Reproductive Health Knowledge and Educational Needs among Vocational High School Students: Associated Factors and Implications for School-Based Education

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Abstract. Background: Reproductive health knowledge during adolescence is essential for informed health decisions; however, access to structured education and opportunities to discuss reproductive health topics may vary among vocational high school students. Understanding students' knowledge and perceived educational needs is therefore important for developing responsive school-based education. **Objective:** This study aimed to describe reproductive health knowledge and educational needs among vocational high school students and to examine factors associated with the perceived importance of school-based reproductive health education. Methods: A cross-sectional study was conducted among 354 tenth-grade students from two vocational high schools in Malang, East Java, Indonesia. Data were collected using a structured questionnaire assessing sociodemographic characteristics, reproductive health communication and educational exposure, perceived educational needs, and reproductive health knowledge. Descriptive statistics and Pearson's chi-square tests were used for analysis. **Results:** Reproductive health knowledge was predominantly moderate (52.8%), while 31.1% of students had good knowledge and 16.1% had poor knowledge. Overall, 80.5% considered reproductive health education at school important or very important. High perceived importance was more frequent among female than male students (86.6% vs. 69.1%; $p<0.001$), students who had previously discussed reproductive health (84.6% vs. 67.8%; $p=0.002$), and those previously exposed to reproductive health education (85.5% vs. 72.4%; $p=0.011$). High perceived importance increased from 57.8% among students with low discussion comfort to 95.9% among those with high comfort ($p<0.001$). **Conclusion:** Vocational students demonstrated moderate reproductive health knowledge but substantial educational needs. School-based reproductive health education should combine structured information with supportive and non-judgmental communication environments that facilitate comfortable discussion of sensitive topics.

Keywords: Adolescent Reproductive health knowledge; Educational needs; Vocational students; School-based reproductive health education.

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1 Introduction

Adolescence is a critical developmental period characterized by substantial biological, psychological, and social changes that shape health-related knowledge, attitudes, and behaviors into adulthood. During this transition, access to accurate sexual and reproductive health (SRH) information is particularly important because adolescents begin to experience pubertal changes, develop interpersonal relationships, and make increasingly independent health decisions. Nevertheless, many adolescents still receive incomplete, inconsistent, or inaccurate information about their bodies, relationships, and reproductive health. The World Health Organization (WHO) emphasizes that insufficient access to comprehensive sexuality education may leave young people unprepared for puberty, healthy relationships, prevention of sexually transmitted infections, and unintended pregnancy, while also increasing their vulnerability to misinformation [1]. UNESCO similarly recognizes that young people frequently encounter conflicting messages about sexuality while communication with adults, including parents and teachers, may remain constrained by embarrassment and social norms [2].

Adequate reproductive health knowledge therefore represents an important foundation for adolescents' ability to understand physiological changes, recognize reproductive health risks, and make informed health decisions. However, information availability does not necessarily guarantee adequate knowledge. The rapid expansion of internet access and social media has diversified adolescents' sources of reproductive health information, ranging from parents, teachers, and health professionals to peers and digital platforms. These sources vary considerably in credibility and completeness. Family communication is also important; evidence indicates that parent–adolescent communication about sexual and reproductive health is associated with healthier sexual decision-making, although such communication is frequently limited by discomfort, cultural barriers, and parents' ability to discuss sensitive topics [3,4]. These findings suggest that reproductive health knowledge should be understood within the broader communication and information environment in which adolescents live rather than solely as an outcome of formal classroom learning.

Schools provide an important setting for addressing these knowledge gaps because they can offer structured and relatively equitable access to scientifically accurate reproductive health information. Evidence from systematic reviews and meta-analyses indicates that comprehensive school-based sexuality education can improve adolescents' knowledge and other sexual health outcomes [5–7]. Current international guidance recommends that sexuality education be curriculum-based, scientifically accurate, age-appropriate, culturally relevant, and responsive to learners' developmental needs [1,2]. Nevertheless, effective education requires more than providing predetermined content. Adolescents' perspectives on what they need to learn and how sensitive topics should be discussed are also important. A qualitative systematic review of school-based sexual health education found that adolescents emphasized the need for relevant content, safe learning environments, well-prepared educators, and interactive approaches [8]. Assessing students' educational needs

alongside their existing knowledge can therefore provide a stronger basis for designing school-based reproductive health education.

The effectiveness and relevance of reproductive health education may also depend on factors beyond the school environment. Adolescents obtain reproductive health information through interactions among family, peers, teachers, health professionals, media, and their wider social environments. Studies have identified parental communication and openness, sources of information, and socioeconomic and residential characteristics as factors associated with adolescents' reproductive health knowledge and communication [3,4,9]. Evidence from Indonesian vocational students has similarly demonstrated associations between reproductive health knowledge and the roles of parents, peers, and media [10]. Examining these factors is important because students with different social and communication environments may not have equal opportunities to obtain reliable reproductive health information.

This issue is particularly relevant to vocational high school students. Vocational education prepares adolescents not only for academic progression but also for relatively early transition into occupational and broader social environments. Nevertheless, this population has received less attention in adolescent reproductive health research than general secondary-school populations. Available Indonesian evidence suggests that reproductive health knowledge among vocational students is associated with their immediate social and information environments [10]. Consequently, understanding both what vocational students know and what they perceive they need from reproductive health education is important for developing educational approaches appropriate to their context.

In Indonesia, school-based SRH education remains heterogeneous. A recent systematic review found that reproductive health education is often fragmented across subjects such as biology, physical education, religious education, civic education, and extracurricular activities rather than delivered through a consistent and comprehensive educational approach [11]. International evidence also indicates that the integration of comprehensive sexuality education into educational systems in low- and middle-income countries can be affected by teacher preparedness, curriculum organization, sociocultural acceptance, institutional support, and available resources [12]. These implementation challenges reinforce the importance of understanding learners' existing knowledge and educational needs before strengthening reproductive health education at the school level.

Despite growing evidence on adolescent reproductive health, studies frequently examine knowledge, educational interventions, or communication factors separately. Evidence simultaneously describing reproductive health knowledge, students' perceived educational needs, and factors associated with knowledge remains comparatively limited, particularly among Indonesian vocational high school students. Examining these dimensions together may provide a more context-sensitive understanding of existing knowledge gaps and the educational environment in which they occur. Therefore, this study aimed to describe reproductive health knowledge and educational needs among vocational high school students and to examine sociodemographic, communication-related, and educational factors associated with students’ perceived importance of school-based reproductive health education. The

findings are expected to provide evidence for developing reproductive health education that is responsive to students' knowledge levels, perceived needs, and communication contexts within vocational school settings.

2 Methods

2.1 Study Design and Setting

This study employed a cross-sectional design to describe reproductive health knowledge and educational needs among vocational high school students and to examine factors associated with students' perceived importance of school-based reproductive health education. The study was conducted in two public vocational high schools in Malang City, East Java, Indonesia, hereafter referred to as the first school and the second school to maintain institutional confidentiality. Data were collected in August–September, 2025.

2.2 Participants and Sampling

The study population consisted of tenth-grade students from classes taught by two teachers who collaborated with the research team, one from each participating school. All students enrolled in these classes were invited to participate. Students were eligible if they were registered as tenth-grade students in the participating classes and were willing to complete the study questionnaire. Students who were absent during data collection or did not complete the questionnaire were excluded from the analysis.

A total of 354 students who met the eligibility criteria and completed the questionnaire were included in the study, comprising 190 students from the first school and 165 students from the second school. All eligible and willing students from the participating classes were included; therefore, no additional random sampling procedure was applied.

2.3 Instrument

Data were collected using a structured self-administered questionnaire developed by the research team. The questionnaire was constructed by adapting selected components of the "Asking Young People About Sexual and Reproductive Behaviors" questionnaire developed by Cleland et al. (2001), which was published jointly by the UNDP / UNFPA / WHO / World Bank, and subsequently modified to suit the Indonesian vocational school context.

The questionnaire consisted of four sections:

Section A collected respondents' sociodemographic characteristics, including residential area (urban/rural), living arrangements with parents, parental occupation, parental educational attainment, and family income.

Section B explored communication and information-related characteristics, including discussions about reproductive health with parents, preferred family members for discussing reproductive health, primary sources of reproductive health information, and previous experiences receiving reproductive health education.
Section C assessed student's perceived educational needs regarding reproductive health education. Students rated the importance of providing reproductive health and adolescent developmental topics in vocational high schools and their comfort in discussing reproductive health topics in the classroom using five-point Likert scales. For bivariate analysis, perceived importance was recategorized into three levels: low importance (very unimportant and unimportant), moderate importance (moderately important), and high importance (important and very important). Similarly, discussion comfort was categorized as low comfort (very uncomfortable and uncomfortable), moderate comfort (moderately comfortable), and high comfort (comfortable and very comfortable). An open-ended question was also included to explore students' perceptions of whether reproductive health should remain a sensitive or taboo topic or be discussed more openly.
Section D assessed reproductive health knowledge using 20 items related to adolescent reproductive health. Each correct response was assigned one point, whereas an incorrect response received zero points, resulting in a raw score ranging from 0 to 20. For ease of interpretation, the raw score was converted to a 0–100 scale by multiplying the number of correct responses by five. Knowledge levels were categorized as good (75–100; 15–20 correct responses), moderate (50–70; 10–14 correct responses), and poor (<50; 0–9 correct responses)

The questionnaire was developed specifically for the present study and was not subjected to formal psychometric validation. This methodological consideration was taken into account when interpreting the findings and is acknowledged as a study limitation.

2.4 Study Variables

Reproductive health knowledge and perceived educational needs were the primary descriptive outcomes of the study. Reproductive health knowledge was measured using the total score obtained from the 20 knowledge items in Section D and categorized as good, moderate, or poor according to the predetermined scoring criteria.

For the bivariate analysis, the outcome variable was students' perceived importance of school-based reproductive health education, categorized as low, moderate, or high. Factors examined for their associations with perceived importance included school, study program, sex, residential setting, living arrangement with parents, parental occupation, parental educational attainment, parental income, previous discussion of reproductive health topics, previous exposure to reproductive health education, and comfort in discussing reproductive health topics.

2.5 Data Collection

Data collection was conducted during scheduled school activities in coordination with the collaborating teachers. Before completing the questionnaire, students received information regarding the purpose of the study, voluntary participation, confidentiality, and anonymity of their responses. The questionnaires were completed individually. Students who did not complete the questionnaire were excluded from the final analysis.

2.6 Ethical Considerations

Ethical approval was obtained from the Ethics Committee of Universitas Negeri Malang (No. 02.06.13/UN32.14.2.8/LT/2025). Participation was voluntary, and informed consent was obtained from all participants prior to data collection. Respondents' identities were kept anonymous throughout the study, and all collected data were treated confidentially and used exclusively for research purposes.

2.7 Statistical analysis

Data were analyzed using IBM SPSS Statistics 26. Descriptive statistics were used to summarize participants' sociodemographic characteristics, reproductive health information exposure, reproductive health knowledge, and perceived educational needs. Categorical variables were presented as frequencies and percentages.

Bivariate analyses were conducted to examine associations between selected sociodemographic, communication-related, and educational factors and students' perceived importance of school-based reproductive health education. Pearson's chi-square test was used to assess associations between categorical variables. Statistical significance was set at $p < 0.05$. Results from analyses in which the expected cell-count assumption was not fully satisfied were interpreted cautiously. No multivariable analysis was performed.

3 Results

3.1 Participant Characteristics and Educational Needs

The sociodemographic characteristics, reproductive information exposure, and educational needs of the participants are summarized in Tabel 1.

Table 1. Sociodemographic Characteristics, Reproductive Health Information Exposure, and Educational Needs of Participants (n=354)

Characteristics	n	%
School		
First School	164	46.3
Second School	190	53.7
Study Program		

Nursing	67	18.9
Hospitality	146	41.2
Culinary	98	27.7
Computer and Network Enginering	43	12.1
Sex		
Female	231	65.3
Male	123	34.7
Residential Area		
Urban core	256	72.3
Peri-urban	57	16.1
Rural	41	11.6
Living with Parents		
No	25	7.1
Yes	329	92.9
Parental Occupation		
Unemployed	17	4.8
Private-sector employee	142	40.1
Teacher/Lecturer	10	2.8
Entrepreneur	115	32.5
Civil servant (excluding teacher/lecturer)	14	4.0
Other	56	15.8
Parent's Educational Attainment		
No schooling/did not complete primary school	6	1.7
Primary School	62	17.5
Junior Secondary School	48	13.6
Senior Secondary School	176	49.7
Diploma	19	5.4
Bachelor's Degree	37	10.5
Postgraduate Degree	6	1.7
Parent's Monthly Income		
No income	3	0.8
< IDR 1,000,000	103	29
IDR 1,000,000 – 2,000,000	136	38.4
IDR 2,000,000 – 5,000,000	90	25.4
IDR 5,000,000 – 10,000,000	18	5.1
>IDR 10,000,000	4	1.1
Previously Received Reproductive Health Education		
No	134	37.9
Yes	220	62.1
Comfort Discussing Reproductive Health Topics in Class		
Very Uncomfortable	13	3.7
Uncomfortable	32	9.0
Moderately Comfortable	165	46.6
Comfortable	99	28.0
Very Comfortable	45	12.7

Importance of Reproductive Health Education at School		
Very Unimportant	11	3.1
Unimportant	6	1.7
Moderately Important	52	14.7
Important	82	23.2
Very Important	203	57.3

A total of 354 vocational high school students were included in the analysis, of whom 65.3% were female. Most participants resided in urban-core areas (72.3%) and with their parents (92.9%). Nearly half of the participants reported that their parents had completed senior secondary education (49.7%).

Regarding reproductive health information and communication, 75.4% of students reported having discussed reproductive health topics, and 62.1% had previously received reproductive health education. Nevertheless, 37.9% reported no previous exposure to reproductive health education. Students generally demonstrated positive acceptance of classroom-based reproductive health discussions: 46.6% reported being moderately comfortable, while 28.0% and 12.7% reported being comfortable and very comfortable, respectively.

A strong perceived educational need was also observed. More than half of the students (57.3%) considered reproductive health education at school very important and 23.2% considered it important. Overall, 80.5% rated reproductive health education as important or very important, whereas only 4.8% considered it unimportant or very unimportant.

3.2 Reproductive Health Knowledge

The distribution of students' reproductive health knowledge is presented in Table 2. Overall, more than half of students had a moderate level of reproductive health knowledge (52.8%), while 31.1% demonstrated good knowledge and 16.1% had poor knowledge. A similar pattern was observed across both schools, with moderate knowledge representing the largest category in the first school (47.0%) and the second school (57.9%).

Table 2. Distribution of Reproductive Health Knowledge among Vocational High School Students (n=354)

Reproductive Health Knowledge	First School (n=164), n(%)	Second School (n=190), n(%)	Total (n=354), n(%)
Good	57 (34.8)	53 (27.9)	110 (31.1)
Moderate	77 (47.0)	110 (57.9)	187 (52.8)
Poor	30 (18.3)	27 (14.2)	57 (16.1)
Total	**164 (100)**	**190 (100)**	**354 (100)**

Data are presented as frequency and percentage, n (%). Percentages for each school were calculated using the number of participants within the respective school.

3.3 Factors Associated with the Perceived Importance

Several factors were associated with students' perceived importance of school-based reproductive health education, as shown in Table 3.

Factors	X^2	df	p-value
School	8.143	2	0.017
Study Program	14.499	6	0.025[a]
Sex	17.539	2	<0.001
Residential Setting	2.005	4	0.735
Living with parents	0.068	2	0.966
Parental Occupation	12.301	10	0.265
Parental Education	26.173	12	0.010[a]
Parental Income	8.644	12	0.733
Previous Discussion of Reproductive Health	12.182	2	0.002
Previous Reproductive Health Education	9.065	2	0.011
Comfort Discussing Reproductive Health Topics	48.454	4	<0.001

χ^2, Pearson's chi-square test; df, degrees of freedom. Statistical significance was set at $p < 0.05$.

[a] *The Pearson chi-square result should be interpreted cautiously because the expected cell-count assumption was not fully satisfied.*

Female students were more likely to report high perceived importance than male students (86.6% vs. 69.1%; $\chi^2 = 17.539$, $p < 0.001$). Students who had previously discussed reproductive health topics also showed a higher proportion of high perceived importance than those who had not (84.6% vs. 67.8%; $\chi^2 = 12.182$, $p = 0.002$). Similarly, high perceived importance was more frequently reported among students who had previously received reproductive health education than among those without previous exposure (85.5% vs. 72.4%; $\chi^2 = 9.065$, $p = 0.011$).

The strongest pattern was observed for students' comfort in discussing reproductive health topics. The proportion reporting high perceived importance increased from 57.8% among students with low discussion comfort to 73.2% among those with moderate comfort and 95.9% among those with high comfort ($\chi^2 = 48.454$, $p < 0.001$). In contrast, residential setting, living arrangement, parental occupation, and parental income were not significantly associated with perceived importance.

4 Discussion

This study provides an integrated description of reproductive health knowledge, perceived educational needs, and factors associated with the perceived importance of school-based reproductive health education among vocational high school students. Three findings are particularly noteworthy. First, reproductive health knowledge was predominantly moderate, with fewer than one-third of students reaching the good-knowledge category. Second, students expressed a substantial need for reproductive health education at school, with more than four-fifths considering it important or very important. Third, perceived importance was associated with sex, previous discussion of

reproductive health, previous exposure to reproductive health education, and particularly students' comfort in discussing reproductive health topics. Together, these findings suggest that strengthening reproductive health education in vocational schools requires attention not only to the content delivered but also to the communication environment in which students engage with sensitive topics.

More than half of the students in this study had moderate reproductive health knowledge (52.8%), whereas only 31.1% demonstrated good knowledge and 16.1% were categorized as having poor knowledge. This distribution suggests that most students possessed some understanding of reproductive health but that substantial room for improvement remained. Importantly, moderate knowledge should not be interpreted as an absence of knowledge; rather, the finding indicates that many students had not yet achieved the level classified as good according to the study criteria. This is relevant because adolescents increasingly encounter reproductive health information from multiple sources whose accuracy and completeness may vary. Evidence from comprehensive sexuality education research indicates that structured educational interventions can substantially improve cognitive outcomes among children and adolescents, supporting the role of systematic education in addressing incomplete knowledge [5,6].

The knowledge findings become particularly meaningful when considered alongside students' educational needs. Although 62.1% of participants reported previous exposure to reproductive health education, 37.9% had never received such education. At the same time, 80.5% considered reproductive health education at school important or very important. Rather than indicating that previous educational exposure had already fulfilled students' learning needs, these findings suggest continued demand for structured reproductive health education. Previous research examining adolescents' perceptions of school-based sexual health education similarly emphasizes that young people should be regarded as active stakeholders whose perspectives are important when developing relevant and acceptable programs [14]. This is especially relevant in Indonesia, where school-based sexual and reproductive health education remains fragmented across different subjects and extracurricular activities rather than consistently delivered through a comprehensive framework [11].

Sex was significantly associated with perceived importance, with 86.6% of female students reporting high perceived importance compared with 69.1% of male students. This difference may reflect variations in how male and female adolescents perceive the personal relevance of reproductive health information. Female adolescents experience reproductive events such as menstruation during adolescence, which may increase the perceived immediacy of some reproductive health information. Nevertheless, the present study did not investigate the mechanisms underlying the observed sex difference, and this finding should therefore not be interpreted as evidence that male students have lower educational needs. Indeed, more than two-thirds of male students still demonstrated high perceived importance. School-based programs should therefore remain inclusive of both sexes while recognizing that engagement with reproductive health topics may differ between student groups. Previous evidence has also identified sex-related differences in adolescent communication about sexual and reproductive health [4].

Communication experience was another relevant factor. Students who had previously discussed reproductive health topics were more likely to report high perceived importance than those who had not (84.6% vs. 67.8%). This finding is consistent with evidence showing that communication about sexual and reproductive health is associated with openness, perceived relevance, and interpersonal communication environments [3,4]. Previous research has demonstrated the importance of parent–adolescent sexual communication for adolescent sexual and reproductive health [3]. Conversely, embarrassment, discomfort, cultural norms, and perceptions of sexuality as a sensitive or taboo subject have been identified as barriers to parent–child communication about sexual and reproductive health [13]. However, because the present study employed a cross-sectional design, the direction of this association cannot be determined. Students who perceive reproductive health education as important may be more willing to discuss these topics, while previous opportunities for discussion may also contribute to greater recognition of their importance.

Previous exposure to reproductive health education was also associated with perceived importance. High perceived importance was reported by 85.5% of students who had previously received reproductive health education compared with 72.4% among those without previous exposure. This pattern is noteworthy because educational exposure did not appear to diminish students' perceived need for reproductive health education. Instead, students who had previously encountered reproductive health education were more likely to recognize its importance. One possible explanation is that previous exposure increases awareness of the breadth and relevance of reproductive health issues and may consequently increase recognition of remaining information needs. Evidence from systematic reviews and meta-analyses demonstrates that comprehensive sexuality education can improve adolescents' knowledge and other cognitive outcomes [5–7]. Nevertheless, the present study measured previous educational exposure rather than its content, duration, quality, or delivery method. Consequently, the findings should not be interpreted as evidence of the effectiveness of the education previously received by participants.

The most pronounced finding concerned students' comfort in discussing reproductive health topics. The proportion reporting high perceived importance increased from 57.8% among students with low discussion comfort to 73.2% among those with moderate comfort and 95.9% among students with high comfort. This pattern suggests that perceived educational need is closely related to the communication environment in which reproductive health topics are discussed. Adolescents may recognize the relevance of reproductive health education but remain hesitant to engage when classroom discussions evoke embarrassment, fear of judgment, or discomfort. Previous evidence on school-based sexual health education indicates that educational outcomes are influenced not only by curriculum content but also by the broader school and educational environment [14]. Adolescents themselves have also emphasized the importance of safe learning environments, appropriate educators, and educational approaches that enable comfortable participation in discussions of sensitive topics [8]. These findings support the importance of creating respectful and non-judgmental classroom environments when reproductive health topics are addressed.

These findings have practical implications for vocational education. School-based reproductive health education should not be conceptualized solely as the addition of reproductive health information to the curriculum. Instead, the findings support an approach combining structured and scientifically accurate content with communication strategies that allow students to ask questions and discuss sensitive issues comfortably. This may involve preparing teachers to facilitate sensitive discussions, using participatory learning approaches, establishing respectful classroom norms, and providing opportunities for students to raise questions without fear of embarrassment or judgment. Such an approach is consistent with international recommendations that sexuality education should be scientifically accurate, age-appropriate, learner-centered, and responsive to students' developmental and educational needs [1,2]. It is also relevant to the Indonesian educational context, where reproductive health education remains heterogeneous across school settings [11]. Rather than necessarily requiring a separate subject, reproductive health content may be more systematically integrated into appropriate existing learning structures, provided that teachers are adequately prepared and students' educational needs are considered.

Several limitations should be acknowledged. First, the cross-sectional design allowed the identification of associations but did not establish temporal or causal relationships. In particular, the relationship between discussion comfort and perceived importance may operate in either direction. Second, participants were recruited from selected classes in two vocational high schools in Malang, which may limit the generalizability of the findings to other vocational-school populations. Third, the questionnaire was developed and adapted for this study and was not subjected to formal psychometric validation; therefore, the interpretation of the knowledge categories and perceived educational needs should be made cautiously. Fourth, previous exposure to reproductive health education was measured through self-report without detailed assessment of its content, duration, educator, or quality. Finally, some bivariate analyses involved small expected cell frequencies and should therefore be interpreted cautiously. Despite these limitations, this study provides evidence regarding reproductive health knowledge, perceived educational needs, and communication-related factors among vocational high school students, a population that remains relatively underrepresented in adolescent reproductive health research..

5 Conclusion

Vocational high school students in this study demonstrated predominantly moderate reproductive health knowledge, with fewer than one-third achieving a good level of knowledge. At the same time, students expressed a substantial need for school-based reproductive health education, as most perceived such education as important. Perceived importance was associated with sex, previous discussion of reproductive health, previous exposure to reproductive health education, and particularly students' comfort in discussing reproductive health topics. These findings highlight that reproductive health education in vocational schools should address not only students' knowledge gaps but also the communication environment in which sensitive topics are

discussed. School-based programs should therefore provide structured and relevant reproductive health information while promoting a supportive, respectful, and non-judgmental learning environment that encourages students to engage comfortably in reproductive health discussions.

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