BMJ Public Health

Exploring the determinants of sexual and reproductive health knowledge and intentions for safer sexual practice among out-of-school adolescents in northern rural settings in Burundi: a cross-sectional population-based study

Nadine Misago ,[1,2] Petronie Nyawenda,[1] Jean Paul Ndayizeye,[3] Yvette Nsabimana,[1] Jean Bosco Ahishakiye,[1] Anne Marie Manga,[4] Gabriel Ndayisaba,[1,2] Desire Habonimana [1,2,5]

To cite: Misago N, Nyawenda P, Ndayizeye JP, *et al*. Exploring the determinants of sexual and reproductive health knowledge and intentions for safer sexual practice among out-of-school adolescents in northern rural settings in Burundi: a cross-sectional population-based study. *BMJ Public Health* 2026;**4**:e002906. doi:10.1136/bmjph-2025-002906

► Additional supplemental material is published online only. To view, please visit the journal online (https://doi.org/10.1136/bmjph-2025-002906).

Received 19 March 2025
Accepted 20 March 2026

Check for updates

© Author(s) (or their employer(s)) 2026. Re-use permitted under CC BY-NC. Published by BMJ Group.

For numbered affiliations see end of article.

Correspondence to
Dr Nadine Misago;
nadine.misago@ub.edu.bi

ABSTRACT

Introduction Comprehensive Sexual and Reproductive Health and Rights (SRHR) knowledge is critical for reducing unintended pregnancies and sexually transmitted infections (STIs) among adolescents in low-resource settings. We assessed SRHR knowledge gaps among rural, out-of-school adolescents in Burundi and examined associations with intentions for safer practices (eg, condom use).

Methods We purposively sampled and surveyed 767 out-of-school adolescents aged between 10 and 19 years from the rural settings of Ngozi health district in northern Burundi examining their SRHR knowledge and practice. We employed the Rasch model of the Item Response Theory (IRT) to examine overall SRHR knowledge and by gender, assuming that the test was administered an infinite number of times and supplemented this model with a multiple linear regression to detect factors affecting knowledge. Determinants of intentions for safer sexual practice were investigated using logistic regression.

Results First, although the test drew on basic SRHR skills, it appeared to be difficult for the study population. Indeed, participants needed a minimum underlying competence θ>2.4 on −4 to 4 scale (with θ>2.4 indicating in the IRT model high difficulty while average knowledge corresponds to θ≈0) to succeed the whole exam and θ>0 to attempt 14/15 questions. The most challenging topics related to condom use, menstruation versus pregnancy, contraception and STIs. Younger females had slightly better knowledge than males, but this has crossed over past 16 years. Second, SRHR knowledge was higher among adolescents who completed primary education and those whose parents or siblings are educated. Further, the long distance to a youth health centre and the lack of prior SRHR information decrease knowledge. Finally, adolescents who have higher SRHR knowledge are more likely to report intentions for safer sexual health practices.

Conclusion Rural and out-of-school adolescents have lower than expected SRHR knowledge. Those who have never heard about SRHR and those whose parents and/or siblings have lower or no education are worse off. SRHR knowledge determines intentions for sexual health behaviours (eg, condom use, seeking HIV testing). Tailored

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Amounting evidence established the relationship between sexual and reproductive health and rights (SRHR) knowledge and safer sexual health (eg, sexual practice) but little has been done to document this correlation among out-of-school adolescents living in remote and rural areas in low- and middle-income countries (LMICs).

WHAT THIS STUDY ADDS

⇒ This study proved that out-of-school and rural adolescents have deficient knowledge of SRHR subjects including condom use, menstruation, contraception and pregnancy, and sexually transmitted infections (STIs) and further highlighted gender differences showing that younger females have generally better knowledge than their male counterparts although this trend reverses from the age of 16 years.

⇒ We emboldened the contributory effect of SRHR communication (eg, discussion with siblings, parents and peers) and that of living within the vicinity of a youth health centre on increasing knowledge, highlighting that females are less likely to use distant youth centres compared with their male counterparts owing to commute difficulties, among other female gender-related issues.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ This study will enable SRHR stakeholders to design interventions tailored to this particular group of population (ie, out-of-school adolescents aged from 10 to 19 years living in rural areas in LMICs) considering gender disparities to better address challenges affecting males and females differently.

SRHR programmes for rural adolescents should address misconceptions on condoms/contraception.

INTRODUCTION

A global survey of 70 developing countries highlighted that more than half of births in low- and middle-income countries (LMICs) are unplanned and of mothers younger than 20 years and further revealed the huge magnitude of unmet needs for contraception in these resource-limited countries.[1] Such failures to provide quality sexual and reproductive health (SRH) services to adolescents and young people ostensibly increase the risk of new sexually transmitted infections (STIs), that of maternal deaths, and further reinforce poverty while widening the existing country gaps based on income levels.[2 3] For instance, compared with older women, adolescents are likely to take longer to recognise their pregnancy and consequently to seek antenatal care services and are further more likely to receive poor childbirth or abortion services.[4 5] Concerning contraception, a recent study conducted in Kenya found that about 49% of young people reject modern contraception fearing infertility and other side effects, while only about 22% of adults expressed the same reluctance.[6]

To deliver on the Sustainable Development Goals (SDGs) agenda 2030 particularly its specific targets 3.1 and 3.7 and all targets premising poverty eradication, gender equality including educational goals and universal health coverage (UHC), nations must ensure quality SRH services to all sexually active adolescents, including those in hard-to-reach settings.[7–9] Globally and regionally, sexual and reproductive health and rights (SRHR) face persistent challenges spanning socio-cultural and gender disparities in access to SRHR information and services.[10] These challenges also concern the supply of youth-friendly SRH services particularly in rural settings across LMICs and are heightened among youth with particular needs (eg, displaced young people and those living with disabilities).[11] In Sub-Saharan Africa (SSA) and other LMIC contexts, early and unplanned pregnancies and STIs remain high among adolescents, with poverty intensifying the risk through limited schooling, reduced negotiation power and constrained healthcare access.[12] These factors reinforce cycles of poverty and poor health, including adverse maternal outcomes and increased vulnerability to gender-based violence . The WHO's holistic SRHR framework treats sexual health as going beyond the mere absence of disease, dysfunction or infirmity and rather corresponds to the state of physical, emotional, mental and social well-being related to sexuality requiring a safe, positive and respectful approach to sexuality and sexual relationships.[13] The right to sexual health is inalienable and rural and out-of-school adolescents and young people particularly should indiscriminately receive accurate SRH information and confidential services in order to foster societies where all people can express their sexuality safely, enjoying their choice of how and when to have children.[14] Therefore, aligning SDG targets with the above sexual health definition means expanding comprehensive sexuality education, confidential adolescent services and rights-based policies, ensuring education and health equity, gender equality and UHC so adolescents can freely determine if, when and how to form families.[15]

However, despite a comprehensive SRHR thematic understanding and the wider consensual approach to foster SRH among adolescents and young people who make up about a fourth of the world's population,[16] efforts to attain quality SRH, mostly in SSA, have long been constrained by inadequate access to and inequitable distribution of quality SRH services contributing to poor utilisation and poor health outcomes.[17–20] Adolescent SRH therefore continues to be a major public health challenge in SSA, with reportedly thousands of child marriages, teenage pregnancies, HIV new infections and low coverage of modern contraception.[21] In Burundi, specifically where SRHR evidence is generally sparse, Demographic and Health Surveys (DHS) proved that sexual intercourse among male and female adolescents aged below 14 years rose from 0.7% in 1987 to 2.6% in 2017 while adolescent childbearing increased from 5.9 to 8.3% within the same timeframe, although approximately 90% of adolescents reportedly knew at least one modern contraceptive method.[22] Most intriguingly, the 2017 DHS highlighted that about one in four adolescents repudiate contraception, principally those from poorer and rural settings with limited literacy.[22] Another study that predicted SRH behaviours among Burundian youth and adolescents in relation to SRH service availability and the supplemental presence of an SRH youth-friendly centre revealed geographic patterns between service availability and consumption hinting on potential effect of programme interventions to scale SRH services in rural settings.[23]

In the wake of many SRHR community-targeted interventions mainly through humanitarian activists, for example, UN Agencies such as The United Nations Population Fund and various international and local non-governmental organisations, we aimed to contribute to the latter evidence which remains limited and less policy informative by targeting a sensitive sample of rural and out-of-school adolescents examining empirically the individual, household and community-level determinants of SRHR knowledge and how these altogether affect safe SRH practices. Findings of this study are useful to inform SRHR interventions tailored to underprivileged and out-of-school adolescents from rural settings in Burundi.

METHODS

Study design and description

We conducted a cross-sectional, census-style survey to examine SRHR knowledge and practices among adolescents aged between 10 and 19 years in Ngozi, which is

a northern rural setting of Burundi. Ngozi's setting was targeted conveniently, and the study consisted of a baseline survey nested within the ongoing SRHR programme funded by AmplifyChange. Sections of the survey tool (online supplemental material S3) capturing SRHR knowledge and intentions for safer practices drew on Burundi's SRHR socio-cultural context and global existing evidence on determinants of SRHR among young people and adolescents as well as the expected SRHR knowledge and skillset that would enable them to enjoy safer sexual health practices.[24–29] This tool is further premised on findings of the scoping review of published literature on SRHR among adolescent people covering the period over 20 years from 2000 until 2019 in SSA.[30]

Study participants and data collection

We targeted adolescents within the eligible age category without a formal education or those who trained only until primary school but are no longer schooling. We aimed to interview the maximum eligible population using a census-style survey, so sample size was not calculated. We trained 16 experienced (SRHR) surveyors on the data collection tool and formed eight pairs, and each pair collected data from one geographic location over a period of 5 days in October 2024 using a digital survey tool (KoboCollect). The digitalised tool was piloted on a different sample of 32 adolescents in Bujumbura capital city, with each pair of surveyors practising data collection on two individuals to ensure adequate questioning and correct questionnaire setting. Collected data comprised the respondent's sociodemographic information and household level background information, a set of questions relating to SRHR knowledge and another set of questions on SRHR practices focusing intentions for safer sexual practices and contraception. The interview was directly administered orally to an interviewee and the data collector captured responses into the digital tool. To ensure data quality, the principal investigator and an information technology and computer scientist monitored data quality daily and communicated with survey teams and all study stakeholders.

Study conceptualisation

We conceptualised individual, household and community-level SRHR determinants in online supplemental material S1. Hypothetically, we would expect adolescents who completed primary education, those living with *parents* and those who openly engage in SRHR debates either at home or with peers to demonstrate a better understanding of the SRHR topic while engaging in safer sexual life. Family size, which corresponds to the number of living siblings, the education level of these siblings and that of parents, the type of religion, the presence of a radio and/or television as well as the presence of a SRHR youth centre within the neighbourhood are supposedly important predictors of SRHR knowledge and practice.

SRHR knowledge is the intermediate outcome and was examined using a set of 15 questions concerning potential consequences of an unprotected sexual intercourse focusing on STIs and an unwanted and unplanned pregnancy, a female menstrual cycle and the relation with pregnancy and the usefulness of and how to use contraception and condoms (online supplemental material S2). As can be seen in the online supplemental material S3 (ie, data collection form), examinees were asked without prompting to provide answers directly to each question or item and the examiner recorded 1 if examinee i correctly provides item j, and 0 if the response is wrong or not given. Intentions for safer SRHR practice were conceptualised using two variables: (i) the willingness of adolescents to actively seek and use a condom during sexual intercourse and (ii) their determination to initiate or actively engage in SRHR discussions and debates at home with siblings and parents and with peers outside their homes eg, in the neighbourhood. Operationally, *intention for safer SRHR practice* outcome variable took value 1 if adolescent i confirmed the willingness to purchase and use a condom during sexual intercourse and to discuss openly SRH matters with both peers and parents or value 0, otherwise. Responses to some interesting but sensitive questions such as the history of condom use at previous sexual intercourse and the knowledge of HIV status were limited in sample sizes and could not be used for analysis.

Data analysis

Descriptive statistics

We began data analysis with simple explorations, determining proportions of correct responses on each item and identifying items that are most challenging. Next, we generated the total raw scores out of 15 which is the maximum possible score with equal item weighting for each participant and summarised them by sex. Before statistical analyses, we explored the correlations within items and examined the test reliability using Cronbach's alpha. We progressed further SRHR knowledge analysis with the Rasch model of the Item Response Theory (IRT). Hypothetically, each examinee responding to a test item possesses some level of underlying ability (ie, latent prior knowledge) that determines the probability of a correct answer to that particular item (Equation 1).[31] Conceptually, IRT updates the latter prior knowledge with actual test scores to predict the posterior knowledge and further uses the empirical Bayes means estimates and the standard errors to examine the validity of the overall test instrument.[31] This method enabled us to distinguish the levels of test difficulty for each item and to predict true scores that an examinee with a given level of prior knowledge would achieve if the test were to be administered an infinite number of times.[32] Thus, IRT is particularly helpful to determine whether the test instrument is powerful for examining SRHR knowledge of the specific target population ie, rural and out-of-school Burundian adolescents.[33] For brevity, the terms ability and knowledge are employed interchangeably, true score denotes the predicted success rate assuming an infinite repeat of test administration,and true knowledge designates posterior

knowledge which, together with the item difficulty, are continuous metrics that can range from – ∞ to +∞.

$$TS_i = \sum_{j=1}^{J} P_j(\theta_i) \quad (1)$$

Where TS_i is the true score for examinees with ability level θ_i

j corresponds to an item; J is the total number of items ie, 15

Pj (θ_i) is the probability of success to item j which depends on ability level θ_i.

Test difficulty and predicted test SRHR knowledge scores

Response items were dichotomous, taking value 1 if respondent i correctly gives item response j, and 0 otherwise; and the total raw score for respondent i ranged between 0 and 15. We denoted b_j to represent the difficulty of response item j and θ to denote the examinee's underlying SRHR knowledge. Therefore, each response to an item represents an encounter between examinee of ability θ and an item of difficulty b_j such that professionals with higher θ than b_j have the likelihood of scoring 1.[34 35] This relationship between θ and b_j further implies that if $\theta<b_j$, the probability of success to item response j tends to 0 and becomes 0.5 if they are equal (Equation 2). We used a one-parameter logistic model and the item characteristic curves (ICC) to determine item difficulties, describing the probability that respondent $i$succeeds on each response item. The ICC uses three parameters of the logistic functional form of the IRT model; the guessing parameter which represents the probability that a provider with the lowest possible knowledge will correctly respond to item j, the discrimination parameter which corresponds to the maximum slope of the curve and the difficulty parameter corresponding to the knowledge level θ at which the probability of responding correctly to item j equals 0.5. Because we assume a zero mean for θ, response item j is believed to be relatively easy if its difficulty estimate is negative and relatively hard if its difficulty estimate is positive. For comparison purposes, we reported each item difficulty level along with the proportion of examinees who succeeded on it.

$$\Pr\left(Y_{ij}=1|b_j,\theta_i\right) = \frac{\exp(\theta_i - b_j)}{1+\exp(\theta_i - b_j)} \quad (2)$$

Where Y_{ij} represents the (yet to be observed) outcome for item j from person i.

b_j corresponds to item j difficulty.

θ_i is the ability level of provider i.

$(\theta_i - b_i)$ ranges from - ∞ to +∞.

Next, we predicted the expected true SRHR knowledge score or success rate that examinee i with competence θ_i would achieve if the SRHR knowledge test were taken repeatedly. To express this more clearly, given that θ_i is a latent trait being examined using the SRHR knowledge test, we transformed the latter θ_i into the proportion 'true score', corresponding to the proportion of response items an examinee with θ_i is expected to answer correctly where expectation is the average score over repeated administrations of the same competence test. The total characteristic curve (TCC) function of the IRT model plots expected scores on the competence test along the latent trait (θ) continuum. As our SRHR knowledge test contained 15 binary response items each coded 0 or 1, an examinee i would score between 0 and 15. We used the 95% critical threshold from a standard normal distribution (z = ± 1.96) to predict the expected average (and the minimum and maximum) scores any random sample out-of-school adolescents would achieve on this SRHR knowledge test.

Finally, we updated the posterior latent competence by predicting θ for each test taker using the empirical Bayes means estimates which combine prior information about the latent competence θ with the likelihood function (actual test scores) to obtain the conditional posterior θ distribution. The posterior θ represents the true competence and generally ranges between —4 and 4, with participants with θ in the vicinity of zero being believed to be averagely competent. We examined the distribution of true SRHR knowledge by sex and further investigated the effects of individual, household and community-level determinants on knowledge using a linear regression. Specifically, we ran complete and then saturated linear regressions each containing an additional dichotomous predictor variable coding for sex to explore gender disaggregated effects. Diagnosis of linear regressions confirmed homogeneity of residuals, so we did not require advanced techniques, for example, robust estimates or bootstraps to address heteroskedasticity of residuals.[36] Similar regressions were performed to seize the effects of standard covariates and the knowledge on SRHR practices.

Patient and public involvement

To better document SRHR knowledge and practices among out-of-school adolescents in rural settings in northern Burundi, we involved SRHR stakeholders, particularly the ministry of health programme responsible for SRHR, health managers at provincial and district levels and the community (eg, community health workers and community and religious leaders) who contributed to the study design by providing inputs to the study proposal which was discussed in a workshop.

RESULTS

Sociodemographic description of study participants

Sociodemographic characteristics of study participants are summarised in table 1 below. About 53% of participants were females and more than half were aged between 10 and 16 years. Family size varied significantly, with about 62% of participants being from a family with 4 to 6 children while another 22% came from large families with more than 6 children. Similarly, participants represented a wide spectrum of birth order, and a third was fourth born or more in the household. While 90% of

Table 1 Sociodemographic description of study participants

Explanatory variables	Sample size (n=767)	
	Sample	Proportion
Age		
10–13 years	160	20.86
14–16 years	300	39.11
17–19 years	307	40.03
Sex		
Male	363	47.33
Female	404	52.67
Number of siblings		
1–3	123	16.04
4–6	474	61.80
More than 6	170	22.16
Birth order		
1st child	171	22.29
2nd child	176	22.95
3rd child	139	18.12
4th child and above	281	36.64
Participants' education		
Has completed primary	595	77.57
Has not completed primary	172	22.43
Live with parents		
Yes	683	89.05
No	84	10.95
Father's education		
Secondary	9	1.17
Primary	321	41.91
No education	436	56.92
Mother's education		
Secondary	8	1.04
Primary	315	41.12
No education	443	57.83
Religion		
Catholic	427	55.96
Other Christians	310	40.63
Muslim	26	3.41
Distance to SRH facility		
1–30 min walking	424	55.28
31–45 min walking	95	12.39
More than 45 min walking	248	32.33
Radio possession		
Yes	384	50.07
No	383	49.93
TV possession		
Yes	11	1.43
No	756	98.57
Sibling with secondary education		
Yes	224	29.24
No	542	70.76
Sibling with higher education		
Yes	32	4.17
No	735	95.83
Received information on SRHR		
Has heard about SRHR	257	33.55
Has not heard about SRHR	509	66.45

Summarises the sociodemographic characteristics of respondents and that of their parents and siblings. It also describes different channels through which respondents get access to SRH information.
SRH, sexual and reproductive health; SRHR, sexual and reproductive health and rights.

participants lived with their parents, the vast majority of the latter had very low education levels (eg, almost half of either parent did not achieve primary education). Education of siblings was also poor, with more than 70% and about 96% of participants being from families without an individual who attained secondary and tertiary education respectively. Expectedly, our sample comprised and reflected the most predominant religions in Burundi, with 96% representing Catholics and other Christians, while Muslims amounted to nearly 4%. This study targeted adolescents from the rural background so families depicted this setting. Indeed, only half and less than 2% of households possessed a radio and TV respectively, which are proxy indicators of poverty. Finally, we found that one-third of participants live at more than 45 min distance from a youth centre and two-thirds of them have never had information about SRHR before.

SRH knowledge test difficulty

The difficulty level of the SRHR knowledge exam is described in figure 1 and shows that this exam proved to be difficult as test takers would generally require the level of underlying competence $\theta>0$ on a standard±4 scale (above the averagely competent) to attempt 93.3% (14/15) questions. The easiest question is item 15 which corresponds to knowledge about whether HIV can be transmitted during sexual intercourse. In fact, any respondent with a very low level of competence ($\theta>-1.63$) would succeed in this item. Contrary, the most difficult item asks whether condoms can be used more than once, and only test takers with $\theta>2.14$ would attempt it, and this implies that adolescents with this level of competence would succeed in the full exam. Detailed difficulty levels are supplemented in online supplemental material S2. Correspondingly to the difficulty level, only 9.1% of

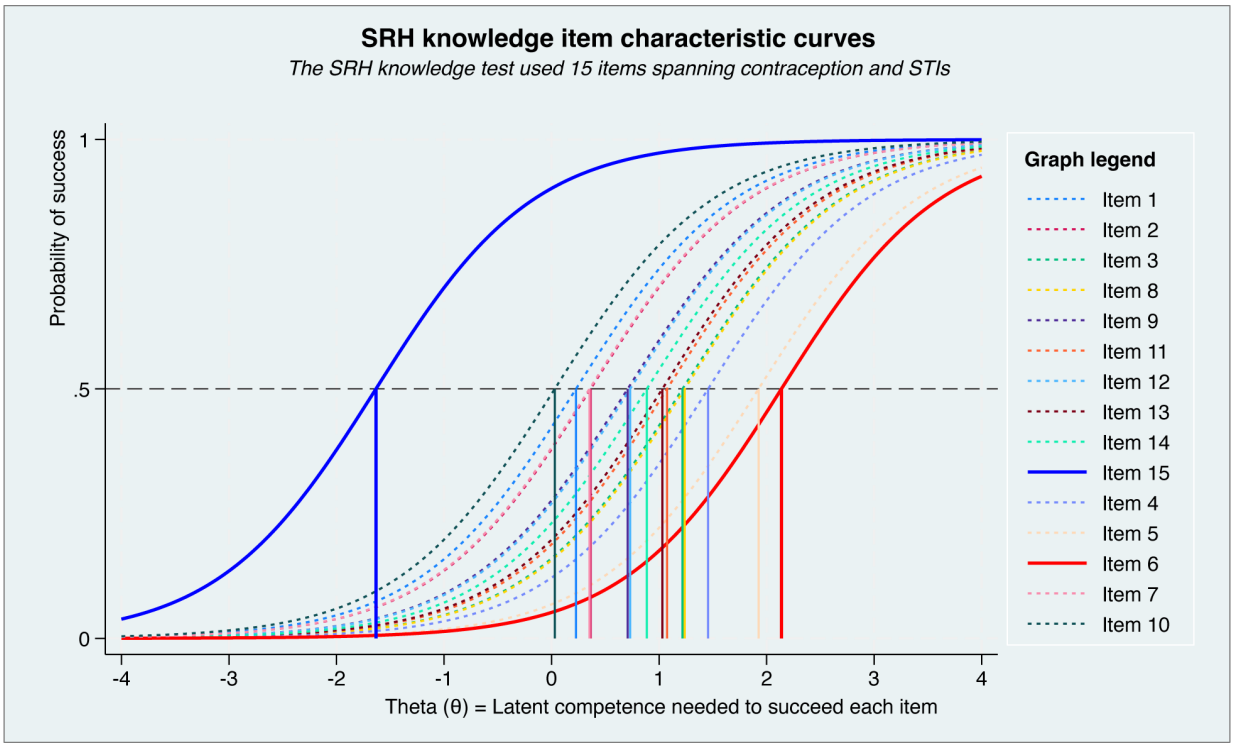

Figure 1 SRH knowledge test difficulty. Presents the item difficulty level based on the ICC function using a set of SRHR knowledge questions (n=15). The horizontal axis represents the latent competence (θ) and the vertical axis corresponds to the probability of success to an item which represents an encounter between θ and the difficulty level (b) such that if $\theta > b$ the probability tends to 1. For instance, test takers would require a competence (θ) greater than 2.14 to attempt the most successful item (eg, item 6). ICC, item characteristic curve; SRH, sexual and reproductive health; SRHR, sexual and reproductive health and rights.

respondents succeeded in the most difficult item while 84.2% succeeded in the easiest question.

SRH knowledge test performance between female and male

In figure 2, we examine the success rate of test takers by gender. Female adolescents demonstrated a slightly higher level of knowledge compared with the male adolescent counterparts, but we show in later sections that this knowledge reverses past age 16. In fact, the averagely competent females, that is, those with θ in the vicinity of zero, would succeed to less than 5/15 questions. The figure further shows that 95% of any random sample of female adolescents from the same population would correctly answer between 1 and 11 questions. Comparatively, the averagely competent males would correctly answer less than 4/15 questions with any 95% random sample of them being expected to correctly answer between less than 1/15 and 12/15 questions.

Determinants of SRH knowledge by gender

A set of five determinants, namely age, distance to a youth centre, education level of either parent and that of other siblings, and previous information about SRHR determine the level of knowledge (figure 3). compared with those aged between 10 and 13 years, mid and older adolescents demonstrated a better understanding of SRHR subjects. For instance, being between 14 and 16 years is associated with about 0.63 (95% CI 0.47 to 0.79; p<0.0001) increase in SRHR knowledge while a further age increase (ie, adolescents aged 17–19 years) augments the latter knowledge of 1.06 (95% CI 0.88 to 1.23; p<0.0001). However, age affects males and females differently, with younger males showing less knowledge than their counterpart females, while older females become less knowledgeable than males. Furthermore, adolescents whose parents have achieved primary education are better off and demonstrated superior SRHR knowledge compared with those whose parents did not attend school. Unfortunately, unlike boys, the education of parents does not affect SRHR knowledge of girls (p>0.13). On the other hand, living above a 45 min distance from a youth centre significantly reduces SRHR knowledge, but this impact prevails among females only. Indeed, SRHR knowledge decreases by 0.33 (95% CI 0.16 to 0.49; p<0.0001) among females while it decreases by 0.21 (95% CI 0.00 to 0.41) among males but is not statistically significant (p>0.05). Similar to parents, siblings' education has a positive impact on SRHR knowledge. Adolescents without an educated sibling have lower SRHR knowledge compared with those with at least one sibling who completed primary education. Further, a long distance to a youth centre has a somewhat huge negative impact on SRHR knowledge which is pronounced for female adolescents. Expectedly, birth order, the household size and religion do not affect SRHR knowledge. The presence of a radio

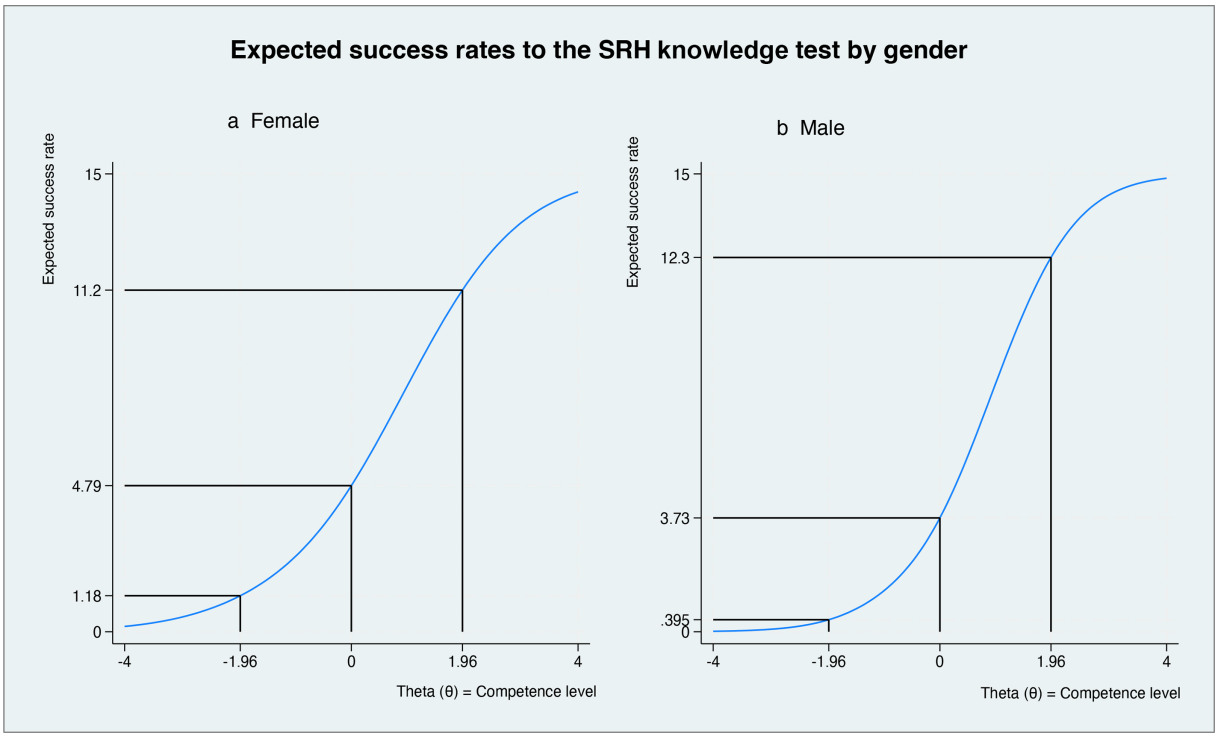

Figure 2 SRH knowledge test performance between female and male illustrates the TCC which predict the 'true score' corresponding to the number of successes out of the total number of response items (n=15) plotted on Y axis as function of competence θ plotted on X axis. We demonstrate in (a) the predicted score of female adolescents and that of male adolescents in (b) and use 95% critical values for the standard normal distribution to predict the expected scores of random samples from the same or similar study population. The expected score of averagely competent respondents (those with θ in the vicinity of zero) is also predicted. SRH, sexual and reproductive health; TCC, test characteristic curve.

increases SRHR knowledge of males, while living with parents proves no effect on SRHR knowledge. Finally, the lack of previous SRHR knowledge is associated with lower current knowledge, and females are worse off if they have never heard anything about SRHR previously.

Determinants of intentions for safer SRH practice

Empirically, the models that include the full set of covariates did not detect statistically significant effects of most determinants (table 2). For instance, age, family size, birth order, education and that of siblings and parents, living with parents and the neighbourhood of a youth centre altogether do not affect how adolescents behave and their decision to want to know their HIV status. Therefore, only having heard about SRHR and the level of SRHR knowledge determines their intentions for safer practice and attitude concerning SRHR. Concretely, adolescents who have never heard anything about SRHR are about 0.6 less likely to openly engage in safer SRHR practice eg, to purchase or use a condom during sexual intercourse and to discuss the SRHR topic with peers or parents. We also found statistically significant evidence that the likelihood of safer practice increases with higher SRHR knowledge. In fact, an increase of 1 unit of knowledge (i.e., θ which varies from −4 to 4) is associated with about double the likelihood of engaging safely in sexual life.

DISCUSSION

This study used a sample of 767 rural and out-of-school adolescents from Ngozi in northern Burundi to explore their SRHR knowledge and how this affects their sexual health. Although we expected our SRHR knowledge test to be generally easy for adolescent people in the current digital era, results proved that the test was rather challenging. Indeed, results revealed that test takers would require a higher level of SRHR understanding with an average θ above 2.4 on the spectrum from −4 to 4 to attempt the whole set of SRHR knowledge questions (n=15). Nevertheless, the Rasch model indicates that a competence level of $\theta > 2.4$ implies a very high level of competence in the domain being investigated and is unlikely in many populations.[37–40] However, considering that the SRHR subject is a commonly discussed subject and prominent topic particularly among younger populations, we had expected that Burundian adolescents, although from the underprivileged setting, would considerably achieve a good level of SRHR knowledge. On the other side, our findings did not surprise us as they corroborate with many previous studies conducted on rural and out-of-school adolescents.[29 41] For instance, a 2020 study conducted on 7116 adolescents aged between 10 and 19 years in eight countries in SSA countries found that only 37.3% (95% CI 31.8 to 43.1) of them have comprehensive knowledge about menstruation and STIs.[29] Contrarily,

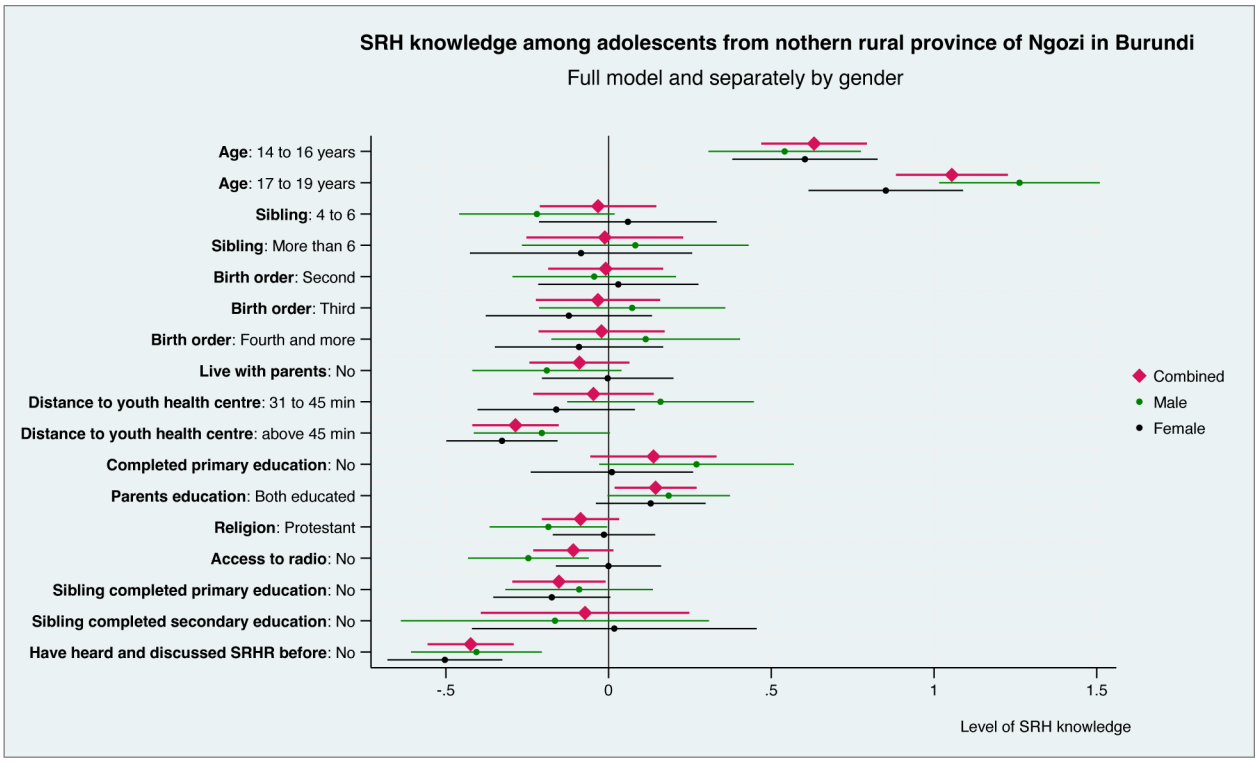

Figure 3 Determinants of SRH knowledge by gender. Represents the regression coefficients of socio-demographic determinants (Y axis) on SRHR knowledge among adolescents. We illustrate combined coefficients, for example, those generated by female and male together and separately by gender. SRH, sexual and reproductive health; SRHR, sexual and reproductive health and rights.

empirical evidence has shown that Ethiopian and Nigerian adolescents generally have advanced knowledge of SRHR[42] including modern contraception and STIs.[43 44] However, Kenya, Nigeria and South Africa have always been seen as consistent outliers regarding the socioeconomic context involving the SSA region.

Further, our SRHR knowledge test revealed that the most challenging topics concern condoms (eg, respondents have limited knowledge concerning whether condoms expire and surprisingly whether a condom can only be used once), menstruation with a lot of confusion regarding female periods and the risk of unplanned pregnancy, modern contraception with the vast majority of respondents apparently lacking knowledge of most contraception methods available in Burundi and STIs apart from HIV (eg, complete ignorance of sexual transmission of syphilis and hepatitis B). This evidence has a significant policy implication as it would help to design tailored SRHR educational sessions targeting out-of-school adolescents and young people in rural communities in Burundi and other comparable LMICs. Although evidence on knowledge deficit in specific SRHR subjects is generally sparse, the literature from other contexts has pointed to some adolescents specifically demonstrating little understanding of time periods when an unplanned pregnancy is likely to occur along the menstruation cycle.[43 44]

Another interesting and meaningful finding which has also been found in other similar African and Asian contexts concerns differences of SRHR knowledge between female and male adolescents.[42 45 46] Results revealed that before the age of 16 years, females have better SRHR knowledge than the male counterparts, but the latter become more knowledgeable of this subject than females past 16. This finding is contextually valid and was expected as Burundian male adolescents from around 15 years would have begun to befriend peers in the community, for example, playing football and other male games when they usually also discuss sexual topics among themselves. Unlike the previous ones, Burundian adolescent females are culturally less likely to meet their peers as Burundian parents are commonly sceptical about their female children befriending others, fearing possible sexual activities.

Indeed, socio-cultural norms around masculinity and femininity shape SRHR knowledge in many African contexts.[47 48] Older adolescent boys often participate in peer-to-peer discussions about sexuality and outdoor activities, which can broaden access to information, whereas girls face restrictive norms such as limited peer networks, heightened parental monitoring and greater stigma around sexual matters, making SRH conversations less common, partly because such discussions are often framed as encouraging sexual initiation.[49] These patterns help explain why SRH knowledge among Burundian female adolescents lags behind that of male adolescents despite comparable parental education, as even educated parents may nonetheless reproduce gender norms that

Table 2 Determinants of intentions for safer SRH practice

	Model 1 SRH attitude and behaviour		Model 2 Willingness to know HIV status	
	OR	95% CI	OR	95% CI
Age category				
14 to 16	1.16	(0.68 to 1.98)	0.69	(0.18 to 2.64)
17 to 19	1.74	(0.94 to 3.20)	2.51	(0.73 to 8.62)
Number of siblings				
4 to 6	1.35	(0.76 to 2.39)	2.86	(0.59 to 13.92)
More than 6	1.00	(0.46 to 2.16)	3.21	(0.55 to 18.84)
Birth order				
2nd child	0.89	(0.50 to 1.60)	0.95	(0.30 to 2.98)
3rd child	0.91	(0.49 to 1.69)	1.15	(0.36 to 3.64)
4th and more	0.93	(0.49 to 1.74)	1.35	(0.44 to 4.14)
Primary education				
No	0.87	(0.54 to 1.41)	1.65	(0.61 to 4.47)
Walking time to youth health centre				
31 to 45 min	0.73	(0.40 to 1.32)	0.35	(0.09 to 1.26)
More than 45 min	1.19	(0.77 to 1.85)	0.79	(0.35 to 1.75)
Live with parents				
No	1.36	(0.73 to 2.55)	2.24	(0.83 to 6.08)
Parents' education				
Educated parents (both)	1.39	(0.93 to 2.09)	1.38	(0.66 to 2.87)
Religion				
protestant	0.77	(0.53 to 1.13)	1.34	(0.68 to 2.65)
Radio possession				
No	0.98	(0.66 to 1.44)	1.67	(0.80 to 3.49)
Sibling with primary education				
No	1.11	(0.70 to 1.77)	0.66	(0.31 to 1.44)
Sibling with secondary education				
No	0.96	(0.34 to 2.71)	0.37	(0.11 to 1.26)
Heard about SRH				
No	0.48	(0.30 to 0.74)	0.70	(0.33 to 1.46)
SRH knowledge	1.99	(1.51 to 2.62)	1.92	(1.10 to 3.37)

Presents the determinants of intentions for safer SRH practice, highlighting the influence of various sociodemographic characteristics of respondents, their parents and siblings, and access to SRH information. It also describes the influence of prior SRH knowledge on intentions for safer SRH practice.

constrain mobility and access to information. Our findings further suggest that parental education and radio ownership are associated with higher SRHR knowledge among adolescent boys, but not girls, a disparity plausibly arising from the limited engagement of girls in parent-child discussions about sexuality; a pattern observed in several LMIC contexts.[50]

Finally, SRHR knowledge is higher among adolescents who have attained primary education, those whose parents or siblings have achieved secondary or tertiary education, adolescents who previously engaged in SRHR discussions at home or among peers or who heard this topic from the media (eg, radio), and those living nearer a youth health centre, and these results corroborate with previous studies.[28 42 51–54] Also, compared with males, the impact of long distance to a youth health centre is more pronounced for female adolescents, particularly because parents are less likely to allow their female children to go to a distant youth centre and further owing to the intrinsic physical ability of males to walk longer distances than females. Concerning SRHR practice, similar to existing evidence,[55 56] results from our study revealed that higher

SRHR knowledge results in higher likelihood of adolescents' intentions for safer sexual activities, for example, those with 1 point more competence on –4 to 4 scale are about twice (OR 1.99; 95% CI 1.10 to 3.37) more likely to intend to use a condom during sexual intercourse.

Strengths and limitations

This study presents strengths and limitations. First, it drew on a relatively large sample size (n=767) of out-of-school adolescents from the rural settings in northern Burundi, which is rarely studied as most research targets easy-to-reach communities. Second, the SRHR knowledge test drew on existing literature and was designed to capture the expected SRHR skillset of the study population. Third, we collected primary data and analysed it using the IRT model which, unlike summated scales such as percent scores and reduction methods such as principal component analysis, rests on the Bayesian concept that captures question difficulties and predicts the underlying competence level θ assuming that test takers had an opportunity to retake the exam repeatedly an infinite number of times. Unfortunately, we failed to capture impact metrics such as HIV status owing to ethical concerns which would have allowed us to correlate SRHR knowledge, practice and health outcomes. Another limitation concerned the SRHR knowledge tool which we did not validate using the Test Information Function of the Rasch model. Furthermore, measuring intention instead of actual SRHR behaviour captures planned rather than acted-upon behaviour and intention can be affected by social desirability, recall biases and changing circumstances, so self-reported intention at the time of interview may not translate into real practices. A final limitation concerns convenient sampling which could introduce selection bias with the sample overrepresenting easily reachable or willing participants and underrepresenting marginalised groups, thus limiting generalisability to the broader adolescent population and reducing external validity of the study findings.

CONCLUSION

This study augments existing evidence around SRHR among adolescents from LMICs. Using a sample of 767 out-of-school and rural adolescents from a northern setting in Burundi, we show that this population lacks the expected minimum SRHR knowledge level including relating condom use during sexual intercourse, as well as knowledge related to menstruation, contraception and STIs. Further, the multivariable regression demonstrates important gender gaps and proves the effect of education and previous SRHR discussion on boosting the overall SRHR knowledge which further determines intention for safer sexual practices. Findings from this study are policy relevant and could inform the design of tailored SRHR interventions targeted at out-of-school adolescents in rural settings of Burundi and similar low-income contexts, thus providing light for several actionable recommendations. The first and foremost recommendation regards the development and implementation of targeted SRHR education for out-of-school adolescents in rural Burundi, focusing on condoms, menstruation, modern contraception and STIs beyond HIV, using practical, context-appropriate modules. Another recommendation would address gender gaps, for example, by prioritising girls through the removal of mobility restrictions, the promotion of parental engagement in SRHR discussions and that of peer-group discussions and outdoor activity, opportunities that were found to boost SRHR knowledge among boys. A final recommendation is to strengthen access to youth SRH health services within reachable distance, and leverage radio and other media to broaden information sources. Finally, we suggest evaluating a programme that could ensure ethical, inclusive implementation to reduce gendered knowledge gaps.

Author affiliations
[1]Young Women's Knowledge and Leadership Institute Burundi, Bujumbura, Burundi
[2]Centre de Recherche Universitaire en Santé (CURSA), Department of Community Medicine, Faculty of Medicine, University of Burundi, Bujumbura, Burundi
[3]University of Global Health Equity (UGHE), Butaro, Rwanda
[4]AmplifyChange, Bath, UK
[5]Centre for Tropical Medicine and Global Health, Nuffield Department of Medicine, University of Oxford, Oxford, UK

Acknowledgements We acknowledge the contribution of health managers in Ngozi, namely the District Medical Officer and the Provincial Health Officer for their collaboration.

Contributors NM and DH collaboratively designed the study and analysed data. NM drafted the manuscript which was reviewed by DH. GN, YN and JBA supervised data collection and proofread the final manuscript. PN and JPN equally proofread the final manuscript. NM is the author guarantor for this manuscript.

Funding AmplifyChange funded data collection (agreement number R-202402-19532) but had no role in the study design and conduct.

Competing interests None declared.

Patient and public involvement Patients and/or the public were involved in the design, or conduct, or reporting, or dissemination plans of this research. Refer to the Methods section for further details.

Patient consent for publication Not applicable.

Ethics approval This study involves human participants. The study protocol, which included detailed consent and assent forms and premises on confidentiality and anonymity, was approved by the Ethics Committee of the Faculty of Medicine of the University of Burundi (Ethics certificate no 04/11/2024 of 4 November 2024). Further, data collectors were trained on these ethical aspects. Thus, we did not collect identifiable information, principles of confidentiality were adhered to, and a verbal consent was obtained from all participants aged above 10 years old. Indeed, based on WHO guidance for adolescent (aged 10–19) SRHR and the UNFPA technical brief to harmonise the age for adolescent SRHR in Africa, the minimum age for access to SRHR information and services is set at 10 years; below this age an assent from parents and guardians must be obtained. However, since our sample did not comprise adolescents under 10, parental consent was not needed.[57] Data are kept on a password-protected computer and only the PI and technical team of the project have access to it. It will be shredded after a period of 10 years in accordance with YOWLI BURUNDI's data protection and security policy. Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available upon reasonable request. The dataset and STATA command file are available and may be accessed upon reasonable request addressed to the first and corresponding author.

Supplemental material This content has been supplied by the author(s). It has not been vetted by BMJ Publishing Group Limited (BMJ) and may not have been peer-reviewed. Any opinions or recommendations discussed are solely those

of the author(s) and are not endorsed by BMJ. BMJ disclaims all liability and responsibility arising from any reliance placed on the content. Where the content includes any translated material, BMJ does not warrant the accuracy and reliability of the translations (including but not limited to local regulations, clinical guidelines, terminology, drug names and drug dosages), and is not responsible for any error and/or omissions arising from translation and adaptation or otherwise.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: https://creativecommons.org/licenses/by-nc/4.0/.

ORCID iDs
Nadine Misago https://orcid.org/0000-0003-4436-7448
Desire Habonimana https://orcid.org/0000-0003-0832-5558

REFERENCES

1 Woog V, Susheela S, Alyssa B, *et al*. Adolescent womens need for and use of sexual and reproductive health services in developing countries: citeseer. 2015.
2 Channon AA, Falkingham J, Matthews Z. Sexual and reproductive health and poverty. In: *Social determinants of sexual and reproductive health*. 2010: 73.
3 Gutiérrez JP, Leyva Flores R, Aracena Genao B. Social inequality in sexual and reproductive health in Ecuador: an analysis of gaps by levels of provincial poverty 2009-2015. *Int J Equity Health* 2019;18:49.
4 Ryan JA, Casapía M, Aguilar E, *et al*. Comparison of prenatal care coverage in early adolescents, late adolescents, and adult pregnant women in the Peruvian Amazon. *Intl J Gynecology & Obste* 2009;107:162–5.
5 Ronen K, McGrath CJ, Langat AC, *et al*. Gaps in Adolescent Engagement in Antenatal Care and Prevention of Mother-to-Child HIV Transmission Services in Kenya. *J Acquir Immune Defic Syndr* 2017;74:30–7.
6 Evens E, Otieno-Masaba R, Eichleay M, *et al*. Post-abortion care services for youth and adult clients in Kenya: a comparison of services, client satisfaction and provider attitudes. *J Biosoc Sci* 2014;46:1–15.
7 Ravindran TKS, Govender V. Sexual and reproductive health services in universal health coverage: a review of recent evidence from low- and middle-income countries. *Sex Reprod Health Matters* 2020;28:1779632.
8 World Health Organization. Critical considerations and actions for achieving universal access to sexual and reproductive health in the context of universal health coverage through a primary health care approach. 2022.
9 Narasimhan M, Pillay Y, García PJ, *et al*. Investing in sexual and reproductive health and rights of women and girls to reach HIV and UHC goals. *Lancet Glob Health* 2018;6:e1058–9.
10 Akwara E, Pinchoff J, Abularrage T, *et al*. The Urban Environment and Disparities in Sexual and Reproductive Health Outcomes in the Global South: a Scoping Review. *J Urban Health* 2023;100:525–61.
11 Aibangbee M, Micheal S, Liamputtong P, *et al*. Barriers to Sexual and Reproductive Health and Rights of Migrant and Refugee Youth: An Exploratory Socioecological Qualitative Analysis. *Youth* 2024;4:1538–66.
12 Maharaj NR. Adolescent pregnancy in sub-Saharan Africa - a cause for concern. *Front Reprod Health* 2022;4:984303.
13 World Health Organization. Sexual health and its linkages to reproductive health: an operational approach. Department of reproductive health and research, World Health Organization, Avenue Appia 20, 1211 Geneva 27, Switzerland. 2017.
14 Saarinen H. Human rights as the means, the goal and the absolute value: analysis of the use of human rights concept in legitimation of sexual and reproductive health and rights. 2020.
15 Mohammed Tohit NF, Haque M. Empowering Futures: Intersecting Comprehensive Sexual Education for Children and Adolescents With Sustainable Development Goals. *Cureus* 2024;16:e65078.
16 World Health Organization. *Working for a brighter, healthier future: how WHO improves health and promotes well-being for the world's adolescents*. Second edition, licence: CC BY-NC-SA 3.0 IGO. Geneva: World Health Organization, 2024.
17 Obong'o C, Zani A. Evaluation of the provision of sexual and reproductive health services to young people in Wagari and Karemo divisions, Siaya County, Kenya. *Am J Soc Sci Humanit* 2014;1:31–42.
18 Odo AN, Samuel ES, Nwagu EN, *et al*. Sexual and reproductive health services (SRHS) for adolescents in Enugu state, Nigeria: a mixed methods approach. *BMC Health Serv Res* 2018;18:92.
19 Tilahun T, Bekuma TT, Getachew M, *et al*. Assessment of access and utilization of adolescent and youth sexual and reproductive health services in western Ethiopia. *Reprod Health* 2021;18:85.
20 Denno DM, Hoopes AJ, Chandra-Mouli V. Effective strategies to provide adolescent sexual and reproductive health services and to increase demand and community support. *J Adolesc Health* 2015;56:S22–41.
21 Melesse DY, Mutua MK, Choudhury A, *et al*. Adolescent sexual and reproductive health in sub-Saharan Africa: who is left behind? *BMJ Glob Health* 2020;5:e002231.
22 Nibaruta JC, Kamana B, Chahboune M, *et al*. Prevalence, trend and determinants of adolescent childbearing in Burundi: a multilevel analysis of the 1987 to 2016-17 Burundi Demographic and Health Surveys data. *BMC Pregnancy Childbirth* 2022;22:673.
23 Moise IK, Verity JF, Kangmennaang J. Identifying youth-friendly service practices associated with adolescents' use of reproductive healthcare services in post-conflict Burundi: a cross-sectional study. *Int J Health Geogr* 2017;16:2.
24 Abajobir AA, Seme A. Reproductive health knowledge and services utilization among rural adolescents in east Gojjam zone, Ethiopia: a community-based cross-sectional study. *BMC Health Serv Res* 2014;14:1–11.
25 Ilori OR, Awodutire PO, Ilori OS. Awareness and Utilization of Adolescent Reproductive Health Services among In-School Adolescents in Urban and Rural Communities in Oyo State. *Niger Med J* 2020;61:67–72.
26 Habte A, Dessu S, Bogale B, *et al*. Disparities in sexual and reproductive health services utilization among urban and rural adolescents in southern Ethiopia, 2020: a comparative cross-sectional study. *BMC Public Health* 2022;22:203.
27 Zakaria M, Karim F, Mazumder S, *et al*. Knowledge on, Attitude towards, and Practice of Sexual and Reproductive Health among Older Adolescent Girls in Bangladesh: An Institution-Based Cross-Sectional Study. *Int J Environ Res Public Health* 2020;17:7720.
28 Iqbal S, Zakar R, Zakar MZ, *et al*. Perceptions of adolescents' sexual and reproductive health and rights: a cross-sectional study in Lahore District, Pakistan. *BMC Int Health Hum Rights* 2017;17:5.
29 Finlay JE, Assefa N, Mwanyika-Sando M, *et al*. Sexual and reproductive health knowledge among adolescents in eight sites across sub-Saharan Africa. *Tropical Med Int Health* 2020;25:44–53.
30 Wado YD, Bangha M, Kabiru CW, *et al*. Nature of, and responses to key sexual and reproductive health challenges for adolescents in urban slums in sub-Saharan Africa: a scoping review. *Reprod Health* 2020;17:149.
31 Baker FB, Kim S-H. *The basics of item response theory using R*. Springer, 2017.
32 Lawley DN. XXIII.—On Problems connected with Item Selection and Test Construction. *Proc Sect A, Math Phys Sci* 1943;61:273–87.
33 Hambleton RK, Swaminathan H. *Item response theory: principles and applications*. Springer Science & Business Media, 2013.
34 Das J, Hammer J. Which doctor? Combining vignettes and item response to measure clinical competence. *J Dev Econ* 2005;78:348–83.
35 Baker FB, Kim S-H, Baker FB, *et al*. The test characteristic curve. In: *The Basics of item response theory using R*. 2017: 55–67.
36 Cribari-Neto F, Zarkos SG. Bootstrap methods for heteroskedastic regression models: evidence on estimation and testing. *Econom Rev* 1999;18:211–28.
37 Mitchell-parker K, Medvedev ON, Krägeloh CU, *et al*. Rasch analysis of the Frost Multidimensional Perfectionism Scale. *Aust J Psychol* 2018;70:258–68.
38 Rahayu W, Putra MDK, Iriyadi D, *et al*. A Rasch and factor analysis of an Indonesian version of the Student Perception of Opportunity Competence Development (SPOCD) questionnaire. *Cogent Education* 2020;7:1721633.
39 Rasch G. *Probabilistic models for some intelligence and attainment tests*. ERIC, 1993.
40 Tennant A, Conaghan PG. The Rasch measurement model in rheumatology: What is it and why use it? When should it be applied, and what should one look for in a Rasch paper? *Arthritis Rheum* 2007;57:1358–62.
41 Tadesse T, Dangisso MH, Abebo TA. Sexual and reproductive health rights knowledge and reproductive health services utilization among rural reproductive age women in Aleta Wondo District, Sidama zone, Ethiopia: community based cross-sectional study. *BMC Int Health Hum Rights* 2020;20:4.

42 Sidamo B, Kerbo A, Gidebo D, *et al*. Predictors of sexual and reproductive health rights knowledge among Adoles-cents in Gamo zone, Southern Ethio-pia: a multi-level analysis. *J Afr Popul Stud* 2024;37:5293.
43 Abiodun O, Olu Abiodun O. Sexual and Reproductive Health Knowledge and Service Utilization among In-school Rural Adolescents in Nigeria. *J AIDS Clin Res* 2016;7.
44 Utaka EN, Sekoni AO, Badru FA. Knowledge and utilization of sexual and reproductive health services among young males in a slum area in Nigeria: A cross-sectional study. *Heliyon* 2023;9:e16289.
45 Simkhada P, Teijlingen E, Acharya D, *et al*. Sexual and reproductive health of adolescents in rural Nepal: Knowledge, attitudes and behavior. *Nepal Popul J* 2012;17:3–10.
46 Adhikari N, Uddin S, Sapakota KP, *et al*. Sexual and Reproductive Health Needs and Service Utilization among Adolescents in Nepal. *Am J Public Health Res* 2020;8:47–53.
47 Mugure NE. Determinants of gender differential in access and utilisation of reproductive health services among youth in Limuru. Kiambu County, Kenya: Kenyatta University, 2022.
48 Ouahid H, Sebbani M, Cherkaoui M, *et al*. The influence of gender norms on women's sexual and reproductive health outcomes: a systematic review. *BMC Womens Health* 2025;25:224.
49 Munea AM, Alene GD, Debelew GT, *et al*. Socio-cultural context of adolescent sexuality and youth friendly service intervention in West Gojjam Zone, Northwest Ethiopia: a qualitative study. *BMC Public Health* 2022;22:281.
50 Singh DR, Shrestha S, Karki K, *et al*. Parental knowledge and communication with their adolescent on sexual and reproductive health issues in Nepal. *PLoS One* 2023;18:e0289116.
51 Annor C, Alatinga KA, Abiiro GA. Is the presence of an adolescent reproductive health corner associated with adolescent knowledge and use of reproductive health services in Ghana? *Sex Reprod Healthc* 2021;27:100583.
52 Amankwaa G, Abass K, Gyasi RM. In-school adolescents' knowledge, access to and use of sexual and reproductive health services in Metropolitan Kumasi, Ghana. *J Public Health (Berl)* 2018;26:443–51.
53 Kemigisha E, Bruce K, Nyakato VN, *et al*. Sexual health of very young adolescents in South Western Uganda: a cross-sectional assessment of sexual knowledge and behavior. *Reprod Health* 2018;15:148.
54 Saha R, Paul P, Yaya S, *et al*. Association between exposure to social media and knowledge of sexual and reproductive health among adolescent girls: evidence from the UDAYA survey in Bihar and Uttar Pradesh, India. *Reprod Health* 2022;19:178.
55 Wakjira DB, Habedi DSK. Perceptions, knowledge and exercises of sexual and reproductive health rights and associated factors among adolescents in Arsi zone, Ethiopia: A sequential explanatory mixed method study. *Afr J Reprod Health* 2022;26:67–78.
56 Sousa B de, Santos RSD, Santana KC, *et al*. Sexual behavior and associated factors in rural adolescents. *Rev Saude Publica* 2018;52:39.
57 United Nations Population Fund. Technical brief: harmonization of minimum ages and adolescent sexual and reproductive health rights. In: *Consent to sex, marriage, and access to sexual and reproductive health services in East and Southern Africa*. 2020.