

Development of a child-rearing promotion of sexual abstinence scale (CPSAS) in Thai female adolescents at two Thai universities

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Abstract

Purpose – Child-rearing promoting sexual abstinence has strongly predicted sexual abstinence in Thai female adolescents, and it requires a valid and reliable measurement. However, no such instrument exists. This study aimed to develop a child-rearing promotion of sexual abstinence scale (CPSAS) and assess its validity and reliability.

Design/methodology/approach – The scale development consisted of two phases; scale construction and psychometric testing. Phase I included item generation extracted from a literature review and existing measurements. Items were reviewed by five-panel experts and were then selected by considering an inter-item correlation, corrected item-total correlation, factor loading and communality value from the exploratory factor analysis ($n = 299$). Phase II involved confirmatory factor analysis (CFA) for construct validity and scale reliability ($n = 300$).

Findings – The CPSAS, first, contained 25 items with four dimensions; assuring daughter to recognize parental love, teaching daughter sexual abstinence, convincing daughter to recognize parent's expectations of sexual abstinence and encouraging daughter sexual abstinence. Two items were then deleted after the experts reviewed, and six items were removed after item analysis. The CPSAS finally contained 17 items with a 4-point Likert scale. Psychometric testing provided acceptable results. CFA reported the fit indices; $\chi^2 = 98.06$, $p = 0.083$, $df = 80$, χ^2/df ratio = 1.220, CFI = 0.996, TLI = 0.992, RMSEA = 0.027 and SRMR = 0.030. The standardized factor loadings were 0.499 to 0.908 ($p < 0.05$). The S-CVI was 0.96, and Cronbach's alpha coefficient was 0.93.

Originality/value – The CPSAS is a reliable and valid instrument for evaluating child-rearing promoting sexual abstinence in Thai female adolescents.

Keywords Promoting sexual abstinence, Child rearing, Instrument development, Thai female adolescents

Paper type Research paper

Introduction

Child-rearing promotion of sexual abstinence or CPSA has strongly predicted sexual abstinence in female adolescents [1–3]. CPSA is the necessary action of parents to transfer attitudes, knowledge and sexual abstinence behaviors to female offspring from a young age. CPSA is thus crucial for shaping female adolescents' attitudes, beliefs and decision-making on sexual abstinence [4, 5]. That is, CPSA convinces female adolescents to choose sexual



abstinence as the first choice in order to gain the benefits of sexual abstinence that include well-being, preventing health problems, unintended pregnancy, human immunodeficiency virus infection (HIV), sexually transmitted diseases (STDs) and developing mental and psychological problems [4, 6]. Female adolescents would then be able to obtain higher levels of educational achievement and have a good career [7].

Child-rearing in most societies shares a typical value as the preservation of life, maintenance of health and the wellbeing of children; however, CPSA is specific to the culture [8]. In Thailand, child-rearing performed throughout the adolescent period consists of reinforcing connectedness, enhancing maturity and protecting children and adolescents from harm [9]. CPSA in the Thai culture is influential to ensure the sexual abstinence and livelihood of individuals. There is a history of practicing sexual abstinence in Thailand due to Thai women wishing to reserve themselves and not wanting to have premature sexual intercourse, while Thai men do not practice such a reserve. Sexual abstinence has been promoted as a health-promoting behavior for Thai female adolescents. Since this group is at high risk of unintended pregnancy, it is a big problem in Thailand. Sexual abstinence is a 100% effective way to prevent this problem. Besides, sexual intercourse may lead to unwanted pregnancy during study, which causes female adolescents to stop studying, commit an abortion, abandon children, or get HIV. For these reasons, Thai parents tend to promote sexual abstinence amongst their daughters more than their sons.

Thai parents raise daughters by observing the effects of premature sexual intercourse in society and decide how to prevent such problems [4]. Therefore, CPSA has been performed by Thai parents to promote sexual abstinence in their daughters in accordance with Thai cultural values.

From the Thai reproductive health database of 2016, the total number of female adolescents aged 10–19 years old was 4,104,419. Most adolescents were in the educational system, for example, in 2015, 96.5% of Thai adolescents were in the educational system, and approximately 70% were continuing on to higher education, among which there were more females than males. Also, in the academic year 2019, 81% of the female students were studying in universities [10, 11]. Literature supporting child-rearing is key to promoting sexual abstinence in Thai female adolescents [4, 12]. Parents believed sexual abstinence could help daughters achieve their life's purposes and be prepared for adulthood [13, 14]. Some parents taught and encouraged daughters to avoid sex, stay safe when using social media and networks, or living in a dormitory [15, 16]. Parents assured their daughters to recognize parental love and expectations of sexual abstinence since they were young or in the pre-school period. Growing up, daughters wanted to make parents happy and eventually maintained sexual abstinence until the right time [4].

CPSA in this study was derived from interpersonal influence, one of the behavior-specific cognitions and affect components in the Health Promotion Model (HPM) [17]. Behavior-specific cognitions and affect variables have been considered as the major motivational significance and are amenable to nursing intervention. The interpersonal influence was contributed by nurses to help promote people to perform sexual abstinence behaviors. The HPM proposed that primary sources of interpersonal influence are parents via parent's norms, support and modeling. Norms were linked to parental beliefs and expectations of sexual abstinence [1, 18]. Support was linked to parental teaching about sexual abstinence, giving love and understanding and encouragement [4, 12]. Modeling was linked to a model of sexual abstinence [4, 19]. Therefore, the CPSA in this study referred to Thai female adolescent's perception about the act of parents in promoting sexual abstinence during the period of study, which included parental beliefs and expectations of sexual abstinence, teaching and encouraging daughter's sexual abstinence, giving love and understanding and being a model of sexual abstinence.

To increase successful child-rearing through promoting sexual abstinence, healthcare providers need to assess and understand the CPSA completely. Many measurements related to the CPSA were conducted based on different definitions and contexts of the population [1, 18, 20, 21]. However, no existing measurements could be used in Thai female adolescents because most of them were not fit for the conceptual definition and population context. In Thailand, there were two measurements conducted in previous research. First, the parental influence scale (PaIN) was conducted by Panurat [22] to measure parental influence in middle-Thai female adolescents. The PaIN contained three dimensions; expectations of parents, teaching about sexual abstinence and encouragement of sexual abstinence. The PaIN contained the majority of indicators about CPSA underpinning the HPM. Nevertheless, this scale lacks indicators about assuring daughters to recognize parental love, which literature presented as the key to CPSA. Additionally, some indicators might need to be modified or updated regarding trends and globalization. The other measurement is the parent-daughter sexual abstinence communication (PDSAC) scale conducted by Chareonsuk and Phuphaibul [23] in early-middle Thai female adolescents. This scale was guided by the theory of plan behavior (TPB) and was used to measure PDSAC. The PDSAC's indicators obtained teaching and encouraging daughters' sexual abstinence. However, the PDSAC still lacks indicators about convincing daughters to recognize parents' expectations of sexual abstinence and assuring daughters to recognize parental love, which suggests that the PDSAC cannot measure child-rearing promoting sexual abstinence in this study. For these reasons, there was no valid and reliable measurement for assessing the CPSA. The purpose of this study was to develop an appropriate instrument to measure the CPSA in Thai female adolescents. The CPSAS could then be used as a tool for public health approaches to parenting-focused strategies or parenting programs in promoting sexual abstinence in Thai female adolescents.

Methods

Study design: This study was a cross-sectional design and had two phases, a development instrument and a psychometric testing phase. Both phases were conducted by utilizing the guidelines of Devellis [24], Waltz *et al.* [25], and Nunnally and Bernstein [26].

Ethical considerations: Research ethics approval was obtained from the Ethical Review Committee for Research Involving Human Research Subjects, Health Sciences Group, Chulalongkorn University (ECCU) (Approval No. COA 051/2020) for a paper-based questionnaire and a web-based questionnaire. The consent form explained the objectives of the study, benefits, risks and type of questionnaire. Verbal permission was obtained from the participants. Participants were informed of confidentiality in both paper and web-based questionnaires via an information sheet; they were not requested to specify names or student identity. Participants were free to withdraw from the study without losing any benefit or penalty. After completing the questionnaires, participants put the answer sheet into the envelopes and sealed them before sending them to the researchers. The web-based questionnaire did not require a log-in to prevent a participant's address and location identification. Data files were kept and deleted by the researcher after the research process was completed.

Settings and participants

The study was conducted at universities in Thailand. The simple random sampling technique was used to select two settings. The first university was in the Western region in Thailand, and the second university in the Central region in Thailand, where there was a similar context and provided sufficient research participants. The convenience sampling was used to recruit participants for each phase despite COVID-19 restrictions, and 300 participants at the first university were recruited for the first phase (scale construction). The other 300 participants at the second university were recruited for the second phase

(psychometric property testing). The inclusion criteria used to select the participants was (1) a first-year student studying in university in Thailand, (2) 18 to 19 years old regarding the ethical consideration and (3) having Thai nationality.

The researcher began collecting data for the first phase after gaining approval from the ECCU from 300 participants (299 participants provided complete responses) in the first university by paper-based questionnaire in February 2020. The 300 participants in the other university were selected for confirmatory factor analysis (CFA) and reliability testing in March 2020 by a web-based questionnaire due to the coronavirus disease (COVID-19) and physical distancing practices in place at the time.

The participants were first-year female students aged 18 to 19 years old, were Thai nationals and studying at a university in Thailand. The characteristics of the two sample groups were similar. For the first group in the scale construction phase, participants were 18 (28.4%) and 19 (71.6%) years. Most of them were Buddhist (93.9%), and the others were Christian (2.7%), Muslim (1.7%), and 2.0% of them had no religion. Most of them lived with their parents (64.9%) or relatives (8.4%), 7.4 % of them lived alone, and the others lived with a boyfriend, a girlfriend, or a same-sex peer at a dormitory. Of the participants, 235 (78.6%) remained sexually abstinent, and 64 participants (25.7%) reported engaging in sexual intercourse (oral, anal, or vaginal). Forty-nine participants (76.6%) reported their age at first sexual intercourse; 65.6% were 17–19 years old, and the youngest participant engaging in sexual intercourse was 14 years old.

For the second group in the psychometric property testing phase, participants were 18 (20.3%) and 19 (79.7%) years. Most of them were Buddhist (92.0%), and the others were Christian (1.0%), Muslim (3.7%), and 3.3% of them had no religion. Most of them lived with parents (74.3%) or relatives (6.7%), 6.7 % of them lived alone, and the others lived with a boyfriend, a girlfriend, or a same-sex peer at a dormitory. Of the participants, 210 (70.0%) practiced sexual abstinence, and 90 participants (30.0%) reported engaging in sexual intercourse (oral, anal, or vaginal). Sixty-nine participants (76.7%) reported their age at first sexual intercourse; 56.7% were 17–19 years old, and the youngest engaging in sexual intercourse was 13 years old.

Phase I: scale construction

The process of constructing the CPSAS began with generating an item pool applied from a comprehensive literature review and existing measurements. Previous studies examined CPSA in various cultures. However, promoting sexual abstinence needs to be undertaken by more specific practice, as in Thai culture. Thus, the researchers used items from Thai evidence as a core and considered evidence worldwide as adjuvant items. The researchers compared items from Thai evidence with items from international evidence. After considering the similarities and the differences, if the researchers found some items with similar meanings, the researchers choose items mainly from the Thai evidence.

The CPSAS was considered to be the four-point Likert scale format as the PaIN (1 = totally untrue to 4 = totally true) [22]. Not including a neutral option ensured that respondents had a precise and stable understanding of each point's meaning and made it easy to complete the questionnaires [27]. The first draft of CPSAS was examined by five experts with experience in sexual health nursing and pediatric nursing: two had experience in the HPM, and three had experience in child-rearing research and scale development. The experts evaluated each item by considering its relevance to the objective of the measurement by using a four-point rating scale; 1 (not relevant) to 4 (very relevant) [25]. The scale content validity index (S-CVI) and the item content validity index (I-CVI) were calculated based on the number of experts giving a rating higher than 3, divided by the number of experts. The experts were requested to provide suggestions of revision on items containing a score lower than three.

Item analysis and item selection were used to identify an appropriate item. This process was provided from the first sample group of 299 female adolescents by using an exploratory factor analysis (EFA). This study used EFA to determine items with lower score criteria. The principal component analysis (PCA) extraction with varimax with the Kaiser normalization method was applied. The researchers conducted factor analysis with the following acceptable estimated sample sizes, which had to be 300 or 10–20 participants per indicator. Normality testing was considered by using skewness and kurtosis values, which were not larger than 3.0 and corresponded with an alpha level of 0.05 [28, 29]. Bartlett's test of sphericity was significant. The Kaiser-Meyer-Olkin (KMO) value had to be greater than 0.5, which was adequate for the relationships between items and indicating the appropriateness of the factor analysis. The corrected item-total correlation had to be >0.30 , inter-item correlation had to be $0.2\text{--}0.8$, factor loading had to be >0.30 , and the communality score had to be >0.50 [26, 29]. Ten participants were confirmed; their willingness to participate was interviewed regarding the problems that occurred while answering the questionnaire. Some items were consequently modified to clarify the meaning. Therefore, in phase I, the researchers had appropriate items for psychometric property testing in phase II.

Phase II: psychometric property testing

The CPSAS was examined for construct validity by using CFA and internal consistency for reliability. Statistical analysis was carried out by using Mplus software Version 8 (SCBMX80001XXX) [30]. Normality testing was also considered by using skewness and kurtosis values, including the consideration of Bartlett's test of sphericity and KMO for conducting CFA. The samples were the other group of 300 first-year female students studying at the university in Thailand. The criteria of the goodness-of-fit of the model were considered to support the scale's construct validity. The Chi-square (χ^2) value could not be significant at p -value 0.05, χ^2 to degrees of freedom ratio was lower than 2.00, comparative fit index (CFI) was higher than 0.95, Tucker-Lewis fit index (TLI) was higher than 0.95, root mean square error of approximation (RMSEA) was lower than 0.05, and standardized root mean square residual (SRMR) was lower than 0.05 [29, 30].

Results

Scale construction

There were 134 item pools from the literature review and existing measurements with guidance by the HPM. Ninety-two items were drawn from the grounded theory of Supametaporn *et al.* [4] and other Thai literature (e.g. [15, 16, 31]) and other international literature (e.g. [2, 18, 21, 32]). Forty-two items were selected from Thai measurements (18 items from PaIN and 24 items from PDSAC) [22, 23]. The researchers checked items concerning the possibility of measuring the concept and compared similarities and differences. The first draft of the CPSAS contained 25 items with four dimensions guided by the HPM; (1) assuring daughter to recognize parental love, (2) teaching daughter sexual abstinence, (3) convincing daughter to recognize parent's expectations of sexual abstinence and (4) encouraging daughter sexual abstinence. Following reviews by the experts, two items with redundancy were then removed. The S-CVI of 23 items was 0.93.

Twenty-three items were then identified to find appropriate items by using item correlation and EFA. Skewness and kurtosis values were -0.441 to -1.005 and 0.090 to 1.482 ($p < 0.05$), which were accepted for normality testing [28]. Bartlett's test of sphericity was significant ($\chi^2 = 5322.910$, $p = 0.000$), and the KMO value was 0.88, indicating the appropriateness of factor analysis. Six items were deleted; 3 items had a high value of inter-item correlations ($r > 0.80$) with others; 1 item had inter-item correlation < 0.2 ; 1 item had corrected item-total correlation < 0.30 , and the other 1 item was also excluded because its communality value was

0.33. Thus, 17 items of the CPSAS were retained [26]. Reviewing the items by 10 participants, 1 item with the acceptably statistical value was modified to be more apparent in its meaning.

The final draft of the CPSAS contained 17 items with four dimensions; assuring daughter to recognize parental love (2 items), teaching daughter sexual abstinence (7 items), convincing daughter to recognize parent's expectations of sexual abstinence (4 items) and encouraging daughter sexual abstinence (4 items). The example of items in the CPSAS was shown in Table 1.

Psychometric property testing

Construct validity. Seventeen items were analyzed in phase II. CFA was conducted to examine whether a particular factor model provided a good fit to the data of the CPSAS or not. Normality testing was tested and provided acceptable results [28]. Bartlett's test of sphericity was significant ($\chi^2 = 4151.12, p < 0.001$), and the KMO were 0.91 [29]. The standardized factor loading was 0.499 to 0.908 ($p < 0.01$). The fit indices were below the threshold values of a good model fit; $\chi^2 = 260.056, p = 0.0000, df = 106, \chi^2/df$ ratio = 2.450, CFI = 0.962, TLI = 0.952, RMSEA = 0.070, SRMR = 0.040. The model modification indices suggested the researchers set covariance paths between measurement errors. After that, the fit indices met with the criteria for a good model fit; $\chi^2 = 98.064, p = 0.083, df = 80, \chi^2/df$ ratio = 1.220, CFI = 0.996, TLI = 0.992, RMSEA = 0.027, SRMR = 0.030 [30]. Fit indices of the factors structure were shown in Table 2, and the standardized modified measurement model of the CPSAS was provided as Figure 1.

Content validity and reliability. The S-CVI of 17-item CPSAS was 0.96. All items achieved the minimum criterion of I-CVI, 0.80–1.00. The Cronbach's alpha coefficient for four factors was 0.84, 0.92, 0.91 and 0.87, respectively. The Cronbach's alpha coefficient of the CPSAS was 0.93, which is considered a consistency of items in measuring the same construct [26].

Dimension	Items
1. Assuring daughter to recognize parental love	2. Parents spend their time being a consultant about my school life or my dating
2. Teaching daughter sexual abstinence	7. Parents teach me that staying with a male in a private place or having physical contact will result in sexual desire for both males and females
3. Convincing daughter to recognize parent's expectations	13. Parents expect me not to have sex during my study
4. Encouraging daughter sexual abstinence	17. Parents often show me the news about social problems caused by sex in school, such as abortion

Table 1.
The example of the
CPSAS items

Model fit information	Acceptable value	Scale value
Chi-square value (χ^2)	–	98.064
Degrees of freedom (df)	–	80
<i>p</i> -value	>0.05	0.083
χ^2/df	<2.00	1.220
Comparative fit index (CFI)	>0.95	0.996
Tucker-Lewis fit index (TLI)	>0.95	0.992
Root mean square error of approximation (RMSEA)	<0.05	0.027
Standardized root mean square residual (SRMR)	<0.05	0.030

Table 2.
Fit indices of the
factors structure of the
CPSAS ($n = 300$)

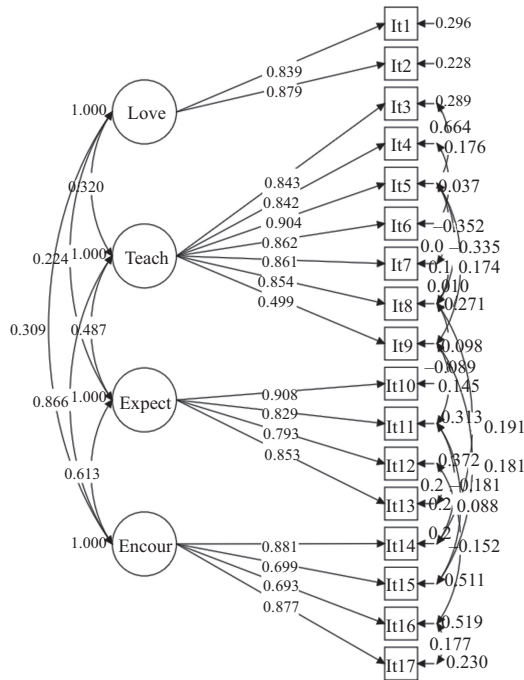


Figure 1.
The standardized
modified measurement
model of the CPSAS

Note(s): Love = Assuring daughter to recognize parental love,
Teach = Teaching daughter sexual abstinence, Expect = Convincing
daughter to recognize parent’s expectation of sexual abstinence, and
Encour = Encouraging daughter sexual abstinence

Discussion

The purpose of this study was to develop the CPSAS for measuring a perception about the actions of parents in promoting sexual abstinence among female adolescents during their studies. The CPSAS consisted of 17 items in four dimensions with a 4-point Likert scale. The construct validity of CPSAS was tested by using CFA. The results of CFA indicated the acceptable values of fit indices that demonstrated the construct validity of the CPSAS [30]. All standardized factor loadings were significant ($p < 0.05$). The structural domain of the CPSAS consists of; assuring the daughter to recognize parental love, teaching daughter sexual abstinence, convincing daughter to recognize parent’s expectations of sexual abstinence, and encouraging daughter to practice sexual abstinence.

Four dimensions were underlying the concept definition of CPSA. The dimensions of the CPSAS were quite similar to other measurements assessing CPSA. First, three dimensions; teaching daughter sexual abstinence, convincing daughter to recognize parent’s expectations of sexual abstinence, and encouraging daughter to practice sexual abstinence in the CPSAS were equivalent to three dimensions in the PaIN scale [22]. Nevertheless, the CPSAS contained assuring the daughter to recognize parental love, whereas the PaIN was not. For these reasons, the researchers developed the CPSAS, according to Supametaporn *et al.* and evidence in other countries [1, 4]. Evidence indicated that parental love and care could bring female adolescents to feel close and enable them to realize sexual abstinence benefits and eventually remain sexually abstinent [1, 4]. Thus, items about assuring the daughters to

recognize parental love and spend time talking with them were added, which made those items seem to be close to items of scales in other countries, such as the Quality of parent-child communication scale [18]. Hence, containing four dimensions made the CPSAS comprehensively measures CPSA in Thai female adolescents, and some items could be applied to measure other groups of adolescents.

The CPSAS developed from the PaIN, which was initially developed by the HPM, but some items were not similar. For example, in teaching the daughter sexual abstinence dimensions, the CPSAS contains more items than the PaIN; the CPSAS contains seven items while the PaIN contains five items. Three items in the CPSAS contained questions with similar meanings to three items in the PaIN because the researcher adopted these items from the PaIN after some modifications. Furthermore, the other four items in the CPSAS had their meaning covered by the other two items in the PaIN, and the CPSAS could give more clarification about teaching daughters sexual abstinence. For instance, the PaIN provided items as “parents teach daughters to be careful about having opposite-sex friends” [22] while the CPSAS clarified that “parents teach daughters that staying with a male in a private place or having physical contact will result in sexual desire for both males and females.” Also, the CPSAS contained items reflecting teaching daughters about sexual abstinence regarding trends such as how to be more careful when accessing information on the website and social media. Thus, the CPSAS could be used to measure CPSA by covering the concept definition of CPSA in Thai female adolescents.

Teaching daughters, sexual abstinence in the CPSAS could be similar to some items in the PDSAC [23]. The PDSAC was conducted to measure parent-daughter communication regarding sex in Thailand. Also, teaching daughters sexual abstinence was operated via communications between parents and daughters. Teaching content was similar according to Thai cultural values such as how to behave appropriately, or the consequence of premature sexual intercourse. Also, the CPSAS was developed underpinning the HPM when the PDSAC was developed underpinning TPB. Both the HPM and the TPB were the health promotion theories [17].

The present study shows that the CPSAS is reliable and valid for assessing CPSA in Thai female adolescents. The CPSAS could be used as a tool for public health approaches to parenting-focused strategies or parenting programs promoting sexual abstinence in Thai female adolescents. However, this study's samples were collected from two Thai universities using convenience sampling by following the university's COVID-19 policy. Some confounding factors might influence the validity and reliability of the CPSAS when it is applied in the future. Future studies should be considered using random sampling and conducted in a larger population to increase this instrument's validity and reliability.

The CPSAS will be useful in terms of practice and future research. Thai nurses and other healthcare providers will have an accurate measure that can be used to assess the CPSA of Thai female adolescents. The CPSAS is easy to use, requires no specialized training for users and can be administered to many Thai female adolescents via a web-based questionnaire at the same time.

In conclusion, the CPSAS was developed among the Thai female adolescent population. The CPSAS could be used as an instrument for evaluating the perception of Thai female adolescents about the act of parents in promoting sexual abstinence. This instrument could be beneficial for sexual abstinence research and the development of sexual abstinence promotion in Thailand.

Conflicts of Interest: None

References

1. Parkes A, Henderson M, Wight D, Nixon C. Is parenting associated with teenagers' early sexual risk-taking, autonomy and relationship with sexual partners?. *Perspect Sex Reprod Health*. 2011; 43(1): 30-40. doi: [10.1363/4303011](https://doi.org/10.1363/4303011).

2. Kao TSA, Loveland-Cherry C, Guthrie B. Maternal influences on Asian American-Pacific Islander adolescents' perceived maternal sexual expectations and their sexual initiation. *J Fam Issues*. 2010; 31(3): 381-406. doi: [10.1177/0192513x09351150](https://doi.org/10.1177/0192513x09351150).
3. Tolma EL, Oman RF, Vesely SK, Aspy CB, Beebe L, Fluhr J. Parental youth assets and sexual activity: differences by race/ethnicity. *Am J Health Behav*. 2011; 35(5): 513-24. doi: [10.5993/ajhb.35.5.1](https://doi.org/10.5993/ajhb.35.5.1).
4. Supametaporn P, Stern PN, Rodcumdee B, Chaiyawat W. Waiting for the right time: how and why young Thai women manage to avoid heterosexual intercourse. *Health Care Women Int*. 2010; 31(8): 737-54. doi: [10.1080/07399331003717298](https://doi.org/10.1080/07399331003717298).
5. Wight D, Fullerton D. A review of interventions with parents to promote the sexual health of their children. *J Adolesc Health*. 2013; 52(1): 4-27. doi: [10.1016/j.jadohealth.2012.04.014](https://doi.org/10.1016/j.jadohealth.2012.04.014).
6. Cook EC, Buehler C, Blair BL. Adolescents' emotional reactivity across relationship contexts. *Dev Psychol*. 2013; 49(2): 341-52. doi: [10.1037/a0028342](https://doi.org/10.1037/a0028342).
7. Sabia JJ, Rees DI. The effect of sexual abstinence on females' educational attainment. *Demography*. 2009; 46(4): 695-715. doi: [10.1353/dem.0.0072](https://doi.org/10.1353/dem.0.0072).
8. Selin H. Parenting across cultures: childrearing, motherhood and fatherhood in non-western cultures. Science across cultures: the history of non-western science. Dordrecht: Springer; 2014. 7.
9. Virasiri S, Yunibhand J, Chaiyawat W. Parenting: what are the critical attributes? *J Med Assoc Thai*. 2011; 94(9): 1109-16.
10. Office of the Education Council. National education plan 2017-2036. [updated 2017 Mar; cited 2020 May]. Available from: <http://www.lampang.go.th/public60/EducationPlan2.pdf>.
11. Ministry of Public Health. Reproductive health situation in adolescent in 2017. [updated 2017; cited 2020 May]. Available from: <http://rh.anamai.moph.go.th/download>.
12. Chareonsuk J, Phuphaibul R, Sinsuksai N, Viwatwongkasem C, Villarruel AM. Development of the causal model of young Thai female adolescents' sexual abstinence intention. *Pac Rim Int J Nurs Res Thail*. 2013; 17(4): 329-41.
13. Ronglue S, Talengjit P, Siriborirak S. Unwanted pregnancies in teenagers: a survey of problems and needs for health care support. *Siriraj Nursing Journal*. 2012; 3(2): 14-28.
14. Punsuwun S, Sungwan P, Monsang I, Chaiban P. Experiences after pregnancy among unmarried adolescents in upper north. *Songklanagarind J Nursing*. 2013; 33(3): 17-36.
15. Isaro N, Toonsiri C, Srisuriyawet R. Factors predicting appropriated sexual behaviors among the lower secondary school students in Chanthaburi province. *J Fac Nursing Burapha Univ*. 2016; 24(2): 72-84.
16. Punmeekij N. Factors affecting sexual risk behaviors among female lower secondary school students in Pattaya city. Chon Buri: Burapha University; 2016.
17. Pender NJ, Murdaugh CL, Parsons MA. Health promotion in nursing practice. 7th ed. Boston: Pearson; 2015.
18. Bersamin M, Todd M, Fisher DA, Hill DL, Grube JW, Walker S. Parenting practices and adolescent sexual behavior: a longitudinal study. *J Marriage Fam*. 2008; 70(1): 97-112. doi: [10.1111/j.1741-3737.2007.00464.x](https://doi.org/10.1111/j.1741-3737.2007.00464.x).
19. Long-Middleton ER, Burke PJ, Cahill Lawrence CA, Blanchard LB, Amudala NH, Rankin SH. Understanding motivations for abstinence among adolescent young women: insights into effective sexual risk reduction strategies. *J Pediatr Health Care*. 2013; 27(5): 342-50. doi: [10.1016/j.pedhc.2012.02.010](https://doi.org/10.1016/j.pedhc.2012.02.010).
20. Borawski EA, Ievers-Landis CE, Lovegreen LD, Trapl ES. Parental monitoring, negotiated unsupervised time, and parental trust: the role of perceived parenting practices in adolescent health risk behaviors. *J Adolesc Health*. 2003; 33(2): 60-70. doi: [10.1016/s1054-139x\(03\)00100-9](https://doi.org/10.1016/s1054-139x(03)00100-9).
21. Lam AG, Russell ST, Tan TC, Leong SJ. Maternal predictors of noncoital sexual behavior: examining a nationally representative sample of Asian and White American adolescents who have never had sex. *J Youth Adolesc*. 2008; 37(1): 62-73. doi: [10.1007/s10964-007-9223-1](https://doi.org/10.1007/s10964-007-9223-1).

22. Panurat S. Factors related to sexual abstinence among Thai female middle adolescents. Bangkok: Chulalongkorn University; 2009.
23. Chareonsuk J, Phuphaibul R. The development of parent-daughter sexual abstinence communication scale. *J Nursing Sci Chulalongkorn Univ.* 2014; 26(3): 84-95.
24. DeVellis RF. Scale development: theory and applications. 4th ed. Los Angeles: SAGE; 2017.
25. Waltz CF, Strickland O, Lenz ER. Measurement in nursing and health research. 5th ed. New York, NY: Springer; 2017.
26. Nunnally JC, Bernstein IH. Psychometric theory. New York, NY: McGraw-Hill; 1994.
27. Marsden PV, Wright JD. Handbook of survey research. Bingley: Emerald; 2010.
28. Kline RB. Principles and practice of structural equation modeling. New York, NY: Guilford Press; 2011.
29. Hair JF, Black WC, Babin BJ, Anderson RE. Multivariate data analysis. 7th ed. Harlow, Essex: Pearson; 2014.
30. Kelloway EK. Using Mplus for structural equation modeling: a researcher's guide. 2nd ed. Los Angeles: SAGE; 2015.
31. Fongkaew W, Cupp PK, Miller BA, Atwood KA, Chamrathirong A, Rhucharoenpornpanich O, *et al.* Do Thai parents really know about the sexual risk taking of their children? A qualitative study in Bangkok. *Nurs Health Sci.* 2012; 14(3): 391-7. doi: [10.1111/j.1442-2018.2012.00703.x](https://doi.org/10.1111/j.1442-2018.2012.00703.x).
32. Madkour AS, Farhat T, Halpern CT, Gabhainn SN, Godeau E. Parents' support and knowledge of their daughters' lives, and females' early sexual initiation in nine European countries. *Perspect Sex Reprod Health.* 2012; 44(3): 167-75. doi: [10.1363/4416712](https://doi.org/10.1363/4416712).

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