PREDICTORS OF SEXUAL AND REPRODUCTIVE HEALTH LITERACY AMONG FEMALE STUDENTS IN BANGKOK, THAILAND

Surang Cherwanitchakorn[1], Punyarat Lapvongwatana[2], Natkamol Chansatitporn[3], Sunee Lagampan[2] and Panan Pichayapinyo[2]

[1]Doctor of Public Health Program, Faculty of Public Health, Mahidol University, Bangkok, Thailand; [2]Department of Public Health Nursing, [3]Department of Biostatistics, Faculty of Public Health, Mahidol University, Bangkok, Thailand

Abstract. Teenage sexual and reproductive health literacy (SRHL) may reduce sexual risk behaviors. In this study, we aimed to identify factors significantly associated with SRHL among female students aged 11-19 years in Bangkok, Thailand in order to guide efforts to improve SRHL in the study population. Inclusion criteria for study subjects were being aged 11-19 years, attending a study public high school in Bangkok, having no communication problems and being willing to participate in this study. The exclusion criterion was being absent during data collection. Study subjects were selected by a two-stage stratified random sampling technique. The minimum number of subjects calculated to be needed for the study was 383 but we added additional subjects to account for missing and incomplete data. Each subject was asked to complete a self-administered questionnaire asking about their sexual attitudes toward opposite sex, their perceived family relationships, their perceived sexual influence of peers, their perceived school connectedness, the type of living environment, sex education activities and their SRHL level. The SRHL level was assessed by asking questions about the subject's ability to access, understand, appraise and apply sexual and reproductive health (SRH) information to their sexual health. Answers were quantified into a possible score of 0-150 points. Each subject's score was categorized using Bloom's cut-off points into one of three levels: low (<90 points), intermediate (90-119 points) and high (120-150 points) SRHL levels. The questionnaire was pilot-tested using 30 female students who met inclusion and exclusion criteria but were not included in the study. Multinomial logistic regression analysis was used to identify factors significantly associated

with SRHL level. The study was conducted during February-March 2021. A total of 394 subjects were included in this study. The mean (± standard deviation (SD)) age of study subjects was 15 (±2) (range: 11-19) years. 52.5% of subjects (n = 207) were in grades 10-12. 6.3% (n = 25), 58.2% (n = 229) and 35.5% (n = 140) had low, intermediate and high SRHL levels, respectively. The factor significantly positively associated with an intermediate SRHL level was perceiving having a positive sexual influence by peers (adjusted odds ratio (aOR) = 1.43; 95% confidence interval (CI): 1.23-1.66, p<0.001). The factors significantly negatively associated with an intermediate SRHL level were: having a good sexual attitude toward the opposite sex (aOR = 0.89; 95% CI: 0.80-0.99, p = 0.030) and perceiving having positive sex education activities (aOR = 0.82; 95% CI: 0.68-0.99, p = 0.034). The factors significantly positively associated with a high SRHL level were: perceiving having a good family relationship (aOR = 1.12; 95% CI: 1.04-1.21, p = 0.004) and perceiving their peers had a positive sexual influence on them (aOR = 1.90; 95% CI: 1.60-2.25, p<0.001). The factor significantly negatively associated with a high SRHL level was having a good sexual attitude toward the opposite sex (aOR = 0.87; 95% CI: 0.78-0.98, p = 0.018). In summary, 93.7% of subjects had either an intermediate or high SRHL level. Factors significantly positively associated with having an intermediate or high SRHL level were perceiving their peers had a positive sexual influence on them and perceiving they had good family relationships. The factors significantly negatively associated with an intermediate or high SRHL level were having a good sexual attitude level toward opposite sex and perceiving having positive sex education activities. We conclude that to improve SRHL levels in the study population, it is important to encourage the positive factors and determine how the negative factor can be improved. Further studies are needed to determine how best to accomplish this in the study population.

Keywords: sexual and reproductive health literacy, associating factors, teenage pregnancy, high school students

Correspondence: Punyarat Lapvongwatana, Department of Public Health Nursing, Faculty of Public Health, Mahidol University, 420/1 Ratchawithi Road, Bangkok 10400, Thailand
Tel: +66 (0) 2345 8542 E-mail: punyarat.lap@mahidol.ac.th

INTRODUCTION

Teenage pregnancy (TP) is a public health problem in Thailand. Unwanted TP can cause some teens to consider having an illegal abortion, even though it may put them at risk for serious health problems. The infants of teen mothers are more likely to have a lower birth weight, a greater risk of mortality and are more likely to be abandoned by their mothers (Tumchuea and Pumprayool, 2018). In 2016, the Thai Ministry of Public Health (MoPH) launched a program to prevent adolescent pregnancy (Bureau of Reproductive Health, 2016) by providing sex education, life skills and youth-friendly health services for teenagers. In 2021, the birth rate among Thai girls aged 15-19 years was reported to be 33/1,000, higher than South Asia birth rate of 29/1,000 for girls the same age (World Bank, n.d.). In 2019, Bangkok had the highest reported number of sexually transmitted diseases (STDs) in Thailand at 94.1/100,000 population (Health Information System Development Office, 2020).

These statistics show the need to teach teens about sexual risks, especially in Bangkok. Sexual and reproductive health literacy (SRHL) is awareness of these risks and how to prevent them (Manwong *et al*, 2022). SRHL has been described as a personal asset (Nutbeam, 2008) and includes having the skills to access, understand, appraise and apply SRHL to their lives (Sorensen *et al*, 2012). Previous studies have reported factors significantly positively associated with a high SRHL level to be education level, having good family relationships (Waling *et al*, 2019), having a family member working in healthcare (Vongxay *et al*, 2019) and having a greater knowledge about sexual risks after attending a sex education class (Santisouk *et al*, 2020). The factor reported to be significantly negatively associated with SRHL level was the perceived sexual influence of the media (Waling *et al*, 2019). However, there is limited data regarding SRHL levels and their associated factors among Thai adolescent females (Narkbubpha and Deoisres, 2020).

The Ecological Model of Health Behavior (EMoHB) has been used to try to explain health behavior by explaining the dynamics of behavioral change and to provide solutions for both prevalence and severity of the selected problem (McLeroy *et al*, 1988). It states that developing healthy behaviors at the individual

level result from subject changes in factors at the intrapersonal, interpersonal, institutional, community and public policy levels (McLeroy *et al*, 1988). Most of the previous studies were conducted at the personal level (Dongarwar and Salihu, 2019; Vongxay *et al*, 2019). There is limited data regarding factors associated with SRHL levels among Thai schoolgirls. We used the EMoHB as a conceptual framework to develop our study. The associations between SRHL levels and the following selected factors among female students were assessed: sexual attitudes toward opposite sex (intrapersonal factors), perceived family relationships (interpersonal factors), perceived sexual influence of peers (interpersonal factors), perceived school connectedness (institutional factors), living in different environments (community factors) and perceived sex education activities (public policy factors) (McLeroy *et al*, 1988).

In this study, we aimed to determine SRHL levels and their significant factors among study subjects in order to guide efforts to improve SRHL levels in the study population.

MATERIALS AND METHODS

Study design and setting

We conducted this cross-sectional study at selected co-educational public high schools in Bangkok, Thailand, during February-March 2021.

Study sample

Study subjects were selected by two-stage stratified random sampling. In the first stage, we randomly selected a total of 4 schools by size, one school from each of the following average school sizes: small (2,585 students), medium (10,420 students), large (25,138 students) and very large (61,159 students) (The Secondary Educational Service Area Office Bangkok 1, 2020; The Secondary Educational Service Area Office Bangkok 2, 2020).

The second stage of sample selection involved randomly selecting subjects studying in grades 7-12.

The inclusion criteria for subjects were being aged 11-19 years, attending one of the study schools in Bangkok, being able to communicate well and being willing to participate in the study. The exclusion criteria for the subjects were requesting to withdraw from the study and being

absent on the day the data were collected.

The minimum sample size for our study subjects was calculated using a population proportion formula (Lavrakas, 2008), with an estimated confidence level of 1.96 at a *p*-value of <0.05, a sampling error of 0.05, a population size of 99,302 female students in the selected schools meeting the study ages and grades criteria and an expected proportion of sexual risk behaviors based on a previous study of 0.05 (Thongnopakun *et al*, 2018). The calculated sample size was 383 subjects. The study was conducted during the second semester of the 2020 academic year. We added an additional 20% to account for incomplete and missing data to give the optimal number of subjects needed to be recruited into the study of 460.

The numbers of subjects selected from each study school by size were: 12 subjects from the small school, 48 subjects from the medium sized school, 116 students from the large school, and 248 subjects from the very large school. The numbers of subjects selected from each size school reflected the numbers of female students at those schools.

Study instrument

Each subject was asked to complete a questionnaire. The questionnaire consisted of 8 parts, as described below.

Part 1 of the questionnaire asked about socio-demographic characteristics (subject age, year in school, academic level, if their parents were living or dead, what their parental marital status was and if the subject had a boyfriend).

Part 2 of the questionnaire asked about the subject's sexual attitude toward the opposite sex, assessing emotional responses regarding the opposite sex. This part consisted of 7 questions with answers using a 5-point Likert scale, where: 1 = strongly disagree, 2 = disagree, 3 = not sure, 4 = agree, 5 = strongly agree. The possible score ranged from 7 to 21 points. The scores were divided into three categories: low (<21 points; seldom or never behaving inappropriately sexually with the opposite sex), moderate (21-27 points; sometimes behaving inappropriately with the opposite sex) and high (28-35; often behaving inappropriately with the opposite sex). The Cronbach's alpha coefficient for this part was 0.70 for the pilot group.

Part 3 of the questionnaire asked about perceived family relationships. It asked about the subject's perceptions regarding receiving support, advice, and care from parents and family members. This part consisted of 15 questions with answers using a 5-point Likert scale, where 1 = strongly disagree, 2 = disagree, 3 = not sure, 4 = agree, and 5 = strongly agree. The possible score ranged from 15 to 75 points. The scores were divided into three categories: poor (<45 points: seldom or never receiving support, advice or care from their parents or family members); moderate (45-59 points; sometimes receiving support, advice or care from their parents or family members) and good (60-75 points; always receiving support, advice or care from their parents or family members). The Cronbach's alpha coefficient for this part was 0.75 for the pilot group.

Part 4 of the questionnaire asked about the perceived sexual influence of peers: whether the subject accepted their friends' sexual attitudes and advice. This part consisted of 7 questions with answers using a 5-point Likert scale, where 1 = strongly disagree, 2 = disagree, 3 = unsure, 4 = agree, and 5 = strongly agree. The possible score ranged from 7 to 35 points. The scores were divided into three categories: low (<21 points; seldom or never influenced by peers), moderate (21-27 points; sometimes influenced by peers) and high (28-35 points; always influenced by peers). The Cronbach's alpha coefficient for this part was 0.65 for the pilot group.

Part 5 of the questionnaire asked about subject's perceptions of support and caring personally and academically. This part consisted of 7 questions with answers using a 5-point Likert scale where 1 = strongly disagree, 2 = disagree, 3 = unsure, 4 = agree and 5 = strongly agree. The possible score ranged from 7 to 35 points. The scores were divided into three categories: low (<21 points; seldom or never received support), moderate (21-27 points; sometimes received support) and high (28-35 points; always received support). The Cronbach's alpha coefficient for this part was 0.79 for the pilot group.

Part 6 of the questionnaire asked if the living environment was sexually provocative, if they had access to medical services or educational resources. This part consisted of 11 questions with two possible answers: (0 = no, 1 = yes). The possible score ranged from 0 to 11 points. The scores were divided into three categories: poor (<7 points; poor environment

and no access to resources), a fair environment (7-8 points; sometimes fairly safe and sometimes have access to resources) and good (9-11 points; safe environment and always have access to resources). The Cronbach's alpha coefficient for this part was 0.75 for the pilot group.

Part 7 of the questionnaire asked about having sex education activities at school. This part consisted of 9 questions with two possible answers (0 = no, 1 = yes). The possible score ranged from 0 to 9 points. The scores were divided into three categories: poor (<5 points; few or no sex education activities at school), moderate (5-6 points; some activities at school) and good (7-9 points; regular sex education activities at school). The Cronbach's alpha coefficient for this part was 0.85 for the pilot group.

Part 8 of the questionnaire asked about the subject's ability to access, understand, appraise and apply sex related health information. This part consisted of 30 questions with answers using a 5-point Likert scale where 1 = strongly not true, 2 = not true, 3 = moderately true, 4 = true, and 5 = strongly true. The possible score ranged from 30 to 150 points. The scores were divided into 3 categories: low (<90 points; only has basic skills to access and apply sex related health information), intermediate (90-119 points; moderate skills to access and process the information) and high (120-150 points; good skills to access and process the information). The Cronbach's alpha coefficient for this part was 0.96 for the pilot group.

The questionnaires were developed by a researcher based on a review of the literature, pilot tested among 30 students who met the inclusion and exclusion criteria for study subjects but were not included in the study and then 5 experts specializing in nursing, family health, and public health reviewed the questionnaire for accuracy, content validity and language. The content validity index for the total questionnaire among the experts ranged from 0.83 to 0.91.

Statistical analysis

We used percentages, means, standard deviations, maximums and minimums to describe subject characteristic. We used multinomial logistic regression with backward stepwise analysis to determine significant associations between independent variables and the subject's SRHL levels. We calculated adjusted odds ratios (aOR) to

determine significant associations between independent variables and the subject's SRHL level. Statistical significance was set at p <0.05 with a 95% confidence interval (CI). Before analysis, the data were tested for normality and multicollinearity.

Ethical approval

Ethical approval for this study was granted by the Ethical Review Committee for Human Research, Faculty of Public Health, Mahidol University (COA No. MUPH 2021-017). All the subjects provided written informed consent prior to participating in the study. Subjects aged <18 years obtained written informed consent from their parents/guardians prior to participation in the study.

RESULTS

A total of 394 subjects were included in the study. The average (±standard deviation (SD)) age of study subjects was 15 (±2) years. 63.7% were aged 15-19 years. 52.5% of the subjects were senior high school students. 76.4% of subjects had a grade point average (GPA) of ≥3.00 with a mean (±SD) GPA of 3.35 (±0.47). 21.6% of subjects had a boyfriend. 63.5% of subjects had married parents (Table 1).

6.3%, 58.2% and 35.5% of subjects had low, intermediate and high SRHL levels, respectively.

The percentages of subjects with low, intermediate and high levels for accessing, understanding, appraising, and applying sexual related health information were as follows. Regarding accessing information, 32.7%, 46.7% and 20.6% had low, intermediate and high SRHL levels, respectively. Regarding understanding information, 4.3%, 36.8% and 58.9% had low, intermediate and high SRHL levels, respectively. Regarding appraising information, 8.6%, 46.4% and 45.0% had low, intermediate and high SRHL levels, respectively. Regarding applying information, 4.8%, 41.1% and 54.1% of subjects had low, intermediate and high SRHL levels, respectively (Table 2).

39.3%, 51.5% and 9.1% of subjects had poor, average and good attitudes regarding the opposite sex, respectively. 8.1%, 62.2% and 29.7% of subjects, stated they had poor, average and good relationships with their family, respectively. 16.5%, 75.1% and 8.4% of subjects stated their peers had low, average and high levels of sexual influence on them, respectively. 3.0%, 52.8%

Table 1

Sociodemographic characteristics of study subjects (N = 394)

Characteristic	Frequency* *n* (%)
Age in years	
Mean ± SD	15.39 ± 2
Minimum	12.0
Maximum	19.0
Age group in years	
11-14	143 (36.3)
15-19	251 (63.7)
Educational level	
Junior high school (grades 7-9)	187 (47.5)
Senior high school (grades 10-12)	207 (52.5)
Grade point average	
Mean ± SD	3.35 ± 0.47
Minimum	1.79
Maximum	4.00
<3.00	92 (23.6)
≥3.00	302 (76.4)
Parental status	
Alive	367 (93.2)
Died	27 (6.8)
Parental marital status	
Married	250 (63.5)
Divorced/ Separated/ Widow	144 (36.5)
Does subject have a boyfriend?	
No	309 (78.4)
Yes	85 (21.6)

*Unless otherwise stated
SD: standard deviation

Table 2

Total and SRHL subset levels among study subjects (N = 394)

Total and SRHL subsets	Frequency* *n* (%)
Total SRHL levels	
Mean score ± SD, (points)	113 ± 17
Minimum score, (points)	65
Maximum score, (points)	150
Low level (<90 points)	25 (6.3)
Intermediate level (90-119 points)	229 (58.1)
High level (120-150 points)	140 (35.5)
SRHL subset level-can access sexual and reproductive health information	
Mean score ± SD, (points)	16 ± 5
Minimum score, (points)	5
Maximum score, (points)	25
Low level (<15 points)	129 (32.7)
Intermediate level (15-19 points)	184 (46.7)
High level (20-25 points)	81 (20.6)
SRHL subset level-can understand sexual and reproductive health information	
Mean score ± SD, (points)	24 ± 4
Minimum score, (points)	11
Maximum score, (points)	30
Low level (<18 points)	17 (4.3)
Intermediate level (18-23 points)	145 (36.8)
High level (24-30 points)	232 (58.9)

Table 2 (cont)

Total and SRHL subsets	Frequency* *n* (%)
SRHL subset level-can appraise sexual and reproductive health information	
Mean score ± SD, (points)	42 ± 7
Minimum score, (points)	22
Maximum score, (points)	55
Low level (<33 points)	34 (8.6)
Intermediate level (33-43 points)	183 (46.4)
High level (44-55 points)	177 (44.9)
SRHL subset level-can apply sexual and reproductive health information	
Mean score ± SD, (points)	32 ± 5
Minimum score, (points)	16
Maximum score, (points)	40
Low level (<24 points)	19 (4.8)
Intermediate level (24-31 points)	162 (41.1)
High level (32-40 points)	213 (54.1)

*Unless otherwise stated
SD: standard deviation; SRHL: sexual and reproductive health literacy

and 44.2% of subjects stated they had low, average and high levels of school connectedness, respectively. 42.4%, 38.6% and 19.0% of subjects stated they lived in poor, average and good living conditions, respectively. 40.4%, 28.1% and 31.5% of subjects stated they had poor, average and good sex education activities at their schools, respectively.

Multinomial logistic regression analysis showed significant associations between having peers who had a positive sexual influence on them and having intermediate (adjusted odds ratio) aOR = 1.43; 95% confidence interval (CI): 1.23-1.66, $p<0.001$) or high SRHL levels (aOR = 1.90; 95%CI: 1.60-2.25, $p<0.001$) and between having good family

Table 3

Associations among selected variables and SRHL level groups among study subjects

Variable	Intermediate SRHL level (90-119 points) n = 229		High SRHL level (>119 points) n = 140	
	aOR (95% CI)	p-value	aOR (95% CI)	p-value
Perceived sex education activities	0.82 (0.68-0.99)	0.034	0.95 (0.76-1.17)	0.607
Perceived school connectedness	0.98 (0.84-1.14)	0.790	1.11 (0.93-1.32)	0.248
Perceived family relationships	1.04 (0.97-1.12)	0.230	1.12 (1.04-1.21)	0.004
Sexual attitude toward opposite sex	0.89 (0.80-0.99)	0.030	0.87 (0.78-0.98)	0.018
Perceived sexual influence of peers	1.43 (1.23-1.66)	<0.001	1.90 (1.60-2.25)	<0.001

aOR: adjusted odds ratio; CI: confident interval; SRHL: sexual and reproductive health literacy

relationships and having a high SRHL level (aOR = 1.12; 95% CI: 1.04-1.21, p = 0.004).

Multinomial logistic regression analysis showed that for each additional 1-point increase in a subject's sexual attitude level toward opposite sex, there were 11.0% and 13.0% significant decreases in intermediate (aOR = 0.89; 95%CI: 0.80-0.99, p = 0.030) and high (aOR = 0.87; 95%CI: 0.78-0.98, p = 0.018) SRHL levels, respectively. For each additional point 1-point increase in sex education activities at their schools, there was an 18.0% significant decrease in their SRHL level among those with an intermediate SRHL level (aOR = 0.82; 95%CI: 0.68-0.99, p = 0.034). School connectedness levels were not significantly associated with intermediate (aOR = 0.98; 95%CI: 0.84-1.14, p = 0.790) or high (aOR = 1.11; 95%CI: 0.93-1.32, p = 0.248) SRHL levels (Table 3).

DISCUSSION

In our study, the majority of subjects had intermediate or high SRHL levels, probably

because most had attended sex education classes, discussed sex with their peers and sought knowledge about sex online. Our results are similar to those of another study from Thailand that found most female subjects had intermediate SHL levels (Tangnorakul *et al*, 2019) but are in contrast to the results of another study (Seedaket and Chotchai, 2021) from Thailand that reported most subjects had a low SHL level. A reason for this difference could be the other study may have been conducted in a sample group with a higher risk. Studies from Lao PDR and Iran reported finding low SRHL levels among adolescent students due to no teacher training, inadequate sex education programs and inability for youth to access sex education materials (Vongxay *et al*, 2019; Dabiri *et al*, 2019; Santisouk *et al*, 2020).

In our study, sexual attitude toward the opposite sex had a significant negative association with having an intermediate or high SRHL level. This could be because subjects with low SRHL levels might simply rely on their previous experience or their emotions rather than using critical thinking when faced with complex decisions (von Wagner *et al*, 2011).

In our study, having good family relationships was significantly positively associated with higher SRHL levels. This could be because the parents might educate their children about sexual health or at least provide the moral and ethical training allowing the subject to develop higher SRHL levels. Our results are consistent with previous studies that reported having good family relationships was associated with higher SRHL levels (Waling *et al*, 2019; Edwards *et al*, 2013). Having poor family relationships has been reported to be associated with sexual risk behaviors (Hafen and Laursen, 2009).

In our study, we found a significant positive association between a positive sexual influence by peers and a higher SRHL level. Teenagers often spend more time with and listen to their peers (Edwards *et al*, 2013) and can learn from their peers how and where to access information regarding sexual health (Wiley and Cory, 2013). Peers can have a positive sexual influence (Edwards *et al*, 2013) and this can result in a higher SRHL level. Our findings are similar to a study that found peers can positively influence health literacy levels (Manganello, 2007).

Peers may have either a positive influence, as seen in our study, or a negative influence on SRHL levels, as seen in other studies (Ahinkorah *et al*, 2019; Gunawardena *et al*, 2019).

In our study, the perceived sex education activities at schools were significantly negatively associated with their SRHL level. Previous studies have reported having greater sexual knowledge is associated with higher SRHL levels (Prayochmee *et al*, 2020; Salachua *et al*, 2022). However, in our study we found the opposite. Our questionnaire only asked yes or no questions regarding sex education activities at school, such as if sex education was taught and if condoms were distributed at school. Our questions may have biased the answer results.

In our study, feeling connected at school was not significantly associated with the SRHL level. This suggests subjects feel less connected with school but this did not affect their SRHL level. They may have viewed school as not being a resource for sexual health (McNeely *et al*, 2009). Our results are in contrast to another study that reported feeling connected at school was helpful to build SRHL levels (Edwards *et al*, 2013).

A strength of this study was that it was designed using EMoHB, which may be helpful in understanding problems with multiple, complex, influencing factors. A limitation of our study was that it is only specific to the study population, so the results cannot be applied to other populations.

In summary, 93.7% of subjects had either an intermediate or high SRHL level. Factors significantly positively associated with an intermediate or high SRHL level were perceiving their peers had a positive sexual influence on them and perceiving they had good family relationships. The factors significantly negatively associated with an intermediate or high SRHL level were having a good sexual attitude level toward opposite sex and perceiving having positive sex education activities at school. We conclude that to improve SRHL levels in the study population, it is important to encourage the positive factors and determine how the negative factor can be improved. Further studies are needed to determine how best to accomplish this in the study population.

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CONFLICT OF INTEREST DISCLOSURE

The authors declare no conflict of interest.

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