

Developing and Testing a School–Family Cyberbullying Prevention Program for Secondary School Students in Thailand

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Abstract

Background: Cyberbullying among secondary school students is increasing worldwide, causing psychological distress and adverse academic performance. Schools in Thailand often lack comprehensive prevention strategies. This study aimed to develop a school–family participatory cyberbullying prevention program and evaluate changes in students' cyberbullying knowledge and response skills following its implementation.

Methods: A quasi-experimental, single-group pretest–posttest developmental study was conducted in Chiang Mai, Thailand, from May to October 2022. Eighteen stakeholders (school leaders, teachers, parents, and community representatives) co-developed the program, which was subsequently implemented with 45 students in Grades 7–9. For data collection, self-report measures comprising demographic information, validated cyberbullying knowledge questionnaires, and response skills questionnaires were employed. The collected data were analyzed using descriptive and inferential statistics with SPSS version 24.

Results: The developed program comprised four core activities: (1) building resilience against cyberbullying, (2) promoting positive communication, (3) creating a cyberbullying-free community, and (4) fostering sustainability. After participation, mean knowledge scores increased from 12.95 (SD=2.44) to 16.82 (SD=1.82) ($P<0.001$), with high knowledge levels rising from 4.45% to 75.56% ($P=0.012$). Response skill scores improved from 3.30 (SD=0.42) to 4.26 (SD=0.33) ($P<0.001$), with high-level responses increasing from 8.89% to 95.55% ($P<0.001$).

Conclusions: The school–family collaboration program effectively enhanced students' knowledge and response skills to cyberbullying and showed promise for broader implementation to promote safer digital environments.

Keywords: Bullying, Students, Family, Schools, Health Promotion

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1. Introduction

Online communication has become an integral part of the daily lives of most people worldwide, particularly among adolescents. Interaction and daily activities of teenagers have increasingly shifted to the online world due to its accessibility, speed, cost-effectiveness, and ability to reach a wide range of individuals of various ages in a short period (1). However, the rapid pace of communication has led to the dissemination of online content by users who lack mindfulness and critical reflection (2, 3), which can negatively impact others, leading to embarrassment, stress, anxiety, or discouragement (3).

Today, cyberbullying has emerged as a significant issue. Cyberbullying involves harassing others through online platforms, often via

messages sent through mobile phones or computers (1). The perpetrators, who may or may not know the victim, engage in behavior that induces fear, sadness, anxiety, a sense of worthlessness, and even feelings of being ridiculed by society (3). For example, verbal attacks or the use of hate speech, sometimes committed unknowingly or without malicious intent, frequently occur. Such actions often continue because the bully does not directly face or perceive the emotions of the victim. Cyberbullying can occur at any time, and repeated victimization has been shown to negatively impact students' subjective well-being and school bonding (2). Moreover, this behavior has been linked to self-harm and suicide. International research showed that youths who are bullied online are 2.3 to 2.6 times more likely to engage in self-harm or attempt suicide (3).

Cyberbullying has emerged as a significant issue among children and adolescents, primarily due to increased Internet access and the widespread use of digital devices (4). Previous research showed that bullying often occurs outside the classroom but continues to affect students at home and school (3, 4). These studies reported a strong correlation between school bullying and various psychological issues, including emotional and behavioral problems, anxiety, post-traumatic stress disorder, poor sleep quality, Internet addiction, and depression (3-5). Notably, the severity of bullying was directly associated with increased risks of these psychological conditions (5).

In Thailand, Internet use among children and adolescents is nearly universal, with over 98% reporting access (6). In line with this high level of digital engagement, cyberbullying has become an increasing concern. A national study of Thai secondary school students reported that approximately 33.3% had experienced cyberbullying (6). Consistent with this, other evidence suggested that more than half of students in Thailand have encountered online risks. For example, 51.7% reported communicating with strangers online, 5.1% had been ridiculed or insulted, 2.1% had been scammed, and 1.3% had experienced unauthorized public exposure of their photos or videos, sometimes leading to extortion (7). Similarly, another study in Thailand (8) found that 17.4% of adolescents reported being cyberbullied and 21.9% experienced traditional school bullying, with the highest rates observed in northern Thailand, particularly in urban areas. Taken together, these findings highlighted the risks associated with frequent exposure to online environments, where bullying is prevalent and may be perceived as common among some adolescents. In the current context, bullying is no longer confined to the classroom but can occur at any time through online platforms (9).

As online social networks continue to grow, efforts to build resilience against online threats among the younger generation remain limited. In addition, youth possess low media literacy skills, limiting their ability to critically evaluate online content, which increases their susceptibility to cyberbullying (10). Research on media literacy and online bullying suggests that many Thai youths still view cyberbullying as normal (11). This

viewpoint reflects a dangerous misconception, as ignoring cyberbullying only exacerbates its severity (12). As long as society continues to normalize cyberbullying as part of its social norms and fails to address it, the problem will only become more deeply entrenched.

Previous studies on addressing cyberbullying among students have primarily focused on developing individual-level skills, such as media literacy, social skills, and behavioral competencies (10, 13, 14), while several studies in the Thai context remain descriptive in nature (8, 9, 12). However, these efforts remain limited to the youth level. In reality, young people exist within multiple social contexts, including family, school, and community. Family and community involvement is crucial in preventing cyberbullying and ensuring children do not become perpetrators. A holistic, community-based approach that integrates families, schools, and students is therefore essential. The present study was based on the community participation framework of Cohen and Uphoff (15), incorporating participatory strategies that reflect the Thai socio-cultural context.

Family and community collaboration with schools is key to combating cyberbullying, as families can provide knowledge and foster correct online communication while also helping shape policies to prevent cyberbullying (14-16). Therefore, addressing this issue requires an integrated, multi-level approach (13, 17). However, there are few studies promoting collaboration between students, schools, and families in preventing cyberbullying, resulting in a lack of sustainability and success in addressing the problem (13). To address this gap, the present study aimed to develop a school-family participatory cyberbullying prevention program, and to evaluate its effectiveness on students' knowledge and response skills.

2. Methods

2.1. Design

This study employed a quasi-experimental, single-group pretest-posttest developmental design. The objectives of this study were to develop a school-family participatory cyberbullying prevention program and to evaluate changes in students' cyberbullying knowledge and response skills.

2.2. Selection and Description of Participants

The study was conducted in one Opportunity Expansion School operating under the Chiang Mai Education Area Office 2. Among six Opportunity Expansion Schools located in Mae Rim District, Chiang Mai Province, Thailand, one school was purposively selected based on predefined criteria: 1) offering Grades 7 to 9, 2) situated in a rural area with socio-economic diversity, 3) classified as an Opportunity Expansion School, and 4) demonstrating administrative readiness and a commitment to school–community collaboration. The selected school was considered contextually appropriate and logistically feasible for implementing the cyberbullying prevention program.

Based on the role and involvement of the participants, two groups were included in the study. The first group, the program development group, functioned as the school management committee and was responsible for co-designing and guiding the implementation of the cyberbullying prevention program. The purposive sampling method was used to select 18 participants, ensuring diverse perspectives of the stakeholders. This group consisted of the school director, five teachers, two community leaders, one public health officer from the subdistrict health-promoting hospital, three members of the parents' association, and six secondary school students. These participants jointly defined the program framework and implementation strategies through participatory collaboration.

The second group, the student intervention group, comprised all secondary school students in Grades 7–9 during the 2022 academic year ($n=47$). Two students were excluded due to incomplete participation in the intervention, resulting in a final sample of 45 students included in the analysis. A total population sampling approach was used to include all students within the selected school, ensuring inclusivity and minimizing peer-related bias. Participation was voluntary and written informed consent was obtained from parents or guardians. All students had access to mobile devices and Internet connectivity, supporting the delivery of the intervention. Given the one-group pretest–posttest quasi-experimental design, all students received the intervention without random allocation. This approach was considered

appropriate based on ethical and contextual considerations for a school-wide, community-participatory program.

2.3. Sample Size Determination

The sample size was estimated using G*Power software (version 3.1) for a paired-samples t-test, corresponding to the one-group pretest–posttest design. A priori power analysis was conducted assuming a two-tailed significance level of 0.05, statistical power of 0.80, and a medium effect size (Cohen's $d=0.50$), as conventionally recommended in behavioral research (18). The minimum required sample size was 34 participants. In this study, 45 students completed the intervention and were included in the final analysis, exceeding the minimum requirement and indicating adequate statistical power to detect pre–post differences.

2.4. Data Collection and Measurements

The data collection tool was a structured questionnaire comprising three sections. The first section collected students' demographic characteristics. The second section assessed cyberbullying knowledge using a 20-item true/false questionnaire, with one point assigned for each correct answer, yielding total scores ranging from 0 to 20, where higher scores indicated greater knowledge. The third section measured cyberbullying response skills using a 20-item instrument rated on a five-point Likert scale. The response skill score was calculated as the mean item score, ranging from 1 to 5, with higher scores indicating better response skills. Scores for both knowledge and response skills were categorized into low, moderate, and high levels based on predefined cut-off points using Best's criterion-referenced method (19).

2.4.1. Content Validity

To ensure content validity, both the research instruments and the cyberbullying prevention program were reviewed by a panel of five experts. The panel included a child and adolescent psychiatrist, a community nursing expert, a psychiatric nursing expert, a researcher specializing in cyberbullying studies, and a school health promotion specialist. The experts evaluated the appropriateness of language, clarity, accuracy of items, and content coverage. Based on their feedback, the instruments

were revised and refined. The content validity index (CVI) of the data collection measures was calculated, yielding values of 0.97 for the cyberbullying knowledge measure and 0.95 for the cyberbullying response skill measure, which indicated high content validity.

2.4.2. Reliability Assessment

The revised instruments were pilot tested with 10 secondary school students who shared similar characteristics with the study sample. The cyberbullying knowledge measure was assessed for internal consistency using the Kuder–Richardson Formula 20 (KR-20), resulting in a reliability coefficient of 0.80. The cyberbullying response skill measure was tested for internal consistency using Cronbach's alpha coefficient, which yielded a value of 0.82. Although the cyberbullying prevention program itself was not piloted, testing of the instruments ensured clarity, reliability, and suitability of the measures for use in the main study.

2.5. Procedure

In this study, program development and implementation followed the community participation framework of Cohen and Uphoff, which emphasizes decision-making, implementation, benefit-sharing, and evaluation (15). The intervention consisted of a cyberbullying prevention program for secondary school students developed through school and family participation. The program content and activities were tailored to Thai cultural and educational contexts to ensure relevance to local student behaviors and school–family dynamics. Data collection was conducted in two phases.

Phase one was the development of the cyberbullying prevention program. This phase lasted three weeks and focused on developing the cyberbullying prevention program. This phase was carried out in four steps. The first step, decision-making, involved the school administration committee in planning the development of the program. The second step, implementation, consisted of three meetings. In the first meeting, the school administration committee and the researcher raised awareness about cyberbullying among secondary school students. In the second meeting, separate sessions were held with school

administrators and student representatives to avoid cognitive bias. During this session, the researcher presented findings from literature reviews on effective cyberbullying prevention strategies, and participants brainstormed and proposed activities to foster a cyberbullying-free school environment. In the third meeting, the program was finalized, and responsibilities for implementation were assigned by the committee and the researcher. The third step, benefits, involved evaluating the anticipated benefits of the development of the program for students, schools, and families. The fourth step, evaluation, consisted of an assessment conducted by the school administration committee and the researcher, who summarized the outcomes and proposed further action plans to enhance program effectiveness.

Phase two lasted for six weeks and focused on the implementation and evaluation of the cyberbullying prevention program. This phase was also conducted in four steps. The first step, decision-making, involved collaboration between the operational committee and the researcher, who acted as a mentor, to plan and deliver the program. The second step, implementation, was the six-week delivery of program activities, carried out according to the developed action plan. The third step, benefits, involved assessing the impact of the program in terms of material, social, and individual outcomes. To do so, the committee and researcher conducted interviews with key stakeholders, including school staff, local authorities, health professionals, and student representatives. Each interview lasted approximately 20–30 minutes and was documented for analysis. The fourth step, evaluation, focused on assessing program outcomes, during which 45 students completed questionnaires regarding their knowledge of cyberbullying and their responses to cyberbullying.

Throughout both phases, an iterative participatory process was maintained, enabling continuous feedback from students, parents, and teachers during program development and implementation. This approach ensured that the program was contextually relevant, inclusive, and responsive to stakeholder needs.

2.6. Data Analysis

The statistical software SPSS version 24.0 was used for all analysis. Descriptive statistics

(frequency, percentage, mean, range, and standard deviation) were used to summarize demographic characteristics. The Kolmogorov–Smirnov test was applied to assess normality of the data. Paired t-tests were employed to compare mean scores of knowledge and response skills before and after the intervention. The Stuart–Maxwell test was used to assess changes in categorical levels of knowledge and response skills (low, moderate, high). The significance level of $P < 0.05$ was considered statistically significant.

3. Results

The study included two groups of participants. The first group was the program development committee, consisting of 18 purposively selected individuals: the school director, five teachers, two community leaders, one public health officer, three parents, and six students. All participants in this group were selected based on active involvement in school or community activities, willingness to participate in program development, and ability to attend meetings. All invited stakeholders agreed to participate in the study. The majority were male (55.56%, $n=10$), serving in roles such as subdistrict administrative organization president and secondary school students, while 44.44% ($n=8$) were female, serving as homeroom teachers, public health officers, and parents of the students. Most participants in this group held a bachelor's degree or equivalent (61.11%, $n=11$).

The intervention group comprised 45 secondary school students from Grades 7–9. Among them, 53.33% ($n=24$) were male and 46.67% ($n=21$) were female, with a mean age of 14.00 years ($SD=1.26$). Students were distributed across Grade 7 (26.67%), Grade 8 (46.66%), and Grade 9 (26.67%). Most reported no chronic illness (86.67%) and lived with both parents (66.67%). Regarding digital access and usage, 84.44% reported unrestricted Internet access, and 55.56% indicated that parents were able to monitor their Internet use. Almost all students (93.33%) accessed the Internet via mobile phones, with an average daily use of 5.88 hours ($SD=4.01$). TikTok (86.66%) and Facebook (82.22%) were the most frequently used platforms. Although most students (66.67%) kept their accounts private, 93.34% reported accepting friend requests from strangers, while 60.00% had never sent requests to strangers. Most students (71.11%) reported never having received information about cyberbullying.

The cyberbullying prevention program was developed and implemented in two phases. Phase one focused on program development over a 3-week period, during which experts in media and activity design were consulted to refine the program components. Phase two involved implementation and evaluation over 6 weeks. Both phases were guided by the four-step community participation framework of Cohen and Uphoff (15). Specifically, the program was developed through a structured, iterative process that included problem identification, collaborative planning, and active stakeholder engagement. School personnel, students, and family representatives participated in identifying context-specific cyberbullying issues and co-designing intervention activities. This participatory process ensured that the program addressed real-world needs and was grounded in the local socio-cultural context, leading to the development of a school–family-based cyberbullying prevention program for lower secondary students. The program consists of four main activities, as summarized in Table 1.

The effects of the program on students' knowledge regarding cyberbullying and response skills were measured before and after participating in the program. Before participating in the program, the students' knowledge about cyberbullying was mostly at a moderate level (53.33%), followed by low (42.22%) and high (4.45%). The mean pre-program knowledge score was 12.95 ($SD=2.44$). After the program, a statistically significant change in students' knowledge levels was observed ($\chi^2=8.77$, $P=.012$). Most students' knowledge scores were at a high level (75.56%), with the remainder at a moderate level (24.44%). None of the students were in the low-level category (Table 2). The mean post-program knowledge score increased to 16.82 ($SD=1.82$), as shown in Table 3. A paired comparison of mean scores before and after the intervention revealed a statistically significant improvement ($P < 0.001$), as shown in Table 3.

Regarding students' cyberbullying response skills, before the program, most students were at a moderate level (80.00%), followed by low (11.11%) and high (8.89%). The mean pre-program response score was 3.30 ($SD=0.42$). After participating in the program, the statistically significant change in students' response to cyberbullying skills levels was found ($\chi^2=67.78$, $P < 0.001$), as shown in the Table 4.

Table 1: Developed cyberbullying prevention program components for secondary school students

Week	Activity	Duration	Participant
1	Activity 1: Cyberbully Immunization Enhancing students' resilience against cyberbullying. This activity included several sub-activities: (1.1) a Cyberbullying awareness session to provide knowledge about cyberbullying (1.2) Thai Kids Grow Up without Bullying"; this workshop encourages the students to write down and analyzed their own behaviors for risks of being bullies or victims, and learned self-care and coping strategies (1.3) Brainstorming in groups to summarize strategies to cope with bullying (1.4) Good Message activity where students sent positive messages to each other by creating impactful captions, slogans, or quotes to campaign "Stop Cyberbullying" (1.5) Talking Tree activity where each group drew a "tree" poster and decorated it with their slogans/quotes to attract attention (1.6) A summarized session to reflect on lessons learned	1 Week	45 Secondary school students
2-3	Activity 2: Good Message A campaign to spread positive messages using the Talking Tree.	2 Weeks	-45 Secondary school students - Teachers and school staff - All students in the school who are not in the intervention group
4	Activity 3: Cyberbully Zero-Tolerance Creating an environment of cyberbully zero- tolerance This activity was conducted over one week consisted of activities which were (1) a talk delivered by national expert regarding cyberbullying prevention for secondary school students and the roles of schools, families, and communities, (2) a renowned public figure shared personal experiences and life skills for responding to cyberbullying (3) an opening of the "Cyberbully Safe Space (CSS)" center, (4) "Thai Kids Grow Up without Cyberbullying" activity which encouraged the students to participate in competitions in inspiring quote, short film, logo, debate, and singing contests and (5) the official announcement of the school's "Cyberbully Zero-Tolerance" policy by the school director.	1 Week	-45 Secondary school students - School director, teachers, and school staff - Community leader - President of subdistrict administrative organization - Representative from district education office -Students' Parent representative - Representative from local health center
5-6	Activity 4: Sustainability Fostering sustainability and awareness to ensure long-term impact. This activity encouraged the school and students to integrate the knowledge and practices from the program into regular activities and daily life for lasting effect. The main activity includes Promoting, Monitoring and Encouragement the act of cyberbully zero- tolerance school policies	2 Weeks	-45 Secondary school students - School director, teachers, and school staff - All students in the school who are not in the intervention group

Table 2: The student's knowledge level before and after attending the cyberbully prevention program (n=45)

Knowledge Level	Before Attending the Program n (%)	After Attending the Program n (%)	χ^2	P value
High	2 (4.45)	34 (75.56)	8.77	0.012*
Moderate	24 (53.33)	11 (24.44)		
Low	19 (42.22)	0.00		

* Statistically significant difference (P<0.05)

Table 3: Comparison of students' cyberbullying knowledge before and after the prevention program (n=45)

Time of assessment	Range	Mean	SD	Median	t	P value
Prior to Attending the Program	8 - 17	12.95	2.44	14	-10.65	<0.001*
After Attending the Program	14 - 20	16.82	1.82	16		

SD: Standard Deviation

Most students' response capability was at a high level (95.55%), with only 4.45% remaining at a moderate level. None of the students were in the low response category after attending the program. The

mean post-program response score increased to 4.26 (SD=0.33), reflecting a statistically significant improvement in students' ability to respond to cyberbullying (P<0.001), as detailed in Table 5.

Table 4: Comparison of students' ability of respond to cyberbullying before and after the program (n=45)

Ability to Respond to Cyberbully	Before Attending the Program n (%)	After Attending the Program n (%)	χ^2	P value
High	4 (8.89)	43 (95.55)	67.78	<0.001*
Moderate	36 (80.00)	2 (4.45)		
Low	5 (11.11)	0.00		

Comparison of students' responses to cyberbullying before and after the program

Table 5: Comparison of students' responses to cyberbullying before and after the program (n=45)

Time of Assessment	Mean	SD	t	P value
Prior to Attending the Program	3.30	0.42	-11.58	<0.001*
After Attending the Program	4.26	0.33		

SD: Standard Deviation

4. Discussion

The present study demonstrated that a school-family participatory cyberbullying prevention program was effective in enhancing both students' cyberbullying knowledge and response skills. After the intervention, no students remained in the "low" category for knowledge or response ability, while the majority reached high levels. These findings indicated that the program addressed its primary objectives and had a positive impact on adolescent knowledge and cyberbullying response strategies. The improvement in outcomes may be attributed to the participatory and student-centered design of the program. Because the program was developed collaboratively with students, parents, teachers, and community members, the activities were contextually relevant and tailored to local needs. This participatory approach is consistent with framework of Cohen and Uphoff, which emphasizes shared decision-making, implementation, and evaluation, thereby enhancing ownership and sustainability (15). Previous studies also reported that interventions involving community and school stakeholders are more likely to succeed in addressing adolescent health issues, including bullying (13, 16).

The cyberbullying prevention program in this study incorporated a wide range of activities that provided students with both knowledge and opportunities to practice response skills in multiple ways. These included educational sessions on cyberbullying, the "Thai Kids Grow Up without Bullying" self-reflection activity, group brainstorming to devise coping strategies, the Good Message campaign, and the Talking Tree activity. Additional activities such as contests,

morning assembly campaigns led by student leaders, peer mentoring, moral projects, and the school's declaration of a zero-tolerance policy further reinforced learning. These activities were designed to be engaging, which may have increased student participation. Importantly, because students themselves were involved in the development of these activities, the content reflected their interests and needs, fostering a stronger sense of ownership and commitment. This participatory approach encouraged students to continue cooperating throughout the program, reinforcing positive peer influence (14, 16) and supporting the establishment of anti-bullying norms within the school community (13).

This study also contributed to the literature by applying a community participation framework to cyberbullying prevention in Thailand, where several previous studies focused only on individual-level skills or descriptive surveys (5, 6, 8, 17, 20). Nevertheless, all the steps conducted in this study enhanced close collaboration among members of the school management committee and other relevant stakeholders. This collaborative process built the capacities of those involved and promoted integrated teamwork, which is the heart of community-based work and leads to sustainable, community-driven action (21-23). During each step, the researcher also periodically invited experts in media development and activity design to provide advice, which increased the confidence and knowledge of the participants. Consultations with experts in media development and student activity design helped refine the program content and delivery strategies to improve contextual relevance and feasibility within the school setting.

Additionally, the sample group of students who participated in the program was also unique, as we had recruited all the secondary students in the school, without any selection or limitation in number. This inclusive approach is important because the program recognized the significant influence of peers on the behavior of adolescents (24-26). By involving every student in the target grade range, the program ensured comprehensive coverage. Cyberbullying, whether as perpetrator or victim, can potentially involve any student; thus, including all students helped to reduce peer pressure and stigma, and it fostered collective learning, peer support in discouraging cyberbullying, and the creation of a mutually trusting environment among students (14, 27, 28). The all-inclusive approach may also enhance scalability and policy relevance, particularly in school-wide interventions supported by national education authorities.

The cyberbullying prevention program for secondary school students, developed through school and family participation, was associated with improvements in students' attitudes, knowledge, and response skills related to cyberbullying. The program also triggered positive changes in peer group dynamics, i.e., students began to intervene and support each other in avoiding bullying behavior. Our results suggested that students who participated in the program are more likely to act as peer supporters and are better prepared to respond effectively to cyberbullying incidents. These outcomes reinforce the importance of participatory, community-rooted interventions in fostering adolescent resilience.

4.1. Limitations

Although the program produced positive outcomes, several limitations should be noted. The study was conducted in a single purposively selected school, which may limit the generalizability to other educational settings. The quasi-experimental design, without a control group or random allocation, restricts causal inferences, as external factors may have contributed to the observed improvements. In addition, the study relied on short-term evaluation, with no follow-up to assess long-term effects, which may have led to an overestimation of the intervention's effectiveness. While internal validity remains intact, the absence of longitudinal assessment reduces external validity and limits understanding of the sustainability of

the observed outcomes. Despite these limitations, the results provided valuable insights into the feasibility and effectiveness of participatory, school-family approaches to cyberbullying prevention.

5. Conclusions

This study demonstrated that a school-family participatory program was effective in improving secondary school students' knowledge and response skills regarding cyberbullying. The collaborative design involving students, families, teachers, and community members helped ensure contextual relevance, foster ownership, and strengthen peer support within the school setting. These findings provided preliminary evidence for the feasibility of participatory, school-wide approaches to cyberbullying prevention. Schools should consider integrating family and community collaboration into health promotion and digital safety strategies, with school health personnel and community nurses playing supportive roles in implementation and sustainability. Future research should test this model across diverse school contexts, incorporate technology-based components, and conduct longitudinal follow-up to evaluate long-term effects.

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Authors' Contribution

Roshinee Oupra: Substantial contribution to the conception and design of the work, tools development, data analysis and interpretation; drafting the work and reviewing the manuscript

critically for important intellectual content. Eakachai Kantawong: Substantial contribution to the conception and design of the work, tools development, data analysis and interpretation; drafting the work and reviewing the manuscript critically for important intellectual content. Chayatida Nonmeatawat: Substantial contribution to the conception and design of the work, tools development, data analysis and interpretation; drafting the work. Chonticha Amattayakong: Substantial contribution to the conception and design of the work and tools development; reviewing the manuscript critically for important intellectual content. Kittiporn Nawsuwan: Substantial contribution to the conception and design of the work and tools development; reviewing the manuscript critically for important intellectual content. All authors have reviewed and approved the final manuscript and take responsibility for all aspects of the work, including questions regarding the accuracy or integrity of any part.

Conflict of interests: None.

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Ethical Approval

The research was approved by the ethics committee of Boromarajonani College of Nursing, Chiang Mai, Thailand with the code of (BCNCT16/2564). The participants were explicitly informed that their participation was entirely voluntary, and they had the right to withdraw from the study at any stage without any repercussions. All research data were treated confidentially. Participants' identities were anonymized by assigning coded identifiers instead of using their names. The research findings were reported in an aggregated format and used strictly for academic purposes. Also, written informed consent was obtained from the participants.

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