex workers (8%) and men who are in prison (15%) [17]. The reported knowledge about HIV prevention among adolescents and young people between 15 and 24 years in Angola in 2020 was 32% [18] which can be considered alarming for a mostly young country [19,20].

This study aims to describe Angolan adolescents and adults' comprehensive knowledge of HIV/AIDS and its associated factors based on the 2016 demographic and health survey (DHS).

2. Methods

Study design

Secondary data cross-sectional study.

Setting

Angola is a sub-Saharan African, developing, lower-middle-income economy [21]. A country with approximately 8 million inhabitants [22]of which 67% live in in urban areas [18,22]. The country has a fragile and under-resourced health system[23], with a current health expenditure of 3,0 % of the Gross Domestic Product (GDP)[24].

Participants

Data from 19,785 individuals aged 15-49 years old, who responded to all the Demographic and Health Survey (DHS) questions in Angola, between October 2015 and March 2016 was used in the analysis [18].

Variables

The outcome variable is comprehensive knowledge of HIV/AIDS (Yes/No) defined by the sum of points (less than 4 points for no; 4 or 5 points for yes) obtained by adding 1 point per correct answer and 0 per wrong answer to each of the following questions in the DHS [25]: i) Can you get HIV from a mosquito bite? ii) Can we reduce the chance of HIV by always using condoms correctly during sex? iii) People can get HIV if they share food with someone infected with HIV? iv) A healthy-looking person can have HIV/AIDS?; and v) Can we reduce the chance of HIV by only having one sex partner without HIV?

This method has been previously used in the DHS, Millennium Development Goals, and Sustainable Development Goals [26–28].

 doi:10.20944/preprints202307.1053.v1

Ten independent variables were included in the analysis according to previous African studies [5,29–35]. Namely gender, age, marital status, province of residence, region, educational level, frequency of reading a newspaper or magazine, listening to the radio, watching television, and language spoken at home.

Data Analysis

Data from DHS surveys are not designed for measuring health literacy [36]. So, we proceeded with the DHS recommendation [8] to calculate a WEIGHT variable to make the data more accurate.

The analysis was done in three steps. In the first step we the compute the variable Comprehensive knowledge of HIV/AIDS. In the second step we used Chi-square / Fisher tests to analyze the associations between comprehensive knowledge about HIV/AIDS in and each independent variable. Finally, we estimated a multivariable logistic regression, and we computed the odds ratio and respective 95% of confidence interval (CI). We used the IBM Statistical Package for the Social Sciences 25.0 for Windows to analyze the data.

Ethical issues

This study does not put the dignity of human beings or animal species at risk. Aspects such as confidentiality and anonymity of the respondents' identities were considered and preserved in the primary source. This study used secondary data analysis and therefore no additional approval was required since the data is accessible in the public domain.

3. Results

3.1. Sociodemographic characteristics of respondents

Of the 19785 subjects included in the study, more than half were female (73%), under 30 years of age (60%), with the most frequent age group being that of 15-19 years old (25%). Most of the respondents had completed primary school (66%), spoke Portuguese at home (72%), lived in an urban area (70%), were not married (88%) and 40% were from Luanda.

Concerning the use of mass media, 48.5% of the respondents preferred to watch television at least once a week, 39.4% do not listen to the radio or listen to it less than once a week (31.2%). About 33.1% don't read newspapers and/or magazines or read them less than once a week (24.3%). The Angolan provinces most represented in our study were Luanda (39.6%), Benguela (8.1%), Huila (8%), Kwanza Sul (6.8%), and Huambo (6.4%) (Table 1 summarizes the sociodemographic characteristics of respondents), (see Table 1).

Table 1. Sociodemographic characteristics of respondents with weighted frequencies and percentages.

	Sociodemographic Characteristics of respondents (n=19,78)		
Variables	**Categories**	**Weighted frequency**	**Weighted percentage (%)**
Gender	Male	5,42	27.4
	Female	1,44	72.6
Age groups	15–19	4,96	24.9
	20–24	4,07	20.6
	25–29	3,36	17
	30-34	2,39	12
	35-39	2,02	10
	40-44	1,69	8.6
	45–49	1,31	6.6
Marital status	Not married	17,43	88.1

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 17 July 2023 doi:10.20944/preprints202307.1053.v1

	Married	2,34	11.9
Residence	Urban	13,91	70.3
	Rural	5,86	29.7
Region	Cabinda	481	2.4
	Bengo	225	1.1
	Zaire	414	2.1
	Uíge	965	4.9
	Luanda	7,82	39.6
	Cuanza Norte	229	1.2
	Cuanza Sul	1,35	6.8
	Malange	616	3.1
	Lunda Norte	485	2.5
	Lunda Sul	312	1.6
	Benguela	1,60	8.1
	Huambo	1,27	6.4
	Bié	795	4
	Moxico	350	1.8
	Huíla	1,57	8
	Namibe	245	1.2
	Cuando Cubango	329	1.7
	Cunene	703	3.6
Education	Complete primary and more	13,1	66.3
	Incomplete primary	6,66	33.7
Radio	At least once a week	5,82	29.4
	Less than once a week	6,17	31.2
	Not at all	7,78	39.4
Television	At least once a week	9,58	48.5
	Less than once a week	3,85	19.5
	Not at all	6,33	32
Journal and magazines	At least once a week	1,61	8.2
	Less than once a week	4,80	24.3
	Not at all	6,54	33.1
House language	Portuguese	14,17	71.6
	Local languages	5,61	28.4

3.2. Comprehensive knowledge of HIV/AIDS in Angola

In Angola, 47.7% of individuals aged 15-49 years had a comprehensive knowledge of HIV/AIDS, i.e., correctly answered at least four of the five questions related to HIV/AIDS comprehensive knowledge. Figure 1 shows the distribution of people who answered "yes" to each of the questions as follows: “Reduce the chance of HIV by only having one sex partner without HIV?” (72%); “Reduce the chance of HIV by always using condoms correctly during sex?” (69%); “A healthy-looking person can have HIV/AIDS?” (63,5%)”; “People can get HIV if they share food with someone infected with HIV?” (19%) “Can get HIV from a mosquito bite?” (18,6%).

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 17 July 2023 doi:10.20944/preprints202307.1053.v1

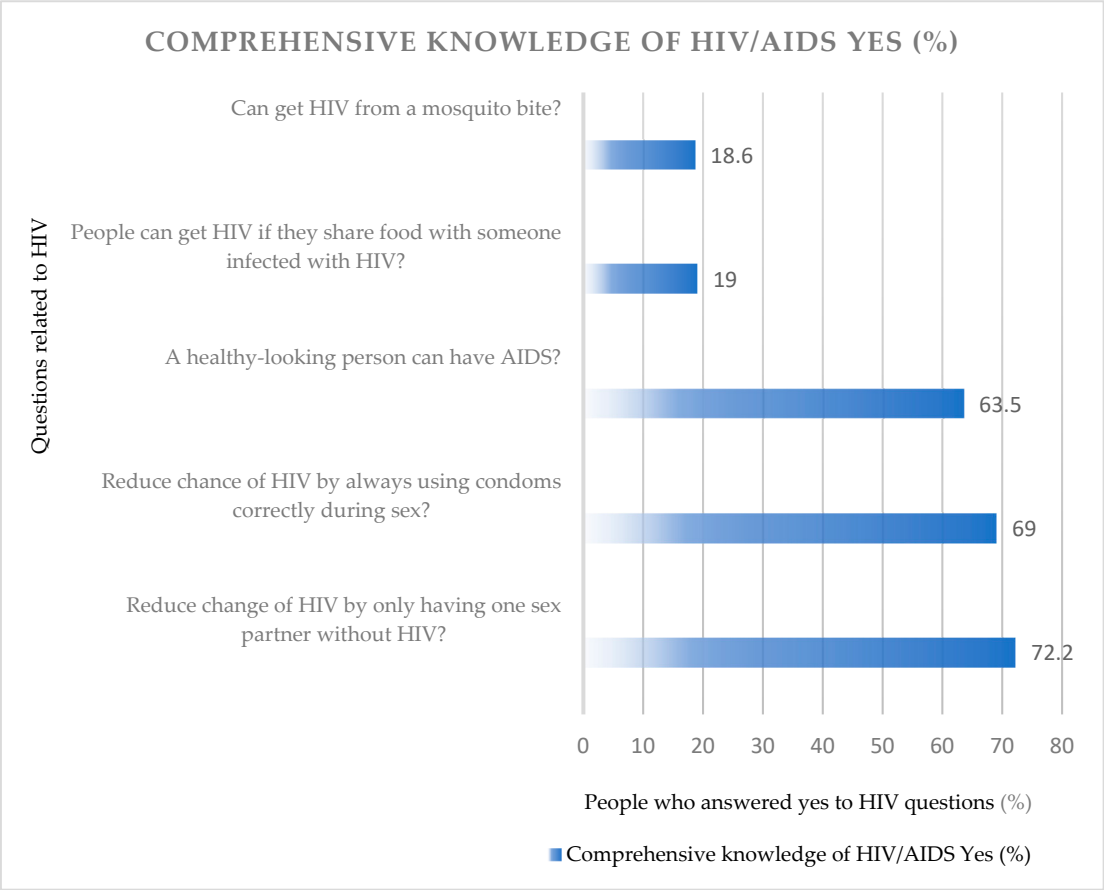

Figure 1. Distribution of people who answered "yes" to the five questions related to HIV/AIDS.

3.3. Factors associated with comprehensive knowledge of HIV/AIDS in Angola

All variables were analyzed with Chi-Square test (X^2), such as sex, marital status educational level, area of residence and speaking Portuguese at home, listening to the radio, watching television, and reading newspapers or magazines more than once a week and were associated (p<0,001) with having comprehensive knowledge of HIV/AIDS. (Table 2).

The logistic regression analysis revealed that the odds of having comprehensive knowledge about HIV/AIDS was higher among individuals who watch television (aOR: 2.40; 95% CI: 2.11, 2.72) or read journals and magazines (aOR: 1.99; 95% CI: 1.72, 2.30) more than once a week; also, people with primary or higher-level education had more comprehensive knowledge of HIV/AIDS (aOR: 1.83; 95% CI: 1.67, 2.00) as compared to those who had not completed primary education. Equally, people living in urban areas (aOR: 1.51; 95% CI: 1.34, 1.71) or spoke Portuguese at home (aOR: 1.40; 95% CI: 1.24, 1.56) were more likely to have comprehensive knowledge of HIV/AIDS). The predictors for comprehensive knowledge of HIV/AIDS in Angola in our study were watching television, reading journals and magazines, educational level, place of residence and language spoked at home (p<0,001).

In our logistic regression analysis, gender, marital status, age group and listen to radio were not associated (p>0,05) with the odds of having comprehensive knowledge about HIV/AIDS (Table 2 summarizes chi-square and multivariate logistic regression analysis of predictors for comprehensive knowledge of HIV/AIDS in Angola)

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 17 July 2023 doi:10.20944/preprints202307.1053.v1

Table 2. Chi-Square and Multivariate Logistic Regression Analysis of Predictors for comprehensive knowledge of HIV/AIDS in Angola (N=19,78).

Variables	Categories	Chi-Square Analysis		Multivariate Logistic Regression Analysis	
		Weighted frequency (N=19,78	Weighted Percentage (%)	Crude OR (IC 95%)	Adjusted OR (IC 95%)
Gender	Male	2,99	55.2	1.51 (1.42 -1.61)	0.90 (0.91 - 1.07)
	Female	6,45	44.9	ref	ref
Age groups	15–19	2,44	49.5	1.34 (1.21 -1.54)	0.93 (0.79 -1.11)
	20–24	1,99	49	1.34 (1.18 -1.51)	0.913 (0.76 -1.09)
	25–29	1,96	50.3	1.40 (1.24 -1.60)	1.04 (0.86 -1.25)
	30-34	1,15	48.1	1.29 (1.12 -1.47)	1.14 (0.93 -1.38)
	35-39	903	44.7	1.12 (0.98 -1.29)	1.20 (0.98 -1.47)
	40-44	710	41.8	1.000 (086 -1.16)	0.95 (0.77 -1.18)
	45–49	548	41.8	ref	ref
Marital status	Not married	8,43	48.4	0.80 (0.732 -0.871)	1.13 (0.995 – 1.280)
	Married	1005	42.8	ref	ref
Residence*	Urban	8,24	59.2	5.63 (5.241 -6.051)	1.51 (1.340 -1.711)
	Rural	1,202	20.5	ref	ref
Education*	Complete primary and more	7,215	55	2.44 (2.300 -2.600)	1.83 (1.677 – 2.007)
	Incomplete primary	2,22	33.3	ref	ref
Radio	More than once a week	3,64	62.5	3.51 (3.27 -3.77)	1.09 (0.97 -1.21)
	At least once a week	3,28	53.2	2.39 (2.23 -2.56)	1.09 (0.98 -1.21)
	Not at all	2,50	32.2	ref	ref

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 17 July 2023 doi:10.20944/preprints202307.1053.v1

Television*	More than once a week	6,49	67.7	8.35 (7.74 -8.99)	2.40 (2.11 -2.72)
	At least once a week	1,67	43.3	3.04 (2.78 -3.32)	1.32 (1.16-1.52)
	Not at all	1,27	20.1	ref	ref
Newspapers and magazines*	More than once a week	1,26	77.9	3.47 (3.06 -3.94)	1.99 (1.73 -2.30)
	At least once a week	3,36	69.9	2.29 (2.12 -2.43)	1.626 (1.49 -1.77)
	Not at all	3,29	50.3	ref	ref
House language *	Portuguese	8,15	57.5	4.53 (4.22 -4.86)	1.39 (1.24 -1.56)
	Local languages	1,29	23	ref	ref

ref = reference category; * (p<0,001) in logistic regression.

4. Discussion

Despite significant medical advances in viral load suppression after the implementation of antiretroviral therapy. Appropriate knowledge about the disease and consequent adherence to treatment is still a major challenge for people with low general literacy and for the health systems where they are inserted[5].

In Angola, the assessment of the Comprehensive Knowledge of HIV/AIDS assumes particular importance since most of the population is young, with few financial resources, low education levels[18]. Although, there is an important prevalence of sexually transmitted diseases such as Syphilis, Hepatitis B and C among the Angolan population[37,38]. In addition, the absence of a comprehensive HIV treatment regime that includes mental health services for the population living with HIV may represent a risk of increased HIV transmission and poor treatment adherence[39].

This study complements an ongoing research on the Angolan population's level of health literacy and associated factors[40]. We used data from the most recent Angolan demographic and health survey. Similarly to findings reported in other studies using DHS, we found a predominance of females in our sample which is explained by the focus of DHS on maternal and child health [41]. Nevertheless, women of childbearing age are frequently used as proxies for sexually active population, known to be their higher risk of HIV/AIDS and other sexually transmitted infections[42].

Our results suggest that the prevalence of comprehensive knowledge of HIV/AIDS in the Angolan population aged from 15 to 49 years of age in Angola is only 48%. This finding is similar to those described for Mozambique (42%) and Malawi (43%) [30,41] and supported by a recent literature review showing that comprehensive knowledge about HIV/AIDS in sub-Saharan Africa is still low [43,44].

In our study we found that the prevalence of comprehensive knowledge of HIV/AIDS in women was 44%, slightly higher than the 37% described Teshale *et al.*, for women from 15 sub-Saharan African countries, although lower than in Rwanda (66,38%) [34]. For males, the prevalence of comprehensive knowledge of HIV/AIDS was 55%, a number very similar to that estimated for men in 29 sub-Saharan African countries (51%), but also lower than in Rwanda (76%) [45]. In Angola, the 27-year military conflict may have had a major impact on learning, educational outcomes and general knowledge [46].

The logistic regression analysis did not show association between gender and marital status to predict comprehensive knowledge for HIV/AIDS. However, this finding is not consistent across

 doi:10.20944/preprints202307.1053.v1

African countries; because other studies suggested married individuals to have more comprehensive knowledge of HIV/ AIDS [30,43,48].

Individuals living in an Angolan urban area and having attained primary school had higher odds of having comprehensive knowledge about HIV/AIDS, this result is supported by other studies [30,31,34,41,44].

Although communication plays an active role in knowledge acquisition [49], in our study listening to the radio was not associated with having comprehensive knowledge about HIV/AIDS, which contradicts previous findings from Malawi and 15 sub-Saharan African countries [34,44].

However, the odds of having comprehensive knowledge about HIV/AIDS was higher among respondents who watch TV and read newspaper and magazines more than once a week, consistent with previous findings in global studies [29,50–52]. The use of mass media can possibly be affected by economic factors, which determine the existence of these media in the home, and by the distribution of electricity[53]. Improving health literacy, promoted by trusted media, is important to reduce misinformation and related problems, and a key step towards achieving at least three sustainable development goals (SDG), namely SDG3, SDG4 and SDG 5.

5. Limitations

Our study had a few significant limitations: firstly, data was limited to 2015 and 2016 Angolan DHS. The cross-sectional nature of the study did not permit for causality to be inferred from the findings. Despite their limitations in data exploration, demographic and health surveys are a credible source of information from which data can be extracted to enable us to analyze the epidemiological and health characteristics of a population.

6. Conclusions

Despite the existence of some studies using DHS data for analyzing HIV/AIDS knowledge, research gaps remain in sub-Saharan Africa. This article contributes to fill a gap in the literature related to HIV/AIDS literacy in Angola. Our study estimated the prevalence of comprehensive knowledge of HIV/AIDS and its related factors with data obtained for the 18 provinces of the country. Even though respondents demonstrated good knowledge on each individual question related to HIV/AIDS, the same was not true when the five questions were analyzed all together.

Our research identified the characteristics of the Angolan population with the lowest comprehensive HIV/AIDS knowledge and showed the existing inequalities that persist in Angola. Our study has also implied the possible importance of television campaigns to improve the comprehensive knowledge of HIV/AIDS. These findings can help health decision-makers adjust strategic health planning in Angola. In addition, they can serve as a wake-up call to governments and civil society to focus on investing more in health education for children, young people of all genders, less-educated women, and rural residents. This will reduce inequalities and increase the focus on health literacy for better health outcomes.

Author Contributions: Conceptualization, Neida Neto Vicente Ramos, Inês Fronteira and Maria do Rosário Oliveira Martins; methodology Maria do Rosário Oliveira Martins; software Maria do Rosário Oliveira Martins and Neida Neto Vicente Ramos; formal analysis Inês Fronteira and Maria do Rosário Oliveira Martins; investigation, Neida Neto Vicente Ramos; resources, Neida Neto Vicente Ramos; data curation and writing, Neida Neto Vicente Ramos; writing—review and editing, Neida Neto Vicente Ramos and Maria do Rosário Oliveira Martins; visualization, supervision, Maria do Rosário Oliveira Martins and Inês Fronteira. All authors have read and agreed to the published version of the manuscript.

Funding: This research was financed by the Multiannual Financial Framework 2014/20, Global Health and Tropical Medicine (GHTM), Institute of Hygiene and Tropical Medicine (IHMT), NOVA University of Lisbon, Lisbon, Portugal.

Data Availability Statement: data supporting reported results are available at request from the DHS program found at the web page of The Demographic and Health Surveys Program at. https://dhsprogram.com/data/dataset/Angola_Standard-DHS_2015.cfm?flag=0 and Instituto Nacional de Estatística de Angola (INE) at http://www.ine-ao.com/.

Acknowledgments: We are very grateful to the DHS program and INE for providing the data that allowed us to conduct this research.

Conflicts of Interest: The authors declare no conflict of interest and the funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

References

1. Jahagirdar, D., et al., *Global, regional, and national sex-specific burden and control of the HIV epidemic, 1990–2019, for 204 countries and territories: the Global Burden of Diseases Study 2019.* The Lancet HIV, 2021. **8**(10): p. e633-e651.
2. Comunidade and E.d.E.d.Á.O. (CEDEAO), *Estratégia Regional para o VIH, Tuberculose, Hepatite B e C, e saúde reprodutiva e sexual e direito entre as populações-chave na comunidade económica dos estados da África ocidental*, CEDEAO, UNDP, and ONUSIDA, Editors. 2020. p. 70.
3. Verónica Mendonça, S.A., Isabel Andrade, A.V. Nádia Osório, Armando Caseiro, António Gabriel, Anabela Correia Martins, and F. Mendes Health Literacy and Social Behaviors: What Relationship to Sexually Transmitted Diseases among Students? International Federation of Biomedical Laboratory Science, 2016. 5, 9-17.
4. Dodson S, G.S., Osborne RH (). New Delhi, Health literacy toolkit for low and middle-income countries: a series of information sheets to empower communities and strengthen health systems. World Health Organization, 2015.
5. Tique, J.A., et al., Measuring Health Literacy Among Adults with HIV Infection in Mozambique: Development and Validation of the HIV Literacy Test. Aids and Behavior, 2017. 21(3): p. 822-832.
6. Perazzo, J., D. Reyes, and A. Webel, A Systematic Review of Health Literacy Interventions for People Living with HIV. AIDS Behav, 2017. 21(3): p. 812-821.
7. Palella, F.J., Jr., et al., Mortality in the highly active antiretroviral therapy era: changing causes of death and disease in the HIV outpatient study. J Acquir Immune Defic Syndr, 2006. 43(1): p. 27-34.
8. Holtzman, C.W., K.A. Brady, and B.R. Yehia, Retention in care and medication adherence: current challenges to antiretroviral therapy success. Drugs, 2015. 75(5): p. 445-454.
9. Nachega, J.B., et al., Severe mental illness at ART initiation is associated with worse retention in care among HIV-infected Ugandan adults. Trop Med Int Health, 2013. 18(1): p. 53-7.
10. Chory, A., et al., HIV-Related Knowledge, Attitudes, Behaviors and Experiences of Kenyan Adolescents Living with HIV Revealed in WhatsApp Group Chats. J Int Assoc Provid AIDS Care, 2021. 20: p. 2325958221999579.
11. Areri, H., A. Marshall, and G. Harvey, Factors influencing self-management of adults living with HIV on antiretroviral therapy in Northwest Ethiopia: a cross-sectional study. BMC Infect Dis, 2020. 20(1): p. 879.
12. Hudelson, C. and L. Cluver, Factors associated with adherence to antiretroviral therapy among adolescents living with HIV/AIDS in low- and middle-income countries: a systematic review. AIDS Care, 2015. 27(7): p. 805-16.

13. Cunha, G.H.d., et al., Health literacy for people living with HIV/Aids: an integrative review. Revista Brasileira de Enfermagem, 2017. 70: p. 180-188.
14. King, A., Poor health literacy: a 'hidden' risk factor. Nat Rev Cardiol, 2010. 7: p. 473–474.
15. Kalichman, S.C., et al., Association between health literacy and HIV treatment adherence: further evidence from objectively measured medication adherence. J Int Assoc Physicians AIDS Care (Chic), 2008. 7(6): p. 317-23.
16. Palumbo, R., Discussing the Effects of Poor Health Literacy on Patients Facing HIV: A Narrative Literature Review. Int J Health Policy Manag, 2015. 4(7): p. 417-30.
17. UNAIDS. Country factsheets Angola 2020. AIDS info 2020; HIV and AIDS Estimates for 2020]. Available from: https://www.unaids.org/en/regionscountries/countries/angola.
18. Instituto Nacional de Estatística (INE), M.d.S.M., Ministério do Planeamento e do Desenvolvimento Territorial (MINPLAN) e ICF International, Inquérito de Indicadores Múltiplos e de Saúde em Angola 2015-2016. Luanda, Angola e Rockville, Maryland, EUA: INE, MINSA, MINPLAN e ICF International., 2016.
19. Vueba, A.N., et al., Prevalence of HIV and hepatitis B virus among pregnant women in Luanda (Angola): geospatial distribution and its association with socio-demographic and clinical-obstetric determinants. Virology Journal, 2021. 18(1): p. 239.
20. UNESCO, I.d.E.d. Angola profile. E ducation and literacy 2 021; Available from: http://uis.unesco.org/en/country/ao?theme=education-and-literacy#slideoutmenu.
21. Bank, W. World Development Indicators /The World by Income and Region. 2022; Available from: https://datatopics.worldbank.org/world-development-indicators/the-world-by-income-and-region.html.
22. Agency, C.I. Angola Profile. . 2020 [cited 2020 2020]; Available from: https://www.cia.gov/library/publications/the-world-factbook/geos/print_ao.html.
23. Gyeltshen, D., et al., COVID-19: A novel burden on the fragile health system of Angola. Journal of global health, 2021. 11: p. 03059-03059.
24. Organization, W.H. Global Health Expenditure Database. Angola 2020 [cited 2023 17/04/2023]; Available from: https://apps.who.int/nha/database/country_profile/Index/en.
25. Program, T.D.a.H.S. Guide to DHS Statistics. . DHS Program 2018 [cited 2022 11/05/2022]; Available from: https://dhsprogram.com/data/Guide-to-DHS-Statistics/index.htm#t=Guide_to_DHS_Statistics_DHS-7.htm.
26. Nations, U., Health literacy and the Millennium Development Goals: United Nations. J Health Commun 2010, 2010. 15 p. Suppl 2:211-23.
27. Nations, U., United Nations Sustainable Development Goals. 2015.
28. McClintock, H., Alber JM, Schrauben SJ, Mazzola CM, Wiebe DJ Constructing a measure of health literacy in Sub-Saharan African countries. Health Promot Int, 2019.
29. Guure, C., et al., Comprehensive Knowledge of HIV and AIDS among Ghanaian Adults from 1998 to 2014: A Multilevel Logistic Regression Model Approach. Scientifica, 2020. 2020: p. 7313497.
30. Budu, E., et al., What has comprehensive HIV/AIDS knowledge got to do with HIV testing among men in Kenya and Mozambique? Evidence from Demographic and Health Surveys. J Biosoc Sci, 2021: p. 1-14.
31. Estifanos, T.M., et al., Predictors of HIV/AIDS comprehensive knowledge and acceptance attitude towards people living with HIV/AIDS among unmarried young females in Uganda: a cross-sectional study. BMC Womens Health, 2021. 21(1): p. 37.

32. Kalichman, S.C., et al., Health literacy and health-related knowledge among persons living with HIV/AIDS. Am J Prev Med, 2000. 18(4): p. 325-31.
33. Hicks, G., et al., Health literacy is a predictor of HIV/AIDS knowledge. Fam Med, 2006. 38(10): p. 717-23.
34. Teshale, A.B., et al., Comprehensive knowledge about HIV/AIDS and associated factors among women of reproductive age in sub-Saharan Africa: a multilevel analysis using the most recent demographic and health survey of each country. BMC Infectious Diseases, 2022. 22(1): p. 130.
35. McClintock, H.F., et al., Constructing a measure of health literacy in Sub-Saharan African countries. Health Promotion International, 2020. 35(5): p. 907-915.
36. Boerma, J.S., A. Elisabeth, Demographic and health surveys: DHS contributions and limitations World health statistics quarterly 1993, 1993. 46: p. 222-226.
37. Dinamene, O., et al., Seropositivity rate and sociodemographic factors associated to HIV, HBV, HCV and syphilis among parturients from Irene Neto Maternity of Lubango city, Angola. Sexually Transmitted Infections, 2020. 96(8): p. 587.
38. Yefimenko, L., et al., Treponema pallidum infection rate in patients attending the general hospital of Benguela, Angola. J Infect Dev Ctries, 2023. 17(1): p. 125-128.
39. Mendes, C.A.A. and J.D. Pedro, Sintomas depressivos em angolanos com HIV em período pré-pandêmico/ Depressive symptoms in Angolans with HIV in the pre-pandemic period/ Síntomas depresivos en angoleños con VIH en el período prepandemia. Journal Health NPEPS, 2022. 7(2).
40. Ramos, N.N.V., I. Fronteira, and M.R.O. Martins, Building a Health Literacy Indicator from Angola Demographic and Health Survey in 2015/2016. Int J Environ Res Public Health, 2022. 19(5).
41. Chirwa, G.C., "Who knows more, and why?" Explaining socioeconomic-related inequality in knowledge about HIV in Malawi. Scientific African, 2020. 7: p. e00213.
42. Hassana, B.Y. and A.Y. Bashir, Socio-ecological predictors of HIV testing in women of childbearing age in Nigeria. PAMJ, 2022. 41(162).
43. Zegeye, B., et al., Women's decision-making capacity and its association with comprehensive knowledge of HIV/AIDS in 23 sub-Saharan African countries. Arch Public Health, 2022. 80(1): p. 111.
44. Mandiwa, C., B. Namondwe, and M. Munthali, Prevalence and correlates of comprehensive HIV/AIDS knowledge among adolescent girls and young women aged 15-24 years in Malawi: evidence from the 2015-16 Malawi demographic and health survey. BMC Public Health, 2021. 21(1): p. 1508.
45. Tetteh, J.K., et al., Comprehensive HIV/AIDS knowledge and HIV testing among men in sub-Saharan Africa: a multilevel modelling. Journal of Biosocial Science, 2021: p. 1-16.
46. Oliveira, D.E.E.M.C., Study of the Digital Skills of the "Sons of War" of Angola, a contribution. 2020. 12(3): p. 223-244.
47. Shimizutani, S. and E. Yamada, Long-term Consequences of Civil War in Tajikistan: The Gendered Impact on Education and Labor Market Outcomes. Defence and Peace Economics, 2022: p. 1-14.
48. Ngadaya, E., et al., Knowledge, awareness and use of HIV services among the youth from nomadic and agricultural communities in Tanzania. Public Health Action, 2021. 11(2): p. 69-74.
49. Yaya, S., et al., Extent of Knowledge about HIV and Its Determinants among Men in Bangladesh. Frontiers in Public Health, 2016. 4.
50. Jung, M., M. Arya, and K. Viswanath, Effect of Media Use on HIV/AIDS-Related Knowledge and Condom Use in Sub-Saharan Africa: A Cross-Sectional Study. PLOS ONE, 2013. 8(7): p. e68359.
51. Mofoluwaso Bankole, O. and A. Abioye, Influence of Access to HIV/AIDS Information on the Knowledge of Federal University Undergraduates in Nigeria. Libri, 2018. 68(2): p. 149-164.

 doi:10.20944/preprints202307.1053.v1

52. Sule, A.M.H.a.G.M., Media Campaign Exposure and HIV/AIDS Prevention: 1980–2020. In (Ed.), AIDS Updates - Recent Advances and New Perspectives., in AIDS Updates - Recent Advances and New Perspectives, S.I. Okware, Editor. 2021, IntechOpen.: London, SW7 2QJ, UNITED KINGDOM.
53. Sarkodie, S.A. and S. Adams, Electricity access, human development index, governance and income inequality in Sub-Saharan Africa. Energy Reports, 2020. 6: p. 455-466.