



## Validating the Malay Version of Adolescent Sexual and Reproductive Health Knowledge and Attitudes Questionnaires

Gerraint Gillan Ahi<sup>1\*</sup>, Md Mizanur Rahman<sup>1</sup>, Rafazila Ramli<sup>1</sup>, Rasitasam Safii<sup>1</sup>, Jacey Lynn Minoi<sup>2</sup>, Stephanie Chua Hui Li<sup>2</sup>, Ahmad Sofian bin Shminan<sup>3</sup>, Lee Jun Choi<sup>3</sup>

<sup>1</sup>Department of Community Medicine and Public Health, Faculty of Medicine and Health Sciences, Universiti Malaysia Sarawak, Malaysia

<sup>2</sup>Faculty of Computer Science and Information Technology, Universiti Malaysia Sarawak, Malaysia

<sup>3</sup>Faculty of Cognitive Sciences and Human Development, Universiti Malaysia Sarawak, Malaysia

\*Authors Correspondence: [gerraintgillan@gmail.com](mailto:gerraintgillan@gmail.com)/+60 138187548

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### ARTICLE INFO

#### Article History:

Received Mar, 24<sup>th</sup>, 2025

Accepted May, 19<sup>th</sup>, 2025

Published online Jun, 30<sup>th</sup>, 2025

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#### Keywords:

Adolescent;

Attitude;

Content Validation;

Knowledge;

Questionnaire Validation;

Sexual and Reproductive Health;

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### ABSTRACT

Adolescent Sexual and Reproductive Health (SRH) knowledge is crucial for informed decision-making, yet cultural barriers in Malaysia limit open discussions, creating significant knowledge gaps. This study validated the Malay version of the Adolescent SRH Knowledge and Attitudes Questionnaire to address this need. The validation process included expert content review (6 panelists), face validity testing (30 respondents), and psychometric analysis among 100 adolescents in Sarawak. The questionnaire demonstrated excellent content validity as rated by the experts and strong face validity among adolescents. The knowledge domain showed high internal consistency ( $\alpha = 0.935$ ), while the attitude domain had moderate reliability ( $\alpha = 0.682$ ), with refinements improving item alignment. The validated questionnaire provides a culturally adapted tool for assessing SRH among Malaysian adolescents, supporting targeted interventions. Future studies should expand validation to diverse populations and assess longitudinal stability.

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## INTRODUCTION

Adolescents are anticipated to face various health and social challenges concerning Sexual and Reproductive Health (SRH), where engaging in sexual activity without adequate knowledge and skills for protection increases their vulnerability to unintended pregnancies, unsafe abortions, and Sexually Transmitted Infections (STIs), including HIV/AIDS.<sup>1</sup> SRH knowledge is crucial for youth as it shapes their attitudes and behaviours regarding sexual health. A comprehensive understanding of SRH empowers adolescents to make informed decisions, decreases the prevalence of STIs, and helps prevent unintended pregnancies, particularly in the Asian region where conservative cultural norms often restrict access to SRH information.<sup>2</sup> Research indicates that effective sexual health education can significantly influence adolescents' knowledge and attitudes, promoting healthier behaviours.<sup>3-5</sup> In Malaysia, cultural, religious, and societal norms present unique challenges in implementing sexual health education, often leading to reluctance to discuss these topics openly. This results in a knowledge gap among adolescents regarding SRH. Studies show that many Malaysian youths have limited knowledge about STIs and contraception, leading to risky sexual behaviours.<sup>6</sup> The stigma surrounding sexual health discussions prevents adolescents from seeking necessary information and support, highlighting the need for culturally sensitive educational interventions.<sup>5,7</sup>

Developing a valid and reliable questionnaire to assess adolescents' knowledge and attitudes regarding SRH is imperative. Previous studies have successfully validated various health-related questionnaires in Malay, demonstrating the feasibility of such an endeavour.<sup>8,9</sup> For example, the validation of the Malay version of the WHO Women's Health and Life Experiences Questionnaire has provided insights into intimate partner violence prevalence and its association with women's health.<sup>9,10</sup> Similarly, the Malay version of the Female Sexual Function Index has been instrumental in assessing sexual dysfunction among women in Malaysia.<sup>11,12</sup> The ASRHKASeQ questionnaires, which measures knowledge, attitude, and self-efficacy among adolescents in Indonesia, is also contextually appropriate for Indonesian youth and has successfully demonstrated that the survey is reliable and valid.<sup>13</sup>

Consequently, this study is explicitly tailored to the community-based adolescent demographic in Sarawak, which may exhibit cultural distinction that set it apart from the validated ASRH-KASeQ population.

The questionnaire's psychometric properties must be rigorously evaluated to ensure validity and reliability. Validity refers to how accurately the questionnaire measures what it intends to measure, while reliability pertains to the consistency of results across different contexts and populations.<sup>8,9</sup> Methods such as exploratory factor analysis and confirmatory factor analysis are used in this validation process.<sup>3,14,15</sup>

Comprehensive sexual health education is further emphasised by studies indicating that adolescents with higher levels of SRH knowledge are more likely to engage in protective behaviours.<sup>3,4</sup> Research among university students in Malaysia showed that those with a better understanding of sexual health issues were more likely to practice safe sex and seek medical advice when necessary.<sup>3,16</sup> Integrating Comprehensive Sexuality Education (CSE) into school curricula effectively improves adolescents' knowledge and attitudes towards sexual health.<sup>3-5</sup> CSE programs focusing on gender, power dynamics, and rights are associated with reduced rates of STIs and unintended pregnancies among youth.<sup>3,4</sup> Findings from validating the Malay version of the SRH Knowledge and Attitudes questionnaire could serve as a foundation for developing targeted educational interventions for Malaysian adolescents. Involving stakeholders like educators, healthcare professionals, and policymakers is essential for promoting acceptance and implementation of sexual health education programs. Collaborative efforts can create a supportive environment for open discussions about sexual health, leading to improved outcomes for adolescents.<sup>4,5</sup>

Validating the questionnaire will provide a tool for assessing knowledge and attitudes and catalyse broader discussions on the importance of sexual health education in Malaysia. Validating the Malay version of the Sexual and Reproductive Health Knowledge and Attitudes among Adolescents Questionnaire is crucial for addressing the sexual health education needs of Malaysian adolescents. Ensuring its validity and reliability will provide valuable insights into the knowledge and attitudes of young people re-

garding sexual health. This can inform culturally sensitive educational interventions that promote healthier behaviours and improve overall adolescent sexual health outcomes in Malaysia. Successful implementation requires concerted efforts from various stakeholders to foster an environment conducive to open discussions about sexual health, empowering adolescents with the necessary knowledge for informed decision-making.

## MATERIAL AND METHOD

The validation of a questionnaire is a multifaceted process that ensures that the instrument is reliable and valid for its intended purpose.<sup>17</sup> This process can be divided into several key stages: development, translation, content validation, and psychometric analysis (Figure 1).

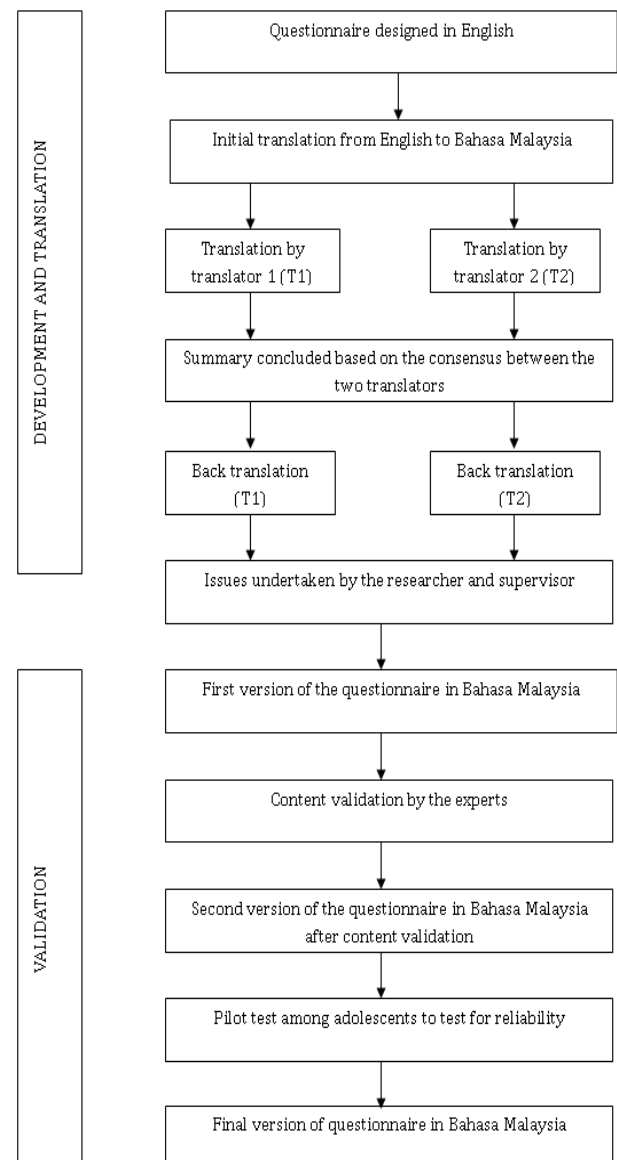
### Questionnaire Development

In developing the questionnaire, the research team assessed the respondent's knowledge and attitudes about sexual and reproductive health (SRH). The questionnaire was designed to cover several critical content areas, including sexual growth and development, pregnancy and abortion, sexual risk behaviours, sexually transmitted diseases and contraception, and parenting and communication. Each of these areas was addressed with a specific number of items: 10 items each for sexual growth and development, pregnancy and abortion, sexual risk behaviour, sexually transmitted diseases, and contraception; 12 items for parenting and communication; and 16 items dedicated to evaluating attitudes towards SRH. The research team began by crafting the initial set of questions in English using various open sources to ensure comprehensive coverage of the topics. Recognising the importance of cultural and linguistic relevance, the team then engaged two native Malay speakers to translate the questionnaire. The team carefully merged the two translations into a single version and then retranslated into English. This back-translation step was crucial for verifying the accuracy and consistency of the translation, ensuring that the meaning of each item was preserved across languages.

### Content Validation

Content validation constitutes a crucial procedure to ensure relevance, clarity, simplicity, and the absence of ambiguity in targeted items. Within this research, the content valida-

tion process engaged the expertise of six proficient assessors, encompassing two linguistic specialists, two social science experts and two public health practitioners. These experts have extensive knowledge pertinent to the subject matter under investigation. Each item was evaluated based on four fundamental attributes: relevance to the specific domains, content clarity of content, presentation simplicity and degree of ambiguity. The assessment was structured using a four-point scale, wherein each attribute was appraised and scored, with a rating of (1) indicating the item as *'Not relevant/Not clear/Not simple/Doubtful'*, and (4) signifying that the item was deemed *'Very relevant/Very clear/Very simple/Meaning is clear'*.



Source: Primary Data, 2024

**Figure 1. Summary of The Development of The Questionnaire**

Item-level content validity refers to the extent to which individual items on a measurement scale accurately represent the intended construct they are intended to measure. This is typically quantified using the Item-Level Content Validity Index (I-CVI), which is calculated by dividing the number of experts who rate an item as relevant (usually on a scale of 1 to 4) by the total number of experts. A commonly accepted cut-off value for I-CVI is 0.70, indicating that at least 70% of experts agree on the relevance of an item, while a higher threshold, such as 0.78, is sometimes recommended for greater rigour in specific contexts.<sup>18-20</sup> In addition to I-CVI, the Scale-Level Content Validity Index (S-CVI) was employed to assess the overall validity of the scale. The S-CVI was calculated using the average method (S-CVI/Ave) and the universal agreement method (S-CVI/UA). A typical cut-off value for the S-CVI is 0.80, suggesting that the overall scale is considered valid when at least 80% of experts agree on the relevance of the items.<sup>21-23</sup> These indices provide a systematic approach to evaluating the content validity of measurement tools, ensuring that they are both relevant and representative of the constructs they assess.

### Face Validation

The assessment of face validity for an instrument designed to evaluate various aspects, such as grammar, clarity, and cultural acceptability, is crucial for ensuring that the instrument is effective and appropriate for its intended purpose.<sup>24</sup> The evaluation process involved 30 individuals who provided feedback on 10 specific areas using a four-point Likert scale. This assessment method is widely recognised in survey research for capturing subjective opinions and perceptions regarding the instrument's design and content.<sup>25</sup>

### Psychometric Analysis

A cross-sectional study was conducted to assess knowledge and attitudes regarding sexual and reproductive health (SRH) among 100 adolescents aged 16 to 19 years old in the suburban areas of Padawan subdistrict, Kuching, and Asajaya district, Samarahan, Sarawak. The study was conducted between September and November 2023 and included Malaysian nationals residing in the areas. We purposefully selected two villages in Padawan, in the Kuching district, and one in the Asajaya district. Using simple random sampling without replacement, each individual

was given an equal chance of selection. Data were collected through face-to-face interviews using an interviewer-administered questionnaire that covered sociodemographic and personal attributes, knowledge of SRH and attitudes towards SRH.

### Statistical Analysis

The collected data were subjected to rigorous manual examination and validation protocols to ensure precision. The data were then transcribed into a Microsoft Excel spreadsheet, incorporating validation mechanisms to minimise entry errors. The raw data were then imported into the Statistical Package for Social Sciences (SPSS), version 29 for Windows, for comprehensive statistical analysis. Prior to analysis, a thorough data screening, coding, and verification process was conducted to identify and rectify any duplication. These steps are essential for maintaining the integrity and reliability of the research findings. The study assessed content validity using the Item Content Validity Index (I-CVI), Scale Content Validity Index/Average (S-CVI/Ave), and Scale Content Validity Index/Universal Agreement (S-CVI/U) to evaluate the relevance, clarity, simplicity, and ambiguity. A CVI of 0.83 was deemed acceptable for six experts, which is consistent with the established content validity thresholds.<sup>26</sup> Face validity was evaluated by calculating the intraclass correlation (ICC) using a two-way mixed-effects model with multiple raters and absolute agreement. An ICC between 0.75 and 0.90 is considered good, whereas values above 0.90 are deemed excellent.<sup>27</sup> Internal reliability was measured using Cronbach's alpha, with values above 0.70 considered acceptable and consistent with findings in the literature.<sup>28</sup>

### Ethical Issues

Given the potential ethical concerns associated with this study, it is crucial to emphasise that respondent participation was entirely voluntary. Throughout the research process, stringent measures were taken to ensure the confidentiality and privacy of the respondents, including the protection of their personal information. Importantly, ethical approval was obtained from the Medical Research Ethics Committee of Universiti Malaysia Sarawak (Ref: FME/23/58), highlighting the commitment to maintaining high ethical standards in the conduct of the research.

## RESULTS

### Characteristics of Respondent

Table 1 shows that the respondents were predominantly Malaysian adolescents aged 16-19, with a slight majority of males (59%). Ethnically, Bidayuh (59%) formed the largest group, followed by Malay (23%), Iban (16%), and Chinese (2%). Christianity was the dominant religion (76%), with Islam (23%) and Buddhism (1%) also represented. Most respondents were single (97%) and currently in secondary education (68%), though a notable portion (18%) reported no formal schooling. This demographic profile reflects a diverse sample of Malaysian youth, with a particular focus on the Bidayuh ethnic group and Christian religious affiliation.

### Preliminary Item Analysis

The developed questionnaire had two domains. Based on the feedback from experts and respondents, one item was removed from the knowledge domain due to irrelevance. For the attitude domain, one item was removed because of redundancy, and two were removed due to the sensitivity and inappropriate questions. However, ten items in both domains were required to rephrase the question.

### Content Validity

The content analysis of the questionnaire, as presented in Table 2, evaluates four parameters: relevance, clarity, simplicity, and ambiguity, using three indices: Item-Level Content Validity Index (I-CVI), Scale-Level Content Validity Index based on average (S-CVI), and Scale-Level Content Validity Index based on universal agreement (S-CVI/UA). For the parameter of relevance, the I-CVI ranges from 0.83 to 1.00, indicating that experts generally deem individual items highly relevant. The S-CVI ranged from 0.99 to 1.00, suggesting that, on average, the scale was considered almost entirely relevant. The S-CVI/UA also ranged from 0.98 to 1.00, reflecting a high level of universal agreement among experts on the relevance of the scale items. In terms of clarity, the I-CVI also ranged from 0.83 to 1.00, indicating that most items were clear to experts. The S-CVI is 0.99 - 1.00, indicating that the scale is perceived as very clear overall. The S-CVI/UA ranged from 0.94 to 1.00, demonstrating substantial universal agreement on item clarity. For

simplicity, the I-CVI again ranges from 0.83 to 1.00, reflecting that experts generally consider individual items to be simple. The S-CVI was 0.99 - 1.00, suggesting that the scale is simple on average. The S-CVI/UA ranged from 0.94 to 1.00, indicating a high universal agreement on the simplicity of the items. Regarding ambiguity, the I-CVI ranges from 0.83 to 1.00, indicating that experts mostly view items as unambiguous. The S-CVI ranges from 0.99 to 1.00, suggesting that the scale is perceived as generally unambiguous. The S-CVI/UA ranged from 0.83 to 1.00, indicating a somewhat lower but still substantial level of universal agreement on the lack of ambiguity in the items.

**Table 1. Characteristics of Respondents**

Variable	n = 100	%
<b>Age in years</b>		
16	33	33.0
17	26	26.0
18	23	23.0
19	18	18.0
<b>Gender</b>		
Male	59	59.0
Female	41	41.0
<b>Ethnic group</b>		
Malay	23	23.0
Iban	16	16.0
Bidayuh	59	59.0
Chinese	2	2.0
<b>Religion</b>		
Islam	23	23.0
Christianity	76	76.0
Buddhism	1	1.0
<b>Marital Status</b>		
Single	97	97.0
Married	3	3.0
<b>Level of education</b>		
No schooling	18	18.0
Primary	1	1.0
Secondary	68	68.0
Pre-university	11	11.0
Others	2	2.0

Source: Primary Data, 2024

**Table 2. Content Analysis of The Questionnaire**

Parameters	I-CVI	S-CVI	S-CVI/UA
Relevance	0.83-1.00	0.99-1.00	0.98-1.00
Clarity	0.83-1.00	0.99-1.00	0.94-1.00
Simplicity	0.83-1.00	0.99-1.00	0.94-1.00
Ambiguity	0.83-1.00	0.99-1.00	0.83-1.00

Source: Primary Data, 2024

I-CVI = Item-level content validity

S-CVI = Scale-level content validity based (on average)

S-CVI/UA = Scale-level content validity based on universal agreement

Overall, the high values across all indices and parameters suggest that the questionnaire items are well-constructed, with strong content validity in terms of relevance, clarity, simplicity, and ambiguity.

### Face Validity

Intraclass Correlation Coefficient (ICC) analysis, which is based on a two-way mixed-effects model in which people effects are random and measures effects are fixed, provides insights into the consistency of the measurements. The single measure ICC was 0.523, with a 95% confidence interval ranging from 0.336 to 0.776, indicating moderate reliability for individual measurements. The F test for single measures yielded a value of 33.843, with degrees of freedom (df1 = 10, df2 = 290) and a significance level of  $p < .001$ , indicating that the reliability was statistically significant. The average measure ICC was 0.970, with a 95% confidence interval ranging from 0.938 to 0.990, demonstrating excellent reliability when averaging across items. The F test for average measures also produced a value of 33.843, with the same degrees of freedom and significance level ( $p < .001$ ), confirming the high reliability of the scale when considering average measures. The ICC was calculated using Type C coefficients with a consistency definition, excluding the between-measure variance from the denominator variance. This reliability analysis underscores the robustness and consistency of the scale used in this study (Table 3).

### Psychometric Analysis

Table 4 summarises the reliability analysis for the different parts of the questionnaire, each measured using a Likert scale. The Knowledge of Sexual and Reproductive Health section comprises 42 items and exhibits excellent internal consistency with a Cronbach's alpha of 0.935.

The corrected item-total correlations for this section ranged from 0.183 to 0.714, indicating a wide variation in how well individual items correlated with the total score. The Sexual Growth and Development section includes 10 items and demonstrated good reliability, with a Cronbach's alpha of 0.871. The corrected item-total correlations ranged from 0.340 to 0.738, suggesting that most items contributed well to the overall construct. For the Pregnancy and Abortion section, which also consists of 10 items, reliability was good, with a Cronbach's alpha of 0.842. However, the corrected item-total correlations ranged from 0.077 to 0.687, indicating that some items may not align well with the overall construct. The Risky Sexual Behaviour, Sexually Transmitted Diseases (STDs), and Contraceptive section, which contains 10 items, showed good reliability, as evidenced by a Cronbach's alpha of 0.857. The item-total correlations ranged from 0.350 to 0.778, reflecting a generally strong contribution of items to the scale. The Parenting and Communication section, which includes 12 items, had a moderate level of reliability, with a Cronbach's alpha of 0.782. The corrected item-total correlations ranged from 0.257 to 0.579, indicating variability in item contributions. Finally, the Attitude Towards Sexual and Reproductive Health section, which comprises 16 items on a 1-5 Likert scale, demonstrated moderate reliability with a Cronbach's alpha of 0.682. The corrected item-total correlations ranged from 0.005 to 0.553, suggesting that some items do not effectively contribute to the overall construct. Overall, the reliability analysis indicates that although most sections exhibit good to excellent internal consistency, certain items within sections may require refinement to enhance their alignment with the intended constructs.

**Table 3. Face Validity of The Questionnaire**

Measures	Intraclass Correlation	95% CI		F Test with True Value 0			
		LL	UL	Value	df1	df2	p-value
Single	.523	.336	.776	33.843	10	290	<.001
Average	.970	.938	.990	33.843	10	290	<.001

Source: Primary Data, 2024

LL = Lower limit of 95% confidence interval

UL = Upper limit of 95% confidence interval

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

**Table 4. Summary of Reliability Analysis Results**

Parts	No. of Items	Question Type	Cronbach Alpha	Corrected Item-Total Correlation
Knowledge of Sexual and Reproductive Health	42	Close-ended	0.935	0.183 – 0.714
Sexual Growth and Development	10	Close-ended	0.871	0.340 - 0.738
Pregnancy and Abortion	10	Close-ended	0.842	0.077 - 0.687
Risky Sexual Behaviours, Sexually Transmitted Diseases (STDs), and Contraceptives	10	Close-ended	0.857	0.350 - 0.778
Parenting and Communication	12	Close-ended	0.782	0.257 - 0.579
Attitude Towards Sexual and Reproductive Health	16	1-5 Likert Scale	0.682	0.005 – 0.553

Source: Primary Data, 2024

## DISCUSSION

Validating the Malay version of the Sexual and Reproductive Health Knowledge and Attitudes among Adolescents Questionnaire is critical in ensuring that the instrument effectively measures the intended constructs. A well-validated instrument enhances the accuracy of data collection, informs evidence-based interventions, and facilitates meaningful comparison across different populations. In adolescent SRH, a robust questionnaire validation is critical as it directly affects the reliability of findings used to guide educational and policy initiatives.

Content validity analysis of the questionnaire demonstrated robust findings across relevance, clarity, simplicity, and ambiguity parameters. The I-CVI for relevance (0.83-1.00) indicated high item relevance, while S-CVI (0.99-1.00) and S-CVI/UA (0.98-1.00) values further supported the scale's overall relevance and expert consensus.<sup>29,30</sup> Similar results were observed for clarity, with I-CVI (0.83-1.00) and S-CVI (0.99-1.00) suggesting clear items crucial for data reliability. Simplicity measures showed comparable strength, with I-CVI (0.83-1.00) and S-CVI (0.99-1.00) indicating simple items essential for adolescent engagement.<sup>31,32</sup> Ambiguity assessment yielded I-CVI (0.83-1.00) and S-CVI (0.99-1.00), suggesting unambiguous items, though the slightly lower S-CVI/UA (0.83-1.00) highlighted the need to address potential misinterpretations.<sup>33</sup> Our findings collectively support the questionnaire's validity for assessing adolescent sexual and reproductive health knowledge. The high content validity indices (I-CVI/S-CVI) align with rigorous validation standards for adolescent SRH questionnaires.<sup>13</sup> These emphasise the importance of relevance, clarity, simplicity, and

unambiguity in health-related questionnaires for adolescents, aligning with previous research.

Face validity, often considered the weakest form of validation, is a preliminary step in assessing whether an instrument appears to measure what it intends to.<sup>34-36</sup> This study's Intraclass Correlation Coefficient (ICC) analysis further supports the questionnaire's reliability. Single measures showed moderate reliability (ICC=0.523) with a 95% confidence interval of 0.336 to 0.776, indicating meaningful response variability.<sup>37,38</sup> The average measure ICC of 0.970, with a confidence interval from 0.938 to 0.990, demonstrated excellent reliability across items, reinforcing the scale's robustness.<sup>39,40</sup> Compared to similar validation studies,<sup>41</sup> these findings underscore the reliability of the questionnaire while emphasising the need for continued refinement to improve individual item consistency. High face validity enhances adolescents engagement and stakeholder acceptance, but it must be complemented by content and construct validity to ensure comprehensive measurement accuracy.<sup>34,36</sup>

Psychometric analysis reveals essential insights into the reliability of its various sections, which are critical for ensuring the instrument's validity when measuring the intended constructs. The reliability analysis summarised Cronbach's alpha as a measure of internal consistency, which is a widely accepted method for evaluating the reliability of questionnaires, particularly those using Likert scales.<sup>42-44</sup>

The sexual and reproductive health knowledge questionnaire demonstrated excellent overall internal consistency (Cronbach's alpha = 0.935), which exceeded the value of the previous study for the adolescent SRH questionnaire.<sup>45</sup> A study on SRH knowledge conducted in Nepal re-

vealed results similar to those found in this study.<sup>29</sup> This indicates well-correlated items effectively measuring the underlying construct.<sup>42,46</sup> Individual sections showed good to moderate reliability: Sexual Growth and Development ( $\alpha = 0.871$ ), Pregnancy and Abortion ( $\alpha = 0.842$ ), Risky Sexual Behaviour, STDs, and Contraceptives ( $\alpha = 0.857$ ), and Parenting and Communication ( $\alpha = 0.782$ ). Corrected item-total correlations varied across sections, ranging from 0.077 to 0.778, suggesting some items contribute strongly to their respective constructs while others may require refinement.<sup>47,48</sup> A similar study has been observed where items related to attitude constructs exhibit lower consistency due to the subjective nature of responses.<sup>13,49</sup> These findings support the questionnaire's overall reliability while highlighting potential areas for improvement in specific items to enhance its effectiveness in assessing adolescent sexual and reproductive health knowledge.

Finally, the Attitude Towards Sexual and Reproductive Health section, which was comprised of 16 items, demonstrated moderate reliability with a Cronbach's alpha of 0.682. The corrected item-total correlations ranged from 0.005 to 0.553, suggesting that some items may not effectively contribute to the overall construct and warrant further examination.<sup>44,50</sup> The survey regarding domain attitudes conducted in Africa and the Middle East indicates higher values compared to this study.<sup>51 52</sup> Future refinements could involve conducting Exploratory Factor Analysis (EFA) to identify underlying dimensions and improve the scales psychometric properties.

The study has several limitations. The sample was predominantly from a specific ethnic group (Bidayuh) and religious affiliation (Christian), which may limit generalizability to other Malaysian populations as Malaysia's multicultural context (e.g., Malay/Muslim norms on SRH) could influence the responses where religious communities viewed on SRH matters are taboo and leading to stigmatisation.<sup>53</sup> Consequently, the generalisability of the questionnaire's validity and its specific findings related to knowledge and attitudes concerning sexual and reproductive health may be limited, as the demographic focus is primarily situated within the context of Sarawak, where the majority of respondents belong the Dayak indigenous ethnic groups, specifically the Bidayuh and Iban.<sup>54</sup> To enhance the robustness and cultural appropriateness of

the instrument on a national level, future validation studies should utilise a stratified sampling strategy that incorporates a variety of ethnic and religious groups.<sup>55</sup>

Some items in the questionnaire, particularly in the Attitude Towards Sexual and Reproductive Health section, showed low item-total correlations, indicating potential issues with construct validity. The face validity assessment, while showing good overall reliability, demonstrated only moderate reliability for individual measurements. Additionally, the study's cross-sectional design limits the ability to assess the questionnaire's stability over time. A test-retest reliability analysis, which would require a longitudinal follow-up, could not be conducted; however, it would be essential for confirming the instrument's consistency across different time points.<sup>56</sup>

This validated questionnaire, beyond affirming its psychometric robustness, holds significant implications for enhancing adolescent SRH outcomes in Malaysia. It acts as a versatile tool for various stakeholders. Educators can utilise it as a baseline assessment to identify specific knowledge gaps and attitudes among students before implementing SRH education, allowing for the development of a tailored curriculum.<sup>45</sup> Additionally, it can function as a pre and post-test instrument to evaluate the impact of educational interventions.<sup>57</sup> For healthcare providers in adolescent health clinics, the tool can facilitate discussions on sensitive topics and assess adolescents' knowledge and concerns, thereby enhancing personalised counselling and care.<sup>41</sup> Policymakers can leverage the data collected to inform the creation of evidence-based, culturally relevant public health policies.<sup>13, 56</sup> By uncovering prevalent misconceptions or risky attitudes, resources can be better allocated to address urgent SRH issues among Malaysian youth.<sup>58</sup> Overall, this questionnaire evolves into a critical component for designing and assessing targeted approaches in adolescent health.

Despite these limitations, this validated tool provides a foundation for policymakers to assess SRH needs in East Malaysia, with potential for adaptation to other regions.

## CONCLUSION AND RECOMMENDATION

The validation of the Malay version of the Sexual and Reproductive Health Knowledge and Attitudes among Adolescents Questionnaire

shows strong content validity, as evidenced by high I-CVI, S-CVI, and S-CVI/UA scores, establishing it as a reliable tool for assessing adolescents' sexual and reproductive health knowledge and attitudes in Malaysia. This study emphasises the importance of a comprehensive validation process, including ICC analysis and face validity, to ensure the questionnaire's relevance and clarity for its users. Although most sections demonstrate good to excellent internal consistency, some items require refinement to align with the intended constructs, although they were retained due to their importance. This iterative process is crucial for developing robust instruments. Future research should focus on enhancing construct validity and reliability, as well as addressing weaknesses in specific items, to improve the questionnaire's overall psychometric properties and applicability to diverse adolescent populations. Apart from that, future studies should stratify sampling by ethnicity/religion. This cross-sectional design precludes the assessment of test-retest reliability, which could be evaluated through longitudinal follow-ups. This study recommends that the Ministry of Health and the Ministry of Education Malaysia pilot this questionnaire as a needs-assessment tool in schools. The collected data can directly inform curriculum development for subjects like Health Education by pinpointing specific knowledge gaps and attitudes that require attention. Furthermore, community health organisations and NGOs can use this validated tool to plan and assess the impact of their SRH outreach efforts. Employing it as a pre- and post-intervention measure offers concrete evidence of a program's success, fostering a move towards more evidence-based community health strategies.

## ACKNOWLEDGMENTS

We gratefully acknowledge the financial support Universiti Malaysia Sarawak (UNIMAS) provided for this research (Research ID: UNI/F05/VC-HIRG/85490/P05-01/2022). The authors sincerely thank the UNIMAS authorities for their ongoing support and encouragement throughout this study. The authors express their appreciation to the ANZCTR committee for accepting their study and providing them with the trial number registry (Registration number: ACTRN12625000148471), which is a clinical trial registry recognised by the World Health Organization (WHO) International Clinical Trials

Registry Platform (ICTRP) and the International Committee of Medical Journal Editors (ICMJE).

## AUTHOR CONTRIBUTIONS

The authors of this article were actively involved in various stages of the research process. GGA, MMR, and RR contributed to developing the questionnaire, submitting it to experts for validation, pilot testing, data analysis, drafting the initial manuscript, and finalising the manuscript for approval. RS, JLM, SCHL, ASS and LJC participated in drafting the initial manuscript and finalising the manuscript for approval. GGA = Gerraint Gillan Ahi; MMR = Md Mizanur Rahman; RR = Rafazila Ramli; RS = Rasitasam Safii; JLM = Jacey Lynn Minoi; SCHL = Stephanie Chua Hui Li; ASS = Ahmad Sofian bin Shminan; LJC = Lee Jun Choi.

## CONFLICTS OF INTEREST

All authors declare that they have no known financial or personal conflicts of interest concerning any scientific papers cited in this article that could affect the integrity of the research.

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