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Healthcare-Seeking behavior for sexually transmitted infections among women who initiated sexual intercourse at an early age in 22 Sub-Saharan African Countries: a multilevel analysis of 2018–2024 demographic and health survey data

Getachew Teshale[1*], Melak Jejaw[1], Kaleb Assegid Demissie[1], Nebebe Demis Baykemagn[2], Tirualem Zeleke Yehuala[2] and Jenberu Mekurianew Kelkay[3]

Abstract

Introduction Sexually transmitted infections (STIs) represent a significant global public health concern, contributing substantially to illness and mortality, particularly in Sub-Saharan Africa (SSA). Women of reproductive age who initiated sexual intercourse at an early age are at high risk of acquiring STIs. However, comprehensive data on their care-seeking behaviors in SSA are lacking. This study determines the prevalence of STI-related care-seeking behavior and identifies associated factors among these women.

Method This study utilized data from the most recent Demographic and Health Surveys (DHS) conducted in 22 SSA countries between 2018 and 2024. A weighted sample of 54,425 reproductive-age women who initiated sexual intercourse at an early age and reported STIs or related symptoms in the past year was analyzed. A multilevel mixed-effects logistic regression model identified individual and community-level factors, with statistical significance set at *p* < 0.05. Adjusted odds ratios (AORs) with 95% confidence intervals (CIs) were calculated.

Results The pooled prevalence of STI-related care-seeking behavior among women initiated sexual intercourse at early age in SSA countries was 39.18% (95% CI: 33.25%, 45.03%). Multilevel analysis revealed significant associations with age, education, religion, pregnancy status, employment, household wealth, media exposure, financial barriers, awareness of AIDS/STIs, cervical cancer testing, residence, community education, media exposure, and poverty.

Conclusion STI-related care-seeking behavior remains lower in this population compared to other studies. Associated factors include age, education, religion, pregnancy status, employment, household wealth, media exposure, financial barriers, awareness of AIDS/STIs, cervical cancer testing, residence, and community-level

*Correspondence:
Getachew Teshale
getateshale1221@gmail.com

Full list of author information is available at the end of the article

factors such as education, media exposure, and poverty. Public health efforts should prioritize socioeconomically disadvantaged women by strengthening counseling and awareness during cervical cancer screenings and antenatal visits. Policies to improve healthcare access and financial support for these women are essential.

Keywords Healthcare seeking, Early age sexual intercourse, STI, Sub-Saharan, DHS

Introduction

Sexually transmitted infections (STIs) are clinical syndromes caused by various pathogens and transmitted through sexual contact [1]. Globally, over 374 million new STI cases were reported by 2021 and in the developing countries over 17% of economic losses attributed to illnesses of STIs. Sub-Saharan Africa accounts for approximately 40% of the global burden STI [2]. Thus, prevention and control of STIs have widespread benefits and contribute to the achievement of Sustainable Development Goals related under five deaths, communicable diseases, and sexual and reproductive health care [3].

STIs are a major public health problem worldwide which causes serious morbidity and mortality [4]. The most common STI includes Chlamydia, syphilis and gonorrhea cause serious complications like pelvic inflammatory disease, ectopic pregnancy, infertility, chronic pelvic pain, arthritis, neurological, cardiovascular and dermatological disease [5]. Besides, these infections cause stillbirth, neonatal death, premature delivery or severe disability in infants [6, 7, 8]. Untreated STIs also facilitate the transmission and acquisition of human immunodeficiency virus (HIV) [9].

Although most STIs can be cured with early and proper treatment, they are usually asymptomatic or go unnoticed. Most people with STIs have mild or no symptoms and they do not seek treatment [10]. Early detection and treatment of STIs are crucial to reduce the prevalence and transmission rate. However, studies showed that women with self-reported symptoms of STIs do not seek treatment at public health institutions, while others self-medicate [11].

Studies showed that health care-seeking behavior for STIs is influenced by different factors including economical barriers, distance from the health facility, educational status, residence, age at first sex, number of sexual partners, use of a condom, media exposure, wealth index and cultural beliefs and practices [11–14].

In many low- and middle-income countries (LMIC) in Africa, health services may not fully address the sexual and reproductive health (SRH) needs of youth [15]. Although females who initiated sexual intercourse early in their age increased the risk of acquiring STI, only few of them seek healthcare for their problem. Studies also show that females often face greater challenges and require more attention in seeking care for STI compared to males [16, 17]. This may be due to cultural barriers, economic challenges or accessibility problems [17]. Untreated STIs in females can also lead to more severe outcomes like infertility, chronic pain, and adverse pregnancy outcomes [18]. Thus, understanding their care seeking practices and determinant factors can help to inform policies and strategies aimed at improving the service provision and utilization. However, there is limited information available on care and help seeking behaviors for STIs especially on our target population. Therefore, our study determines the level healthcare seeking behavior and their individual and community level variables among women initiated early sexual intercourse.

Method and material

Study design, study area and period

Recent DHS data from the 22 sub-Saharan African countries, which were conducted between 2018 and 2024 were used in this study. The DHS is a nationally representative, cross-sectional survey conducted every five years. It collects data on HIV/AIDS, nutrition, child health, reproductive health, family planning, marriage, fertility, and mortality. For this particular study, the most recent DHS data of Benin, Burkina Faso, Burundi, Cameron, Coat'd'ivoire, Gabon, Gambia, Ghana, Guinea, Kenya, Lesotho, Liberia, Madagascar, Mali, Mauritania, Mozambique, Nigeria, Rwanda, Senegal, Sierra Leone, Tanzania, and Zambia were used.

Data source, study population and sampling technique

The Individual Record (IR) data set of the 22 Sub-Saharan African countries' recent DHS data was appended to figure out the prevalence and contributing factors of healthcare seeking behavior for STI among women initiated sexual intercourse early of their age. The data was obtained from the DHS website; https://dhsprogram.com upon reasonable request online by stating the objective of the study. The study used a weighted total sample of 54,425 reproductive age women who initiated sexual intercourse early at their age (Table 1). We predict that women in the same cluster will be more similar than women across the countries; because the DHS data had a hierarchical structure and women were nested within clusters. The heterogeneity between clusters should therefore be taken into consideration using sophisticated models. Thus, a mixed-effect logistic regression model was used to identify the factors associated with care seeking behavior of the women for STI.

Table 1 Weighted sample size in the study of care seeking behavior for STI among women with early sexual intercourse history in sub-Saharan Africa

Countries	Survey year	Weighted Sample size (*n*)	Weighted Sample size (%)
Benin	2018	445	0.82
Burkina Faso	2021	3,419	6.28
Burundi	2018	687	1.26
Cameron	2018	853	1.57
Cotedivoir	2021	4,172	7.67
Gabon	2019	1,512	2.78
Ghana	2022	2,858	5.25
Gambia	2019	717	1.32
Guinea	2018	4,395	8.08
Kenya	2022	1,851	3.40
Lesotho	2024	773	1.42
Liberia	2020	5,327	9.79
Madagascar	2021	1,482	2.72
Mali	2018	4,402	8.09
Mauritania	2021	3,355	6.17
Mozambique	2023	3,237	5.95
Nigeria	2018	6,152	11.30
Rwanda	2020	872	1.60
Sierra Leone	2019	4,582	8.42
Senegal	2019	1,571	2.89
Tanzania	2022	670	1.23
Zambia	2018	1,089	2.00
Total		54,425	100.00

Inclusion criteria

All women of reproductive age in the selected countries who initiated sex at 15 years and below, and had been diagnosed with STI or a sign or symptom of STI within a year before the time of data collection were included. We included all the study participants who fulfill the eligibility criteria and we didn't apply any exclusion criteria.

Variables and measurement

Dependent variable

The outcome variable of our study; care-seeking behavior for STI was measured and categorized as follows: reproductive-age women (15–49 years) who initiated sexual intercourse at early age (15 years or below) (v531) and had STIs or sign or symptoms of STIs (v763a-c) in the last 12 months prior to the survey. Those women who sought prescribed treatment or professional medical advice for STIs were classified as having STIs-related care-seeking behavior and coded as "Yes," whereas those who had STIs or sign or symptoms of STIs but did not seek any prescribed treatment or professional medical advice were classified as not having STIs-related care-seeking behavior and coded as "No" [13]. The description and measurement of the outcome variables used in the study are presented in Table 2.

Table 2 Description and measurements of stis related care seeking behavior

Variable	Description	Response measurements
Had STI infection	Have you had STI or symptoms of an STI (a bad-smelling, abnormal discharge from the vagina or a genital sore or ulcer) in the 12 months before the survey?	"Yes" = respondents who had STIs or STI symptoms and "no" otherwise
STIs related care-seeking behavior (outcome variable)	If you had the infection, did you seek any kind of advice or treatment?	"Yes" = for respondents who sought prescribed treatment or professional medical advice e and "no" otherwise

Independent variables

Because of the hierarchical nature of the DHS data, we considered individual and community-level factors as independent variables. Individual-level variables including age of respondents, current marital status, educational status of the women, religion, current working status, current pregnancy status, media exposure, sex of household head, HH wealth status, distance from health facility, problem of getting money for getting care, problem of getting permission to go to facility, and not want to go to health facility alone whereas community-level variables like community poverty status, community education, community media exposure and residence were considered independent variables. Household wealth indices are scored based on the number and type of consumer goods they own and classified as: poor, middle and rich [19]. Media exposure was categorized as "yes" if a household had access to one or more of the three media (read a newsletter, listen to the radio, and watch television) at least once a week, and "no" otherwise [20]. The list of independent variables and their categorization is shown in the table below (Table 3).

Data processing and statistical analysis

STATA version 14 software was used for the analysis of our data. Each country's DHS data were appended and the appended data consisted of individual and community-level variables that represent the selected SSA countries. The DHS data set is hierarchical followed stratified two-stage cluster design: Enumeration Areas (EA) drawn from census files and a sample of households is drawn from each selected EA. The nested nature of the DHS data (individual respondents nested in the household and in clusters), advanced statistical techniques to account for variability, multilevel mixed-effects logistic regression was used to determine the factors associated with care-seeking behavior for STI. Multilevel mixed effect logistic

Table 3 Independent variables in the study of care seeking behavior for stis among women with early sexual intercourse history in sub-Saharan Africa

Variables	Category
Individual level variables	
Age of respondents	15–24, 25–34, 35–49
Current marital status	Currently married or lived with partner, not married
Educational status of the women	No education, Primary education, Secondary education, Higher education
Religion	Vodoun, Islam, Traditional, All Christianity, Others, No religion
Current working status	Currently working, currently not working
Current pregnancy status	Currently pregnant, currently not pregnant
Media exposure	Had exposure, no exposure
Sex of household head	Male, female
HH wealth status	Poor, middle, rich
Distance from health facility	Problem, not problem
Problem of getting money for getting care	Problem, not problem
Problem of getting permission to go to facility	Problem, not problem
Not want to go to health facility alone	Problem, not problem
Ever heard about STIs	Yes, No
Ever heard about AIDS	Yes, No
Ever been tested for HIV	Yes, No
Ever tested for cervical cancer	Yes, No
Sexual activity in last 4 weeks	Active, not active
Number of sexual partners in the last 12 months	No sex partner, one sex partner, two pr more sex partner
Condom used during last sex	Yes, No
Community level variables	
Community poverty status	Poorer, Poor
Community education	Less educated, more educated
Community media exposure	less exposed, more exposed
Residence	Urban, rural

regression follows four models: the null model (outcome variable only), model I (only individual-level variables with the outcome), model II (only community-level variables with the outcome), and model III (both individual and community level variables with the outcome). The model without independent variables (null model) was used to check the variability of care-seeking behavior for STI across the cluster. The association of individual-level variables with the outcome variable (Model I) and the association of community-level variables with the outcome variable (Model II) were assessed with bivariable logistic regression and variables with a p-value ≤ 0.2 were taken to the final model (Model III) in which both individual and community variables fitted simultaneously with the outcome variable. Both fixed and random effects were reported and adjusted OR (AOR) with 95% CI was used. Because of the nested nature of the model, deviance = -2(log-likelihood ratio) was used to compare models, and the model with the lowest deviance was selected as the best-fit model. The differences between clusters were measured and reported using intra-class correlation coefficients (ICC) and median odds ratio (MOR). The ICC quantifies the similarity of observations within a cluster, whereas the MOR evaluates unexplained cluster heterogeneity [21]. The variables used in the models were verified for multi-collinearity by measuring the variance inflation factors (VIF), with the findings falling within acceptable limits of 1–10 [22]. In the final model variables with a p-value less than 0.05 were declared as factors significantly associated with care-seeking behavior for STI. The descriptive findings were presented as narrations, frequency tables, and figures.

Results

Sociodemographic and sexual and reproductive health characteristics of respondents

The study used a weighted sample of 54,425 reproductive-age women (15–49) who initiated sexual intercourse at early age and had STIs or symptoms of STIs in the last 12 months prior to the survey. Over one-third of respondents (19,021, 34.95%) were aged 15–24 years while the remaining (19,527 (35.88%)) and (15,876 (29.17%)) were between 25 and 34 and 35–49 years respectively. Around three-fourth (39,945 (73.39%)) of the women were married or lived with their partner and almost for equal number of respondents, the head of the households were males. Few of the women (1,182 (2.17%)) had higher educational level and (24,670 (45.33%)) had no formal education. Over two-third (36,933 (67.86%)) of the women had media exposure and three-fifth (32,389 (59.51%)) had work. Similarly, two-fifth (21,595 (39.68%)) of the respondents reported that the health facility is far from them and around one-fourth (12,699 (23.33%)) had problem of getting permission to go to health facilities. Over half (31,870 (58.56%)) of the women also had a problem getting money for healthcare and 23.34% didn't want to go to health facilities alone. Around three-fifth (33,066 (60.76%)) of the respondents were from the rural site and over half (52.28%) respondents were from the poorer community. In the same way, over the half (27,857 (51.18%)) of the women were from more media exposed and 28,180 (51.78%) were from more educated communities.

Majority (89.63% and 78.3%) of the women heard about STIs and AIDS respectively. However, below half (24,848 (45.66%)) of the women had been tested for HIV and almost none (282 (0.52%)) tested for cervical cancer. Almost two-third (35,822 (65.82%)) of the women had performed sexual intercourse in the last four weeks and one in the eight (7,033 (12.92%) of the women had two

or more sex partners. Only one-fifth (10,871 (19.97%)) of the women the same had used condom during the last sexual intercourse (Table 4).

Prevalence of care seeking behavior for STI

The number of women who had STIs or sign and symptoms STI were high in Liberia (9.79%) and low in Benin (0.82%). The pooled prevalence of STI-related care-seeking behavior in sub-Saharan African countries was 39.18% [95% CI: 33.25%, 45.03%]. The highest prevalence of care-seeking behavior toward STIs was found in Liberia (67%), while the lowest prevalence was found Senegal (9.6%) (Fig. 1).

Random effect analysis (Measures of variation) and model comparison

The null model revealed that variance between countries was 1.48, indicating the existence of statistically significant differences between countries care seeking behavior towards STIs. Furthermore, the ICC in the null model showed that about 31.15% of the variation of care-seeking behavior for STIs was attributed to the difference in country-level factors. Moreover, the MOR was 3.14 which implied that the odds of care-seeking behavior for STIs among women from high-risk communities were 3.14 times of women from low-risk communities. This showed the existence of significant heterogeneity in care-seeking behavior towards STIs across different countries.

Besides, in the final model (model IV) PCV indicates that about 55.48% of the variation of care-seeking behavior for STIs was attributable to both individual-level and community-level factors. As the model is nested, deviance was used for model comparison and the model with the lowest deviance (model IV) was found to be the best-fitted model (Table 5).

Individual and community level factors of care-seeking behavior for STI (fixed-effects)

In the multilevel logistic regression analysis age of respondents, women's educational level, religion, current working status, current pregnancy status, sex of household head, individual media exposure, individual level wealth index, problem of getting money for care, ever heard about AIDS, ever heard about STI, test for cervical cancer, and all community level variables were significantly associated with the outcome variables at $p \leq 0.05$.

Accordingly, the odds of care seeking behavior for STI among women aged 25–34 years were 1.1 times of women aged 15–25 years (AOR = 1.10, 95% CI: 1.04, 1.16). Women with secondary and higher educational level had 1.2 and 1.25-times care-seeking behavior for STI of uneducated women (AOR = 1.2, 95% CI: 1.13 1.28 and AOR = 1.25, 95% CI: 1.07, 1.46) respectively. Women who were Islamic, Christian and other religion followers were 30%, 88% and 99.6% less likely of having care seeking behavior for STI as compared to Vondou religion followers (AOR = 0.7, 95% CI:0.64, 0.75, AOR = 0.12, 95% CI: 0.11, 0.13 and AOR = 0.04, 95% CI 0.03, 0.06) respectively. The odds of care-seeking behavior for STI among women who had work was 1.51 times of those who haven't (AOR = 1.51, 95% CI: 1.44, 1.58). Similarly, the odds of care-seeking behavior among women from female headed households were 1.07 times of their counters (AOR = 1.07, 95% CI:1.02, 1.14). Furthermore, women with rich wealth status had 1.38 times care seeking behavior for STI as compared to the poor (AOR = 1.38, 95% CI: 1.29, 1.47). Currently pregnant women had also 1.6 times care-seeking behavior as compared to non-pregnant women (AOR = 1.6, 95% CI: 1.49, 1.72). The odds of care seeking behavior for STI among women who had media exposure was 24% less likely as compared to those who hadn't (AOR = 0.76, 95% CI: 0.72, 0.80). In the same way, women who had a problem of getting money for care were 23% less likely to have care seeking behavior for STI as compared to those who hadn't (AOR = 0.77, 95% CI: 0.73, 0.81). The odds of care seeking behavior for STIs among women who ever heard about AIDS was 14.1 times of women who didn't hear about AIDS (AOR = 14.1, 95% CI: 12.69, 15.67). Similarly, women who ever heard about STIs were 1.6 times of who didn't heard about STIs (AOR = 1.6, 95% CI:1.52, 1.69). Women who ever tested for cervical cancer were 2.35 times of who didn't tested for cervical cancer (AOR = 2.35, 95% CI:1.71, 3.25).

Care seeking behavior for STI among women from less media exposed, less educated and poorer community were 36%, 35% and 36% less likely as compared to their counters (AOR = 0.64, 95% CI: 0.53, 0.77, AOR = 0.65, 95% CI: 0.54, 0.78, and AOR = 0.64, 95% CI: 0.54, 0.77) respectively. Similarly, women from rural site were 22% less likely to have care-seeking behavior for STI as compared to women from urban site (AOR = 0.78, 95% CI: 0.73, 0.83) (Table 6).

Discussion

This study examines the pooled prevalence and factors associated with care-seeking behavior for STIs among high-risk reproductive-age women. Accordingly, The pooled prevalence of STI-related care-seeking behavior was 39.18% [95% CI: 33.25%, 45.03%], with the highest prevalence in Liberia (67%) and the lowest in Senegal (9.6%). The finding was higher than studies conducted in Ethiopia [13], and India 14% [11]. However, it was lower than the studies done in East Africa 54.14% [23], Iran 68.85% [10] and Dehradun India 63% [23]. The discrepancy might be due to the difference in socioeconomic status, cultural norms, and access and availability to health facilities across different countries [13].

Table 4 Sociodemographic and sexual and reproductive health characteristics of respondents in the study of care seeking behavior for STI in sub-Saharan Africa ($n = 54,425$)

Variables	Categories	Care-seeking behavior		Total n (%)
		No	Yes	
Age of respondent	15–24	11,738 (61.71)	7,283 (38.29)	19,021 (34.95)
	25–34	11,475 (58.76)	8,052 (41.24)	19,527 (35.88)
	35+	9,890 (62.29)	5,986 (37.71)	15,876 (29.17)
Current marital status	Not married	8,623 (59.55)	5,857 (40.45)	14,480 (26.61)
	married or lived with partner	24,480 (61.29)	15,464 (38.71)	39,945 (73.39)
Educational status	No education	15,245 (61.79)	9,425 (38.21)	24,670 (45.33)
	Primary education	9,133 (66.48)	4,605 (33.52)	13,738 (25.24)
	Secondary education	8,162 (55.02)	6,672 (44.98)	14,834 (27.26)
	Higher education	563 (47.65)	619 (52.35)	1,182 (2.17)
Religion	Vodoun	12,754 (53.68)	11,003 (46.32)	23,757 (43.65)
	Islam	4,261 (62.45)	2,562 (37.55)	6,824 (12.54)
	Traditional	5,301(51.60)	4,972 (48.40)	10,274 (18.88)
	All Christianity	6,278 (88.86)	787 (11.14)	7,065 (12.98)
	Others	1,251(95.24)	62 (4.76)	1,314 (2.41)
	No religion	3,256.416 (62.75)	1,933 (37.25)	5,189 (9.54)
Current working status	Not working	14,596 (66.24)	7,440 (33.76)	22,036 (40.49)
	Working	18,507 (57.14)	13,881 (42.86)	32,389 (59.51)
Currently pregnant	No	30,113 (61.65)	18,733 (38.35)	48,846 (89.75)
	Yes	2,990 (53.60)	2,588 (46.40)	5,579 (10.25)
Sex of HH	Male	24,411(61.42)	15,335 (38.58)	39,746 (73.03)
	Female	8,692 (59.22)	5,986 (40.78)	14,678 (26.97)
HH wealth status	Poor	15,504 (65.85)	8,039 (34.15)	23,543 (43.26)
	Middle	7,060 (61.52)	4,416 (38.48)	11,476 (21.09)
	Rich	10,538 (54.31)	8,866 (45.69)	19,404 (35.65)
Media exposure	No	10,829 (61.91)	6,662 (38.09)	17,492 (32.14)
	Yes	22,273 (60.31)	14,659 (39.69)	36,933 (67.86)
Health facility is far	No	19,280 (58.73)	13,549 (41.27)	32,829 (60.32)
	Yes	13,823 (64.01)	7,772 (35.99)	21,595 (39.68)
Problem of getting money	No	12,862 (57.03)	9,692 (42.97)	22,554 (41.44)
	Yes	20,240 (63.51)	11,630 (36.49)	31,870 (58.56)
Problem of getting permission	No	25,028 (59.98)	16,697 (40.02)	41,725 (76.67)
	Yes	8,074 (63.58)	4,625 (36.42)	12,699 (23.33)
Not want to go alone	No	25,139 (60.25)	16,583 (39.75)	41,723 (76.66)
	Yes	7,963 (62.70)	4,738 (37.30)	12,701(23.34)
Ever heard about STIs	Yes	28,038 (57.48)	20,744 (42.52)	48,783 (89.63)
	No	5,065 (89.77)	577 (10.23)	5,642 (10.37)
Ever heard about AIDS	Yes	22,356 (52.46)	20,257 (47.54)	42,614 (78.30)
	No	10,747 (90.99)	10,746 (9.01)	11,811(21.70)
Ever been tested for HIV	Yes	15,299 (61.57)	9,549 (38.43)	24,848 (45.66)
	No	17,804 (60.20)	11,772 (39.80)	29,577 (54.34)
Ever tested for cervical cancer	Yes	94 (33.43)	188 (66.57)	282 (0.52)
	No	33,009 (60.97)	21,134 (39.03)	54,143 (99.48)
Sexual intercourse in last 4 weeks	Not performed	11,477 (61.70)	7,125 (38.30)	18,603 (34.18)
	Performed	21,625 (60.37)	14,196 (39.63)	35,822 (65.82)
Number of sexual partners in the last 12 months	No partner	2,987 (60.98)	1,911 (39.02)	4,899 (9.00)
	Only one	25,727 (60.55)	16,765 (39.45)	42,492 (78.08)
	two and more	4,388 (37.61)	2,644 (62.39)	7,033 (12.92)
Condom used during last sex	Yes	6,399 (58.87)	4,471(41.13)	10,871 (19.97)
	No	26,703 (61.31)	16,850 (38.69)	43,553 (80.03)
Residence	Urban	11,648 (54.54)	9,710 (45.46)	21,359 (39.24)
	Rural	21,455 (64.88)	11,611 (35.12)	33,066 (60.76)

Table 4 (continued)

Variables	Categories	Care-seeking behavior		Total n (%)
		No	Yes	
Community education	Less educated	16,383 (62.42)	9,862 (37.58)	26,245 (48.22)
	More educated	16,721 (59.34)	11,459 (40.66)	28,180 (51.78)
Community media exposure	less exposed	16,508 (62.13)	10,060 (37.87)	26,568 (48.82)
	More exposed	16,595 (59.57)	11,262 (40.43)	27,857 (51.18)
Community poverty status	Poorer	16,358 (57.48)	12,098 (42.52)	28,456 (52.28)
	Poor	16,745 (64.48)	9,224 (35.52)	25,969 (47.72)

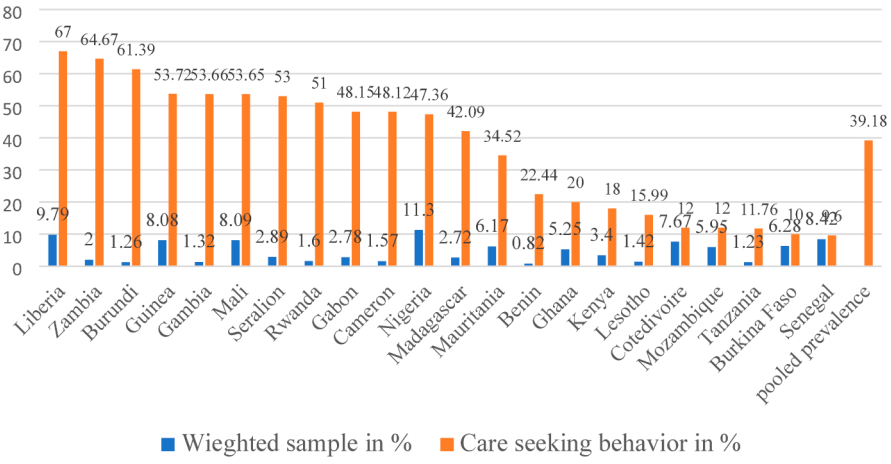

Fig. 1 Prevalence of care seeking behavior for STI among women having early sexual intercourse in the sub-Saharan countries

Table 5 Random effect and model comparison in the study of care seeking behavior for STI and associated factors among women with early sexual intercourse history in sub-Sahara Africa

Measure of variation	Null Model (I)	Model II	Model III	Model IV
Random effect				
Variance	1.48	1.76	1.38	1.72
ICC (%)	31.15	34.86	29.68	34.39
MOR	3.14	3.42	3.03	3.38
PCV (%)	Ref	54.32	43.94	55.48
Model comparison				
Deviance	67,733	56,252	67,668	56,134
AIC	67736.94	56314.19	67348.18	56205.76
VIF	Ref	1.34	1.10	1.35

In this study after adjusting for individual and community level factors, we found age of women was one of statistically significant factors for STIs related care seeking behavior. Accordingly, women who aged 25–34 years had slightly higher care seeking behavior as compared to women aged 15–24. This finding was supported by the previous studies conducted in east Africa [23], Nigeria [24], and Iran [10]. This may be due to older women are more aware of the reproductive health care and young women are embarrassed and ashamed to go to the clinic for treatment since it is a sexual related issue [17, 24].

The study also found that women who attained secondary and higher education were more likely to have care-seeking behavior for STIs compared to women who did not have formal education. This finding was in line with studies conducted in India and east Africa [11–25]. This implies that educated people have greater access to information and can apply health education messages they received and education may boost women's confidence and ability to make decisions regarding their health [13, 26].

Women who were Muslim, Christian or other religious followers had less STIs related care seeking behavior as compared to Vodou religion followers. The reason might be due to in many Islamic and Christian communities, discussions about sexuality and STIs may be considered taboo or morally sensitive. This can lead to shame, fear of judgment, or stigma, discouraging women from seeking care [27]. The study also showed that women who have been working had higher care seeking behavior for STIs than their counters. The result was supported by previous study conducted in sub-Sharan Africa [28]. Similarly, women from female headed households had slightly higher odds of care seeking behavior for STIs as compared to male headed households. It is obvious that women from female-headed households likely reflect greater autonomy, and economic independence [29].

This study revealed that STIs-related care-seeking behavior of women from rich wealth status households was higher than women from poor households.

Table 6 Determinant of care seeking behavior towards stis among women having early sexual intercourse in sub-Sahara Africa

Variables	Categories	Model II	Model III	Model IV
		COR (95% CI)	COR (95% CI)	AOR (95% CI)
Age of respondents	15–24	1		1
	25–34	1.10 (1.04, 1.17)		1.10 (1.04, 1.16) *
	35+	0.96 (0.91, 1.02)		0.95(0.90, 1.01)
Educational status	No education	1		1
	Primary education	0.92(0.88, 0.98)		0.93 (0.88, 1.01)
	Secondary education	1.22(1.14, 1.30)		1.20 (1.13, 1.28) *
	Higher education	1.28 (1.09, 1.49)		1.25 (1.07, 1.46) *
Religion	Vodou	1		1
	Islam	0.71 (0.66, 0.77)		0.70 (0.64, 0.75) *
	Traditional	1.14 (1.07, 1.21)		1.15 (0.98, 1.22)
	All Christianity	0.12 (0.11, 0.13)		0.12 (0.11, 0.13) *
	Others	0.05 (0.04, 0.07)		0.04 (0.03, 0.06) *
	No religion	0.97 (0.88, 1.09)		0.97 (0.86, 1.03)
Working status	Not working	1		1
	Working	1.50 (1.42, 1.57)		1.51 (1.44, 1.58) *
Marital status	Not married	1		1
	married or lived with partner	0.95 (0.89, 1.00)		0.97 (0.91, 1.03)
Sex of household head	Male	1		1
	Female	1.09 (1.03, 1.15)		1.07 (1.02, 1.14) *
Currently pregnant	No	1		1
	Yes	1.60 (1.49, 1.72)		1.60 (1.49, 1.72) *
Wealth index	Poor	1		1
	Middle	1.10 (1.03, 1.16)		1.04 (0.9, 1.11)
	Rich	1.58 (1.49, 1.68)		1.38 (1.29, 1.47) *
Media exposure	Yes	1		1
	No	0.75 (0.72, 0.79)		0.76 (0.72, 0.80) *
Health facility is far	No	1		
	Yes	1.01(0.95, 1.02)		1.02 (0.96, 1.08)
Problem of getting money for healthcare	No	1		1
	Yes	0.77 (0.73, 0.81)		0.77 (0.73, 0.81) *
Problem of getting permission to go to HF	No	1		1
	Yes	0.89 (0.83, 0.94)		0.88 (0.83, 1.01)
Problem to go alone to HF	No	1		1
	Yes	1.05 (0.99, 0.12)		1.05 (0.99, 1.12)
Ever heard about AIDS	No	1		1
	Yes	14.23 (12.81, 15.81)		14.10(12.69, 15.67) *
Ever tested for HIV	No	1		
	Yes	1.00 (0.96, 1.05)		0.98 (0.94, 1.03)
Ever heard about STI	No	1		1
	Yes	1.60 (1.53, 1.69)		1.60 (1.52, 1.69) *
Recent sexual intercourse	Not performed last 4 weeks	1		1
	Performed in last 4 weeks	1.10 (1.04, 1.16)		1.09 (0.98, 1.15)
Tested for cervical cancer	No			1
	Yes	2.47 (1.79, 3.41)		2.35 (1.71 3.25) *
Condom use for recent sex	No			1
	Yes	1.10 (1.01, 1.2)		1.09 (0.99, 1.19)
Number of sexual partners	No	1		1
	Only one	1.25 (1.13, 1.40)		1.24 (0.98, 1.38)
	Two and more	1.14 (1.01, 1.29)		1.12 (0.99 1.27)
Community education	More educated		1	1
	Less educated		0.78 (0.66, 0.93)	0.65 (0.54, 0.78) *

Table 6 (continued)

Variables	Categories	Model II	Model III	Model IV
		COR (95% CI)	COR (95% CI)	AOR (95% CI)
Community media exposure	More exposed		1	1
	Less exposed		0.71(0.6, 0.84)	0.64 (0.53, 0.77) *
Community poverty status	Low poverty		1	1
	High poverty		0.57 (0.48, 0.78)	0.64 (0.53,0.77) *
Residence	Urban		1	1
	Rural		0.67 (0.64, 0.7)	0.78(0.73, 0.83) *

Our study also revealed that women who have problem of getting money for medical care had less care seeking behavior as compared to their counters. This finding was supported by studies done in Nigeria [30], India [11] and eastern Africa [23]. This might be due to wealth is a crucial to access health services, as women with good economic status are more likely to be able to overcome financial barriers to access health care services [13, 26]. This study also showed that STIs-related care-seeking behavior of women who were currently pregnant was higher than non-pregnant women. The finding was consistent with a study done in Ethiopia [13]. The reason might be pregnant women receive STI counseling during their antenatal care (ANC) visit and WHO recommended pregnant women should be screened for STIs during their ANC visit [13]. Women who had no media exposure had less care seeking behavior for STIs as compared to women having media exposure. The finding was supported by previous studies [31]. This implies that mass media, specifically television and radio, are vital methods for disseminating knowledge and raising awareness STIs [32].

This study evidenced that the odds of STIs-related care-seeking behavior among women who had ever been heard about AIDS or STIs were higher as compared to women who had not ever been heard about AIDS or STI. The study also revealed that women who ever tested for cervical cancer had over two times of STIs related care seeking behavior as compared to those who haven't. The possible explanation might be women who had ever heard about AIDS or STIs may have better awareness about STIs and its treatment [33]. It is also obvious that health care providers provided counselling about the risk, prevention and treatment of STIs for women who tested for cervical cancer [34].

This study also revealed that residency is associated with STIs related care-seeking behavior. Women who lived in rural areas had lower odds of STIs-related care-seeking behavior than urban resided women. This finding was similar to a study done in India [25] and east Africa. This might be due to women who live in rural areas have poor access to healthcare services and media exposure [35]. Women from less educated, less media exposed and poorer community had also lower care seeking behavior for STIs as compared to their counters. The finding implies that women from disadvantaged communities may face multiple barriers to accessing healthcare, such as lack of awareness, stigma, financial constraints, and limited access to healthcare facilities [36–38].

Strength and limitations of the study

This study was done based on weighted nationally representative sample size from 22 sub-Saharan African countries. This large sample size enables to generalize the findings for the source population. In order to provide credible standard error and estimate, multilevel analysis was employed to accommodate the hierarchical nature of the DHS data.

However, the responses about having STIs, early age sexual initiation and care seeking behavior was based on the respondents' reports, which could lead to social desirability and recall bias. Due to the cross-sectional method of the DHS study, we are unable to prove a cause-and-effect link between STI-related care-seeking behavior and independent variables. Aggregating DHS data from different countries collected in different years may affect comparability of each dataset due to changes in demography, health systems and other socio-economic change over time.

Implication to research and policy

The aim of this study was to assess the pooled prevalence of care seeking behavior for STIs and associated factors among reproductive-age women who had early age sexual intercourse (high risk group) in sub-Saharan Africa. The finding of this study could help to understand women's health-seeking practices and the underlying factors which can help policymakers to design appropriate policies and strategies. This study shows that uneducated women, women from rural areas, women from poor households and communities, women from male headed households, women who had problem of getting money for care, women who had no information about STI or AIDS and women who never tested for cervical cancer had lower STIs-related care-seeking behavior as compared to their counter parts. This could have implication of there is a need of an intervention for socio-economic disadvantaged women and communities for effective

STI control and prevention. This study also showed that testing for HIV/AIDS and having ANC visit increase the health seeking behavior of women towards STI. This association implies that policy makers should design strategies that strengthen counseling and awareness creation during HIV/AIDS and cervical cancer testing and ANC visits to increase care-seeking behavior toward STIs.

Conclusion and recommendations

This research revealed that care seeking behavior for STIs continues to be a significant public health challenge in Sub-Saharan Africa, with notable differences observed between countries. Factors such as age, education level, religion, household head's gender, wealth status, employment status of women, pregnancy, media exposure, problem of getting money for healthcare, ever heard of AIDS and STIs, and cervical cancer testing were identified as individual-level predictors of STIs-related care-seeking behavior. Additionally, community-level factors like place of residence, community education, media exposure, and poverty levels also played a significant role. Public health initiatives should focus on addressing the needs of uneducated women, economically disadvantaged households, and communities, and enhancing counseling and awareness efforts during cervical cancer screenings and antenatal care visits. This would help to improve their understanding of the importance of seeking STIs-related care. Moreover, policies and strategies aimed at improving healthcare accessibility and providing financial assistance to women from socioeconomically marginalized backgrounds would be highly beneficial.

Abbreviations

AIDS	Acquired Immune Deficiency Syndrome
ANC	Antenatal Care
AOR	Adjusted Odds Ratio
CI	Confidence Interval
DHS	Demographic Health Survey
HIV	Human Immune Virus
HH	Household
ICC	Intra-Cluster Coefficient
IR	Individual Record, LMIC: Low-and -Middle Income Countries
MOR	Median Odds Ratio
STI	Sexual Transmitted Infection
SSA	Sub-Saharan Africa
VIF	Variance Inflation Factor

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GT, MJ, KAD, NDB, TZY and JMK conceptualize the research, GT and JMK perform the analysis and GT, JMK, MJ and KAD prepare the manuscripts. All the authors read and revised the manuscript.

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Data availability

Data is available online and any one can access it at https://dhsprogram.com.

Declarations

Ethical consideration

Since we used secondary data and had no direct interaction with the study participants, ethical clearance was not required for this study. The DHS Study administered written informed consent to study participants. We submitted an online request to have permission to access the data. The data was obtained from the DHS program's measure at http://www.dhsprogram.com .The details of the ethical approval for the DHS program make it possible to approve the download of survey data.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

Author details

[1]Department of Health Systems and Policy, Institute of Public Health, College of Medicine and Health Sciences, University of Gondar, Po. Box 196, Gondar, Ethiopia
[2]Department of Health Informatics, Institute of Public Health, College of Medicine and Health Sciences, University of Gondar, Gondar, Ethiopia
[3]Department of Public Health, College of Health Sciences, Debark University, Debark, Ethiopia

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