



Validation of a Sexual Health Literacy Scale for Secondary School Students in High-Risk Area of Thailand

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Abstract

Adolescents need strong sexual health literacy to make decisions that help avoid unintended pregnancies and sexually transmitted infections. This study validated the Sexual Health Literacy Scale for Secondary School Students (SHLSS) in high-risk area of Thailand, using Confirmatory Factor Analysis (CFA). Secondary data from a 2018 cross-sectional survey involving 319 secondary school students in Chonburi Province, Thailand, were used. The SHLSS consists of 28 items across four dimensions: Access, Understand, Appraise, and Apply. CFA results demonstrated strong reliability, with a Cronbach's alpha of 0.90, and satisfactory construct validity, as composite reliability values ranged from 0.88 to 0.91. Factor loadings varied between 0.43 and 0.81, indicating moderate to strong correlations. However, the Access dimension exhibited lower convergent validity (AVE = 0.28), suggesting need for refinement. These findings highlight need for further validation across diverse cultural groups and support the SHLSS as a promising framework for guiding sexual health education and policy development for adolescents.

Keywords: Health literacy, Sexual health, Student, Factor analysis, Psychometrics

What was Known

- Existing sexual health literacy tools were rarely validated for Thai adolescents.
- Prior studies confirmed the SHLSS reliability mainly in adult or mixed populations.
- Limited evidence existed on SHL dimensions' construct validity among students

What's New and Next

- This study validates the SHLSS for Thai students.
- Findings guide refinement of the Access dimension and cross-cultural validation.

- Future work should adapt the SHLSS for diverse youth contexts and interventions.

Introduction

Sexual Health Literacy (SHL) is a key determinant of adolescent health, supporting young people in making informed and responsible decisions about their sexual well-being. SHL involves more than knowledge of reproductive biology; it includes the ability to find, understand, critically evaluate, and apply sexual health information in daily life. Adequate SHL is associated with safer sexual behaviors and lower risks of sexually transmitted infections (STIs) and unintended pregnancies⁽¹⁾. Despite its importance, evidence indicates that many adolescents lack sufficient sexual health knowledge and skills. One study reported that approximately 74.5% of adolescents demonstrated limited understanding of sexual and reproductive health concepts⁽²⁾.

In Thailand, discussions related to sexual health are often shaped by cultural norms that discourage open communication. Conservative attitudes toward sexuality, combined with limited access to reliable educational resources, have allowed misconceptions to persist among adolescents^(3,4). The growing use of social media has further complicated this issue, as young people are frequently exposed to inaccurate or misleading sexual health information⁽⁵⁾. These challenges are particularly significant in Chonburi Province, which includes Pattaya, an internationally known tourist destination. The high number of visitors and the prevalence of commercial sex activities increase concerns about STI transmission in the area^(3,6). This emphasizes the urgent need for targeted sexual health education that aligns with the region's specific cultural and social context.

Research conducted in Thailand highlights ongoing gaps in adolescent SHL. A study in Chonburi Province found that 66% of secondary school students had low overall sexual health literacy across four dimensions: access, understanding, interactive communication, and decision-making⁽⁷⁾. Similarly, a study among female students aged 15–19 years in Phetchaburi Province reported moderate levels of sexual health literacy across six dimensions, including health knowledge, information access, communication, management skills media literacy, and decision-making related to unplanned pregnancy prevention⁽⁸⁾. Additionally, a study in Bangkok involving 394 female students revealed that 64.4% had low to intermediate levels of reproductive and sexual health literacy across four dimensions: access, understanding, appraisal, and Apply⁽⁹⁾. Overall, evidence from multiple Thai studies shows that a large proportion of adolescents have inadequate sexual health literacy across key domains, indicating a persistent and widespread gap in SHL.

However, many of these assessments used measurement tools that were not fully adapted to the Thai cultural context, limiting their reliability and applicability. To address this issue, the comprehensive health literacy framework developed by Sørensen et al.⁽¹⁰⁾ provides a valuable foundation. This model promotes empowerment, encouraging individuals to make confident and well-informed decisions about their sexual health⁽¹¹⁾.

A comprehensive review of the literature on health literacy, sexual health, and sexual health literacy yielded critical insights supporting the definition of Sexual Health Literacy for Students (SHLS) in this study, as follows. *Health literacy* refers to the cognitive and social skills enabling individuals to access, understand, evaluate, and apply health information for effective decision-making in healthcare, disease prevention, and health promotion⁽¹⁰⁾. *Sexual health* is a state of physical, emotional, mental, and social well-being related to sexuality—not merely the absence of disease or dysfunction. It requires a positive, respectful approach to sexuality and relationships, and the possibility of pleasurable, safe sexual experiences free from coercion, discrimination, and violence⁽¹²⁾.

Thongnopakun et al.⁽¹³⁾ developed the Sexual Health Literacy Measurement Tool for Pregnancy Prevention Among Adolescents (SHL-PPA) and defined sexual health literacy (SHL) as the ability to access, understand, evaluate, and apply information related to sexual health for informed decision-making that promotes and maintains sexual health and well-being. This definition integrates general health literacy skills within the specific context of sexuality, sexual behavior, and reproductive health.

Additionally, Phuwasuwan⁽¹⁴⁾ assessed SHL based on the V-shape health literacy framework. It incorporated four of the framework's six dimensions: information access, comprehension, inquiry and exchange, and decision-making. They defined sexual health as encompassing genital hygiene practices, prevention of sexually transmitted diseases, protection from sexual violence, self-control in sexual matters, sexual happiness, awareness of sexual information, ability to evaluate decision-making outcomes, and application of knowledge to solve problems or promote one's sexual health. Then SHL refers to the skills and ability to access, understand, and interpret sexual health information to develop knowledge and positive sexual attitudes, enabling individuals to interact, inquire, exchange information, make informed decisions, and appropriately practice self-care for their sexual health.

For the present study, SHLS was developed based on two frameworks: Sørensen et al.'s the health literacy framework⁽¹⁰⁾ and WHO's definition of sexual health⁽¹²⁾. Further the SHLSS was culturally adapted to ensure its suitability for lower secondary school students. SHLS was operationalized as students' self-reported ability to find, comprehend, evaluate, and use sexual health information related to contraception, STI prevention, consent, and personal decision-making.

Despite growing awareness of adolescent sexual health issues in Thailand, a critical shortage of culturally appropriate and psychometrically robust instruments for measuring sexual health literacy (SHL) persists. Existing instruments frequently lack comprehensive cultural adaptation and rigorous psychometric validation, particularly confirmatory factor analysis (CFA). Such limitations substantially impede the development, implementation, and systematic evaluation of effective educational interventions. Accordingly, this study sought to validate the Sexual Health Literacy Scale for Secondary School Students (SHLSS) within Chonburi Province, an area formally designated as high-risk for adolescent sexual health concerns. The findings are expected to provide a validated, culturally sensitive measurement tool that advances sexual health education and fosters responsible decision-making among Thai adolescents.

Materials and Methods

Study Design and Data source

This cross-sectional study validated the Sexual Health Literacy Scale for Students (SHLSS) using secondary data from a previous study⁽¹⁴⁾ that surveyed 319 lower secondary students across four schools in Chonburi Province, Thailand, under the Office of the Basic Education Commission. Participants were distributed across Year 1 (33.5%), Year 2 (30.1%), and Year 3 (36.4%). Males comprised 73.4% of the sample. Most students reported a GPA of 3.0–4.0 (55%), came from nuclear families (81.7%), lived with their parents (71.5%), and perceived their family's financial situation as sufficient (66%).

Procedures

The original scale from previous study⁽¹⁴⁾ consisted of 32 self-reported items across four domains: (1) access to sexual health information, (2) understanding of sexual health information, (3) inquiry and exchange of sexual health information, and (4) decision-making using sexual health information. Responses used a 4-point rating scale, with "Very difficult" to "Very easy" for the Access domain and "Always" to "Never" for the remaining domains. Cronbach's alpha reliability coefficients were 0.80, 0.84, 0.87, and 0.89, respectively.

Following a comprehensive review, four items related to genital hygiene were excluded, as this topic fell outside the scope of the study based on the current definition of SHLS and assessments of content relevance. The final adapted version consisted of 28 items, retaining the original four-domain structure. This revision enhanced contextual relevance and content validity for adolescent respondents while maintaining the theoretical foundation of the scale. The operational definitions are as follows:

Access to sexual health information refers the ability to locate and obtain information on contraception, protection from sexual violence, sexual feeling management, gender and sexual diversity, reliable sources, and sexual boundaries and communication.

Understanding of sexual health information refers the comprehension of STI/HIV and pregnancy prevention, protection from sexual violence, appropriate sexual emotion regulation, respectful behavior toward diverse gender identities and sexual orientations, critical appraisal of media information, and sexual communication skills.

Appraisal of sexual health information refers the ability to critically evaluate and verify sexual health information by consulting trusted sources (parents, guardians, teachers, healthcare providers) regarding contraception, sexual violence and consent, sexual arousal management, discrimination advocacy, and online information verification.

Application of sexual health information refers the ability to make informed decisions and take action regarding sexual communication, contraceptive use, self-protection from sexual violence, sexual arousal management, sexual expression, media consumption, and assertive communication including discussing sex and refusing unwanted activities.

Data Analysis

SPSS software (version 18.0; IBM Corp., Armonk, NY, USA) for descriptive statistics. This software is licensed to Mahidol University. Classical test theory evaluation included 1) internal consistency reliability: adequate ($0.70 \leq \alpha < 0.80$), very good ($0.80 \leq \alpha < 0.90$), and excellent ($\alpha \geq 0.90$) and 2) item discrimination was assessed via corrected item-total correlation (CITC), classified as very good ($\text{CITC} \geq 0.40$), good ($0.30 \leq \text{CITC} < 0.40$), marginal ($0.20 \leq \text{CITC} < 0.30$), and poor ($\text{CITC} < 0.20$)⁽¹⁵⁾.

Confirmatory Factor Analysis (CFA) was conducted using Mplus Software, version 8.0 (Muthén & Muthén, Los Angeles, CA, USA), with license no.STBML80006817. The maximum likelihood (ML) estimation method was used for CFA. Model fit was evaluated through multiple

indices, including the normed chi-square ($\chi^2/\text{df} < 2$), RMSEA (< 0.08), and SRMR (< 0.08) for absolute fit, and the comparative fit index (CFI) and Tucker–Lewis’s index (TLI) for incremental fit, with values above 0.90 indicating acceptable model fit. Convergent validity was supported by factor loadings > 0.50 , average variance extracted > 0.50 , and composite reliability > 0.70 , while discriminant validity was confirmed when inter-construct correlations were below 0.90 and each construct’s AVE exceeded the squared correlations between constructs^(16,17).

The overall percentage score for SHL and each dimension was categorized into three levels: $< 60\%$ (Limited), $60\%–79\%$ (Intermediate), and $\geq 80\%$ (Sufficient) according to Bloom’s criteria⁽¹⁸⁾.

Results

A confirmatory factor analysis (CFA) was conducted to evaluate the psychometric quality of the sexual health information scale. The results supported the four-factor structure—Access, Understand, Appraise, and Apply—and indicated strong reliability and validity. The CFA model showed acceptable fit ($\chi^2/\text{df} = 1.95$, RMSEA = 0.05, SRMR = 0.06, CFI = 0.90, TLI = 0.90). The overall Cronbach’s alpha coefficient was 0.90, reflecting excellent internal consistency. Composite reliability values ranged from 0.88 to 0.91 across the four dimensions. Average variance extracted values ranged from 0.28 to 0.40, indicating limited convergent validity. Item factor loadings varied between 0.43 and 0.81, while squared multiple correlations ranged from 0.34 to 0.81, suggesting that individual items accounted for a substantial proportion of variance within their respective factors. High corrected item–total correlations further confirmed that all items contributed meaningfully to the overall scale, and removing any item would not improve reliability. (see Figure 1 and Table 1).

Correlation analysis revealed relationships ranging from weak to moderate among the four dimensions. The strongest associations were found between understanding and application ($r = 0.57$), access and application ($r = 0.50$), and access and understanding ($r = 0.46$), highlighting the importance of information access and comprehension for effective use. Moderate correlations were observed between appraisal and application ($r = 0.36$) and between understanding and appraisal ($r = 0.27$). The weakest relationship occurred between access and appraisal ($r = 0.13$), suggesting that access alone does not necessarily enhance critical evaluation skills.

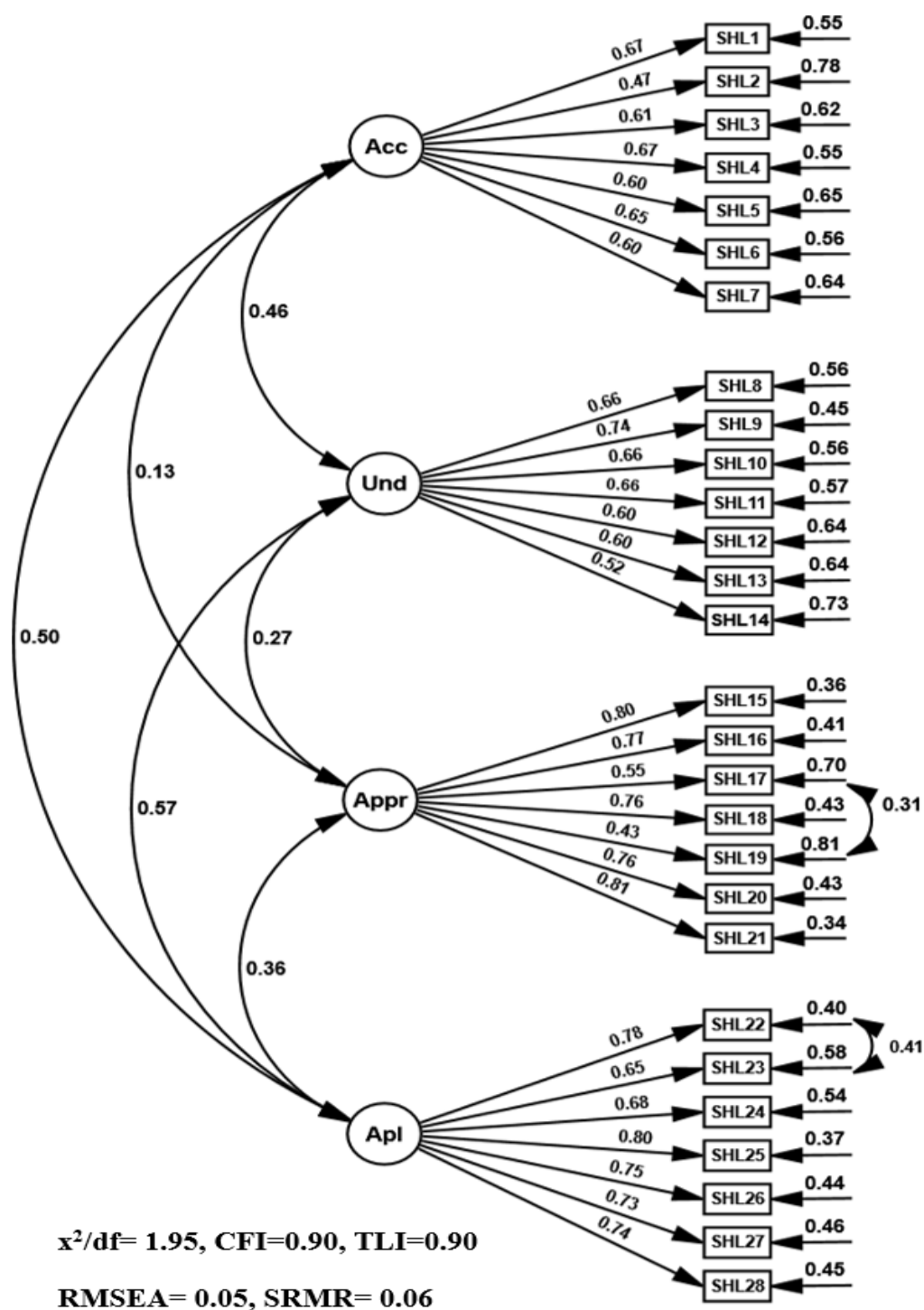


Figure 1 Confirmatory factor analysis of sexual health literacy scale for students

Table 1 Validation and Reliability of Sexual Health Literacy Scale for Students (n = 319)

Items	CFA		Classical Test theory	
	Loadings [†]	R ²	CITC	Alpha if item deleted
Access: AVE= 0.28, CR= 0.90				
SHL1	0.67	0.45	0.40	0.90
SHL2	0.47	0.22	0.35	0.90
SHL3	0.61	0.37	0.40	0.90
SHL4	0.67	0.45	0.42	0.90
SHL5	0.60	0.36	0.36	0.90
SHL6	0.65	0.42	0.43	0.90
SHL7	0.60	0.36	0.40	0.90
Understand: AVE= 0.31, CR= 0.91				
SHL8	0.66	0.44	0.44	0.90
SHL9	0.74	0.55	0.55	0.90
SHL10	0.66	0.44	0.46	0.90
SHL11	0.66	0.44	0.47	0.90
SHL12	0.60	0.36	0.43	0.90
SHL13	0.60	0.36	0.42	0.90
SHL14	0.52	0.27	0.44	0.90
Appraise: AVE= 0.32, CR= 0.88				
SHL15	0.80	0.64	0.46	0.90
SHL16	0.77	0.59	0.41	0.90
SHL17	0.55	0.30	0.47	0.90
SHL18	0.76	0.58	0.30	0.90
SHL19	0.43	0.18	0.40	0.90
SHL20	0.76	0.58	0.40	0.90
SHL21	0.81	0.66	0.41	0.90
Apply: AVE= 0.40, CR= 0.90				
SHL22	0.78	0.61	0.67	0.89
SHL23	0.65	0.42	0.60	0.90
SHL24	0.68	0.46	0.61	0.90
SHL25	0.80	0.64	0.64	0.90
SHL26	0.75	0.56	0.60	0.90
SHL27	0.73	0.53	0.59	0.90
SHL28	0.74	0.55	0.60	0.90
Cronbach's alpha = 0.90				

Table 1 Validation and Reliability of Sexual Health Literacy Scale for Students (n = 319) (Cont.)

Items	CFA		Classical Test theory	
	Loadings [†]	R ²	CITC	Alpha if item deleted
Correlation (r) between dimension				
Access and Understand	0.46			
Access and Appraise	0.13			
Access and Apply	0.50			
Understand and Appraise	0.27			
Understand and Apply	0.57			
Appraise and Apply	0.36			

Note. [†] = loadings of all items were significant at $p < 0.001$; AVE = average variance extracted;

CR = composite reliability; r = Pearson's product moment correlation coefficient;

CITC = corrected item-total correlation.

Overall, the findings confirm that the scale is a reliable and valid instrument for assessing multiple aspects of sexual health literacy among secondary school students.

Sexual health literacy was assessed across four domains: access, understand, appraise, and apply. Overall scores ranged from 28 to 112, with a mean score of 70.55 ± 14.69 . Most participants (68.7%) demonstrated an intermediate level of sexual health literacy, while 15.0% achieved a sufficient level and 16.3% were classified as having a limited level.

In the access domain, scores ranged from 7 to 28, with a mean of 18.92 ± 4.66 , and the majority of participants (68.0%) demonstrated an intermediate level of access to sexual health information. In the understand domain, scores also ranged from 7 to 28, with a mean of 21.51 ± 4.45 , and most participants demonstrated an intermediate level of understanding. In the appraise domain, the mean score was 12.43 ± 4.76 , with 73.4% of students classified at the intermediate level. Finally, in the apply domain, scores ranged from 7 to 28, with a mean of 17.68 ± 6.46 , and 58.9% of students exhibited intermediate application skills (see Table 2).

Table 2 Sexual health literacy levels and scores among secondary school students (n = 319)

Lists	Level: n (%)			Score		
	Sufficient	Intermediate	Limited	Min	Max	Mean $\pm$ SD
Overall SHL	48 (15.0)	219 (68.7)	52 (16.3)	28	112	70.55 $\pm$ 14.69
- Access	49 (15.4)	217 (68.0)	53 (16.6)	7	28	18.92 $\pm$ 4.66
- Understand	58 (18.2)	214 (67.1)	47 (14.7)	7	28	21.51 $\pm$ 4.45
- Appraise	46 (14.4)	234 (73.4)	39 (12.2)	7	28	12.43 $\pm$ 4.76
- Apply	58 (18.2)	188 (58.9)	73 (22.9)	7	28	17.68 $\pm$ 6.46

Discussion

The purpose of this study was to assess the psychometric properties of a set of items designed to measure four dimensions of sexual health knowledge and behaviors: Access, Understanding, Appraise, and Apply.

The confirmatory factor analysis (CFA) results showed that most items loaded adequately on their intended factors, supporting the proposed four-factor structure. Factor loadings above 0.50 are generally considered acceptable in psychometric evaluation⁽¹⁹⁾, and this criterion was largely met, particularly within the Understanding and Apply dimensions. These two dimensions demonstrated stronger construct validity than Access and Appraise. Notably, the Apply dimension showed the strongest performance, with the highest Composite Reliability (CR = 0.90) and Average Variance Extracted (AVE = 0.40), indicating that its items effectively represent the underlying construct.

In contrast, the Access dimension demonstrated weaker convergent validity, with the lowest AVE value (0.28). Although this value is below the recommended threshold of 0.50, such results can still be considered acceptable in the early stages of scale development, especially for complex and multidimensional constructs like sexual health literacy^(20, 21). The AVE values (0.28–0.40) were below the recommended threshold of 0.50, indicating limited convergent validity and suggesting the need for further refinement of the scale. Several items within the Access and Appraise dimensions showed lower factor loadings, particularly SHL2 and SHL19, suggesting that these items may not fully capture their intended constructs. Despite a high overall Cronbach's alpha, the corrected item–total correlations for Access items were relatively low, indicating the need for item refinement to improve measurement precision.

The correlations among the four dimensions further support the factorial structure of the instrument. Moderate correlations were observed between Access and Apply ($r = 0.50$) and between Understanding and Apply ($r = 0.57$), reflecting expected conceptual overlap between obtaining information, understanding it, and applying it in real-life contexts. However, the weak correlation between Access and Appraise ($r = 0.13$) raises concerns about the closeness of these constructs. This finding aligns with previous research suggesting that different components of sexual health literacy rely on distinct cognitive and evaluative processes.

In terms of internal consistency, the overall Cronbach's alpha of 0.90 indicates excellent reliability across the 28-item instrument. Values above 0.80 are considered optimal for tools measuring complex constructs⁽²²⁾. The "alpha if item deleted" analysis showed that removing any single item would not substantially improve reliability, suggesting that all items contribute meaningfully to the scale. Nonetheless, items with lower item-total correlations should be reviewed in future versions, as revising or removing them could further enhance reliability⁽²³⁾.

When compared with existing instruments, the current scale performs favorably. For example, the Sexual Health Literacy Measurement Tool for Pregnancy Prevention Among Adolescents (SHL-PPA) reported a Cronbach's alpha of 0.97, which may indicate item redundancy⁽¹³⁾. Other instruments, such as the sexual and reproductive health literacy questionnaire developed for adolescents in the Lao People's Democratic Republic, reported strong reliability ($\alpha = 0.86$)⁽²⁴⁾. The present instrument achieves a balance between comprehensive coverage and high reliability, minimizing excessive redundancy that can occur when alpha values are extremely high⁽²⁵⁾.

In terms of discriminant validity, the correlation values between the dimensions show moderate relationships between most constructs, with Access and Apply ($r = 0.50$) and Understand and Apply ($r = 0.57$) demonstrating reasonable overlap. However, the correlation between Access and Appraise ($r = 0.13$) was notably lower, which suggests that these two constructs may not be as closely related as originally hypothesized. This finding is consistent with research suggesting that different aspects of sexual health literacy engage separate cognitive and evaluative processes^(8, 26).

When compared with existing tools, the current instrument shows a more differentiated factor structure. For example, the SHL-PPA tool reported higher inter-correlations among its dimensions, indicating a more integrated approach⁽²²⁾. In contrast, this study emphasizes a clearer

distinction between understanding and applying, which aligns with health literacy frameworks that separate comprehension from application⁽²⁷⁾. I health literacy independently.

Despite these strengths, several limitations should be acknowledged. The cross-sectional design limits causal interpretation, and the sample drawn from a single province restricts generalizability. Future research should involve more diverse populations and settings. Further development should also focus on strengthening the Access and Appraise dimensions, potentially through qualitative methods to enhance item relevance. Exploring social and environmental influences on sexual health literacy would also provide valuable context for future studies.

Conclusion

This study validates the Sexual Health Literacy Scale for Students (SHLSS) as a reliable and contextually appropriate tool for assessing adolescents' sexual health literacy in Chonburi Province, Thailand. The SHLSS effectively measures four key components—access, understanding, evaluation, and application of sexual health information. Although the scale demonstrates acceptable psychometric properties with some limitations in validity, further refinement of the Access and Appraise dimensions is recommended to enhance its precision. The findings provide valuable insights for improving sexual health education programs and promoting informed decision-making and healthier behaviors among adolescents. The findings provide practical implications for improving adolescent sexual health education and school-based interventions.

Future research should extend the application of the SHLSS to diverse regions and populations across Thailand to test its generalizability and cultural adaptability. Longitudinal studies are also encouraged to explore how improvements in sexual health literacy influence behavioral and health outcomes over time. Furthermore, investigating the role of digital platforms and social media as sources of sexual health information could deepen understanding of how adolescents access and evaluate such information in contemporary contexts.

Ethical Approval Statement

This study received approval and exemption from the Ethical Review Committee for Human Research, Faculty of Public Health, Mahidol University, protocol No. MUPH 57/2026. Proof date: March 23, 2026.

Author Contributions

KZ and WK conceptualized and designed the study. KZ and NP contributed to the literature review and drafted the initial manuscript. KZ performed the data analysis. WK supervised the entire study and directed the manuscript revision process. All authors have reviewed and approved the final version of the manuscript.

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Conflicts of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Lists of Sexual Health Literacy Scale for Students (SHLSS)

SHL1: I can find information on how to use condoms correctly.

SHL2: I can find information on how to use birth control pills correctly.

SHL3: I can find information on how to protect being molested, hugged, or kissed.

SHL4: I can find information on how to manage sexual feelings in healthy ways.

SHL5: I can find information on the differences between men, women, transgenders, gays, and lesbians.

SHL6: I can identify and access reliable sources of sexual health information.

SHL7: I can find information on how to communicate about sexual feelings and boundaries with others.

SHL8: I understand how to prevent sexually transmitted infections including HIV.

SHL9: I understand how to prevent unintended pregnancy.

SHL10: I understand how to protect myself from molestation, hugging, and kissing.

SHL11: I understand how to manage my sexual feelings appropriately.

SHL12: I understand how to behave when I am with my friends, regardless of whether they are male, female, transgenders, gays, or lesbian.

SHL13: I understand that not all sexual health information in media is accurate or truthful.

SHL14: I understand how to communicate and express my sexual feelings.

SHL15: When I have questions about condom use, I can ask my parents, guardians, teachers, or healthcare providers.

SHL16: When I have questions about using birth control pills, I can ask my parents, guardians, teachers, or healthcare providers.

SHL17: I can communicate to my friends that molestation, hugging, and kissing without consent are acts of sexual violence.

SHL18: I ask my parents, guardians, teachers, doctors, and nurses about how to handle myself when I feel sexually aroused.

SHL19: I can speak out when I witness discrimination, regardless of whether the person is male, female, transgender, gay, or lesbian.

SHL20: I can verify sexual health information from online sources with my parents, guardians, teachers, or healthcare providers.

SHL21: I can discuss appropriate sexual communication and expression with my parents, guardians, teachers, or healthcare providers.

SHL22: I can decide when and how to use condoms.

SHL23: I can decide when and how to use birth control pills.

SHL24: I can decide how to take care of myself so that no one will grope, hug, kiss, or molest me.

SHL25: If I feel sexually aroused, I can decide what to do.

SHL26: I can decide how to express myself sexually with others.

SHL27: If I encounter sexually appealing material, I can decide whether to watch it or not.

SHL28: I can decide when to talk about sex with others, express my feelings, and refuse sexual activities.