Knowledge and attitudes regarding contraceptive methods and sex education in students and parents of eight Colombian schools 2020–2021: a mixed methods study

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Summary

Background In Colombia, the average age of first sexual intercourse is between 14 and 15, and it has one of the highest fertility rates among adolescents in Latin America, which reflects poor access to health services and a lack of knowledge about contraception. Some laws support comprehensive sex education as a learning process that families and schools should provide. The objective of this work was to assess the frequency of adequate knowledge and attitudes of acceptance towards contraception in students, their associated factors, sexual behaviours in sexually active students, and experiences with sex education.

Methods Mixed methods study consisting of an analytical cross-sectional study and a qualitative hermeneutic phenomenological study. The former included students who completed a questionnaire with sociodemographic variables, surveys on knowledge and attitudes toward contraception, and questions about sexual behaviour. Focus groups were used in the qualitative study to evaluate students' and parents' sex education experiences.

Findings 827 students were surveyed, of whom 52.3% had adequate knowledge about contraceptives and 80.1% had attitudes of acceptance. Talking with parents about sex education, receiving sex education, and being in the eleventh grade increased the likelihood of having adequate knowledge. Each year of age, being male, being a victim of forced displacement, and studying in a public school were associated with lower possibilities of attitudes of acceptance. Using condoms, compared to other contraceptives, was associated with less adequate knowledge and attitudes of acceptance ($p < 0.05$). Experiences with sex education, contraception, and sexual and reproductive rights were three emerging categories in the focus groups.

Interpretation In a group of Colombian high school students, half of them had adequate knowledge, eight out of 10 had attitudes of acceptance about contraception, and both were associated with having received sex education. Nevertheless, different types of barriers to sexual education were identified at home and in schools. The results will allow the generation of educational policies that modify the educational model as well as new strategies by health professionals to raise awareness about responsible sexuality.

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Keywords: Sex education; Contraception; Knowledge; Attitude; Sexual and reproductive health; Parents

Introduction

Comprehensive sex education involves a continuous learning process and encompasses multiple dimensions (emotional, social, cognitive, physical, and behavioural) around the development of sexuality to achieve well-being, health, and awareness.[1] It also involves human growth, interpersonal relationships, rights, values, cultural diversity, behaviour, and sexual and reproductive health. The latter aspect includes, among others, family planning, defined by the World Health Organization (WHO) as the strategy "that allows people to attain their desired number of

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Research in context

Evidence before this study

The authors structured an information matrix where articles were included without exclusion by design, language, date, or region. Databases such as PubMed, Lilacs, Embase, Google Scholar and Cochrane were searched, and university repositories were explored as a source of grey literature. The keywords used were: Sex Education, Contraception, Knowledge, Attitude, Sexual and Reproductive Health, and Parents. Additionally, they were crossed with terms such as descriptive, analytical, and mixed studies. All current Colombian legislations related to public policy on sexual and reproductive education were consulted, as well as the national demographic and health survey, which is part of the development plans. Finally, the World Health Organization and the Pan American Health Organization guidelines were taken into account, which allowed guiding the project according to the global development objectives and the Organization for Economic Co-operation and Development (OECD).

As part of the problem statement of this project, the available literature was reviewed to argue the research question, finding mainly descriptive studies that inquired about knowledge about contraceptive methods and sexual education without exploring associations between variables. In the same way, African and European studies that addressed similar objectives with a similar context to the Colombian one were taken into account. No national or international mixed (qualitative-quantitative) studies were found that included the family and teachers as a unit of information to understand the phenomenon comprehensively and holistically. This last argument was the main reason to carry out the project, trying to innovate from the methodological point of view and address the issue from different perspectives that allow better finding solutions of a preventive and educational order.

Added value of this study

This study's results provide elements and arguments to the available evidence that can better explain the lack of knowledge about contraceptive methods and the gaps regarding sexual education. In addition, it provides quantitative aspects that describe and associate social, cultural, demographic, and gender variables with knowledge and attitudes toward contraceptive methods. From the qualitative point of view, the importance of interaction with the family and the school environment is deepened and established, which are leading factors in sexual education. Both scenarios play a relevant role and provide educational tools from different perspectives to strengthen sexual education and adolescent life projects, which is why neither of these pillars (parents and teachers) should be excluded from this learning process. These findings give way to a participatory construction of tools and strategies that are more in line with the current situation of adolescents and the availability of information.

Implications of all the available evidence

Currently, Colombian educational policy includes mandatory sexual and reproductive education activities in schools throughout the country regardless of their geographical location. Additionally, all institutions must train their teachers on these issues to offer adequate guidance in sexual development from childhood. However, the difficulties of access and economic resources do not allow this objective to be achieved, which directly impacts adolescents and their sexuality, especially in rural areas where cultural aspects are a barrier that increases ignorance. For this reason, the results and the proposal generated by this study would allow the structuring of permanent training that is built from the specific needs found, as well as the possibility of taking advantage of virtuality to give it continuity and follow-up. Nowadays, education sources should not be limited exclusively to bibliographic material or master classes; students, parents, and teachers can access virtual bibliographic sources that offer reliable and certified information and health personnel through electronic means. It is expected to propose an educational model in a future investigation, which can impact reducing risky sexual behaviors, and unwanted pregnancies, raising awareness about the importance of making informed decisions, and generating long-term oriented critical thinking.

These study results were socialized in the participating schools, with students, teachers, families, and school administrators, who identified shortcomings in which they must work and reinforced the strengths of their sexual education programs. In these same schools, it is intended to carry out the second phase of the project applying a pedagogical intervention tool with the subsequent evaluation of knowledge and attitudes about contraceptive methods and sexual education.

children, if any, and to determine the spacing of their pregnancies".[2]

In Colombia, 69.9% and 52.7% of sexually active women and male adolescents, respectively, do not use contraceptives.[3] These figures reflect poor access to health services and a lack of knowledge about birth control; they also explain the incidence of sexually transmitted infections (STIs) and unplanned pregnancies.[3] These scenarios are common during adolescence, given that the average age of the first sexual intercourse is between 14 and 15.[4]

Local studies show that Colombia has one of the highest adolescent fertility rates in Latin America, with 77.7 cases per 1000 live births.[5] One in five adolescents between 15 and 19 years of age has been pregnant at least once, more often in rural areas, where education

and health disparities, as well as violence, prevail.[3,5] Moreover, approximately 98,400 cases of STIs are reported annually, of which 34% occur between 20 and 29 years, followed by adolescents (10–19 years) with 12.3%.[6] The impact of these facts is evident in psychosocial aspects and labour development since unemployment among women who have had a pregnancy during adolescence is 16.5% compared to 11.9% of those who postponed motherhood.[5] Additionally, the early initiation of sexual relations has been associated with low knowledge about sexual education; however, the perception of sexuality becomes an important aspect when facing the first sexual relationship responsibly and being consistent with the physical and mental health risks involved.[7,8] This situation exposes a public health issue that hurts development, psychological and educational processes, as well as economic, social, labour, and health implications. Therefore, it is essential to promote counselling, supportive networks, communication, and education, to understand the shared responsibility of parents and teachers in the processes of comprehensive sex education and to stop perceiving sexuality as a taboo and recognise it as a fundamental right and a dimension of the human being,[9] where the triangulation between educational institutions, the family and adolescents themselves constitutes a strategy for sexual and reproductive education.

Parents and schools are part of this educational process and play a vital role in developing biological, psychological, affective, and social aspects. Understanding the importance of sex education, not only from the risk factors point of view but also from the role and synergy between adolescents, parents, and educational institutions, makes it possible to guarantee a comprehensive education that offers knowledge, attitudes, skills, and values for the constant search for health, well-being, dignity, and respectful social and sexual relations.[10] Consequently, communication and dialogue must be accompanied by a formative process in which adolescents discover their sexuality and self-awareness, guaranteeing the exercise of sexual and reproductive rights.

No studies in the local literature have identified associated factors with inadequate knowledge about contraception and sex education. Therefore, the present study addresses this knowledge gap to evaluate the frequency of adequate knowledge and attitudes of acceptance towards contraceptive methods in ninth, tenth, and eleventh-grade students from eight schools located in five geographic regions of Colombia, as well as the associated factors, sexual behaviours in sexually active students and the experiences of students and parents about sex education in the years 2020–2021.

Methods

Mixed methods study (concurrent nested or embedded dominant model), divided into two stages: a dominant, quantitative (STAGE I) and a nested, qualitative (STAGE II). Both approaches were used to analyse the information and were interpreted, compared, and integrated into the analysis.

Stage I

An observational analytical cross-sectional study was carried out. 15 schools were invited to participate due to the institutional agreement and approach of the authors. Schools' selection was made at convenience after contacting the directors and their voluntary acceptance, no random sampling was carried out. Eight Colombian public or private schools located in rural or urban areas agreed to participate. Ninth, 10th, and 11th-grade students were included; participation consisted of completing a self-administered virtual or physical questionnaire that had three sections: 1) questions on sociodemographic characteristics, history of sex education, and sexual behaviours; 2) contraceptive knowledge scale; and 3) attitudes towards contraceptive methods scale.[11] In the initial phase of the project, the cross-cultural adaptation of the two scales was carried out to allow their application to Colombian participants, taking into account that these were developed in Peru; this process has already been published.[12] A translated version of the survey is available in the Supplementary Materials. Students who did not entirely respond to the questionnaires, did not consent to participate voluntarily, and did not have written parental permission were excluded from the study.

The sample size to estimate the difference between the two population proportions was calculated using a pilot test with 250 students. The following assumptions were considered: confidence level of 95%, power of 80%, sample size ratio of 1, percentage of students with no communication about sex education with parents and adequate knowledge about contraceptives (proportion 1) 45%, and percentage of students with communication about sex education with parents and adequate knowledge (proportion 2) 57%. A total sample size of 546 students was estimated, 273 for each group (p1 and p2).

Analysis

Due to their nonparametric distribution, continuous data were expressed as medians (Me) and interquartile ranges (IQR). Categorical data were expressed as absolute and relative frequencies. The association between knowledge or attitudes about contraceptive methods[13] and independent variables was estimated through a bivariate analysis including all the participants in the study. Independent variables were sociodemographic characteristics (age, sex, sexual orientation, grade, type of school, forced displacement), sources of sex education, and those related to sexual activity (age at first sexual intercourse, current sexual partner, sexual intercourse without the use of any contraceptive method, use of contraceptive methods at first intercourse, use of

contraceptive methods at last intercourse, sexual intercourse without the use of any contraceptive method, previous pregnancy, contraceptive method currently used, contraceptive method used in first sexual intercourse). Adjusted logistic regression was performed for the knowledge and attitude outcomes, including sociodemographic variables and history of sex education.

Statistical analysis was performed using Stata 16®. A sub-analysis was performed in sexually active students (those who have had previous sexual intercourse). Associations between knowledge about or attitudes towards contraceptive methods with the variables on sexual behaviours were calculated. An adjusted logistic regression model was performed for each of the dependent variables. The Hosmer–Lemeshow test was applied for logistic regression models. A value *of* p <.05 was statistically significant.

Stage II

Qualitative hermeneutical phenomenological study

The sample size was estimated based on information saturation and non-probability purposive sampling. Students from ninth to 11th grade and parents from the same schools were included. They were invited to participate voluntarily through the academic coordinators of the institutions. Information was collected through 15 focus groups (eight with students and seven with parents) in which six and 10 subjects participated voluntarily. Its development was virtual, with a maximum duration of 90 min. The sessions were recorded on the Hangouts Meet platform for later transcription. It uses a semi-structured group interview script for each group of actors. The information was manually operated on Excel matrices to analyse and interpret the results to build the emerging categories of final analysis and compare between study populations following the proposal of Strauss and Corbin. To guarantee the scientific quality of the study, the following criteria of methodological rigour were applied: Credibility, Reflexivity, and Transferability.

Ethical considerations

International and local ethical rules were considered as some participants were minors, and sensitive issues were addressed. Both the study participants and their parents signed out an informed consent for the collection of information. The project and the results were presented to all school boards. This research project was submitted to and approved by a Human Research Ethics Committee.

Role of the funding source

The funding source was a research call from the Fundación Universitaria de Ciencias de la Salud–FUCS (DI-I-0392-20), which financed the project and had no intervention in the data collection or construction of the manuscript.

Results

Stage I

General characteristics

Of the 853 questionnaires applied, 26 were discarded, nine of those were discarded because they were incorrectly completed, 12 students did not have the informed consent signed by their parents, and five students regretted participating despite having authorization from their parents. A total of 827 students from the last three grades of eight schools located in five geographic regions of Colombia were included. 52.3% had adequate knowledge about contraceptive methods, and 80.1% had attitudes of acceptance toward contraception. 542 (65.5%) students had adequate communication about sex education with their parents, and 693 (83.8%) had received sex education (Fig. 1). The median age was 16 years (IQR 15–17), 56.9% were female, 11.4% were bisexual, 2.7% were homosexual, and 200 students were in a relationship. Finally, 58.4% lived with both parents, and 33.2% with only one parent. Other general characteristics are shown in Table 1.

Bivariate analysis

Communication with parents on topics related to sex education and a history of sex education were associated factors with adequate knowledge and attitudes of acceptance towards contraception (Fig. 1). Adequate knowledge and attitudes of acceptance towards contraceptives were 40% lower in students from public schools compared to private schools and in males compared to females. Sexual orientation, different sources of sex education, and other variables are presented in Table 1.

Multivariate analysis

Parent-child dialogue about sex education was associated with adequate knowledge or attitudes of acceptance towards contraception. A history of receiving sex education, being male, being a victim of forced displacement due to violence, and being a student in a public school was also associated with lower possibilities of adequate knowledge about contraceptive methods. Age was associated with lower attitudes toward contraceptive acceptance (OR 0.89; 95% CI 0.3–0.8). Table 2 shows the two logistic regression models selected based on the AIC and BIC criteria, which had an adequate statistical fit.

Sexual behaviours in sexually active students

Of the total respondents, 266 (32.1%) had initiated sexual activity, of which 52.2% were female and 47.7% were male. Of these, 148 (55.5%) had had two or more sexual partners, and 76 (28.5%) had sex with multiple partners (friends or acquaintances). 77.4% and 74% reported using some method of contraception during the first and the last intercourse, respectively. In turn, 167 (62.7%) had had at least one sexual intercourse without any contraceptive method, and 13.1% had

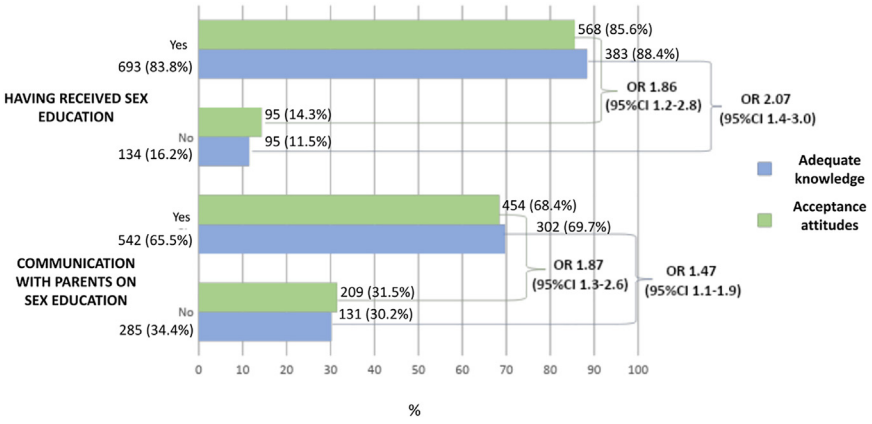

Fig. 1: History of sex education as a factor associated with adequate knowledge about and attitudes of acceptance towards contraceptive methods. Bivariate analysis.

Variables	Total (n = 827)	Knowledge about contraceptive methods[a]				Attitudes toward contraceptive methods[a]			
		Adequate	Inadequate	OR (95% CI)	p value	Acceptance	Rejection	OR (95% CI)	p value
		433 (52.3%)	394 (47.6%)			663 (80.1%)	164 (19.8%)		
Age Me (IQR)	16 (15–17)	16 (15–17)	16 (15–17)	1.0 (0.9–1.0)	0.68	16 (15–17)	16 (15–17)	0.9 (0.8–0.9)	**0.02**
Sex									
Female	471 (56.9)	267 (61.6)	204 (51.7)	1		392 (59.1)	79 (48.1)	1	
Male	356 (43.0)	166 (38.3)	190 (48.2)	0.6 (0.5–0.8)	**0.004**	271 (40.8)	85 (51.8)	0.6 (0.4–0.9)	**0.01**
Sexual orientation									
Heterosexual	709 (85.7)	363 (83.8)	346 (87.8)	1		546 (85.0)	145 (88.4)	1	
Homosexual	23 (2.7)	10 (2.3)	13 (3.3)	0.7 (0.3–1.6)	0.46	18 (2.71)	5 (3.0)	0.9 (0.3–2.5)	0.88
Bisexual	95 (11.4)	60 (13.8)	35 (8.8)	1.6 (1.0–2.5)	**0.02**	81 (12.2)	14 (8.5)	1.4 (0.8–2.6)	0.19
Grade									
Ninth	187 (22.6)	79 (18.2)	108 (27.4)	1		142 (21.4)	45 (27.4)	1	
Tenth	288 (34.8)	150 (34.6)	138 (35.0)	1.4 (1.0–2.1)	**0.03**	230 (34.6)	58 (35.3)	1.2 (0.8–1.9)	0.31
Eleventh	352 (42.5)	204 (47.1)	148 (37.5)	1.8 (1.3–2.6)	**<0.001**	291 (43.8)	61 (37.2)	1.5 (0.9–2.3)	0.06
Type of school									
Private	306 (37.0)	179 (41.3)	127 (32.2)	1		257 (38.7)	49 (29.8)	1	
Public	521 (63.0)	254 (58.6)	267 (67.7)	0.6 (0.5–0.8)	**0.007**	406 (61.2)	115 (70.1)	0.6 (0.4–0.9)	**0.03**
Sources of sex education									
None	66 (7.9)	23 (5.3)	43 (10.9)	1		38 (5.7)	28 (17.0)	1	
Parents	254 (30.7)	134 (30.9)	120 (30.4)	2.0 (1.1–3.6)	**0.01**	202 (30.4)	52 (31.7)	2.8 (1.6–5.0)	**<0.001**
School	255 (30.8)	136 (31.4)	119 (30.2)	2.1 (1.2–3.7)	**0.008**	207 (31.2)	48 (29.2)	3.1 (1.7–5.6)	**<0.001**
Friends	63 (7.6)	29 (6.7)	34 (8.6)	1.5 (0.7–3.2)	0.19	49 (7.3)	14 (8.5)	2.5 (1.1–5.5)	**0.01**
Internet	189 (22.8)	111 (25.6)	78 (19.8)	2.6 (1.4–4.7)	**<0.001**	167 (25.1)	22 (13.4)	5.5 (2.9–10.8)	**<0.001**
From whom would you like to receive sex education?									
School	153 (18.5)	64 (14.7)	89 (22.5)	1		110 (16.5)	43 (26.2)	1	
Parents	59 (7.1)	26 (6.0)	33 (8.3)	1.0 (0.5–2.0)	0.76	35 (5.2)	24 (14.6)	0.5 (0.3–1.0)	0.07
Friends and Internet	55 (6.6)	22 (5.0)	33 (8.3)	0.9 (0.4–1.7)	0.81	43 (6.4)	12 (7.3)	1.4 (0.6–2.9)	0.36
Health professionals	560 (67.7)	321 (74.1)	239 (60.6)	1.8 (1.3–2.6)	**<0.001**	475 (71.6)	85 (51.8)	2.18 (1.4–3.3)	**<0.001**

Bivariate analysis. Bold indicates statistically significant p value. [a]Knowledge scale: minimum score of 0 and a maximum score of 16, adequate knowledge of contraceptive methods was considered between 11 and 16 points. Attitude scale: a score between 24 and 53 points suggests attitudes of rejection towards contraceptive methods, and between 54 and 72, attitudes of acceptance.

Table 1: **Knowledge and attitudes towards contraceptive methods according to general characteristics.**

Adequate knowledge of contraceptive methods[a]				Attitudes of acceptance toward contraceptive methods[b]			
n = 433 (52.3%)				n = 663 (80.1%)			
Variables		OR (95% CI)	p value	Variables		OR (95% CI)	p value
Communication on sex education with parents[c]		1.40 (1.0–1.9)	**0.046**	Communication on sex education with parents[c]		1.99 (1.3–3.0)	**<0.001**
Having received sex education[c]		1.65 (1.04–2.6)	**0.03**	Having received sex education[c]		1.26 (0.7–2.1)	0.4
Forced displacement[c]		0.54 (0.3–0.9)	**0.02**	Forced displacement[c]		0.59 (0.3–1.0)	0.06
Sex	Female	1		Sex	Female	1	
	Male	0.57 (0.4–0.8)	**<0.001**		Male	0.56 (0.3–0.8)	**0.006**
Sources of sex education	Nowhere	1		Sources of sex education	Nowhere	1	
	Parents	1.13 (0.5–2.2)	0.71		Parents	1.51 (0.7–3.1)	0.26
	School	1.15 (0.5–2.2)	0.67		School	2.22 (1.0–4.5)	**0.02**
	Friends	0.94 (0.4–2.0)	0.88		Friends	1.85 (0.8–4.2)	0.14
	Internet	1.45 (0.7–2.7)	0.25		Internet	3.77 (1.8–7.8)	**<0.001**

Adjusted logistic regression (n = 827). Bold indicates statistically significant p value. [a]Hosmer–Lemeshow test 52. [b]Hosmer–Lemeshow test 17. [c]Binary predictors–the reference groups are the "No" for the questions.

Table 2: **Associated factors with knowledge about and attitudes towards contraceptive methods.**

children. Finally, 51.1% showed adequate knowledge of contraceptive methods, and 81.2% showed attitudes of acceptance toward contraception.

Bivariate analysis

The use of any contraceptive method during the first sexual intercourse was associated (OR 2.34, 95% CI 1.2–4.2) with adequate knowledge about contraceptive methods and with attitudes of acceptance (OR 2.33, 95% CI 1.1–4.5). Similarly, having used some contraceptive methods during the last intercourse was associated with adequate knowledge and attitudes of acceptance towards contraception (OR 2.27, 95% CI 1.2–4.0) and (OR 2.53, 95% CI 1.3–4.8), respectively. Students who had had sexual intercourse without using any method were 70% and 60% less likely to have adequate knowledge and attitudes of acceptance toward contraception, respectively. No statistically significant associations were found between the number of sexual partners, age at first sexual intercourse, or use of emergency contraception with knowledge or attitudes towards contraceptive methods. Table 3 depicts the unadjusted logistic regression.

Multivariate analysis

There was no statistically significant association between the communication with parents about sex education and the subgroup of sexually active students. In contrast, the likelihood of having adequate knowledge about contraceptive methods was lower in students who had had sex without using any contraceptive method and in those who currently use condoms compared to those who resort to hormonal or non-hormonal methods when including the other variables (Table 3).

Stage II

Five categories emerged based on the perceptions and experiences of parents and students about sex education. Fig. 2 describes the characteristics of each one of them, and Table 4 illustrates some of the participants' stories.

Category 1: sex education

Young people express that sexual education is approached with fear, requesting the intervention of professionals who can guide them in their doubts without being judged. Parents agree that sex education is based on biological and physiological aspects. They reiterate that the religious influence in their teaching strengthens the subject as a taboo. Young people consider their role from the search and validation of information sources, are willing to receive guidance and learn from scientific evidence, strengthen aspects such as self-esteem, and become replicators of information with social sense, respecting rights and recognizing diversity.

The role of parents must be based on understanding and support without judgment, recognising and respecting the sexual and reproductive rights of young people, for which it is essential to update themselves and generate spaces of proximity with their children in a framework of trust, assertiveness and unprejudiced. They reiterate that the home is a facilitating factor for sexual education where they can address their doubts without being judged.

Regarding the barriers expressed by the students, the lack of sexual education and communication that their parents have was found, as well as the fact that low economic resources directly impact the acquisition of contraceptive methods and assistance to healthcare professionals, specialized health, who generate trust without question.

Category 2: perception of sexuality as a dimension of the human being

The parents did not express anything regarding this category, while the students were much broader in

Adequate knowledge of contraceptive methods[a] (n = 136)				Attitudes of acceptance towards contraceptive methods[b]			
Variables		OR (95% CI)	p value	Variables		OR (95% CI)	p value
Unadjusted logistic regression							
Communication on sex education with parents[c]		1.6 (0.9–2.7)	0.49	Communication on sex education with parents[c]		2.0 (1.0–3.8)	**0.02**
Age at first sexual intercourse		1.1 (0.9–1.2)	0.11	Age at first sexual intercourse		1.0 (0.8–1.2)	0.53
Current sexual partner[c]		0.6 (0.4–1.1)	0.12	Current sexual partner[c]		0.5 (0.2–0.9)	**0.044**
Sexual intercourse without the use of any contraceptive method[c]		0.3 (0.2–0.6)	**<0.001**	Sexual intercourse without the use of any contraceptive method[c]		0.4 (0.1–0.8)	**0.01**
Use of contraceptive methods at first intercourse[c]		2.3 (1.2–4.2)	**0.005**	Use of contraceptive methods at first intercourse[c]		2.3 (1.1–4.5)	**0.01**
Use of contraceptive methods at last intercourse[c]		2.2 (1.2–4.0)	**0.004**	Use of contraceptive methods at last intercourse[c]		2.5 (1.3–4.8)	**0.005**
Adjusted logistic regression							
Communication on sex education with parents[c]		1.46 (0.8–2.5)	0.16	Communication on sex education with parents[c]		1.84 (0.9–3.6)	0.07
Age at first sexual intercourse		1.07 (0.9–1.2)	0.38	Use of contraceptive methods at first intercourse[c]		1.24 (0.4–3.0)	0.64
Use of contraceptive methods at first intercourse[c]		1.65 (0.7–3.4)	0.19	Use of contraceptive methods at last intercourse[c]		1.47 (0.6–3.4)	0.38
Use of contraceptive methods at last intercourse[c]		1.7 (0.8–3.4)	0.11	Sexual intercourse without the use of any contraceptive method[c]		0.67 (0.2–1.5)	0.36
Sexual intercourse without the use of any contraceptive method[c]		0.48 (0.2–0.8)	**0.01**	Pregnancy[c]		0.26 (0.09–0.7)	**0.01**
Method currently used	Hormonal or non-hormonal	1		Current sexual partner[c]		0.56 (0.28–1.15)	0.11
	None	0.90 (0.3–2.0)	0.80	Method currently used	Hormonal or non-hormonal	1	
	Condom	0.52 (0.2–0.9)	**0.042**		None	0.11 (0.02–0.4)	**0.003**
					Condom	0.10 (0.02–0.4)	**0.002**

Unadjusted and adjusted logistic regression. Bold indicates statistically significant p value. [a]Hosmer–Lemeshow test 54. [b]Hosmer–Lemeshow test 56. [c]Binary predictors–the reference groups are the "No" for the questions.

Table 3: **Associated factors (sexual behavior) with knowledge about and attitudes towards contraceptive methods in sexually active students.**

their description, stating that sexuality is an expression of the human being that occurs from birth to death; they also describe it as a social, multidimensional, and dynamic construction related to social aspects, gender roles, and power relations, the social environment in the free development of sexuality, considering

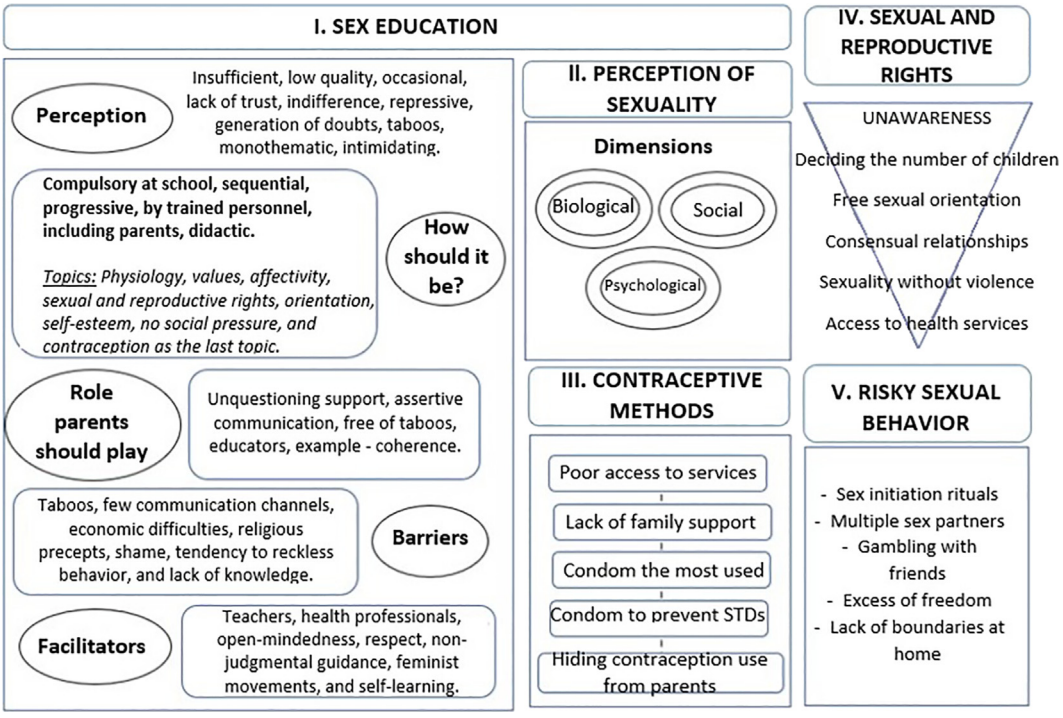

Fig. 2: Emerging categories of Stage II (Qualitative stage).

***Category 1**: Sex education*	***PG3P9** "... Sex education taught to school children is necessary, yet it is lacking in our country, which is a major problem ... Students believe that sex education is only about sex ... It would be really good to have experts in schools."*
	***SG1P13** "... Current sex education is mainly focused on avoiding sexual encounters ... They show us graphic pictures of the diseases that people can get, which is true, but I think they show too many terrifying cases for us to be scared and not have sexual relations, in my opinion."*
	***SG1P10** "... Parents should also receive sex education because it is more than evident that we teenagers know much more than they do, so they treat sexuality as a taboo subject, push us away, and restrict us."*
	***SG4P2** "... At home, I do not talk much about this with my mother, and I learned what I know in some talks given at school or by researching on the Internet, listening to people with experience and classmates who also have sexual experiences."*
***Category 2:** Perception of sexuality as a dimension of the human being*	***SG1P8** "It is the social construction of a biological drive, which is also multidimensional and dynamic. A person's experience of sexuality is mediated by biology, gender roles, and power relations, as well as by factors such as age and social and economic status."*
	***SG3P7** "... Sexuality is anything that relates to sexuality or any feeling that can produce pleasure or a certain degree of satisfaction when performing an action or activity."*
	***SG1P12** "Sexuality refers to a fundamental dimension of the human being based on sex and gender, sexual orientation, eroticism, bonding, and love and reproduction."*
	***SG4P1** "I think it has to do with the behaviors we have regarding our sex life, our desires, our pleasure ... I imagine that with the sexual act."*
***Category 3:** Contraceptive methods*	***SG4P6** "... Those are methods that help us to protect ourselves, but not all of them are reliable ... No contraceptive method is 100% effective because there are contraceptive methods that are only useful to protect you from pregnancy or to protect you from a disease ...."*
	***SG1P5** "The psychological consequences of having a child when these methods do not work are that the child will suffer because the parents do not have emotional education, considering that we usually educate them directly through physical violence or threats, which I don't think is the right way to do things."*
***Category 4:** Identification of sexual and reproductive rights*	***SG1P6** "... The issue of legal and safe abortion is what feminists are fighting for today because sexual and reproductive rights have a lot to do with orientation and our intimate partner ... I had not heard about reproductive rights or something like that before ..."*
	***SG3P6** "... It knows how to say no and how to have a consensual relationship, because two people can agree to have sexual relations with a condom, and if the other person takes it off, it would be a breach of the agreement and a violation of the other person's rights ...."*
	***PG1P6** "... These rights not only have to do with reproduction and deciding when sexual life starts ... These rights also apply to younger children as they grow up and have sexual orientations contrary to their gender ...."*
***Category 5:** Risk practices*	***PG1P4** "There are boys who take advantage of the fact that their parents go to work and bring people to the house to have sex there as if it were an hourly hotel. Sometimes they even challenge each other to see who loses their virginity better or faster, or who has sex with more people ...."*
	***PG1P4** "Obviously we all have to start our intimate life at some point, that is natural, let's put it that way, but reckless behavior to a certain extent is ... For me, the reckless behavior of many teenagers or young adults is a good example for others."*

In each account, the first letter (S or P) refers to the person who told the story: student or parent. The second letter (G) corresponds to the focus group with its number. The last letter (P) corresponds to the participant number.

***Table 4:** Emerging categories and narratives in focus groups.*

machismo as a factor that limits the experience of sexuality in women.

Category 3: contraceptive methods

Students report that there is little training in sexual education for adolescents, a lack of knowledge about free information services and accessibility, barriers to access to information, little family support for the free exercise of sexual and reproductive rights, and a lack of economic resources as a significant barrier to the acquisition of contraceptive methods. In this line, they refer to the scarcity of economic resources as an essential barrier to the acquisition of contraceptive methods.

Category 4: identification of sexual and reproductive rights

Parents and youth affirm that these rights are universal and must be respected at all moments of the life course. They recognise some rights, such as the right to decide on the beginning of sexual life, consent to sexual relations, the right to decide on gestation, the right to express sexual orientation freely, and the right not to be discriminated against because of it. However, some recognize a general need for more knowledge of these rights.

Category 5: risk practices

Among the risk practices to avoid pregnancy or abortion are consumption of cinnamon and pineapple, hitting the abdominal region, and jumping for prolonged periods after sexual intercourse. Parents describe some challenges that young people face before the beginning of their sexual life, such as "having several sexual partners."

Discussion

Currently, there is insufficient training on sex education in schools and homes. In Colombia, as in other countries, most schools lack institutional programs on sex education, and there are few spaces at home for parents and children to discuss these issues.[3] Despite the existence of regulations that support its mandatory nature, the fact that it is a fundamental human right, and although sex education is recognized as essential and

necessary, there are still shortcomings and difficulties in its implementation and normalisation.[1,14]

In this study, more than half of the students had talked to their parents about sex education, and more than a third reported receiving sex education; the primary sources of information, in equal proportion, were parents and teachers. Similar results were obtained in 600 students from The Gambia, where 42.2% discussed contraception with their parents,[15] and in a local study, where 62% of the respondents discussed sexuality with different sources of information.[16] Another study reported less communication between parents and children about sexual and reproductive health, in which 21.3% had discussed at least four topics about sexuality in the last six months with their parents.[17] These results suggest that the approach to sex education varies among homes and institutions, regardless of the methodology used. The need for the constant accompaniment of young people during this educational process is recognized to mitigate the negative consequences of misinformation.

Several studies identify teachers as the primary source of information and learning regarding sex.[18–20] However, the students and parents who participated in our study considered school teachings on sex education as scarce, superficial, and occasional. These appreciations coincide with Munakampe and colleagues,[21] who identified the opinion of adolescents on the sex education received in schools as insufficient and manifested the need for more detailed information that, instead of focusing on negative consequences and risks, included topics on how to lead a responsible sexual life, self-esteem, and affectivity. Implementing sex education programs should be part of the academic curriculum, and teachers should develop strategies that involve the family as part of the comprehensive education process.[22] Other studies state that parents are the first source from which adolescents obtain information.[4,21,23–25] However, there are barriers to initiating dialogues on sexuality at home, such as shame, ignorance, distrust, denial, fear of legitimizing the initiation of sexual life, religious dogmas, lack of time, and generational gaps, among others.[15,22,26] For this reason, it is necessary to build relationships based on trust, to start the teaching process from a young age with basic subjects according to age, use appropriate language, transform educational paradigms, and rely on external people who can contribute assertively to the education of children.[9,27]

Sex education is usually addressed for the first time during adolescence, as it is considered a stage of greater vulnerability and susceptibility to adopt risky behaviours.[23] To avoid these behaviours, sex education has been erroneously limited to biological and reproductive aspects, generating the false perception that it comprises only sexual relations, pregnancies, and contraceptive methods.[23] Parents participating in this study considered that this could be explained by the fact that in schools, sex education is provided by natural science teachers. They point out that the person in charge of sex education should have training in the area and be able to approach the topic comprehensively, from different perspectives, and solve the doubts and needs that may arise. It is recommended that institutions have a sexual education subject included in the school curriculum according to the school level through open learning, which manages thematic spaces naturally, including sociocultural aspects and social skills, which strengthen empowerment and the free exercise of sexual and reproductive rights.

Lapeira and colleagues,[19] in a study of 64 adolescents in the Colombian Caribbean, found that 54.7% of respondents knew contraceptive methods, a finding consistent with the 52.3% of students with adequate knowledge in this study. However, eight out of ten students demonstrated attitudes of acceptance towards contraceptives, which suggests an opportunity for improvement in the processes and sources of learning, considering that there is interest and willingness on the part of adolescents. This fact is further supported if we consider that 560 students out of the 827 included in this study stated that they wanted to receive sex education from health professionals. Students in the present research prefer open-minded, non-judgmental, and knowledgeable educators in the subject matter.[28]

Regarding knowledge and attitudes towards contraceptive methods among groups, it is usually women who have more knowledge, while some men mistakenly believe that family planning is the exclusive responsibility of their partner; specific teaching methodologies reinforce these conceptions by emphasizing the prevention and consequences of unprotected sex, especially for women.[24,29,30] On the other hand, previous literature reports agree that the frequency of knowledge and attitudes towards contraception tend to be lower in public schools than in private schools due to less access to sexual and reproductive health services and less rigorous or absent curricular programs on sexuality.[22,30] In this study, three of the six public schools included were located in rural areas, a factor that in other studies has been associated with poor knowledge.[20]

According to the qualitative-interpretive findings, currently, there is a taboo where the population considers that the only ones who should provide sex education to adolescents are health professionals. They say that they are more qualified and have more knowledge of these issues. Because of this, adolescents begin their sexual life early with many uncertainties about the subject, which is why they begin sex education late, and parents do not consider themselves capable of providing this type of education to their children at an early age. However, sex education can also be provided by teachers, as long as they are trained on the topics to be taught to adolescents. In this respect, lack of knowledge and excessive freedom are triggers for risky sexual

behaviours due to the failure to assess danger, establish boundaries, identify long-term consequences, and adopt critical thinking. Parental guidance, special programs with an integrative approach to health and sexual and reproductive health, comprehensive and permanent sex education, and timely access to sexual and reproductive health services can delay the premature onset of sexual activities and allow for a responsible process.[22] As identified in this study, unprotected sex and using the least effective contraceptive methods are associated with a lack of knowledge and attitudes toward rejecting contraception. This finding is consistent with the literature, which also adds associations with early sexual intercourse, pregnancy, multiple sexual partners, contraceptive myths, and risky manoeuvres to avoid pregnancy.[18,21,24,25,31–34]

The present study has limitations inherent to cross-sectional designs. The characteristics of students' communication with their parents were not addressed. Although the calculated sample size was included, the sample was selected for convenience, so the results cannot be generalised. Moreover, the administration of the questionnaires and the online meetings to conduct focus groups are considered a limitation because the researchers could not supervise the process or observe the non-verbal language of the participants. However, it is also a strength because the questionnaires had to be completed in their entirety to be submitted, and the participants felt more confident to answer honestly because they did not feel observed. Another strength is the cross-cultural adaptation of the scales applied, allowing the control of measurement bias.[12] Finally, the mixed methods design and the inclusion of two population groups allowed for a broad understanding of the study phenomenon and the interpretation of their perspectives.

It is recommended that government officials promote and comply with educational legislation, guaranteeing sex education from an early age following the different stages of growth and ensuring that the population has access to sexual and reproductive health services. It is suggested that school authorities include sex education in their curricula, train and constantly update teachers in this area, and involve parents. Parents are advised to build relationships based on trust and dialogue with their children on sex education issues to guide and accompany them in making responsible and informed decisions regarding sexual and reproductive health.

Conclusions

In a group of ninth-, 10th, and 11th-grade Colombian surveyed students, 52.3% had adequate knowledge, and 80.1% had attitudes of acceptance towards contraceptive methods, dialogue with parents about sexuality, and having received sex education were associated factors. 32.1% had initiated penetrative sexual relations. Participants considered that sex education received at school and home was basic due to multiple barriers. High-quality sex education as an obligatory subject in the school curriculum is needed, which involves parents and teachers and provides adolescents with tools to avoid risky sexual behaviour to make responsible and informed decisions.

Contributors

CAC: conceptualisation, data curation, formal analysis, funding acquisition, investigation, methodology, project administration, resources, software, supervision, validation, visualisation, writing—original draft, and writing—review & editing.

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LLR: data curation, formal analysis, investigation, methodology, writing—original draft.

AC and LB: data curation, formal analysis, investigation, methodology, software, supervision, validation.

MJL and DP: data curation, formal analysis, methodology, software, writing—original draft.

CM and FB: writing—original draft, and writing—review & editing.

All authors had full access to all the data in the study and accept responsibility to submit for publication.

Data sharing statement

Individual participant data that underlie the results reported in this article (after de-identification), study protocol, statistical analysis plan, informed consent form, databases with all the information and Excel matrices with the qualitative results will be available upon request immediately after publication. The data can be requested by the email of the corresponding author (cacastro@fucsalud.edu.co).

Declaration of interests

None of the researchers declared any conflict of interest.

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Appendix A. Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.lana.2024.100678.

References

1 World Health Organization. *WHO recommendations on adolescent sexual and reproductive health and rights*; 2018 [cited 2022]. Available from: https://www.who.int/publications/i/item/9789241514606.
2 World Health Organization. *Family planning/contraception methods*; 2020 [cited 2022]. Available from: https://www.who.int/news-room/fact-sheets/detail/family-planning-contraception.
3 Ministerio de Salud y Protección Social. *Profamilia. Encuesta Nacional de Demografía y Salud (ENDS) 2015 Colombia*; 2015 [cited 2020]. Available from: https://www.minsalud.gov.co/Documents/General/20161212_B_ENDS%202015_Metodos_anticonceptivos.pdf.
4 Departamento Nacional de Planeación. *12% de hombres y 6% de mujeres adolescentes tienen primera relación sexual antes de los 14 años Colombia*; 2015 [cited 2020 01-04-2020]. Available from: https://www.dnp.gov.co/Paginas/12-de-hombres-y-6-de-mujeres-adolescentes-tienen-primera-relaci%C3%B3n-sexual-antes-de-los-14-a%C3%B1os.aspx.
5 UNFPA. *Consecuencias socioeconómicas del embarazo en adolescentes en Colombia. Implementación de la metodología para estimar el impacto socioeconómico del embarazo y la maternidad adolescentes en países de América Latina y el Caribe–Milena 1.*

0 Fondo de Población de las Naciones Unidas–Oficina de país en Colombia. Bogotá; 2020.
6 Ministerio de Salud y Protección Social de Colombia. *Situación de las infecciones de transmisión sexual diferentes al VIH. Colombia 2009–2011 Colombia*; 2011 [cited 2020 01-04-2020]. Available from: https://www.minsalud.gov.co/salud/Documents/observatorio_vih/documentos/monitoreo_evaluacion/1_vigilancia_salud_publica/a_situacion_epidimiologica/SITUACION%20DE%20LAS%20INFECCIONES%20DE%20TRANSMISION1.pdf.
7 Yosef T, Nigussie T, Getachew D, Tesfaye M. Prevalence and factors associated with early sexual initiation among college students in Southwest Ethiopia. *BioMed Res Int*. 2020;2020:8855276.
8 Mostert K, Sethole KM, Khumisi O, et al. Sexual knowledge and practice of adolescent learners in a rural South African school. *Afr Health Sci*. 2020;20(1):28–38.
9 Lu M, Barlow J, Meinck F, Wu Y. "Prevention alone is not enough:" stakeholders' perspectives about school-based child sexual abuse (CSA) prevention programs and CSA research in China. *J Interpers Violence*. 2022;37(7–8):NP5116–N5142.
10 UNFPA, Profamilia. Descubriendo la sexualidad en familia Colombia2021 [55]. Available from: https://colombia.unfpa.org/sites/default/files/pub-pdf/cartilla_descubriendo_la_sexualidad_en_familia_.pdf.
11 Dávalos Zumaeta N, Ríos Sayón A, Ruiz Pinedo SL. *Nivel de conocimiento y actitudes hacia el uso de métodos anticonceptivos en adolescentes de I.E.S.M MORB Iquitos-2015*. Iquitos, Perú: Universidad Nacional de la Amazonía Peruana; 2015.
12 Castro CA, Monterrosa-Blanco A, Baquero F, Melo C, Losada-Rodríguez L. Adaptación transcultural de una escala sobre conocimientos y actitudes de métodos anticonceptivos en adolescentes, del contexto cultural peruano al colombiano. *Tecné, Episteme y Didaxis*. 2023;(53):121–138.
13 Nunez-Smith M, Pilgrim N, Wynia M, et al. Health care workplace discrimination and physician turnover. *J Natl Med Assoc*. 2009;101(12):1274–1282.
14 Ministerio de Educación. Ley 115 de Febrero 8 de 1994. Por la cual se expide la ley general de educación Colombia. Available from: file://C:\Documents%20and%20Settings\GREGORIO%20RODRIGUEZ\Mis%2 mincit.gov.co.
15 Sagnia PIG, Gharoro EP, Isara AR. Adolescent-parent communication on sexual and reproductive health issues amongst secondary school students in Western Region 1 of the Gambia. *Afr J Prim Health Care Fam Med*. 2020;12(1):e1–e7.
16 Ministerio de Salud y Protección Social, Profamilia. *Encuesta Nacional de Demografía y Salud. Componente de Salud sexual y Salud Reproductiva, Tomo II*; 2015. Available from: ENDS-2015-TOMO-II.pdf profamilia.org.co.
17 Vongsavanh V, Lan VTH, Sychareun V. Sexual and reproductive health communication between parents and high school adolescents in Vientiane Prefecture, Lao PDR. *Glob Health Action*. 2020;13(sup2):1785145.
18 Vongxay V, Albers F, Thongmixay S, et al. Sexual and reproductive health literacy of school adolescents in Lao PDR. *PLoS One*. 2019;14(1):e0209675.
19 Lapeira P, Acosta D, Vásquez M. Knowledge, beliefs and practices of adolescents from Caribbean culture in contraception. *Rev Cuid*. 2016;7(1):1204–1209.
20 Chimbindi N, Ngema U, Ngwenya N, et al. The sexual and reproductive health needs of school-going young people in the context of COVID-19 in rural KwaZulu-Natal, South Africa. *Afr J AIDS Res*. 2022;21(2):162–170.
21 Munakampe MN, Zulu JM, Michelo C. Contraception and abortion knowledge, attitudes and practices among adolescents from low and middle-income countries: a systematic review. *BMC Health Serv Res*. 2018;18(1):909.
22 Obach A, Sadler M, Cabieses B, et al. Strengths and challenges of a school-based sexual and reproductive health program for adolescents in Chile. *PLoS One*. 2022;17(3):e0265309.
23 Gutiérrez Bonilla ML, Reyes Fernández N, Ortíz Hernández M, Escobar Martínez JR, Robles Arenas S. *Juventudes Colombianas 2021 Preocupaciones, Intereses y Creencias. Una mirada desde la encuesta nacional de juventud Colombia*; 2021. Available from: Informe-Encuesta-de-Juventudes-colombianas.pdf(fundacion-sm.org).
24 Debele GR, Tsegaye D, Gemechu T, Siraj SZ. Influences of parental monitoring and school connectedness on age at first sexual debut among unmarried female youth in Bedele town, Ethiopia: a survival analysis of timing using accelerated failure time model. *PLoS One*. 2022;17(7):e0271906.
25 James PB, Osborne A, Babawo LS, Bah AJ, Margao EK. The use of condoms and other birth control methods among sexually active school-going adolescents in nine sub-Saharan African countries. *BMC Publ Health*. 2022;22(1):2358.
26 Wanje G, Masese L, Avuvika E, Baghazal A, Omoni G, Scott McClelland R. Parents' and teachers' views on sexual health education and screening for sexually transmitted infections among in-school adolescent girls in Kenya: a qualitative study. *Reprod Health*. 2017;14(1):95.
27 Domínguez Domínguez I. Family influence on the sexuality in adolescence Revista Cubana de Obstetricia y Ginecología. 2011;37(3):387–398.
28 Corcoran JL, Davies SL, Knight CC, Lanzi RG, Li P, Ladores SL. Adolescents' perceptions of sexual health education programs: an integrative review. *J Adolesc*. 2020;84:96–112.
29 Jain M, Jain S, Patil S, Bang A. A study on knowledge attitude and practice of contraception in school-going children in Wardha district in central India. *Int J Reprod Contracept Obstet Gynecol*. 2014;3(4):903–908.
30 Barchi F, Ntshebe O, Apps H, Ramaphane P. Contraceptive literacy among school-going adolescents in Botswana. *Int Nurs Rev*. 2022;69(1):86–95.
31 Mbachu CO, Agu IC, Obayi C, Eze I, Ezumah N, Onwujekwe O. Beliefs and misconceptions about contraception and condom use among adolescents in south-east Nigeria. *Reprod Health*. 2021;18(1):7.
32 Li C, Cheng Z, Wu T, et al. The relationships of school-based sexuality education, sexual knowledge and sexual behaviors-a study of 18,000 Chinese college students. *Reprod Health*. 2017;14(1):103.
33 Guzzo KB, Hayford SR. Adolescent reproductive and contraceptive knowledge and attitudes and adult contraceptive behavior. *Matern Child Health J*. 2018;22(1):32–40.
34 Cabral MA, Schroeder R, Armstrong EM, et al. Pregnancy intentions, contraceptive knowledge and educational aspirations among community college students. *Perspect Sex Reprod Health*. 2018;50(4):181–188.