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Validity and Reliability of an Adolescent Knowledge Questionnaire on Puberty and Reproductive Health in Indonesian Version

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ABSTRACT

Adolescence is a critical developmental period characterized by significant physical, psychological, and social changes, particularly during puberty. Adequate knowledge about puberty and reproductive health is essential to help adolescents understand these changes and develop healthy attitudes toward their bodies and sexuality. However, limited knowledge among adolescents remains a concern, highlighting the need for reliable instruments to assess their understanding of reproductive health. This study aimed to evaluate the validity and reliability of an adolescent knowledge questionnaire on puberty and reproductive health.

This methodological research involved the development and psychometric testing of a questionnaire consisting of 12 knowledge items covering four domains: puberty, human reproductive system, menstruation, and nocturnal emission. Content validity was assessed through expert judgment, and the revised questionnaire was pilot tested among 60 respondents. Construct validity was analyzed using item–total correlation, while reliability was assessed using Cronbach's alpha coefficient with the Statistical Package for the Social Sciences (SPSS).

The results showed that all questionnaire items were statistically valid, with correlation coefficients ranging from 0.841 to 0.994, exceeding the critical r-table value of 0.254 ($p < 0.05$). Reliability analysis demonstrated a Cronbach's alpha coefficient of 0.970, indicating excellent internal consistency. These findings suggest that the questionnaire is both valid and reliable for measuring adolescents' knowledge regarding puberty and reproductive health.

In conclusion, the developed instrument can be used as a reliable tool for assessing adolescents' knowledge of reproductive health and may support the evaluation of educational programs aimed at improving adolescent reproductive health literacy.

Keywords: adolescents, puberty, reproductive health, questionnaire validation

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What are the main findings?
1. All questionnaire items measuring adolescents' knowledge about puberty and reproductive health were found to be statistically valid based on the item–total correlation analysis. 2. The questionnaire demonstrated excellent internal consistency reliability, indicating that the items consistently measure the same construct. 3. The developed questionnaire covering puberty, reproductive organs, menstruation, and nocturnal emission can be used as a valid and reliable instrument to assess adolescents' knowledge of reproductive health.

INTRODUCTION

Adolescence is a critical developmental period marked by rapid physical, psychological, and social changes. One of the most significant processes occurring during this stage is puberty, a biological transition that leads to sexual maturation and reproductive capability. Puberty involves hormonal changes that trigger the development of secondary sexual characteristics, including menstruation in females and nocturnal emission in males. These physiological changes often occur simultaneously with cognitive and emotional development, making adolescents particularly vulnerable to confusion and misinformation if they do not receive adequate reproductive health education (World Health Organization [WHO], 2022).

Adequate knowledge about puberty and reproductive health is essential for adolescents to understand the changes occurring in their bodies and to develop healthy attitudes toward sexuality. However, many adolescents still have insufficient knowledge about reproductive health issues. Studies have shown that limited knowledge may contribute to risky sexual behaviors, early pregnancy, and sexually transmitted infections among adolescents (UNESCO, 2018). Furthermore, adolescents often obtain information about sexuality from peers or media sources that may not provide accurate or comprehensive information, which can lead to misconceptions regarding puberty and reproductive health (Chandra-Mouli et al., 2015).

Improving adolescents' knowledge of reproductive health has therefore become an important global health priority. Various educational programs have been implemented in schools and communities to enhance adolescents' understanding of puberty, reproductive anatomy, menstruation, and other related topics. Nevertheless, the effectiveness of these programs must be evaluated using appropriate measurement instruments. Reliable and valid questionnaires are essential to accurately assess adolescents' knowledge and to determine whether educational interventions successfully improve their understanding of reproductive health (Boateng et al., 2018).

Instrument validation is a critical step in research involving questionnaires. Validity ensures that the instrument measures what it is intended to measure, while reliability refers to the consistency of measurement across different contexts and times. Without proper psychometric testing, the results obtained from questionnaires may not accurately represent the true level of adolescents' knowledge (DeVellis & Thorpe, 2021). Therefore, establishing the validity and reliability of a questionnaire is necessary

to ensure the accuracy and credibility of research findings.

Although several instruments have been developed to measure adolescent sexual and reproductive health knowledge, validated questionnaires specifically focusing on key puberty-related knowledge—such as puberty changes, reproductive organs, menstruation, and nocturnal emissions—remain limited in many contexts. As a result, the evaluation of psychometric properties of questionnaires used to measure adolescents' knowledge about puberty and reproductive health is needed.

Therefore, this study aims to assess the validity and reliability of an adolescent knowledge questionnaire on puberty and reproductive health, ensuring that the instrument can accurately and consistently measure adolescents' knowledge regarding these important health topics.

METHOD

This study used a methodological research design to develop and evaluate the psychometric properties of a questionnaire measuring adolescents' knowledge of puberty and reproductive health. The study aimed to assess the validity and reliability of the instrument to ensure that it accurately measures adolescents' understanding of puberty and reproductive health concepts.

The questionnaire was developed through several stages. First, a comprehensive literature review was conducted to identify key concepts related to puberty and reproductive health among adolescents. The literature review focused on important topics such as physiological changes during puberty, reproductive organs, menstruation, and nocturnal emission. Based on these concepts, an initial pool of questionnaire items was generated to measure adolescents' knowledge regarding puberty and reproductive health. The questionnaire consisted of knowledge-based questions with dichotomous response options (correct or incorrect). Each correct response was scored as 1, while incorrect responses were scored as 0, with higher scores indicating better knowledge levels.

Content validity was evaluated through expert judgment involving professionals with expertise in adolescent health, reproductive health, and health education. The experts assessed the questionnaire items based on their relevance, clarity, and appropriateness for measuring adolescents' knowledge of puberty and reproductive health. Suggestions provided by the experts were used to revise and improve the wording and structure of the questionnaire items to ensure that they accurately represented the construct being measured.

Following expert evaluation, the revised questionnaire was pilot tested among 60 respondents. The pilot testing was conducted to evaluate the clarity and comprehensibility of the questionnaire items as well as to assess the psychometric properties of the instrument. Descriptive statistics were used to describe the characteristics of the respondents, including age, education level, occupation, and access to information related to reproductive health.

Construct validity of the questionnaire was assessed using item-total correlation analysis. Each item was considered valid if the correlation coefficient was greater than the critical value of the correlation table at a significance level of 0.05. Items that did not meet the validity criteria were reviewed and considered for revision or removal. Reliability of the questionnaire was evaluated using Cronbach's alpha coefficient to assess the internal consistency of the instrument. A

Cronbach's alpha value of 0.70 or higher was considered acceptable for demonstrating adequate reliability (Boateng et al., 2018; DeVellis & Thorpe, 2021).

All statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS). The results of the validity and reliability testing were used to determine whether the developed questionnaire was suitable for measuring adolescents' knowledge of puberty and reproductive health.

RESULTS

Table 1. Results of the Validity Test of Questionnaire Items on Adolescents' Knowledge about Puberty and Reproductive Health (n = 60)

Item No	Questionnaire Item (Bahasa Indonesia)	r-value	p-value	Decision
1	Pubertas merupakan kedewasaan remaja putri dimulai dengan perubahan fisik dan perubahan perilaku	0,937	0,000	Valid
2	Remaja putri terjadi pembesaran pada payudara dan mulai haid merupakan tanda kematangan seksual	0,862	0,000	Valid
3	Remaja putri yang telah haid maka organ seksualnya telah mulai berfungsi	0,994	0,000	Valid
4	Tanda utama mulai dewasa pada remaja perempuan adalah tumbuh rambut pada kemaluan dan membesarnya panggul dan payudara	0,923	0,000	Valid
5	Organ seksual remaja putri belum dapat berfungsi dan dapat menyebabkan kehamilan jika melakukan hubungan seksual	0,885	0,000	Valid
6	Organ reproduksi merupakan bagian tubuh yang berfungsi untuk melanjutkan keturunan	0,968	0,000	Valid
7	Haid ditandai dengan keluarnya darah pada organ kewanitaan	0,957	0,000	Valid
8	Pendarahan haid normalnya 5–7 hari	0,930	0,000	Valid
9	Empat belas hari setelah haid seseorang dapat hamil jika melakukan hubungan seksual	0,930	0,000	Valid

Item No	Questionnaire Item (Bahasa Indonesia)	r-value	p-value	Decision
10	Mimpi basah merupakan pengeluaran cairan sperma secara alami	0,930	0,000	Valid
11	Mimpi basah terjadi pada usia 9–14 tahun	0,923	0,000	Valid
12	Tanda mimpi basah yaitu saat bangun tidur remaja putra mengeluarkan cairan pada alat kelamin	0,994	0,000	Valid

Table 2. Reliability Test of the Adolescent Knowledge Questionnaire

Variable	Number of Items	Cronbach's Alpha	Interpretation
Knowledge of Puberty and Reproductive Health	12	0.97	Excellent reliability

The validity test results showed that all items in the adolescent knowledge questionnaire on puberty and reproductive health had correlation coefficients greater than the r-table value (0.254). The item-total correlation values ranged from 0.841 to 0.994 with significance values of $p < 0.05$. These findings indicate that all questionnaire items were statistically valid and were able to measure the construct of adolescents' knowledge regarding puberty and reproductive health appropriately (**Table 1**).

The questionnaire consisted of 12 knowledge items covering four domains: puberty, human reproductive system, menstruation, and nocturnal emission. Each domain contained three items developed based on fundamental reproductive health concepts for adolescents.

Furthermore, the reliability analysis using Cronbach's alpha demonstrated a coefficient of 0.970. This value exceeds the recommended threshold of 0.70, indicating excellent internal consistency of the questionnaire. Therefore, the developed instrument is considered reliable and suitable for measuring adolescents' knowledge about puberty and reproductive health.

Table 1. Blueprint of the Adolescent Knowledge Questionnaire on Puberty and Reproductive Health

Construct	Indicator	Item Description (Bahasa Indonesia)	Item Number	Correct Answer
Puberty	Definition of Puberty	Pubertas merupakan kedewasaan remaja putri dimulai dengan perubahan fisik dan perubahan perilaku	1	Ya
	Signs of Sexual Maturity	Remaja putri terjadi pembesaran pada payudara dan mulai haid merupakan tanda kematangan seksual	2	Ya
	Function of Reproductive Organs After Menstruation	Remaja putri yang telah haid maka organ seksualnya telah mulai berfungsi	3	Ya
Human Reproductive System	Main Sign of Entering Adulthood	Tanda utama mulai dewasa pada remaja perempuan adalah tumbuh rambut pada kemaluan dan membesarnya panggul dan payudara	4	Ya
	Function of Sexual Organs	Organ seksual remaja putri belum dapat berfungsi dan dapat menyebabkan kehamilan jika melakukan hubungan seksual	5	Tidak
	Function of Reproductive Organs	Organ reproduksi merupakan bagian tubuh yang berfungsi untuk melanjutkan keturunan	6	Ya
Menstruation	Signs of Menstruation	Haid ditandai dengan keluarnya darah pada organ kewanitaan	7	Ya
	Duration of Menstruation	Pendarahan haid normalnya 5–7 hari	8	Ya
	Fertile Period	Empat belas hari setelah haid seseorang dapat hamil jika melakukan hubungan seksual	9	Ya
Nocturnal Emission	Definition of Nocturnal Emission	Mimpi basah merupakan pengeluaran cairan sperma secara alami	10	Ya
	Age of Occurrence	Mimpi basah terjadi pada usia 9–14 tahun	11	Ya
	Signs of Nocturnal Emission	Tanda mimpi basah yaitu saat bangun tidur remaja putra mengeluarkan cairan pada alat kelamin	12	Ya

Note: Ya (Yes), Tidak (No)

The adolescent knowledge questionnaire on puberty and reproductive health consisted of 12 items with dichotomous response options ("Yes" or "No"). Respondents were asked to read each statement carefully and select one answer that best reflected their knowledge. Each item had a predetermined correct answer based on established concepts of adolescent reproductive health. A correct response was scored as 1, while an incorrect response was scored as 0. The total knowledge score was calculated by summing all item scores, resulting in a possible score range from 0 to 12, where higher scores indicated a higher level of knowledge about puberty and reproductive health. To facilitate interpretation, the total scores were categorized into three levels of knowledge based on percentage criteria: good knowledge (76–100% of the maximum score, equivalent to scores of 9–12), moderate knowledge (56–75%, scores of 5–8), and poor knowledge (≤55%, scores of 0–4). This scoring approach allowed the questionnaire to quantitatively assess adolescents' understanding of key topics related to puberty, the human reproductive system, menstruation, and nocturnal emission (**Table 2**).

DISCUSSION

The present study aimed to evaluate the validity and reliability of an adolescent knowledge questionnaire on puberty and reproductive health. The findings demonstrated that all questionnaire items met the criteria for validity, as indicated by item–total correlation coefficients exceeding the critical r-table value. This result suggests that each item effectively measures the construct of adolescent knowledge related to puberty and reproductive health. Valid items are essential in questionnaire development because they ensure that the instrument accurately measures the intended construct and contributes meaningfully to the overall score (DeVellis, 2017). In psychometric studies, item–total correlation is commonly used to assess construct validity at the item level, indicating whether each question is consistent with the overall scale measurement (Polit & Beck, 2021).

The reliability analysis of the questionnaire showed a Cronbach's alpha coefficient of 0.970, indicating excellent internal consistency. Reliability reflects the degree to which an instrument produces stable and consistent results when measuring a particular construct (Field, 2018). Cronbach's alpha values above 0.70 are generally considered acceptable, while values above 0.80 indicate good reliability and values above 0.90 indicate excellent internal consistency (Tavakol & Dennick, 2011). Therefore, the high Cronbach's alpha value obtained in this study demonstrates that the developed questionnaire has strong internal consistency and that the items measure similar aspects of adolescent knowledge about puberty and reproductive health.

The findings of this study are consistent with previous research on the development and validation of reproductive health knowledge instruments among adolescents. For example, a study that developed the Adolescent Sexual and Reproductive Health Knowledge, Attitude, and Self-Efficacy Questionnaire reported acceptable reliability values for the knowledge domain with a Cronbach's alpha coefficient of approximately 0.70 (Alimoradi et al., 2024). Similarly, another study that developed a reproductive health literacy questionnaire for youth reported high internal consistency with a Cronbach's alpha value of 0.919, indicating that the instrument was reliable for

measuring reproductive health literacy among young people . These findings support the psychometric quality of instruments designed to measure adolescent reproductive health knowledge.

Furthermore, previous studies have shown that questionnaires assessing adolescent reproductive health knowledge often demonstrate strong reliability when items are developed based on theoretical frameworks and expert validation. For instance, a sexual health knowledge measurement study among adolescents reported that factor analysis and reliability testing confirmed the validity of the instrument, indicating that properly constructed questionnaires can effectively assess adolescent knowledge of sexual and reproductive health (Jaworski & Carey, 2013) . Similarly, another study examining reproductive health knowledge instruments among adolescents also reported high reliability coefficients exceeding 0.90, suggesting strong internal consistency across questionnaire items (Prawiyogi et al., 2021) .

Adolescence is a critical developmental stage characterized by significant biological, psychological, and social changes, including the onset of puberty and the development of reproductive capacity. Adequate knowledge about reproductive health during this period is essential because it helps adolescents understand the physiological changes occurring in their bodies and supports healthy behavioral decision-making (World Health Organization, 2022). Lack of knowledge about puberty and reproductive health can lead to misconceptions, risky behaviors, and poor reproductive health outcomes (UNESCO, 2018). Therefore, reliable and valid measurement tools are necessary to assess adolescents' knowledge and to evaluate the effectiveness of reproductive health education programs.

The questionnaire developed in this study covers several important domains of adolescent reproductive health knowledge, including puberty, reproductive organs, menstruation, and nocturnal emission. These domains represent fundamental aspects of reproductive health education that are commonly included in adolescent health curricula (Santrock, 2019). Previous studies have also emphasized that knowledge of puberty-related changes, such as menstruation and nocturnal emission, is essential for adolescents to understand normal physiological development and to reduce anxiety associated with bodily changes (Astarani et al., 2023) .

Despite the strong validity and reliability results, several research gaps remain. First, this study focused primarily on item validity and internal consistency reliability. More comprehensive psychometric testing, such as exploratory factor analysis (EFA) or confirmatory factor analysis (CFA), could further evaluate the underlying construct structure of the questionnaire. Previous validation studies have demonstrated that factor analysis provides stronger evidence of construct validity by identifying the dimensional structure of the instrument (Zhang et al., 2021) . Including such analyses in future studies would strengthen the psychometric evidence for the questionnaire.

Second, the questionnaire measures only the knowledge component of adolescent reproductive health. However, reproductive health literacy is a multidimensional concept that includes knowledge, attitudes, perceptions, and self-efficacy (Alimoradi et al., 2024) . Previous research has indicated that knowledge alone may not be sufficient to influence adolescents' reproductive health

behaviors. Instead, behavioral outcomes are often influenced by a combination of knowledge, attitudes, social norms, and self-efficacy (Glanz et al., 2015). Therefore, future research could expand this instrument by incorporating additional domains related to attitudes or behavioral intentions toward reproductive health.

Third, the validation process in this study was conducted on a limited sample size. Psychometric studies often recommend larger sample sizes to ensure stable parameter estimation and improve the generalizability of findings (Hair et al., 2019). Expanding the sample to include adolescents from different schools, regions, or socio-cultural backgrounds could further confirm the applicability of the instrument in broader populations.

Overall, the findings of this study demonstrate that the adolescent knowledge questionnaire on puberty and reproductive health has strong validity and excellent reliability. The instrument can therefore serve as a reliable tool for assessing adolescents' knowledge related to puberty and reproductive health. The availability of valid and reliable measurement tools is important for evaluating adolescent health education programs and identifying knowledge gaps that may affect adolescent reproductive health outcomes (Sawyer et al., 2018).

CONCLUSION

This study aimed to evaluate the validity and reliability of an adolescent knowledge questionnaire on puberty and reproductive health. The results showed that all questionnaire items met the validity criteria, with item–total correlation coefficients exceeding the critical value, while the reliability test indicated a very high Cronbach's alpha coefficient, demonstrating excellent internal consistency. The instrument covers key domains of adolescent reproductive health, including puberty, reproductive organs, menstruation, and nocturnal emission, making it suitable for assessing adolescents' knowledge and supporting the evaluation of reproductive health education programs. Although the findings are promising, further research involving larger and more diverse samples and additional analyses such as exploratory or confirmatory factor analysis is recommended to strengthen the psychometric properties of the questionnaire. Overall, this instrument has strong potential for use in research, education, and public health programs related to adolescent reproductive health.

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CONFLICT OF INTEREST

No conflict of interest.

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