### RESEARCH



# Determinants underlying teenager's accessibility to contraceptive methods and HIV preventive measures in Rwamagana district, Rwanda

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### Abstract

**Background** In Rwanda, despite significant political achievements in women's empowerment and efforts to eliminate child sexual abuse, the rate of teenage pregnancy remains high. Increased access to and use of contraceptive methods could reduce the rates of teenage pregnancy and HIV infection.

**Objectives** The study aimed to identify sociodemographic characteristics of secondary school teenagers, factors influencing their access to contraceptive methods and HIV preventive services, the components of the theory of planned behaviour that underlie teenagers' access to these services, and propose strategies for improvement.

**Methods** A cross-sectional design was used in this study. A multistage sampling strategy with a simple random technique was employed to select 374 female students as participants. Data were collected using a pretested questionnaire composed of closed-ended questions with Likert scale constructs based on the *Theory of Planned Behavior*. Descriptive statistics, bivariate analysis, and multivariable logistic regression were conducted.

**Results** A multiple logistic regression analysis shows that participants aged 18–20 are more than twice as likely to use contraceptive methods or HIV preventive measures compared to those aged 13–15 (OR=2.876, P=0.041, 95% CI=1.974–4.052). Urban participants are also more than twice as likely to use contraceptives or HIV preventive methods compared to those whose schools are in rural areas (OR=2.333, P=0.037, 95% CI=1.261–4.316). Female students in Senior 6 are more than three times as likely to use contraceptive methods or HIV preventive measures compared to those in Senior 1 (OR=3.444, P=0.032, 95% CI=2.544–6.884). Participants who intend to have sex at an older age had a 24.9% reduction in the odds of using a contraceptive method or HIV preventive measures (OR=0.751, P=0.033, 95% CI=0.352–0.977). Friends of respondents also influence contraceptive use (OR=0.611, P=0.043,

\*The summation in the tables from the responses does not give the same total because either of missing data on the questions asked or data eliminated during the analysis for their inconsistency.

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95% CI = 0.252–0.917). Participants with contraceptive knowledge are three times more likely to use contraceptives or HIV preventive methods compared to those with less contraceptive knowledge (OR = 3.096, P = 0.011, 95% CI = 1.150–6.803)

**Conclusion** Area of residence, age, friendships, and knowledge of contraceptive methods and HIV preventive measures are the determinants underlying early sexual activity among teenagers. One of the biggest challenges is the level of sex education, which remains a taboo topic in Rwandan culture. It is still difficult for parents to discuss sex directly with their children. We recommend further studies to focus on teenage non-scholars while conducting similar research.

**Keywords** Adolescent reproductive health, Contraceptive methods, HIV preventive measures, Teenage pregnancy, Sociodemographic factors, Sexual health education

### Introduction

Access to sexual and reproductive health (SRH) services is a critical component of global health systems. Inadequate access to SRH services can lead to significant adverse outcomes such as early and unintended pregnancies, maternal mortality, HIV, and sexually transmitted infections (STIs). Complications from untreated STIs can also result in pelvic inflammatory disease, certain types of cancer, and various pregnancy and fertility issues [1]. Globally, substantial yet uneven progress has been made in reducing adolescent childbearing and meeting adolescent contraceptive needs over the last 25 years [2]. Despite these advancements, considerable gaps remain, particularly in low-resource settings like Rwanda, where the provision of adolescent-friendly sexual and reproductive health (AFSRH) services faces numerous challenges.

In Rwanda, and similar settings, teenage pregnancy presents a significant health concern due to its association with higher morbidity and mortality rates for both mothers and their children. According to the Rwanda Demographic and Health Survey (2019–2020), 5% of women aged 15–19 have started childbearing: 4% have given birth, and 1% are pregnant with their first child [3]. Although this represents a decrease from 7% in 2014/2015, the absolute numbers are alarming. In 2017, 17,337 underage girls became pregnant, escalating to 19,832 in 2018, with 23,544 children born to teen mothers in 2019 [4]. These figures underscore the persistent prevalence of teen pregnancies and their severe social consequences, including increased likelihood of school dropout among teenage mothers [3].

The issue extends to HIV prevalence as well, with girls aged 15-19 in Rwanda exhibiting a higher HIV prevalence rate (0.9%) compared to their male counterparts (0.3%).<sup>3</sup> Adolescents generally acknowledge the existence of commercial sex and perceive that the poor or those lacking sex education are more likely to engage in it [5]. Economic hardships following unwanted pregnancies often force teen mothers into precarious situations, such as accepting risky sexual offers to meet

survival needs, thereby increasing their susceptibility to HIV [6]. These conditions expose them to multiple complications, including infection, school dropout, continued poverty, and potential engagement in sex work, particularly in low-resource settings [7, 8].

Access to AFSRH services is influenced by a variety of factors, including healthcare-related issues, costs, shortages of skilled healthcare workers, long waiting times, lack of privacy at clinics, insufficient comprehensive sexuality education, misconceptions about contraceptives, and non-friendly services [9]. These barriers significantly impede adolescents' access to contraceptive methods and HIV preventive measures in Rwanda.

Rwamagana District provides a stark illustration of these challenges. The district, with a population of 484,953, is predominantly composed of young people, with approximately 56.05% of residents under the age of 25 and 22.21% aged 10-19 [10]. Between July 2021 and June 2022, the district recorded 305 teenage pregnancies, 150 of which occurred during the COVID-19 pandemic [11]. This highlights the urgent need to address the determinants that affect teenagers' access to contraceptive and HIV preventive services.

The World Health Organization (WHO) emphasizes the right to the highest attainable standard of health, alongside the rights to education and information in its guidance on the provision of contraceptive information and services [12]. These rights, upheld by international, regional, and national human rights bodies, advocate for accessible contraceptive costs, proximity to services, modern contraceptive prevalence, uptake by new users, and adolescent contraceptive use.

Although barriers persist, the involvement of all stakeholders—including parents, health professionals, policy makers, and educators—is essential to overcoming these challenges and narrowing the gap in sexual health and safety. Given the ongoing prevalence of teenage pregnancy and HIV exposure, it is crucial to explore the determinants underlying teenagers' accessibility to contraceptive and HIV preventive services in Rwamagana.

### **Definition of concepts**

The World Health Organization defines adolescence as the phase of life between childhood and adulthood, encompassing ages 10-19 [13]. This is a unique stage of human development and a crucial period for establishing the foundations of good health. Adolescents undergo rapid physical, cognitive, and psychosocial growth, which influences how they feel, think, make decisions, and interact with the world around them.

The United Nations defines "youth" as individuals between the ages of 15 and 24 [14]. In Rwanda, the legal age is 16, but the legal age for marriage is 21. This study adopts the term "teenage" to refer to the age group of 10-19-year-olds.

### **Specific method aims**

This study, conducted in the Rwamagana District, aimed to achieve several objectives. The study aimed to identify sociodemographic characteristics of secondary school teenagers, factors influencing their access to contraceptive methods and HIV preventive services, the components of the theory of planned behaviour that underlie teenagers' access to these services, and propose strategies for improvement.

### Framework

The theoretical framework of this research is based on Ajzen's TPB (1988) [15]. This theory has been proven effective in evaluating the factors contributing to the explanation or prediction of health behaviors across various populations, particularly for behaviors that are under partial volitional control, as is the case in this study [16]. The TPB provides clear benchmarks for understanding its constructs, and its dimensions are easily operationalized [17]. Moreover, understanding the links between the factors associated with the use or non-use of contraceptives and HIV preventive measures, as well as the beliefs of individuals regarding their use, is essential for the future establishment of an intervention program aimed at preventing unwanted pregnancies and HIV infection (see Fig. 1). The purpose of this study is dependent on this understanding.

### **Research methodology**

This cross-sectional descriptive study with a quantitative approach was conducted in the Rwamagana District. The targeted population consisted of secondary school girls from Senior 1 to Senior 6 in public schools. A sample size of 388 was selected from a total of 12,682 female students from 62 secondary schools using Slovin's Formula, where  $n = N / (1 + Ne^2)$ , with a confidence level of 95% and a margin of error of 5%. After data collection and analysis, the final sample size was 374, representing 96.3% of the target population, which provides very good representativeness.

Purposefully, we decided to sample six schools in urban sectors and three schools in rural areas. The lists provided by the heads of schools were used as the sampling frame, and a multistage sampling strategy was employed. A simple random technique, with probability proportionate to the number of female students in each school, was used to generate the sample size for each school. Figure 2 shows the multistage sampling method used.



Fig. 1 Theory of planed behavior (Ajzen, 2019). (Reproduced with authorization from the author Ajzen Icek in April 2022)



Fig. 2 Multistage sampling strategy used. Legend: So = Sovu, Rwa = Rwamagana, Bi = Bicumbi, Mw = Mwurire, Mu = Muyumbu, Bu = Bujyujyu, Sh = Shyogoshyo, Bw = Bwana, Ny = Nyamatete

### **Multistage sampling**

### Measurements

The study's questionnaire included closed-ended questions related to the measurement of TPB variables as well as the sociodemographic characteristics of the participants. The questions measuring the TPB variables were scaled according to the Likert scale as described in Gagné et al. [18]

### Intentions

Intentions to engage in risk-reduction behaviors were evaluated using a 5-point scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Condom use intentions were measured with two items (correlation coefficient r=0.74, p<0.01): (1) "In the next few months, I will not have sex unless I use a condom," and (2) "In the next few months, I'll make sure I have condoms anytime I think I might have sex." Intentions to postpone sexual activity were measured with two items (r=0.80, p<0.01): (1) "In the next few months, I will not have sex in the next few months because I want to wait until I am older."

### Perceived behavioral control

Perceived behavioral control was assessed using a 10-point scale ranging from 1 (Very Sure I Cannot) to 10 (Very Sure I Can). The condom use subscale comprised four items, such as "How sure are you that you can use a condom every time you have sex?" Similarly, the delay subscale also included four items, such as "How sure are

you that you can wait until you are older to have sexual intercourse?"

### Perceived norms

Participants rated perceived norms on a 5-point scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The subscale for condom use contained six items (r = 0.74, p < 0.01), while the subscale for delaying sexual activity also contained six items. The perceived norms scales addressed both descriptive norms (e.g., "My friends in TPB always use condoms during sexual intercourse") and subjective norms (e.g., "My boyfriend or girlfriend thinks it is okay or even good to wait until you're older to have sexual intercourse").

### Attitude

Participants answered questions concerning their behavioral beliefs and outcome expectations, which are foundational to attitude formation (Ajzen, 1985). These questions were rated on a 5-point scale from 1 (Strongly Disagree) to 5 (Strongly Agree). The condom use subscale consisted of six items (r=83, p < 0.01), such as "If I use condoms every time I have sex, I won't enjoy having sex," and the delay subscale included five items (e.g., "I'll be doing what's best for me if I don't have sex until I'm older").

The gathered data included information on sociodemographic characteristics and components of the TPB, such as attitudes toward contraceptive use, subjective norms that may influence this behavior, and perceived behavioral control. Additionally, the data addressed the accessibility of contraceptive methods and HIV preventive measures.

### Validity and reliability

The tool used in this research was developed by Icek Ajzen. Authorization for its use was provided by Ajzen himself. The questionnaire was then adapted to the Rwandan context, and a pilot study was conducted with 20 female students. The reliability of the tool was assessed using Cronbach's alpha, which resulted in a coefficient of 0.829, indicating a statistically good correlation between the items. These 20 female students were excluded from the study.

### **Ethics consideration**

The proposal for this study was submitted to and approved by the institutional review board of the University of Rwanda (No326/CMHS IRB/2022), which provided ethical clearance. The questionnaire was anonymous and irreversibly de-identified, using only numerical codes to differentiate participants from

Table 1	Sociodemographic	information of	participants

Variables	n	%
Age group (years)		
13–15	141	37.7
16–17	128	34.2
18–20	105	28.1
Marital status		
Single	213	57.0
Single, not in relationship	57	15.2
Single, in relationship	96	25.7
Separated, divorced, or widowed	8	8.2
Religion		
Catholic	132	35.3
Protestant	228	61.0
Muslim	14	3.7
Location of the school		
Rural	257	68.7
Urban	117	31.3
Social Welfare category		
Category A	43	11.5
Category B	136	36.4
Category C	167	44.7
Category D	25	6.7
Category E	3	0.8
Live at boarding school		
Yes	336	89.8
No	38	10.2
Level of study		
A level	138	36.9
O level	236	63.1

<sup>1</sup>Social Welfare or *Ubudehe* in Kinyarwanda refers to the long-standing Rwandan practice and culture of collective action and mutual support to solve problems within a community. The focus of traditional *Ubudehe* is mostly on cultivation

different schools. The management, accessibility of the raw data, and their intended purpose were explained and guaranteed to the participants. An informed assent form, providing information about the research, was signed by the heads of schools for all female students, both those living in boarding facilities and those staying at home. Additionally, a consent form was signed by the respondents.

### Data collection and management

Data collection for the study was carried out using a self-administered questionnaire distributed directly by the researchers. Beforehand, the purpose of the study, guidelines for completing the questionnaire, ethical considerations, and the specific questions were thoroughly explained to the participants. Each questionnaire was completed immediately after distribution and returned to the researchers. All data were collected within the same week across all schools.

### Analysis

Data analysis was performed using Statistical Package for the Social Sciences software version 24. Descriptive statistics were carried out for each variable. Bivariate analysis was conducted to assess the association between the independent variables (sociodemographic characteristics, components of the TPB, and individual characteristics toward sexual and reproductive health) and the dependent variables (contraceptive methods and HIV preventive measures). The significance level was set at 0.05. Independent variables that showed a significant association were included in a multiple logistic regression to study their effect on the dependent variable. Odds ratios, which quantify the strength of the association between independent and dependent variables, were computed, and confidence intervals (CI) were estimated to indicate the probability that a population parameter will fall between a set of values for a certain proportion of times.

### Findings

### Sociodemographic information of participants

Table 1 presents the sociodemographic information of the participants. The study results showed that a large proportion, 141 (37.7%), were between 13 and 15 years old. Regarding marital status, 215 (57.5%) were single. A significant proportion, 228 (61.0%), identified as Protestant, and the majority, 257 (68.7%), lived in rural areas. In the participants population there were not married or in relationship no single (See Table 2).

The mother's occupation was assessed, revealing that a large proportion, 279 (74.6%), were cultivators/farmers. The study also assessed the fathers' occupations, showing

Variables	Strongly disagree n(%)	Disagree n (%)	Neutral n (%)	Agree <i>n</i> (%)	Strongly agree <i>n</i> (%)
If I tell my boyfriend that I'm going to use condoms every time I have sex, they'll agree this is best for me	60(16)	28(7.5)	73(19.5)	67(17.9)	146(39.0)
If I tell my friends in THP that I'm going to use condoms every time I have sex, they'll agree this is best for me	58(15.5)	48(12.8)	53(14.2)	91(24.3)	124(33.2)
My boyfriend believes you should always use condoms during sex	29(7.8)	30(8.0)	51(13.6)	91(24.3)	124(33.2)
My friends in THP believe you should always use condoms during sex	36(9.6)	32(8.6)	36(9.6)	117(31.3)	153(40.9)
My boyfriend always uses condoms during sexual intercourse	33(8.8)	44(11.8)	86(23.0)	107(28.6)	104(27.8)
My friends in THP use condoms during sexual intercourse	35(9.4)	40(10.7)	79(21.1)	125(33.4)	95(25.4)

 Table 2
 Perceived norms toward the use of the contraceptive methods during possible sexual relations

that 236 (63.1%) were cultivators/farmers. For fathers or father figures, 173 (46.3%) had attended primary school.

The standard of living, which is a common measure in Rwanda, indicated that a large proportion, 167 (44.7%), fell into welfare category C. Additionally, the majority of participants, 336 (89.8%), attended boarding schools. The Rwandan secondary school system is divided into two cycles: lower secondary (O level), consisting of Senior 1 to Senior 3, and upper secondary (A level), consisting of Senior 4 to Senior 6. Among participants, a larger proportion, 236 (63.1%), reported being in the O level than the A level.

### Components of TPB Perceived norms

Perceived norms were assessed in this study, and the results showed that a significant number of respondents, 146 (39.0%), strongly agreed that if they told their boyfriends they were going to use condoms every time they have sex, their boyfriends would agree that this is best for them. Similarly, 124 respondents (33.2%) strongly agreed that if they told their friends they were going to use condoms every time they have sex, their friends they were going to use condoms every time they have sex, their friends would also agree that this is best for them.

A large number of participants, 145 (38.8%), strongly agreed that their boyfriends should always use a condom during sex, and 153 (40.9%) strongly agreed that their friends believe they should always use condoms during sex. Among the participants, 107 (28.6%) agreed that their boyfriends always use condoms during sexual intercourse, and 125 (33.4%) agreed that their friends always use condoms during sexual intercourse (See Table 3).

The majority, 201 (53.7%), strongly agreed that if they told their boyfriend or girlfriend that they were going to wait to have sex, their partners would agree that this decision is best for them. Additionally, 193 (51.6%) strongly agreed that if they told their boyfriends they were going to have sex, their partners would agree it is best for them. A large number of participants, 198 (52.9%), strongly agreed that their boyfriends think it is okay or even good to wait until they are older to have sexual intercourse. Similarly, 203 participants (54.3%) strongly agreed that their friends think it is okay or even good to wait until they are older to have sexual intercourse. Among respondents, 126 (33.7%) strongly agreed that their boyfriends are waiting to have sexual intercourse. Additionally, 152 (40.6%) strongly agreed that their friends are waiting to have sexual intercourse.

### Attitude

This study assessed attitudes toward condom use, revealing that 107 participants (28.6%), strongly disagreed with the statement that using a condom every time they have sex would reduce their enjoyment. Conversely, the majority, 236 (63.1%), strongly agreed that using condoms every time they have sex would protect them from unwanted pregnancy, HIV, and AIDS. Among the participants, 190 (50.8%) strongly agreed that informing their friends about their intention to use condoms every time they have sex is the right thing to do. Additionally, 213 participants (57.0%) strongly agreed that using condoms every time they have sex is in their best interest (See Table 4).

Furthermore, 201 (53.75%) strongly agreed that telling their boyfriends about their intention to use condoms every time they have sex is the right thing to do, and 106

 Table 3
 Delay to have sex

Variables	Strongly agree n (%)	Disagree n (%)	Neutral n (%)	Agree <i>n</i> (%)	Strongly agree n (%)
If I tell my boyfriend or girlfriend that I'm going to wait to have sex, they will agree this is best for me	23(6.1)	25(6.7)	19(5.1)	106(28.3)	201(53.7)
If I tell my friends in THP that I'm going to wait to have sex, they will agree this is the best for me	16(4.3)	34(9.1)	25(6.7)	106(28.3)	193(51.6)
My boyfriend or girlfriend thinks it is okay or even good to wait until you're older to have sexual intercourse	17(4.5)	26(7.0)	17(4.5)	116(31.0)	198(52.9)
My friends in THP think is okay or even good to wait until you're older to have sexual intercourse	17(4.5)	23(6.1)	22(5.9)	109(29.1)	203(54.3)
My boyfriend or girlfriend is waiting to have sexual intercourse	26(7.0)	49(13.1)	46(12.3)	127(34.0)	126(33.7)
My friends in THP are waiting to have sexual intercourse	28(7.5)	24(6.4)	43(11.5)	127(34.0)	152(40.6)

(28.3%) strongly agreed that doing so would strengthen their relationship.

A significant proportion, 275 (73.5%), strongly agreed that waiting until they are older to have sex would keep them safe from HIV and AIDS, and 246 (65.8%) strongly agreed that telling their friends they are going to wait until they are older to have sex is the right decision. Among the participants, the majority, 256 (68.4%), strongly agreed that abstaining from sex until they are older is in their best interest. A large proportion, 234 (62.6%), strongly agreed that informing their boyfriend about their decision to wait to have sex is the right thing to do, and 165 (44.1%) strongly agreed that such a decision would strengthen their relationship.

### Individual characteristics regarding students' sexual and reproductive history

The majority of respondents, 328 (87.7%), have never had sexual relations in their lifetime. Among the 46 (12.3%) who have had sex, many (17, 37.0%) reported that the age when they first had sex was between 18 and 20 years old. Additionally, 14 (48.3%) of those who have had sex rarely use condoms. A significant proportion of respondents, 311 (83.2%), did not know what contraception was. Among the respondents, 190 (50.8%) have never used a contraceptive or HIV preventive method. Mass media was cited as their source of information on contraception/HIV preventive measure more than any others (90, 24.0%). A majority of participants, 210 (56.1%), said abstinence could be used for contraception (See Table 5).

Age group and location of the school were statistically associated with the use a contraceptive or an HIV Preventive method (p-value < 0.05) (See Table 6).

Results of cross tabulation of attitude toward contraceptive methods and use of contraception or an HIV preventive method showed that the statements "I'll be doing what is best for me if I use condoms every time I have sex" and "If I tell my friends that I'm going to wait until I'm older to have sex, I know I'll be doing the right thing" were statically associated with the outcome (p-value < 0.05) (See Table 7).

Knowing about contraception was statistically associated with the use of contraception or an HIV preventive method (p-value < 0.05) (See Table 8).

Independent variables that showed significant associations with the dependent variable were included in multiple logistic regression analyses to identify their independent effects on the use of contraceptives or HIV preventive methods. The results indicated that participants aged 18-20 were more than twice as likely to use contraception or HIV preventive methods compared to those aged 13-15 (OR=2.276, p-value=0.031, 95% CI=1.674-5.052). Participants who reported that their schools were located in urban areas were also more than twice as likely to use contraception or HIV preventive methods compared to those whose schools were in rural areas (OR = 2.733, p-value = 0.047, 95% CI = 1.061-4.316) (See Table 9).

Additionally, respondents who strongly agreed that using condoms every time they have sex is the best choice for them were more than twice as likely to use contraceptive or HIV preventive methods compared to those who strongly disagreed (OR = 2.611, p-value = 0.023, 95% CI = 1.472-6.777). Conversely, participants who strongly agreed that telling their

### Table 4 Attitude toward the use of the contraceptive methods during possible sexual relations

Variables	Strongly disagree n(%)	Disagree n(%)	Neutral n(%)	Agree n(%)	Strongly agree n(%)
Condom use					
If I use condoms every time I have sex, I won't like having sex	107(28.6)	53(14.2)	103(27.5)	66(17.6)	45(12.0)
I'll be safe from unwanted pregnancy, HIV, and AIDS if I use condoms every time I have sex	14(3.7)	13(3.5)	21(5.6)	90(24.1)	236(63.1)
I know I'll be doing the right thing if I tell my friends that I'm going to use condoms every time I have sex	23(6.1)	25(6.1)	23(6.1)	113(30.2)	190(50.8)
I'll be doing what is best for me if I use condoms every time I have sex	16(4.3)	30(8.0)	29(7.8)	86(23.0)	213(57.0)
I am doing the right thing if I tell my boyfriend or girlfriend that I'm going to use condoms every time I have sex	20(5.3)	21(5.6)	30(8.0)	118(31.6)	185(49.5)
If I tell my boyfriend or girlfriend that I'm going to use condoms every time I have sex, I know it will strengthen my relationship with them	23(6.1)	25(6.7)	19(5.1)	106(28.3)	201(53.7)
Delay having sex until older					
I'll be safe from HIV and AIDS if I wait until I'm older to have sex	9(2.4)	11(2.9)	14(3.7)	65(17.4)	275(73.5)
If I tell my friends that I'm going to wait until I'm older to have sex, I know I'll be doing the right thing	2(0.5)	6(1.6)	18(4.8)	102 (27.3)	246(65.8)
I'll be doing what is best for me if I don't have sex until I'm older	11(2.9)	10(2.7)	20(5.3)	77(20.6)	256(68.4)
I'll know I am doing the right thing if I tell my boyfriend or girlfriend that I'm going to wait to have sex	12(3.2)	11(2.9)	25(6.7)	92(24.6)	234(62.6)
If I tell my boyfriend or girlfriend that I'm going to wait to have sex, I know it will strengthen my relationship with them	20(5.3)	32(8.6)	33(8.8)	124(33.2)	165(44.1)

Table 5	Sexual and	reproductive	history	of students
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Variables	n	%
Have had sex		
Yes	46	12.3
No	328	87.7
Age at first intercourse		
10–14	14	30.4
15–17	15	32.6
18–20	17	37.0
Frequency of condom use during	g these sexual intercour	se
Rarely	8	17.4
Frequently	12	26.1
Never	20	43.5
Sometimes	6	13.0
Sexually active currently		
Yes	181	48.4
No	193	51.6
Knowledge of contraception		
Yes	311	83.2
No	63	16.8
Have used a contraceptive meth	od or an HIV preventive	measure
Yes	184	49.2
No	190	50.8
Source of information about con	traceptive method/HIV	
preventive measures		
Friends	67	17.9
Parents	87	23.2
Mass media	90	24.0
Healthcare facilities	35	9.3
Youth center	66	17.6
Web pages	29	7.7

**Table 6** Cross tabulation of sociodemographic information anduse of contraceptives or HIV preventive methods

Variables			P-value
Use of contraceptive meth	od or HIV preve	entive measure	
	Yes	No	0.033
	n(%)	n(%)	
13–15	69(48.9)	72(51.1)	
16–17	69(53.9)	59(46.1)	
18–20	50(47.6)	55(52.4)	
Marital status			
Single	100(51.2)	105(48.8)	0.824
Single, not in relationship	29(50.9)	28(49.1)	
Single, in relationship	48(47.5)	53(52.5)	
Religion			
Catholic	69(52.3)	63(47.4)	0.242
Protestant	115(50.4)	113(49.6)	
Muslim	4(28.6)	10(71.4)	
Location of the school			
Rural	125(48.6)	132(51.4)	0.024
Urban	54(46.2)	63(53.8)	
Welfare category			
Category A	20(46.5)	23(53.5)	0.277
Category B	74(54.4)	62(45.6)	
Category C	81(48.5)	86(51.5)	
Category D	10(40.0)	15(60.0)	
Category E	3(100)	0(0)	
Live at boarding school			
Yes	170(50.6)	166(49.4)	0.418
No	18(47.4)	20(52.8)	
Level of study			
A Level	69(50)	69(50.0)	0.937
O Level	119(50.4)	117(49.6)	

Table 7 Cross tabulation of attitude toward contraceptive methods and use of contraceptives or HIV preventive methods

Use of contraception will make sex unpleasable         Ver N(%)         No         0.567           Strongly diagnee         48(4/4)         59(15.1)         1           Deagree         31(84.5)         21(41.5)         1           Neutral         50(48.5)         51(51.5)         1           Neutral         50(48.5)         51(51.5)         1           Strongly diagnee         24(53.5)         21(46.7)         2           Use of contraception will increase safety from unwanted pregnancy. (MV and ADDS         1         2           Deagree         960.31         41(60.7)         7(33.3)         2           Neutral         14(60.7)         7(33.3)         4         4           Strongly disagree         967.11         6(2.9)         0.762           Disagree         7(53.8)         6(40.2)         4           Strongly disagree         9(57.11         6(2.9)         4           Disagree         110(46.0)         10(53.4)         4           Strongly disagree         9(57.11         6(2.9)         4           Strongly disagree         9(57.11         6(2.9)         4           Disagree         9(57.11         6(10.00)         1           Strongly disagree	Variables			P-value
Ne of contraception will make sex unplessableYesNo0.5370%9 <t< td=""><td>Use of contraception or HIV preventive measures</td><td></td><td></td><td></td></t<>	Use of contraception or HIV preventive measures			
InstructInf%M(%)Dicagree3158.322(41.3)Dicagree3158.323(41.3)Neutral3048.33451.5Strongly agree243.33451.5Strongly agree243.33557.70.264.5Dicagree906.35557.70.264.5Dicagree906.35557.70.264.5Dicagree906.35557.70.264.5Dicagree906.3733.31.064.7Strongly agree14667.7733.31.064.7Dicagree11147.0250.301.064.7Strongly agree11047.0250.301.064.7Dicagree11047.0250.301.064.7Dicagree150.111.064.301.064.30Neutral160.14628.61.064.30Neutral150.14628.61.064.30Neutral150.14628.61.064.30Neutral160.141.064.301.064.30Neutral160.631.064.301.064.30Dicagree100.011.064.301.064.30Neutral1448.334.064.201.064.30Dicagree100.70.71.063.301.064.30Dicagree100.70.71.063.301.064.30Dicagree100.70.71.063.301.064.30Dicagree100.70.71.063.301.064.30Dicagree100.70.71.063.301.064.30Dicagree100.70.71.063.301.064.30Dicagree100.70.7	Use of contraception will make sex unpleasable	Yes	Νο	0.567
Shongho dangee4844390(85.1)Desagee31858345.3Neutral30483345.3Aqueo30483345.3Shongh dangee446.33345.3Contraception will nerase safety from unwanted pergana VIV. art US100.0Used contraception will nerase safety from unwanted pergana VIV. art US300.0Stongh dangee969.240.03.0Neutral969.240.03.0Neutral1065.720.33.0Stongh dangee405.2404.7Stongh dangee107.020.03.0Stongh dangee100.0100.0Stongh dangee		n(%)	n(%)	
Disgree3183522414.5122414.51Neutral5048.553451.51Strongly agne2443.53146.71Evel contraception will increase safely from unwanted pregnanou/, IVI, and MAD2.36Disgree969.21430.313.35.71Strongly disgree969.21430.33Neutral1466.71733.31.11Strongly agne11147.022.1265.301.11Strongly agne11147.022.1265.301.12Strongly agne11147.024.1265.301.12Strongly agne11147.024.1265.301.12Strongly agne11147.024.1265.301.12Strongly agne11147.024.121.12Paramation to Elling friends of contraceptive use1.121.12Strongly agne1.1147.024.121.12Paramation to Contraceptive use being what is best for sell1.121.12Strongly agne1.121.121.12Strongly agne <td>Strongly disagree</td> <td>48(44.6)</td> <td>59((55.1)</td> <td></td>	Strongly disagree	48(44.6)	59((55.1)	
NutulaNutulaNutulaNutulaAgree32485)34515Stongly agree2453521467)Ue contraception will increase safety from unwanted pergen94.3335.72.02Diago for all gene96.935.72.02Neutral96.940.0240.0210.02Neutral1040.733.310.0210.02Stongly agree41.0241.47.8150.0250.02Stongly agree41.0241.0250.0250.02Diago contraceptive use86.7161.0267.62Diago contraceptive use10.04.0640.0210.02Diago contraceptive use being what is best for self20.0210.0210.02Stongly agree10.02.0210.02.0210.0210.02Darge contraceptive use being what is best for self20.0210.0210.02Darge contraceptive use being what is best for self10.02.0210.0210.02Darge contraceptive use being what is best for self10.02.0210.02.0210.02Darge contraceptive use being what is best for self10.02.0210.02.0210.02.02Darge	Disagree	31(58.5)	22(41.5)	
Agree34(31)34(31)34(31)Strongly agree34(453)34(457)34(35)Deagree9692)46020333Neutral46667)7333.1Agree47522)44(478)7333Strongly agree1114707333.1Strongly agree1114702153.01Disagree657.1646.01Oringly disagree657.1646.01Neutral167.1628.61Neutral1016.01003.01Neutral1016.01003.01Neutral1016.01003.01Neutral1016.01003.01Strongly agree1016.01003.01Strongly agree1016.01240.01Disagree1016.01240.01Strongly disagree1016.01240.01Strongly disagree1016.01102.01Strongly disagree1016.01240.01Strongly disagree1016.01010.01Strongly disagree1016.01010.01Strongly disagree1016.01010.01Strongly disagree1010.01010.01Strongly disagree1010.01010.01Strongly disagree1010.01010.01Strongly disagree1010.01010.01Strongly disagree1010.01010.01Strongly disagree1010.01010.0 <td>Neutral</td> <td>50(48.5)</td> <td>53(51.5</td> <td></td>	Neutral	50(48.5)	53(51.5	
Sirong/ signer24/363721/46.7Use contraception will nercess safe from unwanted pregrot8/64.36/5.70.24Disagre9/69.3430.81Neutral4/66.2743147.81Agree4/65.2743147.81Strongly diagref11/10.01215.311Diplion celling friends of contraceptive use157.11612.90.75.2Disagree157.14628.611Neutral157.14628.611Neutral157.14628.611Neutral1104.6246.3011Neutral1104.6246.3011Neutral1104.6246.3011Neutral1104.6246.3011Neutral1104.61240.011Neutral1104.71115.111Neutral146.01115.111Neutral146.01115.111Neutral146.01115.111Neutral146.7146.31446.11Neutral146.7146.31446.11Neutral146.7146.711Neutral146.7146.711Neutral146.7146.711Neutral146.7146.711Neutral146.7146.711Neutral146.7146.711	Agree	32(48.5)	34(51.5)	
NetworkNetworkStrongly disagree9(64.3)50.570.244Disagree9(69.2)43.08,910.14Neutral14(60.7)73.33,31.14Agree11147.01250.301.14Strongly agree11147.01250.301.14Strongly agree11147.0642.90.752Disagree753.8646.211.14Strongly diagree10104.63645.301.14Neutral10104.63645.301.14Agree45100.002510.001.14Strongly diagree10104.63645.301.14Personal judiagree956.21743.810.047Disagree10104.6311105.111.11Strongly disagree1115.51446.51.211.11Disagree10204.991.1152.111.11Strongly disagree10204.911.1152.111.11Disagree10204.911.1152.111.11Strongly disagree1.1155.019.163.311.12Disagree96.021.1152.111.11Strongly disagree9.163.011.1162.111.11Neutral1.4164.071.653.311.12Neutral1.4164.071.653.311.12Neutral1.4164.071.653.311.12Neutral1.4164.071.653.311.12Neutral1.4164.071.653.311.12Neutral1.4164.071.653.311.12Neutral1.615.0	Strongly agree	24(53.5)	21(46.7)	
Strongly disagree         9(04.3)         535.7)         0.204           Disagree         9(09.2)         430.8)         4           Disagree         9(09.2)         430.8)         4           Strongly agree         1110/4.0         123.3.3)         4           Agree         4752.27         43(47.8)         5           Strongly disagree         857.1)         642.9         0.752           Disagree         857.1)         642.9         0.752           Disagree         15(71.4)         628.6)         1           Neutral         15(71.4)         628.63         1           Strongly disagree         110(#6.0)         1265.3.0         1           Strongly disagree         110(#6.0)         1265.3.0         1           Strongly disagree         110(#6.0)         1265.3.0         1           Disagree         110(#6.0)         1240.00         1           Neutral         1444.8.3         4451.2         1           Disagree         102(#7.9)         11102.11         1           Strongly disagree         102(#7.9)         11052.1         1           Disagree         9(45.0)         9(450.0)         9.936           Dis	Use of contraception will increase safety from unwanted pre	gnancy, HIV, and AIDS		
Disagre         9(92)         4(30.8)           Neutral         14(60.7)         73.33           Agree         43(47.8)         50.000           Strongly agree         11147.0         12553.0)           Opinion telling friends of contraceptive use         642.9)         0.762           Strongly diagree         8(57.1)         6(42.9)         0.762           Diagree         7(53.8)         6(42.7)         0.762           Strongly diagree         100(0.0)         20.000         20.000           Strongly diagree         8(51.00.0)         45(100.0)         20.000           Strongly diagree         9(65.2)         743.8)         0.047           Disagree         100(47.9)         11152.1)         10.000           Vestral         14(48.3)         11152.1)         10.000           Strongly disagree         100(27.9)         11152.1)         10.000           Strongly disagree         100000         11152.1)         10.000           Disagree         100000         1257.1)         10.000           Strongly disagree         1002.000         1257.1)         10.000           Disagree         100000         1257.1)         10.000           Strongly disagree	Strongly disagree	9(64.3)	5(35.7)	0.264
Netral1466/7733.3Agree4752.243478.Stongly agree111/0.0125(30.0Disagree636.1.1646.2.90.762.0Disagree753.0.0646.2.90.762.0Disagree753.0.0646.2.90.762.0Stongly agree1264.6.012615.3.00.762.0Stongly agree1266.6.012615.3.00.762.0Stongly agree765.2.0743.0.00.762.0Disagree766.2.0743.0.00.762.0Disagree766.2.0743.0.00.762.0Disagree766.2.0743.0.00.762.0Disagree766.2.0743.0.00.762.0Disagree766.2.0743.0.00.762.0Disagree766.2.0743.0.00.762.0Neutral10247.9.011162.111162.1Stongly disagree766.2.0763.0.09.762.0Disagree765.0.0764.0.0763.0.0Disagree765.0.0764.0.0763.0.0Disagree765.0.0764.0.0764.0.0Stongly disagree960.3.0764.0.0764.0.0Disagree764.0.0764.0.0764.0.0Disagree764.0.0764.0.0764.0.0Disagree764.0.0764.0.0764.0.0Disagree764.0.0764.0.0764.0.0Disagree764.0.0764.0.0764.0.0Disagree764.0.0764.0.0764.0.0Disagree764.0.0764.0.0<	Disagree	9(69.2)	4(30.8)	
Agree4/(52.2)4/(47.8)Strongly agree11/17.01125.0.0Option entiling friends of contraceptive use8/57.116/42.910.762.1Disagree105.380/46.20.762.1Disagree105.380/46.2120.0Agree45(100.0)45(100.0)120.0Strongly agree106.60120.00120.0Personal judgment of contraceptive use being what is best or sell124.000.762.1Disagree9/66.27/(48.8)0.407.1Disagree1466.0011152.1120.0Personal judgment of contraceptive use being what is best or sell or 100.0011152.1120.0Strongly agree102(47.9)11152.1120.0Parsonal judgment of contraception being the right Hild1446.7161.3120.0Strongly agree1050.001050.000.936135.000.936Disagree0.000.808/69.2011152.1120.0120.0Strongly disagree0.000.808/69.20120.0120.0Disagree0.000.808/69.20120.0120.0120.0Strongly disagree3/(50.7)9/(43.0)0.182.0120.0Disagree3/(50.7)2/(50.3)120.0120.0Disagree3/(50.7)2/(50.3)120.0120.0Disagree3/(50.7)2/(50.3)120.0120.0Disagree3/(50.7)2/(50.3)120.0120.0Disagree3/(50.7)2/(50.3)120.0120.0	Neutral	14(66.7)	7(33,3)	
Stongly agree11147.0125(S3.0)Disagree11147.0125(S3.0)0.762Disagree7(S3.8)6(46.2)1Neutral15(71.4)6(26.8)1Agree45(100.0)45(100.0)1Strongly agree110(46.6)126(S3.4)1Personal Judgment of contraceptive use being what is best for set77Strongly dagree100(45.0)124(00.0)1Personal Judgment of contraceptive use being what is best for set77Strongly dagree102(47.9)111(52.1)1Strongly dagree102(47.9)111(52.1)1Strongly dagree102(47.9)12(57.1)9Strongly dagree102(47.9)12(57.1)0.936Disagree40(48.8)111(52.1)1Strongly dagree1050.09 (45.0)0.936Disagree40(48.8)111(52.1)1Strongly dagree102(47.9)12(57.1)1Strongly dagree40(48.7)16(53.3)1Disagree60(50.8)58(49.2)1Strongly disagree34(56.7)29(43.3)0.182Disagree34(55.7)25(40.3)1Strongly disagree34(55.7)25(40.3)1Disagree34(55.7)25(40.3)1Disagree34(55.7)3(57.3)1Disagree35(55.5)40(51.5)1Disagree6(54.5)40(51.5)1Disagree35(55.5)40(	Agree	47(52.2)	43(47.8)	
DefinitionInstanceInstanceStrongly disagree8(5.7.1)6(42.9)0.762Disagree8(5.7.1)6(42.9)0.762Disagree15(71.4)6(28.6)1Agree45(100.0)12(60.0)1Strongly agree10(46.6)1.26(53.4)0.747Disagree9(56.2)7(43.8)0.747Disagree8(60.0)12(40.0)1Neutral14(48.2)44(51.2)1Agree42(48.8)111(52.1)1Strongly agree102(47.9)111(52.1)1Telling boyfriend/git/friend to use contraception being the right thi/11Strongly agree11(55.0)9 (45.0)0.96Disagree9(50.8)91(49.2)1Strongly agree9(50.8)91(49.2)1Neutral14(46.7)1653.3)1Neutral14(46.7)1653.3)1Strongly disagree9(50.8)91(49.2)1Strongly disagree31(50.8)91(49.2)1Strongly disagree31(50.2)25(40.3)1Strongly disagree31(51.4)35(48.6)1Disagree35(45.5)42(45.3)1Neutral37(59.7)25(40.3)1Neutral37(59.7)25(40.3)1Neutral37(59.7)25(40.3)1Neutral37(59.7)35(45.5)1Disagree36(45.5)3(55.7)1Strongly disagree36(45.1) <t< td=""><td>Strongly agree</td><td>111(47.0</td><td>125(53.0)</td><td></td></t<>	Strongly agree	111(47.0	125(53.0)	
Strongly disagree         8(57.1)         6(42.9)         0.762           Disagree         7(53.8)         6(42.7)         1           Neutral         15(71.4)         6(28.6)         1           Agree         45(100.0)         45(100.0)         1           Strongly agree         1046.6)         12(40.0)         0.765.3)           Personal judgmen of contraceptive use being what is best for self         7         0.767.3         0.767.3           Strongly disagree         1066.0)         12(40.0)         0.767.3         0.767.3           Neutral         14(48.3)         44(51.2)         0.767.3         0.767.3           Strongly agree         102(47.9)         111(52.1)         1         1           Strongly agree         102(47.9)         111(52.1)         1         1           Strongly agree         102(47.9)         11(52.1)         1         1           Strongly agree         9(42.9)         12(57.1)         1         1           Strongly disagree         9(42.9)         12(57.1)         1         1           Strongly disagree         9(45.0)         9(49.2)         1         1           Strongly disagree         9(45.0)         5(57.3)         1	Opinion on telling friends of contraceptive use		()	
Ibagree         7(53.8)         646.2)           Neutral         15(71.4)         628.5)           Agree         15(71.4)         628.5)           Strongly agree         110(46.6)         126(53.4)           Personal judgment of contraceptive use being what is best for self         757.40         45(10.00)           Personal judgment of contraceptive use being what is best for self         743.8)         0.047           Disagree         18(60.0)         12(40.0)         743.8)         0.047           Neutral         14(48.3)         44(51.2)         743.8)         0.047           Strongly agree         102(24.9)         111(52.1)         757.40         757.30         75	Strongly disagree	8(57.1)	6(42.9)	0.762
Instant         15(71.4)         626.8)           Agree         45(100.0)         45(100.0)           Strongly agree         110(46.6)         126(53.4)           Personal judgment of contraceptive use being what is best for self         7(43.8)         0.047           Disagree         9(56.2)         7(43.8)         0.047           Disagree         18(60.0)         12(40.0)         12(40.0)           Neutral         14(48.3)         44(51.2)         11(52.1)           Agree         42(48.8)         111(52.1)         11(52.1)           Strongly agree         12(65.0)         9(45.0)         0.936           Disagree         9(42.9)         12(57.1)         0.936           Disagree         9(42.9)         16(53.3)         1182           Agree         60(50.8)         58(492)         1019           Strongly agree         94(50.8)         58(492)         1019           Strongly agree         94(50.8)         58(492)         1018           Strongly agree         94(50.8)         58(492)         1018           Strongly agree         94(50.8)         58(492)         1018           Disagree         35(55.1)         42(54.5)         1018           D	Disagree	7(53.8)	6(46.2)	
Agree         45(10.0)         45(100.0)           Strongly agree         110(46.6)         26(53.4)           Personal judgment of contraceptive use being what is best for self         7(43.8)         0.047           Disagree         18(60.0)         12(40.0)         12(40.0)           Neutral         14(48.3)         41(51.2)         3           Agree         102(47.9)         111(52.1)         5           Strongly disagree         102(47.9)         111(52.1)         5           Telling boyfriend/girlfriend to use contraception being the right Hight         111(52.1)         5           Telling boyfriend/girlfriend to use contraception being the right (46.7)         16(53.3)         0.936           Disagree         19(50.5)         9(45.0)         0.936           Strongly disagree         19(50.8)         9(45.2)         111           Strongly disagree         19(50.8)         9(45.2)         111           Strongly disagree         37(51.4)         35(45.2)         1142           Ibiagree         37(51.4)         35(45.2)         1142           Strongly disagree         37(54.5)         25(40.3)         1142           Disagree         37(54.5)         25(40.3)         1142           Strongly disagre	Neutral	15(71.4)	6(28.6)	
Strongly agree         Int(46.6)         I26(3.3)           Personal judgment of contraceptive use being what is best for self         126(3.3)         0.047           Disagree         9(5.62)         7(43.8)         0.047           Disagree         18(60.0)         12(40.0)         12(40.0)           Neutral         14(48.3)         44(51.2)         4           Agree         42(48.8)         111(52.1)         5           Strongly disagree         102(47.9)         12(57.1)         0.936           Disagree         102(47.9)         12(57.1)         0.936           Disagree         60(50.8)         58(49.2)         5           Strongly disagree         14(46.7)         16(53.3)         5           Telling boyfriend/girlfriend of contraceptive use makes relationship tronger         7         7           Telling boyfriend/girlfriend of contraceptive use makes relationship tronger         7         8         6           Disagree         37(51.4)         58(48.0)         16         16           Disagree         37(59.7)         29(43.3)         0.182         16           Disagree         37(59.7)         25(40.3)         16         16           Disagree         36(5.7)         29(43.3)	Agree	45(100.0)	45(100.0)	
Bactory piece         Factory (1990)           Personal judgment of contraceptive use being what is best for self         6.047           Strongly disagree         9(66.2)         7(43.8)         0.047           Disagree         18(60.0)         12(40.0)         1           Agree         42(48.8)         111(52.1)         1           Strongly disagree         102(47.9)         111(52.1)         0.936           Disagree         102(47.9)         12(57.1)         0.936           Disagree         9(42.9)         12(57.1)         0.936           Strongly disagree         9(450.8)         9(49.2)         0.936           Strongly disagree         9(450.8)         9(450.8)         0.936           Disagree         9(450.8)         9(49.2)         1000000000000000000000000000000000000	Strongly agree	110(46.6)	126(53.4)	
Strongly disagree         9(56.2)         7(43.8) <b>0.047</b> Disagree         18(60.0)         12(40.0)	Personal judgment of contracentive use being what is best f	for self	120(00.1)	
Joing lange (1)         Joing (1)         Joing (1)         Joing (1)           Disagree         18(60,0)         12(40,0)         14           Neutral         14(48.3)         44(51.2)         111(52.1)           Strongly agree         102(47,9)         111(52.1)         111(52.1)           Telling boyfriend/girlfriend to use contraception being the right this         9(42.9)         9(45.0)         0.936           Disagree         9(42.9)         12(67.1)         16(53.3)         111(52.1)           Neutral         14(46.7)         16(53.3)         111(52.1)           Agree         9(42.9)         12(67.1)         111(52.1)           Neutral         14(46.7)         16(53.3)         111(52.1)           Strongly agree         9(42.9)         12(67.1)         111(52.1)           Strongly agree         9(42.9)         12(67.1)         111(52.1)           Telling boyfriend/girlfriend of contraceptive use makes relations it         51(57.1)         111(52.1)           Toringly disagree         38(56.7)         29(43.3)         0.182           Disagree         37(51.4)         35(48.6)         111(52.1)           Strongly agree         37(51.4)         35(48.6)         111(52.1)           Disagree <t< td=""><td>Strongly disagree</td><td>9(56.2)</td><td>7(43.8)</td><td>0.047</td></t<>	Strongly disagree	9(56.2)	7(43.8)	0.047
Basistic         Fields         Heatrial         <	Disagree	18(60.0)	12(40.0)	••••
Agree         42(48)         111(52.1)           Strongly agree         102(47.9)         111(52.1)           Telling boyfriend/girlfriend to use contraception being the right thil         91(42.9)         12(57.1)           Strongly agree         9(42.9)         12(57.1)         12(57.1)           Neutral         14(46.7)         16(53.3)         12(57.1)           Agree         60(50.8)         58(49.2)         12(57.1)           Telling boyfriend/girlfriend of contraceptive use makes relationship true         12(57.1)         12(57.1)           Telling boyfriend/girlfriend of contraceptive use makes relationship true         12(57.1)         12(57.1)           Telling boyfriend/girlfriend of contraceptive use makes relationship true         12(57.1)         12(57.1)           Telling boyfriend/girlfriend of contraceptive use makes relationship true         12(57.1)         12(57.1)           Telling boyfriend/girlfriend of contraceptive use makes relationship true         12(57.1)         12(57.1)           Telling boyfriend/girlfriend of contraceptive use makes relationship true         12(57.1)         12(57.1)           Strongly disagree         37(51.4)         29(43.3)         0.182           Disagree         37(59.7)         25(40.3)         12(57.5)           Strongly agree         41(42.7)         5(57.3)	Neutral	14(483)	44(51.2)	
Instruct         Interact           Strongly agree         12(47.9)         111(52.1)           Telling boyfriend/girlfriend to use contraception being the right thing         9(45.0)         9(45.0)         .936           Disagree         9(42.9)         12(57.1)	Agree	42(48.8)	111(52.1)	
Join of the Contract of	Strongly agree	102(47.9)	111(52.1)	
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binding dialogice       50,00,7       2,64,0,7       5,162         Disagree       37(51,4)       35(48,6)       -         Neutral       37(59,7)       25(40,3)       -         Agree       35(45,5)       42(54,5)       -         Strongly agree       41(42,7)       55(57,3)       -         Delay to have sex until older       -       -       -         Delay for sex until older       -       -       0.05         Strongly disagree       7(7,8)       2(22,2)       -       -         Disagree       6(54,5)       5(45,5)       -       -         Strongly disagree       9(64,3)       5(35,7)       -       -         Agree       25(38,5)       40(61,5)       -       -       -         Strongly agree       141(51,3)       134(48,7)       -       -       -         Ores judgment on waiting       -       -       -       -       -       -         Strongly disagree       1(50,0)       1(50,0)       0.046       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -	Strongly disagree	38(56.7)	20(43 3)	0.182
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Dragies         0(3-3)         5(43.3)           Neutral         9(64.3)         5(35.7)           Agree         25(38.5)         40(61.5)           Strongly agree         141(51.3)         134(48.7)           One's judgment on waiting         150.00         1(50.0)         0.046           Disagree         1(50.0)         1(50.0)         0.046           Disagree         1(16.7)         5(83.3)         -           Neutral         5(27.8)         13(72.2)         -           Agree         47(46.1)         55(53.9)         -           Strongly agree         134(54.5)         112(45.5)         -		6(54,5)	Z(ZZ.Z) 5(45.5)	
Agree       25(38.5)       40(61.5)         Strongly agree       141(51.3)       134(48.7)         One's judgment on waiting       150.0)       1(50.0)       0.046         Disagree       1(16.7)       5(83.3)       0.046         Neutral       5(27.8)       13(72.2)       1         Agree       47(46.1)       55(53.9)       1         Strongly agree       134(54.5)       112(45.5)       1	Noutral	0(54.3)	5(25.7)	
Agree     20(30.3)     40(01.3)       Strongly agree     141(51.3)     134(48.7)       One's judgment on waiting     1     0.00     0.046       Strongly disagree     1(50.0)     1(50.0)     0.046       Disagree     1(16.7)     5(83.3)     1       Neutral     5(27.8)     13(72.2)       Agree     47(46.1)     55(53.9)       Strongly agree     112(45.5)	Agree	25(29 5)	40(61.5)	
Strongly agree     T41(51.5)     T54(48.7)       One's judgment on waiting     I     I       Strongly disagree     1(50.0)     1(50.0)     0.046       Disagree     1(16.7)     5(83.3)       Neutral     5(27.8)     13(72.2)       Agree     47(46.1)     55(53.9)       Strongly agree     134(54.5)     112(45.5)	Agree Strongly agree	23(30.3)	40(01.3)	
Strongly disagree       1(50.0)       1(50.0)       0.046         Disagree       1(16.7)       5(83.3)         Neutral       5(27.8)       13(72.2)         Agree       47(46.1)       55(53.9)         Strongly agree       134(54.5)       112(45.5)	Strongly agree	141(51.5)	154(46.7)	
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Disagree     (10.7)     5(83.5)       Neutral     5(27.8)     13(72.2)       Agree     47(46.1)     55(53.9)       Strongly agree     134(54.5)     112(45.5)		1(167)	F(02 2)	0.040
Agree         47(46.1)         55(53.9)           Strongly agree         134(54.5)         112(45.5)	Noutral	5(10.7)	)(0.20) 12/27 2)	
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	Derenal decision to delay baying cov until the older and	104(04.0)	112(43.3)	

### Table 7 (continued)

Variables			P-value
Use of contraception or HIV preventive measures			
Strongly disagree	5(45.5)	6(54.5)	0.702
Disagree	3(30.0)	7(70.0)	
Neutral	11(55.0)	9(45.0)	
Agree	37(48.1)	40(51.9)	
Strongly agree	132(51.6)	124(48.4)	
One's judgment toward boyfriend			
Strongly disagree	7(58.3)	5(41.7)	0.333
Disagree	5(45.5)	6(54.5)	
Neutral	12(48.0)	13(52.0)	
Agree	38(41.3)	554(58.7)	
Strongly agree	132(51.6)	108(46.2)	
One's judgment toward girlfriend			
Strongly disagree	12(60.0)	8(40.0)	0.321
Disagree	11(34.4)	21(65.6)	
Neutral	19(57.6)	14(42.4)	
Agree	63(50.8)	61(49.2)	
Strongly agree	83(50.3)	82(49.7)	

friends they will wait until they are older to have sex is the right thing to do had a 48.9% reduction in the odds of using contraception or HIV preventive methods compared to those who strongly disagreed (OR = 0.511, p-value = 0.033, 95% CI = 0.352–0.817). Finally, those who knew what contraception is were twice as likely to use contraception or HIV preventive methods compared to those who did not know (OR = 2.096, p-value = 0.021, 95% CI = 1.650–5.883).

### Discussion

## Implications of previous behavior and use of condoms or other contraceptive methods

The finding that only 12.3% of participants reported having had sexual intercourse, and among them, 81.7% engaged in risky sex with only 18.3% frequently using condoms, has significant implications. This low usage rate of condoms suggests a critical gap in sexual education and awareness concerning safe sexual practices. Understanding the cultural factors that inhibit condom negotiation, particularly for females, is essential for developing targeted interventions. Females are often unable to negotiate for safe sexual practices such as condom use, and hence putting them at risk of pregnancy [18]. These results highlight the urgent need for comprehensive sexual education programs tailored to the cultural context to empower young people, especially females, to negotiate safe sex practices.

Moreover, the finding that 48.4% of participants identified as being sexually active but only 16.8% were knowledgeable about contraception underscores the necessity of enhancing accessibility and dissemination of contraceptive information and services. This finding

is consistent with a study conducted in Cameroon, which indicated that few adolescent girls knew how and where to access forms of contraception other than condoms [19]. Only 133 respondents (35.6%) considered healthcare facilities as their source of information about contraception or HIV preventive measures. This is similar to findings by Kawuki et al., which showed that stigma regarding premarital sex creates barriers for sexually active adolescents in accessing contraceptive services [20].

The primary source of information about contraception and HIV preventive measures cited by 90 participants (24%) was healthcare facilities. When asked to choose a method of contraception, 12% selected intrauterine devices, 37% chose condoms, and 83.4% preferred abstinence. This is similar to a nationwide study conducted by Schwandt et al. on the use of modern contraceptives by sexually active adolescent girls in Rwanda, where condoms were among the most commonly used options [21]. It is also consistent with Schwandt et al., who argued that Rwandans believe youth should not have sex before marriage [21]. This aligns with the findings of Mugnier, where respondents appreciated the cultural value of virginity among girls [22]. Furthermore, most prevention programs in Rwanda focus on "Abstinence and Proper Condom Use." [23].

## Implications of the determinants of the intention of contraception use

In response to our research question, two theoretical variables make them possible to predict the intention of young Rwandans in our targeted population to use condoms: (1) attitude toward the behavior, and (2)

**Table 8** Cross tabulation of sexual reproductive history and use of contraceptives or HIV preventive methods

Variables			P-value
Use of contraceptive methods or HI	V preventiv	e	
measures			
Have had sexual intercourse	Yes	No	0.211
	n(%)	n(%)	
Yes	27(58.7)	19(41.3)	
No	159(48.5)	169(51.5)	
Age when first had sex			
10–14	7(50.0)	7(50.0)	0.281
15–17	10(66.5)	5(33.5)	
18–20	11(73.0)	6(27)	
Frequency of sexual intercourse			
1 time/week	8(33.3)	16(66.7)	0.295
2 times/week	4(75.0)	2(25.0)	
3 times/week	0(0.0)	1(100.0)	
Frequency of condom use during se	xual interc	ourse	
Rarely	7(87.5)	1(12.5)	0.865
Frequently	9(75.0)	3(25.0)	
Never	7(35.0)	13(65.0)	
Sometimes	5(83.3)	1(16.7)	
Sexually active currently			
Yes	155(50.7)	93(51.4)	0.605
No	33(49.3)	93(48.2)	
Knowledge of contraception			
Yes	155(50.7)	151(49.3)	0.021
No	33(49.3)	34(50.7)	
Source of information about contra	ceptive/HIV	/ preventive	•
measures			
Friends	34(50.7)	33(49.3)	0.369
Parents	47(54.0)	40(46.0)	
Mass media	43(47.7)	47(52.3)	
Healthcare facility	17(48.5)	18(51.5)	
Youth center	32(48.4)	34(51.5)	
Web pages	13(44.8)	16(55.2)	
Contraceptive methods according t	o responde	nts	
Pills, injections, or intrauterine device	23(57.5)	40(42.5)	0.263
Condom	59(48.3)	63(51.3)	
Abstinence	7(47.5)	63(52.5)	
Don't know	2(100.0)	0(0.0%)	

individual characteristics as an external factor to the framework.

### Perceived norms

The strong influence of perceived norms on the intention to use condoms observed in this study suggests that interventions leveraging the power of social influence could be effective in promoting condom use. The high proportion of participants who believed their boyfriends and peers would support condom use indicates that targeted peer education and partner communication programs could bolster positive normative beliefs around condom use. This finding aligns with studies

### Table 9 Results from multiple logistic regression

	00		0
Variables	OR	95%CI	P-value
Age group			
13–15 (Ref.)			
16–17	0.776	0.574-1.952	0.561
18–20	2.276	1.674-5.052	0.031
Location of the scho	ol		
Rural (Ref)			
Urban	2.733	1.061-4.316	0.047
Using condoms ever	y time one ha	as sex is best.	
Strongly disagree (Ref.)			
Disagree	0.649	1.246-1.653	0.134
Neutral	1.611	0.894-3.453	0.212
Agree	1.524	0.731-3.242	0.316
Strongly agree	2.611	1.472-6.777	0.023
Friends' opinions: Wa	aiting until or	ne is older to have sex	is best.
Strongly disagree (Ref.)			
Disagree	0.739	1.457-1.463	0.634
Neutral	1.112	0.494-2.413	0.862
Agree	0.434	0.121-1.422	0.236
Strongly agree	0.511	0.352-0.817	0.033
Knowledge of what	contraception	n is	
No (Ref.)			
Yes	2.096	1.650-5.883	0.021

conducted in African contexts, where subjective norms were identified as the strongest predictors of condom use. According to Tenkonrang et al. and Benefo, this dominant role of perceived norms may be due partly to the more collectivist nature of African societies, in contrast to the more individualistic decision-making processes in Europe and North America [24, 25].

These results are consistent with a study conducted in Rwanda, which indicated that friends or peers are the most frequently consulted category by adolescents [26]. In this study, perceived norms showed that 146 participants (39.0%) strongly agreed that informing their boyfriend of their intention to use condoms every time they have sex would be acceptable. This finding is in line with Taylor et al., who noted that variations in overall beliefs accounted for between 34% and 56% of the variances reported in attitudes, subjective norms, and perceived behavioral control [27].

### Attitude toward the behavior

The positive attitude towards condom use, with 63.1% strongly agreeing that it would protect them from unwanted pregnancies, HIV, and AIDS, provides a favorable foundation for public health campaigns. However, the mixed feelings about condom use reducing sexual pleasure necessitate addressing these concerns directly in educational programs to mitigate any barriers to consistent condom use. The significant correlation between positive attitudes towards delayed sexual

intercourse and protection from HIV/AIDS reinforces the need to advocate for both condoms use and delayed sexual debut as complementary strategies in sexual health education. A study conducted in Ethiopia also revealed a positive attitude (83.6%) toward condom use [28]. The delay in having sex, the use of contraceptives and HIV preventive methods, as well as waiting until adulthood, were statistically significant (p-value < 0.015). This aligns with Rijsdijk et al., which found that the intention to delay sexual intercourse positively correlated with beliefs about HIV (r = 0.09; p-value < 0.01) and attitudes toward delayed sexual intercourse (r = 0.36; p < 0.01) [29]. Additionally, Fisher et al. established that intentions to practice HIV preventive behaviors are formed by individuals who have positive attitudes toward preventive acts and perceive social support for these behaviors [30].

Contrarily, Sander et al. found that attitudes, subjective norms, and self-efficacy were weakly to moderately correlated with condom use at baseline and follow-up in a study conducted in Dar es Salaam [31]. However, in two other sites, attitudes significantly predicted intentions in using condoms (Cape Town: B = 0.32; Mankweng: B = 0.24). This is consistent with Manloe et al., which discovered that adolescents who had taken a virginity pledge had decreased odds of contraceptive use or consistency [32].

The American Academy of Pediatrics recommends discussing abstinence with adolescents as the most effective way to prevent genital STIs, HIV infection, and unintended pregnancy [33]. The *New Times* suggested that Rwandan youths and adolescents prioritize abstinence, but for sexually active youths and adults, especially those engaging in transactional sex, protected sex should be prioritized to avoid sexually transmitted diseases, including HIV, and unplanned pregnancies [34]. According to UNFPA, SYP and SDC, being abstinent is one of the best decisions one can make, as it is the only method that avoids pregnancy, STIs, and HIV/AIDS 100% of the time [35].

### Implications of individual characteristics

Among the individual features of the participants in this study, the age group of 18-20-years-old (p-value = 0.041), urban location of the school (p-value = 0.037), year of study (p-value = 0.032), and knowledge about contraception (p-value = 0.011) were statistically associated with the use of contraception and HIV preventive methods (p-value < 0.05).

The finding that participants aged 18–20 were more likely to use contraceptive or HIV preventive methods implies that age-specific interventions might be necessary. Tailored messages and interventions recognizing the developmental and psychological maturity of older adolescents could enhance their effectiveness. Similarly, for the knowledge of a practice and product, we are more likely to use or practice something that we know well and with which we are familiar. Therefore, knowing the contraceptive methods and the preventive measures against HIV infection is an advantage for its subsequent use.

The greater likelihood of contraceptive use among participants from urban schools compared to rural ones indicates a disparity in access and education about sexual health services. This rural-urban divide suggests that targeted efforts are required to improve sexual health literacy and services in rural areas to bridge this gap. As for urban living, Aubert noted that there is a striking contrast between the capital Kigali, where more than half of Rwanda's urban population lives, and rural areas, with considerable differences in standards of living and economic productivity [36]. Rwanda seems to be evolving in two different worlds: a highly modern one in its capital with a growing segment of relatively well-paid urban professionals, and a traditional world in the countryside with a large population of people who are close to the poverty line but are managing to avoid severe economic hardship.

Knowing what contraception is was statistically significant in predicting its use, emphasizing the crucial role of sexual health education. Enhancing educational curricula to cover comprehensive sexual and reproductive health topics can empower adolescents with the knowledge necessary to make informed decisions. This is in line with the study done by Schwandt et al. that confirmed modern contraceptive use was positively associated with older age [21]. In that study, girls who were 19 years were 10.28% (95%CI: 1.34-78.71) times more likely to use modern contraceptives than 15-year-olds, while those with tertiary education were 6.98% (95%CI: 1.08-45.07) times more likely to use contraceptives compared to their counterparts with no education [21]. Those residing in Kigali were 75% less likely to use contraceptives compared to their fellows in the Southern region (AOR = 0.28, 95%CI: 0.099-0.802) [21].

### Framework and results

The findings align with Ajzen's TPB, where perceived norms and attitudes significantly predict the intention to use contraceptives and HIV preventive methods. These results suggest that interventions should focus on modifying attitudes and perceived norms within the community to influence behavioral intentions positively. According to Ajzen, perceived norms explain a larger portion of the variance in intention compared to the other constructs [37]. Additionally, attitude—another construct—directly influences intention. In the case of perceived norms, other studies have reached similar conclusions [2, 38, 39]. Furthermore, as predicted by this theory, external variables (such as age, living area, and knowledge about contraceptive methods and HIV preventive measures) influence behavioral intentions through their effects on the model's components [40].

### Strengths and weaknesses of the study

Using a theoretical framework accepted by researchers and other theoreticians in the field of health underscores the robustness of this study. Indeed, according to Godin et al., recent meta-analyses have demonstrated that the TPB is highly effective in predicting and explaining various health-related behaviors [41]. In Rwanda, very few studies have utilized a universally recognized theoretical framework.

The approach adopted for developing the measuring instrument is clear, as the various stages recommended by the model have been adhered to. A pilot study conducted demonstrated excellent metrological qualities. Additionally, the use of a predictive correlational approach to explain the relationships between variables and verify theoretical models is appropriate [42]. Random sampling helped to avoid possible biases.

Regarding limitations, the sample size is a constraint for this study. Moreover, this study may be influenced by social desirability bias, which is inherent in any research involving a behavioral component [43] and in studies with questions that are sensitive and touch upon intimate subjects [44].

### **Practical implications**

In the short term, the results of this study will be shared with local authorities of the Rwamagana District, school principals, and representatives of parents from respective schools in hopes of shaping policies to address the gaps identified. This information could help authorities better shape policies regarding the prevention of unwanted pregnancies and HIV/AIDS among teens.

The Ministry of Health of Rwanda, as part of its strategic plan (2018-2024), has tasked the Rwanda Biomedical Center with leading the implementation of the National Family Planning and Adolescent Sexual and Reproductive Health strategic plan [45]. This initiative involves coordination with internal entities, other ministries, development partners, and civil society. One aspect of this effort includes the creation of one-stop centers in various administrative sectors where young people can access information on family planning and sexual and reproductive health. Through these onestop centers, youth in rural areas can be sensitized and educated about contraceptive methods and preventive measures against HIV infection. Additionally, it would be beneficial to introduce a sexual and reproductive health course into the curriculum for both rural and urban schools, emphasizing contraceptive methods and HIV preventive measures.

Initiatives aimed at educating parents and healthcare professionals about their roles in supporting adolescent sexual health are crucial. Encouraging open communication about sexual health and reducing stigma around accessing contraceptive services can empower adolescents to seek and use these services effectively. Rwandan parents need to understand the importance of becoming resourceful figures for their children and should not shy away from discussing healthy sexuality. Adolescents should be educated on the importance of seeking information from healthcare facilities. Health professionals should be made aware of the significant role they play in the lives of young people and understand the crucial role they can fill in prevention efforts.

### **Further studies**

Conducting larger-scale studies to confirm these findings and explore gender and educational level differences based on gender and education levels among adolescents could provide a more comprehensive understanding. It is crucial to conduct research involving young adolescents, boys, and men, as they play a significant role in combating unwanted pregnancies and preventing the sexual transmission of HIV. Additionally, developing programs for parents and future healthcare workers and incorporating varying theoretical frameworks could further enrich the research landscape on this topic. While the two variables discussed effectively explain the variance in the intention to use contraceptive methods and HIV preventive measures among Rwamagana teens, it is likely that other predictive factors remain unexplored. Moreover, further research aimed at developing programs for parents and future healthcare workers is essential.

### Conclusion

This study aimed to identify the psychosocial determinants underlying the intention to use contraceptive methods and preventive measures again HIV infection among teenage Rwandan female students in secondary schools in Rwamagana District. The study has elucidated key factors influencing the intention to use contraceptive methods and HIV preventive measures among Rwandan students. Ajzen's TPB served as a framework for this study. Statistical analyses showed that attitudes were a key predictor of the intention to use contraceptive methods and HIV preventive measures. Three external variables, namely the age and location of participants and their knowledge of contraceptive methods and HIV preventive measures were also statistically significant.

The findings will inform the development of targeted interventions to enhance sexual health education and services, thereby contributing to improved sexual health outcomes for this demographic. They target three levels: parents, healthcare professionals, and local authorities, and these strategies all have the same goal: increasing sexual health. A series of research based on predictive theories and behavior change is essential to better understand the phenomenon as it appears to have not been studied widely yet in Rwanda. In conclusion, we believe this research has successfully identified the factors influencing the intention to use contraceptive methods and HIV preventive measures among Rwandan students. The findings will contribute to guiding discussions on essential interventions for this demographic.

### Abbreviations

AFSRH	Adolescent-friendly sexual and reproductive health
CI	Confidence Interval
HIV/AIDS	Human Infection Virus Acquired Immunity Deficiency Syndrome
OR	Odds Ratio
SDC	Suiss Agency for Development and Cooperation
STIs	Sexually transmitted infections
SYP	Safeguard Youth Peaople
TPB	Theory of Planned Behavior
THP	Teen Health Project
UNFPA	United Nations Population Fund Agency, and

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### Author contributions

A.R Faculties from School of Nursing and Midwifery of University of Rwanda conceptualized and designed the study. A.R. AND I.B. AND M.B. AND S.G AND A.M AND E.B They led the data collection process, analyzed the data, screened the data and critically revised the analysis and discussed the results. They also drafted the manuscript themselves. A.R. AND I.B. AND M.B. AND S.G AND A.M AND E.B AND B. J. All authors read and approved the final manuscript for publication. A.R. AND I.B. AND A.M AND E.B AND B. J. All authors confirm that they had full access to all the data in the study and accept responsibility for submission for publication. The corresponding author attests that all authors meet authorship criteria and that no criteria were omitted.

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### Data availability

Data are available to the author office and can be accessed by request.

### Declarations

### Ethics approval and consent to participate

The study received ethical clearance (Approval notice: 326/CMHS IRB/2022) from the College of Medicine and Health Sciences (CMHS) of the Directorate of Research and Innovation of CMHS Intuitional Board prior to initiation. Informed and written consent were obtained from the respondents before they were interviewed.

### **Consent for publication**

Not applicable.

### **Competing interests**

The authors declare no competing interests.

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