Editorial:

Selecting an Existing Instrument for Use in a Research Project

Selecting appropriate instruments, after having determined the research question(s) to be answered, is of utmost importance. Upon setting out to develop a research study, often the initial reaction of beginning researchers is to think no instruments exists that adequately can address the proposed research question(s). Thus, many researchers believe they must develop a measurement tool, rather than taking time to thoroughly seek out information about existing instruments used to investigate similar research questions. One should always keep in mind that development of a research instrument is a lengthy and time-consuming process that requires considerable research sophistication and should not be undertaken until all approaches to finding a suitable instrument fail.

On the other hand, locating an appropriate existing research instrument has become easier, over the years, as a result of the internet and the World Wide Web (www). It is possible to do a computerized web search about the type of instrument desired. For example, if a researcher enters, into a search engine, the terms, “quality of life instruments” or “job satisfaction instruments,” a number of web links and internet addresses will appear that can provide information about existing instruments for measuring both of these concepts. Published articles on the topic of interest also are valuable sources of information about various research instruments. Doctoral dissertations also can provide information regarding instruments, especially if the researcher has not published his/her findings. Dissertation Abstracts can be found “online” via use of the World Wide Web. Another potential source of information about research instruments are research conferences, since information about the instruments that have been used in a given study often are presented at a research conference prior to one’s research findings being published. In addition, contacting an individual who has conducted research in one’s area of interest usually proves helpful. Talking with another researcher, either in person or via e-mail, often leads to the location of a previously unknown instrument or information regarding how to contact the author of a known instrument. Researchers’ e-mail addresses, mailing addresses, and/or phone numbers usually are listed on the first page of their published research articles.

Regardless of how or where one retrieves information about a measurement instrument, it is essential for the researcher to evaluate the existing tool prior to selecting it for use in one’s study. In fact, a researcher should evaluate several instruments, regarding the concept to be examined, prior to selecting an instrument for use in a study. Instrument selection requires careful consideration with respect to how the instrument was developed, what the instrument measures, what populations with which the instrument has been used, and how the instrument needs to be administered. In this respect, the following questions need to be appropriately addressed prior to selection of a given instrument for use in answering a particular research question.
Does the instrument measure the concept that is to be assessed?

Is the instrument appropriate for the aims/purposes of the research?

Is the instrument able to produce data appropriate for addressing the research questions/hypotheses?

Is the instrument reflective of the conceptual definition of the variable that is going to be used in the research?

Is the instrument appropriately constructed?

Is the instrument appropriate for the population that will be used in the research? For example, is the instrument appropriate with respect to the age, educational level, gender and culture of the population that will be used in the research?

Is the readability of the instrument appropriate for the population that will be used in the research?

Are there specific skills required in order to appropriately administer the instrument?

How sensitive is the instrument in detecting small differences in the concept under examination (i.e., what is the effect size)?

What is the process for obtaining, administering, and scoring the instrument?

How are scores generated by the instrument interpreted?

What time commitment will be required of the subjects and researcher for instrument administration?

Is there prior evidence of the instrument’s reliability and validity? Using a new instrument that has not been adequately evaluated for validity and reliability is unacceptable and a waste of time for both the researcher and study subjects, since the findings will be useless.

Adequately addressing each of the aforementioned questions, regarding an existing instrument, can assist a researcher in making an appropriate selection for his/her research study.

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Development and Psychometric Evaluation of the Thai Nurses’ Job Satisfaction Scale

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Abstract: The purposes of this research were to: develop the “Job Satisfaction Scale for Thai Nurses (TNJSS)”; and, determine the psychometric properties of the TNJSS. The researcher-developed TNJSS was based on an analysis of the concept of job satisfaction within the context of Asian cultures, in-depth interviews of Thai nurses and an extensive review of the literature. The scale’s psychometric properties were determined using 963 randomly-selected nurses from 12 general hospitals, administered by the government, that represented all regions of Thailand. Due to a large power distance (extent to which the less powerful members of organizations/institutions accept and expect power to be distributed unevenly) and Kreng Jai (not causing discomfort or inconvenience to others) being of importance in the Thai culture, the Social Desirability Scale-17 (SDS-17) was distributed to subjects along with the TNJSS.

Content validity of the scale was examined via three experts in administration and instrument development. The three experts also determined the tool’s items adequately represented the content domain. The instrument's construct validity was assessed via factor analysis and hypothesis testing. The scale’s internal consistency reliability was examined by way of Cronbach’s alpha and its stability was tested using the test-retest method.

The final version of the 107-item TNJSS was found to measure eight factors: incentives; professional autonomy and recognition; nursing supervisor; social aspect at work; workload; work environment; nursing policies and system; and, assertiveness in confronting difficulties. A significantly weak correlation was found between the total scores of the SDS-17 and the TNJSS, suggesting the presence of a large power distance and Kreng Jai were not factors in the nurses’ responses. The construct and content validity, and the reliability of the scale were found to be satisfactory.

The results revealed the TNJSS to be a psychometrically valid and reliable tool for evaluating Thai nurses’ job satisfaction. However, future research is needed to refine the instrument and to assess its applicability in measuring job satisfaction of nurses working in hospitals, throughout Thailand, that are not administered by the government.

Keywords: Job satisfaction; Psychometric evaluation; Thai nurses; Tool development

Introduction

Health care delivery systems go to great lengths to deliver quality care, so as to obtain accreditation from organizations such as the Hospital Accreditation Association. However, because of the extensive
development and required health care delivery tasks associated with obtaining accreditation, an increase in workload is placed upon hospital employees, especially nurses. In addition, due to an increased access to health care, as a result of government policies, patients have developed expectations regarding their care, and, as a result, are demanding receipt of quality nursing care. The requirements of professional performance, related to accreditation, and patients’ demands have led nurses to become frustrated with their roles within their respective health care organization. Thus, many have resigned or left nursing because of feeling physically exhausted, being frustrated, and experiencing a sense of low satisfaction with their jobs. This situation has occurred even though Thai nurses, in both the public and private health care systems, have received consistent increases in salary.

In addition to accreditation and job related responsibilities, Thai nurses have to contend with aspects of the culture that impact their beliefs and how they perform within their respective work settings. For example, the presence of a power distance (extent to which the less powerful members of organizations/institutions accept and expect power to be distributed unequally) and kreng jai (not to cause discomfort or inconvenience for another person) have an influence on Thai nurses. Hence, the nurses tend to concede to individuals with higher authority, in their health care organizations (i.e. senior nurses, physicians and administrators), and, as a result, because of the need to live harmoniously with others, neither question nor confront these individuals. Consequently, when nurses are asked to perform physician-related functions, they do the tasks despite the risk of possibly losing their professional licenses.

In Thailand, it has been noted that despite salary increases, there is a high turnover rate of nurses within various health care systems; an insufficient number of nurses currently exist; and, an increase in the number of elderly individuals requiring health care has led to the need for additional nurses. Consequently, health care administrators need to take a serious look at how to improve the work environment of nurses and, ultimately, foster their job satisfaction for the purpose of enhancing nurse retention and quality patient care. Unlike nurses in western cultures, who indicate salary to be the strongest indicator of their retention, Thai nurses tend to resign from their jobs despite earning a high salary. Thus, it remains unclear as to whether components of job satisfaction instruments, developed in western countries, are culturally sensitive when used to measure Thai nurses’ job satisfaction. This is particularly important given that job satisfaction is influenced by the culture to which a person adheres. At present, none of the available job satisfaction instruments are considered sensitive to the Thai culture. Hence, the aims of this study were to: develop the “Thai Nurses’ Job Satisfaction Scale (TNJSS)” and, determine the psychometric properties of the TNJSS.

Review of Literature

In general, job satisfaction has been viewed as the degree to which employees like their work experiences. In other words, job satisfaction is a positive or pleasurable feeling one has as a result of an evaluation of his/her job or job experiences. Since one’s culture plays a major role in how one evaluates his/her occupation, the primary author, in preparation for this research, conducted a concept analysis of job satisfaction within the context of Asian cultures. The analysis, using Walker and Avant’s guidelines, found that seven major components of job satisfaction (social support/relationships, workload, incentives, professional status, work environment, administration and autonomy) appeared to be important to nurses working within Asian cultures, i.e. Thailand. Each of these seven components are explained and discussed below in descending order of importance.

Social support/relationships: In the Thai culture, collectivism, the interdependence of human
beings or the belief that group goals have priority over individual goals, is practiced. In other words, collectivism is viewed as the reverse of individualism. Thus, not surprisingly, social support/relationships have been noted to be an important factor for Thai nurses regarding job satisfaction. In this regard, positive social support/relationships among nurses and administrators has been found to lead to a reduction in workplace stress and the nurse turnover rate. No doubt this is because support from others gives one a sense of belonging to a specific group, which is vital for those who are collectivists. For such persons, helping, caring and sharing among group members are common practices that help them create a system of connections (i.e. people they know who are in a position to help them). As a result, an employee may tend to feel more secure when he/she can maintain a good relationship with a manager who is part of his/her personal system of connections. As noted in prior research, having a positive social relationship with a nurse manager can be one of the best predictors of an Asian nurse’s job satisfaction.

Workload: Prior studies have found workload to be the number one predictor of Asian nurses’ job satisfaction. An increase in nurses’ workload can be attributed to increasing financial constraints of health care organization, as well as changes in societal and institutional expectations within health care organizations. Financial constraints have forced health care organizations to reduce the number of employees hired, which can result in the remaining employees (often nurses) taking on additional work-related responsibilities. Changes in societal and institutional expectations, within health care organizations, often have caused nurses to perform beyond their scope of practice, deal with a lenient implementation of advanced directives, and contend with more life and death situations. All of these issues can contribute to a higher workload for nurses. Since Thais are a “humble” group of people who do not believe they are better than others, the creation of kreng jai and mai phen rai (showing flexibility to uncomfortable/difficult situations) are intensified. As a result of such cultural practices, Thai nurses tend to fail to vocalize their feelings of discomfort or to negotiate with those in authority within the workplace. Thus, difficult workplace situations go unresolved, with an increase in workload often becoming the outcome.

Incentives (i.e. salary, benefits, continuing education offerings and job promotion) have been noted to be significant factors related to job satisfaction among Asian nurses. As a result of the presence of a large power distance, within the Thai culture, nurses expect work-related incentives that reflect their social status and power within their respective workplaces. However, because of the “humbleness” of Thais, if appropriate workplace incentives for nurses are not forthcoming, they tend not to negotiate with appropriate parties for suitable and reasonable incentives. What remains interesting is that, although nurses have experienced increases in their salaries, the presence of this particular incentive still does not hinder their resignation rates from their places of employment.

Professional status, one’s position relative to others within the workplace, has been found to foster nurses’ sense of job satisfaction. When one has been granted appropriate professional status, he/she is more likely to: be given an opportunity to utilize his/her work related abilities; have a feeling of accomplishment within the organization; and, be involved in work-related governance activities. Having a sense of professional status has been found to foster one’s commitment to the work-related organization. In addition, being involved in governance activities and being recognized (i.e. having status) for professional work performance have been found to be major motivators of nurses’ sense of job satisfaction.

Work environment (i.e. natural surroundings and physical infrastructure) have an impact on one’s
job satisfaction. Natural surroundings involve good ventilation, comfortable temperature, adequate lighting, and cleanliness. On the other hand, physical infrastructure refers to those with whom one works and the resources (supplies and equipment) one requires to accomplish his/her work-related responsibilities. All of these factors are important in providing a functional and pleasant environment in which one can carry out work-related activities. A good workplace environment also shows the social status of workplace employees. For example, a Thai hospital with a reputation of being a center of medical knowledge and fame has been found to foster pride and happiness among the nurses who work there. By comparison, inadequate space and resources have been noted to be obstacles related to nurses’ abilities to perform, which, in turn, can decrease job satisfaction.

Administration involves the presence of supervisors and an organizational system (i.e. administrators and policies). As collectivists, Thai nurses expect supervisors to treat them as family members, which involves working closely together, giving advice on personal matters and being directly involved in work-related tasks. However, because of the presence of a large power distance, within the Thai culture, a health care organization, such as a hospital, often becomes transformed into a passive–defensive, conservative, traditional, non–participative, bureaucratic system. Centralization of administration, within a health care organization, is perceived as providing less consultative and participative management among its members, and as preventing their involvement in managerial decision-making. When Thai nurses are not involved in managerial decision-making, supervisors are perceived as misunderstanding their needs. However, as previously noted, nurses’ involvement in their hospitals’ governance processes fosters their job satisfaction.

Autonomy, the act of being self-governed or having self-directed freedom, has been found to be of importance among nurses with higher levels of education, compared to nurses with lower levels of education. It has been noted that Thai nurses’ autonomy has increased in public hospitals, but slightly decreased in private hospitals. The fact Thai nurses continue to demand more autonomy is not surprising given they have more education today than they did in the past. Unfortunately, Thai nurses continue to experience high levels of stress, due to low levels of autonomy (i.e. lack of the opportunity to be involved in self-governance), in many health care organizations. This tends to be brought on by the fact that many Thai physicians continue to view nurses, regardless of level of education, as passive workers rather than as active colleagues. The fact physicians tend not to provide nurses opportunities to discuss, with them, the care of patients, nurses’ creativity and role independence becomes limited. Autonomy becomes fully functionally when those in positions of power (i.e. supervisors and physicians) authorize, support, and develop subordinates to think and act independently. When the health care administrators and physicians centralize their power, it is not possible for nurses to practice autonomously. On the other hand, an increase in autonomy among nurses has been shown to enhance their satisfaction in the workplace. Thus, given that Thai cultural practices and workplace situations can influence the components of job satisfaction, it is imperative that these aspects be taken into consideration when developing an instrument for measuring job satisfaction among Thai nurses.

Conceptual Framework

The conceptual framework, used in development of the TNJSS, included various aspects of Herzberg’s Motivation Theory and Vroom’s Expectancy Theory. Herzberg’s motivator factor and hygiene factor helped in explaining the elements that are important in creating happiness at work. Valence, instrumentality and expectancy concepts, from Vroom’s theory, assisted
in focusing on motivation and reward. The various domains, used in development of the TNJSS, were obtained from the primary author’s analysis of the concept, job satisfaction, within the Asian context, while Herzberg’s and Vroom’s theories were used to explain each of the job satisfaction domains. Aspects of the Thai culture, along with a norm-referenced framework, also were incorporated into the development and psychometric testing of the TNJSS.

**Method**

**Design:** This instrument development research involved, utilizing guidelines set forth by Waltz, Strickland and Lenz, and DeVellis, two stages: development and psychometric evaluation (see Figure 1). The development stage consisted of: domain identification; item generation; and, item format determination. The psychometric evaluation stage was comprised of: content validity examination; reliability determination through pre-testing; construct validity and reliability determination through field testing; and, validity and reliability confirmation.

**Ethical considerations:** The study was approved by the Institutional Review Board of the principal investigator’s (PI) academic institution, as well as the administrators of the hospitals used as study sites. Each potential subject was informed, in regards to all stages of the study, about: the purpose of the study; what was involved in participating; confidentiality and anonymity issues; and, the right to withdraw at any time without repercussions. Those selected for involvement in the development stage of the scale (i.e. interviews) were asked to sign a consent form prior to participating. Completion and return of one of the versions of the TNJSS served as consent to take part in the psychometric evaluation stage of the research.

**Setting and participants:** The setting included 13 randomly-selected, general hospitals, administered by the government and represented all six regions (northern, northeastern, western, central, eastern and southern) of Thailand, and one purposively selected general hospital. Of the 14 hospitals, subjects from the purposively selected hospital were used for the development phase of the study. From the remaining 13 hospitals (all randomly-selected), subjects from one was used for reliability determination through pre-testing, while subjects from one or all of the other 12 hospitals were used for the remaining psychometric testing phases of the instrument. Of the 12 hospitals, there were two from each of the six regions of Thailand. These hospitals were selected because of the large number of registered nurses they employed, the wide range of health care services they offered (i.e. general health care) and the similarity of their hospital administration (i.e. government). At the time of data gathering, the 12 hospitals employed a total of 3227 nurses: (northern, n = 771; northeastern, n = 672; western, n = 450; central, n = 440; eastern, n = 505; and, southern, n = 389).

The sole inclusion criterion for registered nurses participating in the study was being employed full-time, for at least one year, by the hospital. This criterion was used since it has been shown that the work adjustment period for a nurse, in a hospital, may range from six to 12 months after being hired. Names of potential subjects, used in the development phase, were identified via response to a posted announcement about the study. For the psychometric testing phase, potential subjects were identified, under the supervision of each hospital’s Director of Nursing, via a systematic random sampling technique. A total of 1,101 subjects were used throughout the various stages of the study (instrument development, n = 3; reliability determination through pre-testing, n = 30; construct validity and reliability through field testing, n = 963; reliability confirmation, n = 35; and, validity confirmation, n = 70). Each subject was used only once.
Figure 1  Stages and Results of the Development & Psychometric Evaluation of the TNJSS
The three nurses who took part in the domain identification component of the development stage of the study were: 44 to 48 years of age (mean = 46.33 years); female; married; living with their spouse; baccalaureate prepared; earning an average monthly income of 33,000 baht (range = 31,000 to 35,000 baht); and, working on either a medical/surgical, obstetrical/gynecological or out-patient hospital unit. In addition, one of them was an administrator and two were staff nurses with an average of 25.67 years of nursing experience. They all were working at the purposively-selected, general hospital.

The 30 nurses used in the reliability determination, through pre-testing, predominately, were: 26 to 59 years of age (mean = 45.87); baccalaureate prepared; equally divided between administrators and staff nurses; earning 31,000–35,000 baht per month; and, nurses for an average of 22.83 years. Each of them was from the same randomly-selected hospital.

The sample size, for assessing construct validity and reliability through field testing, was determined using the guideline of five to 10 subjects per scale item.34 Based upon the projected number of scale items (n = 124), a sample size of 620 to 1,240 was needed. Testing the construct validity and reliability was successfully completed by 963 registered nurses (RNs). The RNs were 22 to 62 years of age (mean age = 38 years) and, predominately, were: female; married; living with their spouse; baccalaureate prepared; earning an average monthly income of 28,000 baht (range = 10,000 to 40,000 baht); and, working on a medical or surgical hospital unit. In addition, they had an average of 13 years of nursing experience. These nurses were from 12 of the 13 randomly-selected hospitals used as study sites.

The 35 nurses used in confirming the scale’s reliability (test–retest), primarily, were: 28–49 years old (mean = 40.06); female; married and living with spouse; baccalaureate prepared; staff nurses; earning 21,000–25,000 baht per month (n = 10; 28.6%); working on a medical/surgical floor; and, nurses for an average of 17.21 years. All of them were from the same hospital (one of the 12 used for field testing).

The 70 nurses used in confirming the scale’s construct validity (hypothesis testing) primarily, were: 28–59 years old (mean = 42.55); female; married and living with spouse; baccalaureate prepared; staff nurses; earning 21,000–25,000 baht per month; working on a medical/surgical floor; and, nurses for an average of 22.50 years. All of them were from the same hospital (one of the 12 used in field testing and the same hospital used for conducting test–retest reliability.).

Procedure for creating the TNJSS: As previously indicated, creation of the TNJSS consisted of two stages (development and psychometric evaluation). The development stage consisted of: domain identification; item generation; and, item format determination. The psychometric evaluation stage consisted of: content validity examination; reliability determination through pre–testing; construct validity and reliability determination through field testing; and, validity and reliability confirmation. Details involving the development and psychometric evaluation of the TNJSS are shown in Figure 1.

Development stage: Identification of the instrument’s seven domains were determined by way of: integration of the PI’s analysis of the concept, job satisfaction within the context of Asian cultures; review of the literature (primarily Korean, Chinese and Thai); and, in–depth interviews of three Thai nurses. The purpose of the interviews was to determine whether the job satisfaction components, identified from the concept analysis and literature review, were the same as or different from those identified by the nurses. Each nurse was interviewed once (average of 60 to 90 minutes), by the PI, via use of an interview guide. The interviews were done, in a private office in the hospital, while the nurses were at work. The two–part interview guide, developed by the researchers, sought information
regarding each subject’s demographic characteristics and satisfaction with her job. Nine open-ended questions were used to elicit information regarding level of job satisfaction. Examples of the interview questions were: “When talking about job satisfaction, what do you think about?”; “What would make you have job satisfaction?”; “What do you think about your job environment and the people you work with?”; “Are you satisfied with your job environment and the people you work with?”; “If you are satisfied with the job environment and the people you work with, in what ways are you satisfied?” and, “Is there anything else you want to talk about regarding your satisfaction or dissatisfaction at work?”.

Content from the interviews were examined via thematic analysis. The results of the thematic analysis revealed the job satisfaction components were similar to those identified during the literature review and concept analysis. An integration of data from all three sources (literature review, concept analysis and interviews) was conducted, resulting in creation of seven domains for the TNJSS: workload; work environment (physical infrastructure and natural surroundings); administration (supervision, policies and system); social aspects at work (relationships and support); autonomy; professional status; and, incentives (pay/benefits, continuing education and promotion).

Following identification of the seven domains, item pool generation took place. Since it is advisable to create a large item pool rather than a small item pool, 144 items were generated (workload, n = 16; work environment, n = 14; administration, n = 25; social aspects at work, n = 18; autonomy, n = 23; professional status, n = 16; and, regarding incentives, n = 32). All items were constructed based upon data obtained from the literature review, concept analysis and interviews.

After the items were generated, the format for possible item responses was developed. Since Thais have high respect for authority figures, are collectivists and are concerned about embarrassing others, a strong need to maintain harmony exists. In an attempt to maintain harmony, when possible item responses consist of an odd number (i.e. 3, 5 or 7) Thais tend to pick the middle response (neutral). This response action can lead to inadequate sensitivity of a scale that has an odd number of responses. Thus, a six–point, Likert–like response scale (1 = “absolutely not true” to 6 = “absolutely true”) was created so that a middle response (neutral) did not exist. Completion of the three steps of the development stage resulted in creation of the first version of the TNJSS.

**Psychometric evaluation stage:** The first step of the psychometric evaluation stage involved content validity examination, of the first version of the TNJSS, by three experts (one nurse educator experienced in tool development, one nurse researcher experienced in job satisfaction studies, and one nurse administrator experienced in the nursing policies and systems). The purpose of this stage was to judge the relevance, clarity and conciseness of each of the 144 items that constituted the seven domains. The content validity index, among the three experts, was 0.97. Based upon the experts’ input, 16 of the items were removed due to redundancy of content (one from workload; two from work environment; one from administration; four from autonomy; five from professional status; and, three from incentive). Of the remaining 128 items, 66 were reworded to enhance clarity and simplicity of item content. For example, the item, “Your ward has adequate and suitable equipment for your work, which makes your implementation process easier, quicker and more convenient” was reworded to read, “Your ward has adequate equipment for delivery of patient care.” In addition, the item, “You are confident that your superior will support your appropriate decision even though it will bring problems later,” was reworded to read, “You are confident your superior will support your decisions regardless of the results those decisions will bring.” The outcome of step one of the evaluation stage was generation of the second version of the TNJSS.
The second step of the psychometric evaluation stage involved determination of the scale’s reliability, through pre-testing, for the purpose of noting possible problems prior to field testing. Thus, the second version of the TNJSS (128–items), along with a demographic questionnaire that requested information regarding each subject’s gender, age, marital status, level of education, monthly income, current position/department of employment, and years of nursing experience, was administered to 30 registered nurses. These nurses were asked to assess the clarity of the items and the length of time it took them to complete the scale. In addition, they were asked to make suggestions regarding the scale. Based upon their assessment, four items (two from work environment, one from administration and one from professional status) were eliminated. Thus, the third version of the TNJSS consisted of 124 items.

Determination of the construct validity and reliability, through field testing, were accomplished during the third step of the psychometric evaluation stage. The aim of this step was to test the scaling properties of the instrument. Thus, the third version (124–items) of the TNJSS, the demographic questionnaire used in step two of the psychometric evaluation stage and the Social Desirability Scale–17 were administered to 1,020 nurses (85 nurses in each of the 12 hospitals). Out of 1,020 questionnaires, 995 were returned (97.55% response rate), but only 963 of them were usable. The Social Desirability Scale–17 (SDS–17) was administered because of the presence of the large power distance in the Thai culture. The presence of the large power distance and the fact some of the scale’s questions may have been perceived as socially undesirable could have contributed to the nurses giving answers that would prevent their authority figures from losing face. The SDS–17 was in the public domain. However, since it was originally written in English, translation into Thai and back translation into English was required to assure no changes in meaning occurred during the translation process.

Item analysis, which was part of the third step of the psychometric evaluation stage, was conducted based on the principle of corrected item–scale correlation. This action was undertaken to deal with elimination of items that had content different from other items in a domain (item to item correlation: $\alpha \leq 0.3$) or items that were redundant (inter–item correlation: $\alpha > 0.7$). As a result of the item analysis, four items (one from workload, two from social aspects at work and one from professional status) were eliminated. The inter–item correlations noted six items (two in work environment, one in administration, one in social aspects at work, one in autonomy and one in incentives) needed to be eliminated due to redundancy ($\alpha > 0.7$). As a result, a total of 10 items were eliminated from the scale, leaving 114–items.

As part of step three of the psychometric evaluation stage, the construct validity of the TNJSS was examined by performance of an exploratory factor analysis. The outcome of the construct validity analysis resulted in elimination of seven items (three from workload, two from social aspects at work, one from autonomy, and one from incentives), resulting in 107 items comprising the final version of the TNJSS. In addition, eight, rather than seven, domains were found to exist within the scale. As a result of the factor loadings, one of the eight factors became a combination of two of the original seven domains and one of the original domains became two of the eight factors.

The fourth step of the psychometric evaluation stage involved reliability and validity confirmation of the final version of the TNJSS (107–items). The internal consistency of the data generated by the instrument was assessed. A result that was greater than 0.7 was considered satisfactory for group comparisons. Next, the scale’s stability over time was investigated, using the test–retest method. Thirty–five nurses were administered the final version of the TNJSS twice, within a two week interval. Lastly, the TNJSS was assessed, using the hypothesis that the
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relationship between stress at work and job satisfaction would be in a negative direction. Thus, the 107-item, final version of the TNJSS and the Occupational Stress Scale (OSS) were administered to 70 RNs. The results of this procedure assisted in making an inference as to whether the rationale underlying the scale’s construction was adequate to explain the data collected. The OSS was originally written in Thai and, thus, did not require translation. In addition, since it was in the public domain, permission for use of the OSS was not required.

Data Analysis: Descriptive statistics were used to analyze the subjects’ demographic characteristics. The correlation between the TNJSS and the SDS-17 was calculated using Pearson’s Product-Moment correlation. Since the data generated by the SDS-17 was dichotomous, the alpha for the scale was calculated through use of Kuder-Richardson (KR-20). Cronbach’s alpha was used for calculating the internal consistency coefficient of the TNJSS. The test-retest reliability of the TNJSS and the correlation between the TNJSS and the OSS were evaluated using Pearson’s correlation coefficient. Moreover, the alpha of the OSS was examined using Cronbach’s alpha. Exploratory factor analysis (EFA) was used to examine the construct validity of the TNJSS. The principal component analysis with orthogonal rotation, using the varimax method, was utilized because it maximized a variable’s loading on one factor and minimized its loading on all other factors, thereby making the interpretation clearer. The criteria for extraction were: eigenvalues > 1.0; satisfying scree plot; factor loading > 0.40; respectable reliability of each factor; and, theoretical interpretability.

Results

The EFA revealed the Kaiser–Meyer–Olkin measure of sampling was adequate (0.97) and the Bartlett’s Test of Sphericity was 87634.02 ($p < .000$). Factor extraction found: eigenvalues > 1.0; the presence of eight factors; a total of 107 items [loadings between 0.41–0.84]; and, an explained total variance of 60.35% (See Table 1). The factors and their respective item numbers (see Table 1) were: Factor I – “Incentives” (27 items); Factor II – “Professional Autonomy and Recognition” (21 items); Factor III – “Nursing Supervisor” (13 items); Factor IV – “Social Aspects at Work” (13 items); Factor V – “Workload” (11 items); Factor VI – “Work Environment” (8 items); Factor VII – “Nursing Policies and System” (9 items); and, Factor VII – “Assertiveness in Confronting Difficulties” (5 items).

Moreover, the correlation between SDS-17 and the TNJSS was found to be at a very low magnitude ($r = 0.12$, $p < 0.01$). In addition, the alpha of the SDS-17 was found to be 0.67.

For reliability, the TNJSS’s alpha in the pre-test, field test and reliability/validity confirmation were all 0.98. The alpha of the eight factors ranged from 0.84 to 0.97 indicating all factors were internally consistent. For stability, the scores of all factors and the total scores of the TNJSS were highly correlated between the two-time testing ($r = 0.63 – 084$ and 0.83; $p < 0.01$). For hypothesis testing, the total scores of the TNJSS and OSS revealed a moderately negative correlation ($r = -0.47; p < 0.01$). The Cronbach’s alpha coefficient of the OSS was found to be 0.87.
Table 1  Examples of Items, Factor Loadings, Communalities (h2), Eigenvalues, Percentages of Variance and Alpha of Factors (n = 963)

<table>
<thead>
<tr>
<th>Items</th>
<th>Statements</th>
<th>Factor Loadings</th>
<th>h²</th>
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<tr>
<td><strong>Factor I: Incentives</strong> (n = 27; alpha = 0.96)</td>
<td>Eigenvalue 39.99; Percent of total variance = 13.03</td>
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<tr>
<td>TNJSS110</td>
<td>Hospital provides adequate budget for you to gain more knowledge and skill.</td>
<td></td>
<td>.79</td>
</tr>
<tr>
<td>TNJSS111</td>
<td>Hospital has flexible time-leave policies for you to acquire more knowledge and skill when appropriate.</td>
<td></td>
<td>.76</td>
</tr>
<tr>
<td>TNJSS99</td>
<td>When your work is outside the hospital, you get appropriate extra pay for per-diem, accommodations and mileage.</td>
<td></td>
<td>.74</td>
</tr>
<tr>
<td>TNJSS101</td>
<td>Compared to other comparable professions, you receive a fair salary/incentive according to your special knowledge, difficult level of work and productivity.</td>
<td></td>
<td>.74</td>
</tr>
<tr>
<td><strong>Factor II: Professional Autonomy and Recognition</strong> (n = 21; Alpha = 0.96)</td>
<td>Eigenvalue 8.02; Percent of total variance = 12.84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TNJSS91</td>
<td>Patients and their relatives have confidence in your professional ability.</td>
<td></td>
<td>.79</td>
</tr>
<tr>
<td>TNJSS74</td>
<td>You are independent to solve patient’s problems under your scope of practice.</td>
<td></td>
<td>.77</td>
</tr>
<tr>
<td>TNJSS72</td>
<td>You are independent to provide important information to patients under your scope of practice.</td>
<td></td>
<td>.74</td>
</tr>
<tr>
<td>TNJSS73</td>
<td>You are independent to protect patient’s rights.</td>
<td></td>
<td>.74</td>
</tr>
<tr>
<td><strong>Factor III: Nursing Supervisor</strong> (n = 13; Alpha = 0.97)</td>
<td>Eigenvalue 6.58; Percent of total variance = 10.24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TNJSS31</td>
<td>You are comfortable to bargain with your superior, as appropriate.</td>
<td></td>
<td>.84</td>
</tr>
<tr>
<td>TNJSS38</td>
<td>Your superior judges you fairly.</td>
<td></td>
<td>.83</td>
</tr>
<tr>
<td>TNJSS29</td>
<td>Your superior gives you opportunities to discuss or question when there is a problem or a doubt.</td>
<td></td>
<td>.82</td>
</tr>
<tr>
<td><strong>Factor IV: Social Aspect at Work</strong> (n = 13; Alpha = 0.96)</td>
<td>Eigenvalue 4.15; Percent of total variance = 6.76</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TNJSS56</td>
<td>You and your co-workers are respectful and considerate of each other.</td>
<td></td>
<td>.76</td>
</tr>
</tbody>
</table>
### Table 1  
Examples of Items, Factor Loadings, Communalities ($h^2$), Eigenvalues, Percentages of Variance and Alpha of Factors ($n = 963$) (continued)

<table>
<thead>
<tr>
<th>Items</th>
<th>Statements</th>
<th>Factor Loadings</th>
<th>$h^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>TNJSS52</td>
<td>When facing problems on your ward, everyone helps to properly solve problems.</td>
<td>.74</td>
<td>.75</td>
</tr>
<tr>
<td>TNJSS55</td>
<td>When you have problems or make mistakes, your co-workers will instruct, warn or assist you in smoothly handling the situation.</td>
<td>.74</td>
<td>.72</td>
</tr>
</tbody>
</table>

**Factor V: Workload** ($n = 11; \text{Alpha } = 0.87$)

Eigenvalue 2.92; Percent of total variance = 5.66

| TNJSS6 | You can manage paper work without affecting your routine work. | .73            | .61   |
| TNJSS1 | The quantity of assigned tasks is appropriate so you can complete it within 8 hours/day. | .71            | .54   |
| TNJSS7 | You have time to help others on your ward without affecting your routine work. | .67            | .53   |

**Factor VI: Work Environment** ($n = 8; \text{Alpha } = 0.92$)

Eigenvalue 2.76; Percent of total variance = 4.54

| TNJSS24 | The workplace is organized and suitable for you to work. | .75            | .73   |
| TNJSS17 | Your ward has good ventilation which facilitates a good working environment. | .73            | .70   |

**Factor VII: Nursing Policies and System** ($n = 9; \text{Alpha } = 0.94$)

Eigenvalue 2.32; Percent of total variance = 4.24

| TNJSS44 | The nursing administration department has a decentralized system which creates faster management. | .69            | .77   |
| TNJSS45 | The implementation of nursing policies helps to promptly and appropriately solve problems. | .69            | .78   |

**Factor VIII: Assertiveness in Confronting Difficulties** ($n = 5; \text{Alpha } = 0.84$)

Eigenvalue 2.03; Percent of total variance = 3.05

| TNJSS78 | You are free to report or write-up healthcare team members, who treat you wrong, and send it to your superior. | .66            | .62   |
| TNJSS77 | You are free to report or write-up healthcare team members, who treat patient wrong, and send it to your superior. | .66            | .61   |
Discussion

Even though a number of job satisfaction measures (i.e. Home Healthcare Nurse Job Satisfaction Scale, Nurse’s Job Satisfaction Scale, Misener Nurse Practitioner Job Satisfaction Scale, and McClosky/Mueller Satisfaction Scale) have been developed, the TNJSS is different because it was developed specifically to measure nurses’ job satisfaction, within the context of the Thai culture. Psychometric analysis of the data revealed eight factors were associated with Thai nurses’ job satisfaction. The results of clustered factors confirmed the concept, job satisfaction, which has been explained by both Herzberg’s Motivation Theory and the Vroom Expectancy Theory.

The fact Factor I, “Incentives,” was found to consist of pay/benefits, continuing education and promotion was similar to the contents of other job satisfaction instruments. Similar to this instrument, other instruments possess incentives as one of their most important factors.

The contents of Factor II, “Professional Autonomy and Recognition,” was found to be very different from the contents of a comparable factor in other instruments. This, no doubt, was due to the fact Thai nurses are aware they cannot exercise autonomy because of their culture. As previously noted, Thai nurses are unhappy with their jobs secondary to their perceived inability to have autonomy and, as a result, not always being able to provide care at a desired level.

Factor III, “Nursing Supervisor,” was found to be unique to this instrument. Other job satisfaction instruments do not have a similar factor. This may be because the other instruments were developed in western cultures, where individualism is espoused. On the other hand the Thai culture supports collectivism. Thus, Thais share their actions and feelings with members of their group, including the supervisors with whom they work. The fact that western cultures focus more on individualism, rather than collectivism, may explain why this factor has not existed in other job satisfaction instruments.

Factor IV, “Social Aspect at Work,” was comparable to a similar factor in other job satisfaction instruments. Not surprisingly, this factor reflected the collectivism practiced by Thais. For example, one item in the final version of the instrument was: “Your co-workers demonstrate courtesy (Nam-Jai) when helping others.” The presence of collectivism tends to create a connected system that provides personal warmth in the work environment.

Similar to other job satisfaction instruments, this instrument was found to have a factor called “Workload” (Factor V). When nurses’ workloads increase, they do not have time to help each other (collectivism) with patient care. As a result, they become unhappy. Reflective of workload related collectivism was the instrument item: “You have time to help others on your ward without affecting your work responsibilities.”

Unlike a number of other job satisfaction instruments, this instrument was found to have a factor entitled “Work Environment” (Factor VI). No doubt, this was because most job satisfaction instruments, with the exception of the Nurses’ Job Satisfaction Scale (NJSS), were developed in western countries where facilities, equipment and surroundings are of better quality/quantity than those found in Asian countries. Even though the NJSS was developed in an Asian culture (Taiwan), it also did not include a factor addressing the work environment. The fact the presence of a quality work environment, one aspect of demonstrated social status, is important to Thais helps explain why this factor was important for inclusion in this instrument.

Factor VII, “Nursing Policies and System,” was unique to this instrument and not found in other job satisfaction instruments. Because Thailand
Development and Psychometric Evaluation of the Thai Nurses' Job Satisfaction Scale

is a large power distance culture, there is decentralization of decision-making that often delays working processes. Instrument items, stated in a positive direction, addressing this fact were: “Decentralized nursing administration creates faster management” and “Nursing administration can solve problems promptly and appropriately.”

Factor VIII, “Assertiveness in Confronting Difficulties,” also was unique to this instrument. No other job satisfaction instrument was found to have a similar factor. Different from autonomy, this factor addressed assertiveness that nurses use when dealing with an awkward or unpleasant situation. Because of the Thai culture’s large power distance, sense of humbleness and “Kreng Jai,” nurses tend to respect authority and, as a result, feel uncomfortable in voicing their opinions, questioning an order or confronting a co-worker.

The fact the construct and content validity, and the reliability of the scale were found to be satisfactory suggest the TNJSS is a psychometrically valid and reliable tool for evaluating Thai nurses’ job satisfaction. Unlike other instruments that measure nurses’ job satisfaction, this instrument is unique in that it contained factors and items specific to the context of the Thai culture.

Limitations and Recommendations

Like all studies, this study has limitations that need to be taken into consideration when interpreting its findings. First, there was a potential issue regarding how the nurses were selected for receipt of questionnaires during the psychometric testing phase of the study. Although the nurses’ were identified by each hospital’s personal systematic random sampling technique, under the supervision of the Director of Nursing, there was no guarantee that bias did not exist in the selection process. Since the researchers were not involved in this selection process they did not have knowledge regarding how each hospital randomly selected the nurses that took part in the study. Secondly, only government administered general hospitals were used as study sites. Thus, future studies, using the instrument, need to include other types of hospitals (i.e. private, specialty, military).

The instrument was long (107 items) and took the nurses approximately 20 to 60 minutes to complete it. Thus, future researchers need to consider whether creation of a shortened version of the instrument is warranted so as to eliminate fatigue and facilitate usage in a variety of settings.

Acknowledgements

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การพัฒนาและประเมินคุณสมบัติเครื่องมือวิจัยวัดความพึงพอใจในการทำงานของพยาบาลไทย

จารุรัตน์ ศรีรัตนประภาส, อรัญญา เชาวลิต, วันดี  สุทธรังษี

บทคัดย่อ: วัตถุประสงค์ของวิจัยนี้คือการพัฒนาเครื่องมือวิจัยวัดความพึงพอใจในการทำงานของพยาบาลไทยและประเมินคุณภาพของเครื่องมือนี้ ผู้วิจัยพัฒนาเครื่องมือนี้จากการวิเคราะห์แนวความคิดของความพึงพอใจในการทำงานภายใต้บริบทวัฒนธรรมไทย การสัมภาษณ์พยาบาลไทยและการทำงานระหว่างการวิเคราะห์ข้อมูล การตรวจสอบคุณภาพเครื่องมือนี้ทำได้โดยใช้การสุ่มตัวอย่างพยาบาล 963 คน จากโรงพยาบาลทั่วไปของรัฐบาล 12 โรงพยาบาลซึ่งเป็นตัวแทนจาก 6 ภูมิภาคของประเทศไทย และเนื่องจากวัฒนธรรมไทยโดยเฉพาะเรื่องความแตกต่างของชนชั้น (ผู้ที่ด้อยกว่าในองค์กรยอมรับและคาดหวังให้มีการกระจายอำนาจด้านที่เท่าเทียมกันและความเกรงใจ, ไม่ทำให้ผู้อื่นไม่สบายใจหรือไม่สะดวก) ผู้วิจัยจึงแนบแบบสอบถามความเป็นที่พึงพอใจของสังคมควบคู่กับเครื่องมือนี้ให้กับผู้ร่วมวิจัยด้วย

การทดสอบความตรงตามเนื้อเรื่องของเครื่องมือนี้ทำโดยผู้เชี่ยวชาญในขณะที่การประเมินความตรงตามโครงสร้างได้ใช้วิเคราะห์โครงสร้างและการทดสอบสมมติฐาน สำหรับการวัดความเที่ยงทำโดยการทดสอบความตรงตามโครงสร้างโดยใช้การวิเคราะห์องค์ประกอบและการทดสอบสมมติฐานส่วนการวัดความเที่ยงส่งเสริมโดยการทดสอบภายใน ในขณะที่การประเมินความตรงตามโครงสร้างได้ใช้วิเคราะห์โครงสร้างและการทดสอบสมมติฐาน สำหรับการวัดความเที่ยงทำโดยการทดสอบความตรงตามโครงสร้างโดยใช้การวิเคราะห์องค์ประกอบและการทดสอบสมมติฐานส่วนการวัดความเที่ยงส่งเสริมโดยการทดสอบภายใน

เครื่องมือวิจัยมี 107 ข้อคำถามซึ่งประกอบด้วย 8 องค์ประกอบคือผลตอบแทน, การมีส่วนร่วม, การมีสิทธิ์และสมบัติ, ภาระงาน, นโยบายและระบบทางการพยาบาล, การแสดงออกที่เหมาะสม, ผลตอบแทน, การมีสิทธิ์และสมบัติ, ภาระงาน, นโยบายและระบบทางการพยาบาล, การแสดงออกที่เหมาะสม

เครื่องมือวิจัยนี้มีความเที่ยงและความตรงพอที่จะใช้ในการประเมินความพึงพอใจในการทำงานของพยาบาลไทยอย่างก็ตาม การวิจัยในอนาคตอาจเป็นสิ่งจำเป็นเพื่อการปรับปรุงเครื่องมือนี้ให้ดีขึ้นและประเมินการนำไปใช้ในการวัดความพึงพอใจในการทำงานของพยาบาลไทยได้ดีขึ้นทั่วไป

ค่าสำคัญ: ความพึงพอใจในการทำงาน การประเมินคุณสมบัติเครื่องมือวิจัย, พยาบาลไทย และการพัฒนาเครื่องมือวิจัย

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Using Theory of Planned Behavior to Predict Physical Activity Intention among Pregnant Thais

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Abstract: The purpose of this descriptive, cross-sectional design, using the Theory of Planned Behavior, was to examine factors influencing physical activity intention of pregnant Thais during their second trimester. Theoretical relationships among attitude, subjective norms, perceived behavioral control and physical activity intention were examined via path analysis.

Purposive random sampling was employed to recruit 272 pregnant Thais who were attending one of two selected antenatal clinics in northern Thailand. Two instruments were used to collect data, including: the Demographic Data Questionnaire; and, a modified version of the Theory of Planned Behavior Questionnaire.

The proposed model showed a goodness of fit with the empirical data. The results supported the theoretical propositions and hypotheses. Indirect attitude, indirect subjective norms and indirect perceived behavioral control had significant positive direct influence on attitude toward physical activity, subjective norms and perceived behavioral control, respectively. The indirect measures had a positive indirect influence on the subjects' physical activity intention via attitude toward physical activity, subjective norms and perceived behavioral control. The subjects' attitude toward physical activity, subjective norms and perceived behavioral control had a positive direct influence on their physical activity intention. In addition, the modified model explained 21% ($R^2 = 0.21$) of the variance with respect to intention.

Keywords: Pregnant Thais; Physical activity; Intention; Theory of Planned Behavior

Introduction

Physical activity is a varied, unstable and complex behavior that is classified by the context in which it occurs (i.e. leisure time, occupation, housework or transportation).\textsuperscript{1,2} Since lack of physical activity has been recognized as leading to a risk for global mortality, regular physical activity has been recommended by the Centers for Disease Control and

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Prevention and the American College of Sports Medicine (CDC–ACSM).\textsuperscript{3} Regular physical activity not only establishes a range of physical and mental health benefits, but also reduces the risk of some chronic illnesses, i.e. diabetes mellitus, hypertension, cardiovascular diseases, obesity and depression.\textsuperscript{4–6} Despite recognizing the benefits of participation, many women, including those who are pregnant, fail to engage in a sufficient amount of physical activity.\textsuperscript{7–9}

Among Thais, physical activity participation increased from 21.3\% in 1987, to 30.7\% in 1999, but decreased to 24.2\% in 2001.\textsuperscript{10} In 2007, less than 30\% of Thais were found to participate in physical activity,\textsuperscript{11} with only 23.04\% of women, in Bangkok, taking part in physical exercise.\textsuperscript{12} In addition, the prevalence rate of females, 11 years of age and older, participating in physical exercise reportedly increased from 25.4 \%, in 2004, to 26.7\%, in 2007, but decreased to 25.0\%, in 2011.\textsuperscript{13}

**Review of Literature**

Pregnancy has been recognized as a unique time for anatomical and physiological changes, and viewed as a state of confinement during which a woman often is encouraged not to engage in physical activities, due to concerns that exercise–induced injuries may precipitate adverse maternal and fetal outcomes.\textsuperscript{3,14} Thus, among pregnant women who are physically active, performance of physical activity seems lower with respect to duration, frequency and intensity when compared with their respective pre–pregnancy levels.\textsuperscript{15} In this regard, Rutkowska and Lepecka–Klusek\textsuperscript{16} found most Polish women, prior to pregnancy, willingly spent their free time in active recreational activities, but significantly reduced their physical activity during pregnancy. In addition, Ning et.al.\textsuperscript{8} found that up to 23\% of previously active American women discontinued participation in exercise during pregnancy. Clarke, et al.\textsuperscript{17} also found that the mean of self–reported daily activity level of pregnant British women, between 16 to 34 weeks gestation, significantly declined. Similarly, the physical activity levels of pregnant women, in the UK, have been found to decrease significantly from the second to third trimester.\textsuperscript{9} Within Thailand, the proportion of pregnant women who are sedentary appears to be similar to those in Western countries, with only 58\% of pregnant Thais, in a major hospital in Bangkok, reporting participation in physical exercise while pregnant.\textsuperscript{18}

However, prior studies have confirmed that physical activity during pregnancy is safe and beneficial for most women.\textsuperscript{3,19,20} Thus, the CDC–ACSM has recommended that pregnant women, who do not have obstetric or medical problems, engage in a daily accumulation of 30 minutes or more of moderately intensity physical activity, and that those who have been inactive before pregnancy follow a gradual progression of up to 30 minutes of daily physical activity.\textsuperscript{3}

The benefits associated with physical activity during pregnancy have been shown to include a(an): greater sense of well–being;\textsuperscript{21,22} improvement in self–image and self–esteem;\textsuperscript{23, 24} increase in energy;\textsuperscript{25} improvement in sleep;\textsuperscript{21} decrease in depression;\textsuperscript{23,24} decrease in backaches;\textsuperscript{22,25} sustainment in weight control;\textsuperscript{25} improvement in appearance and posture;\textsuperscript{21,24} enhancement in strength and endurance;\textsuperscript{21,25} and, shortened length of labor.\textsuperscript{21} Furthermore, prior studies have reported physical activity during pregnancy, especially among obese women: reduces the risk of gestational diabetes mellitus;\textsuperscript{26,27} improves glycemic control associated with gestational diabetes mellitus;\textsuperscript{15,25} and, reduces the risk of hypertension and preterm delivery.\textsuperscript{28,29}

Numerous factors are known to be associated with discontinuing or declining physical activity during pregnancy, including: physical limitations;\textsuperscript{22,30} fear of harming self and the fetus;\textsuperscript{31} lack of motivation;\textsuperscript{30} tiredness and fatigue;\textsuperscript{30,31} time limitation;\textsuperscript{30,31} caring
for other children,\textsuperscript{31} and, inclement weather.\textsuperscript{30} Furthermore, many female Thais believe that some activities (i.e. lifting heavy objects or doing farm work) are harmful to one’s pregnancy. Since driving is seen as placing exertion on the fetus, they also believe that driving a car while pregnant may lead to a miscarriage.\textsuperscript{32}

Thus, one’s participation in regular physical activity, as part of daily life, seems to be dependent on various personal and social factors. Therefore, it appears essential to gain an understanding of pregnant women’s thoughts, feelings and beliefs regarding all aspects of physical activity, especially during their second trimester of pregnancy. Such an understanding is necessary so as to facilitate development of effective programs and interventions to increase pregnant women’s physical activity.

Various theories have been utilized when examining factors that influence one’s physical activity behavior.\textsuperscript{33-36} One such theory, which has been used in prior investigations of women’s physical activity intentions and behaviors,\textsuperscript{35,36} is the Theory of Planned Behavior (TPB).\textsuperscript{37-39} The TPB is based on people’s intentions to perform or not perform a behavior and postulates three conceptually independent determinants (predictors) of intention: attitude toward the behavior; subjective norm; and, perceived behavioral control. In addition, attitude, subjective norm and perceived behavioral control have been recognized as antecedents of behavioral intention.

According to the TPB,\textsuperscript{37-39} attitude toward a behavior is: the degree to which a person has a favorable or unfavorable evaluation of a behavior; determined by one’s beliefs about outcomes of behavior; and, multiplied by corresponding evaluations of those beliefs. On the other hand, subjective norm refers to a person’s perception that another person or persons want the performance or nonperformance of a specific behavior carried out. Additionally, one’s subjective norm is believed to be determined by his/her normative beliefs, whether important referent individuals approve or disapprove of performance of the behavior, and the person’s motivation to comply with those referents. The third predictor of intention, perceived behavioral control, has been defined as a person’s perception of the ease or difficulty of performing the behavior of interest. This intention is believed to be determined by control beliefs regarding the presence or absence of facilitations and barriers to behavioral performance, and weighted by the perceived power or impact of each factor to facilitate or inhibit the behavior.

In addition, intention is assumed to be the immediate antecedent of behavior and refers to an individual’s subjective likelihood of engaging in a given behavior. The relationship between intention and behavior may be influenced by the congruence of the measurement of intention and behavior, and the stability of intention at the time of behavior measurement.\textsuperscript{40} In this respect, measurement of behavior should include four elements: action, target, context and time. However, intention can: alter over time; be taken prior to the observation of a behavior; and, differ from the intention at the time the behavior was observed. The longer the interval of time, between measurement of intention and observation of behavior, the less accurate the prediction of behavior. Consequently, the main TPB propositions are that people will: intend to perform a behavior when they evaluate it positively (attitude); believe that significant others want them to participate in the behavior (subjective norms); and, perceive the behavior to be under their control (perceived behavioral control).\textsuperscript{37-39}

Although the TPB has been tested among pregnant Western women, and the literature clearly explains physical activity,\textsuperscript{35,36} a lack of knowledge exists regarding explanation of physical activity intention among Thai pregnant women. Thus, this study was conducted to determine the capability of the TPB constructs (i.e. attitude toward physical activity,
subjective norms and perceived behavioral control) to predict physical activity intention among pregnant Thais during their second trimester of pregnancy. Based on this conceptual framework, it was hypothesized that: all indirect measures (indirect attitude, indirect subjective norms and indirect perceived behavioral control) have significantly positive direct influence on attitude toward physical activity, subjective norms and perceived behavioral control, respectively; all indirect measures (indirect attitude, indirect subjective norms and indirect perceived behavioral control) have positive indirect influence on physical activity intention, via attitude toward physical activity, subjective norms, and perceived behavioral control, respectively; and, attitude toward physical activity, subjective norms and perceived behavioral control have positive direct influence on physical activity intention.

Method

Design: A descriptive, cross-sectional, survey design was used.

Ethical considerations: Permission to conduct the study was obtained from the Institutional Ethics Review Boards of Mahidol University and Chiang Mai University, as well as the Directors of the two hospitals used as study sites. Potential subjects received information regarding: the purpose of the study; anonymity and confidentiality issues; what participation in the study would entail; the right to refuse participation or withdraw from the study at any time; and, the lack of risks during participation. Subjects consenting to take part in the study were requested to sign a consent form. Confidentiality of the respondents’ answers was assured via use of code numbers on the questionnaires, as well as all responses being analyzed as group data without identification of individual responses.

Setting: The antenatal clinics of two hospitals, in northern Thailand, provided the setting for the study. The hospitals were selected because they provide obstetrical care, on an annual basis, to a large number of pregnant Thais.

Sample: The sample size was calculated based on the number of subjects related to the number of independent variables in the model. Since the hypothesized model had seven variables, a sample of at least 210 was required. Due to potential attrition of subjects, the sample size was increased by 20%, resulting in a sample size of at least 252. All subjects were obtained through purposive random sampling. After consent to conduct the study was granted, the names of potential subjects were obtained from the head nurses of the two selected antenatal clinics. Inclusion criteria were healthy pregnant Thais, who were 18 years of age or older and had a gestational age of 16 to 25 weeks. The sample consisted of 272 pregnant Thais, in their second trimester. As shown in Table 1, the majority of women: were 21 – 30 years of age (mean = 27.51 years); were married; had either a secondary or high school education; had a family income of 10,000 to 19,999 baht per month; were employees outside their home; were experiencing their first pregnancy; had a gestational age of 15 – 20 weeks; and, did not have other children.

Instruments: Data were obtained via: a Demographic Data Questionnaire and a modified version of Ajen’s Theory of Planned Behavior Questionnaire. The Demographic Data Questionnaire, developed by the primary investigator (PI), requested information about each subject’s: age; marital status; level of education; monthly family income; occupation; gravida; gestational age; and, number of children.
Table 1  Demographic Characteristics (n = 272)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (year)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 - 20</td>
<td>15</td>
<td>5.50</td>
</tr>
<tr>
<td>21 - 30</td>
<td>181</td>
<td>66.60</td>
</tr>
<tr>
<td>31 - 40</td>
<td>76</td>
<td>27.90</td>
</tr>
<tr>
<td>Mean = 27.51; SD = 4.33</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>13</td>
<td>4.80</td>
</tr>
<tr>
<td>Married</td>
<td>259</td>
<td>95.20</td>
</tr>
<tr>
<td><strong>Education level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary school</td>
<td>21</td>
<td>7.70</td>
</tr>
<tr>
<td>Secondary school</td>
<td>61</td>
<td>22.40</td>
</tr>
<tr>
<td>High school</td>
<td>60</td>
<td>22.10</td>
</tr>
<tr>
<td>Vocational school</td>
<td>31</td>
<td>11.40</td>
</tr>
<tr>
<td>Bachelor’s degree</td>
<td>92</td>
<td>33.80</td>
</tr>
<tr>
<td>Master’s degree</td>
<td>7</td>
<td>2.60</td>
</tr>
<tr>
<td><strong>Family income (per month)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 10,000 Baht</td>
<td>52</td>
<td>19.10</td>
</tr>
<tr>
<td>10,000 - 19,999 Baht</td>
<td>122</td>
<td>44.90</td>
</tr>
<tr>
<td>20,000 - 29,999 Baht</td>
<td>59</td>
<td>21.70</td>
</tr>
<tr>
<td>30,000 - 39,999 Baht</td>
<td>27</td>
<td>9.90</td>
</tr>
<tr>
<td>≥ 40,000 Baht</td>
<td>12</td>
<td>4.40</td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employee</td>
<td>182</td>
<td>66.90</td>
</tr>
<tr>
<td>Civil servant/State enterprise</td>
<td>26</td>
<td>9.60</td>
</tr>
<tr>
<td>Merchant</td>
<td>26</td>
<td>9.60</td>
</tr>
<tr>
<td>Owner of business</td>
<td>21</td>
<td>7.70</td>
</tr>
<tr>
<td>Housewife</td>
<td>11</td>
<td>4.00</td>
</tr>
<tr>
<td>Student</td>
<td>5</td>
<td>1.80</td>
</tr>
<tr>
<td>Politician</td>
<td>1</td>
<td>0.40</td>
</tr>
<tr>
<td><strong>Gravida</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>131</td>
<td>48.20</td>
</tr>
<tr>
<td>2</td>
<td>117</td>
<td>43.00</td>
</tr>
<tr>
<td>≥ 3</td>
<td>24</td>
<td>8.80</td>
</tr>
<tr>
<td><strong>Gestational age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 - 20 weeks</td>
<td>147</td>
<td>54.00</td>
</tr>
<tr>
<td>21 - 26 weeks</td>
<td>125</td>
<td>46.00</td>
</tr>
<tr>
<td><strong>Number of children</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>173</td>
<td>63.60</td>
</tr>
<tr>
<td>1</td>
<td>92</td>
<td>33.80</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>2.60</td>
</tr>
</tbody>
</table>
A modified version of Ajen’s Planned Behavior Questionnaire, developed by the PI, was used to predict physical activity intention among the women. Modifications to the original questionnaire were based upon the outcomes of seven focus group discussions involving 52 pregnant Thais. Each focus group addressed: salient behavioral, normative and control beliefs; attitude toward physical activity; subjective norms; perceived behavioral control; and, intention to engage in physical activity during pregnancy. The results of the focus group lead to creation of a 132-item questionnaire that consisted of four major constructs, including: attitude toward physical activity (25 behavioral beliefs & 25 outcomes indirect measure items, and 11 direct measure items); subjective norm (7 normative beliefs & 7 motivation to comply indirect measure items, and 2 direct measure items); perceived behavioral control (20 control beliefs & 20 perceived power indirect measures items and 3 direct measure items); and, intention (12 items). Content validity of the questionnaire was evaluated by a panel of seven experts (three nurse educators, one obstetrician and one physician specializing in physical activity, and two educators knowledgeable about the TPB and physical activity). The computed content validity index ranged from 0.61 to 0.97. Based upon the experts’ evaluations, items that were unclear were eliminated (i.e., “Walking helps me meet new friends”) or reworded/expanded to improve clarity of content (i.e., “Walking every day helps with good digestion” and “Walking every day helps with normal defecation” were combined into “Walking every day helps with normal digestion and defecation.”). After revisions were made, the questionnaire consisted of a total of 90 items within the four constructs, including: attitude toward physical activity (12 behavioral beliefs & 12 outcomes indirect measure items, and 9 direct measure items); subjective norm (6 normative beliefs & 6 motivation to comply indirect measure items, and 4 direct measure items); perceived behavioral control (15 control beliefs & 15 perceived power indirect measure items, and 3 direct measure items); and, intention (8 items).

The revised, modified, version of the Theory of Planned Behavior Questionnaire was pilot-tested with 34 pregnant Thais who were similar to the study subjects. All components of the instrument had good reliabilities, with Cronbach’s alpha coefficients ranging from 0.68 to 0.92. The revised, modified, questionnaire, used in the study, consisted of the following 4 constructs:

1. **Attitude toward physical activity behavior**, which was measured both indirectly and directly. Indirect attitude was assessed in terms of two aspects: 12 behavioral beliefs about physical activity (i.e., “Doing physical activity every day makes me healthy.”) and 12 corresponding outcome evaluations of physical activity (i.e., “A healthy consequence of doing physical activity every day, during pregnancy, is…”). The belief items had possible responses ranging from 1 = “very unlikely” to 5 = “very likely,” while the corresponding evaluation outcome items had possible responses ranging from 1 = “very unimportant” to 5 = “very important.” The score for the assessment of indirect attitude was calculated by multiplying the numerical value of each of the behavioral beliefs items by the numerical value of its corresponding outcome evaluation item, and then summing the multiplied scores across all items. Total scores could range from 12 to 300, with higher scores indicating positive beliefs and outcome evaluations with regard to physical activity during pregnancy. Direct attitude toward physical activity (i.e., “Doing physical activity is…” was assessed via 9 items that consisted of bipolar–adjective pairs (i.e. unpleasant–pleasant, harmful–beneficial, bad–good, unhealthy–healthy). Each item was assessed using a 5-point semantic differential response range (i.e. 1 = “extremely negative direction” to 5 = “extremely positive direction”). A total score for direct attitude, ranging from 9 to 45, was obtained by summing
across all items. Higher scores indicated a more positive attitude toward physical activity during pregnancy.

2. **Subjective norms**, which were measured both indirectly and directly. Indirect subjective norms were assessed in terms of two components: six normative beliefs (i.e., “My husband thinks I should perform physical activity during pregnancy.”); and, six motivations to comply (i.e., “If my husband wants me to perform physical activity, I will comply with his opinion to this extent.”). Subjects were asked to rate their perceptions of the strength of significant others beliefs (husband, parents, relatives, friends and physicians/nurses) regarding whether they should perform physical activity during pregnancy, and their motivation to comply with these significant referents. Possible responses for the normative beliefs items ranged from 1 = “definitely not true” to 5 = “definitely true”, while possible responses for the motivations to comply items ranged from 1 = “not at all” to 5 = “very much.” To obtain a score for the indirect subjective norm, the numerical value of each normative belief item was multiplied by the numerical value of its corresponding motivation to comply item, and then the multiplied scores across all items were summed. Total scores could range from 6 to 150, with higher scores reflecting greater influence by significant others regarding whether women should perform physical activity during pregnancy, and their motivation to comply with these significant referents. Direct subjective norms were measured via four items which assessed the influence of significant others on the pregnant woman’s performance of physical activity during pregnancy.

3. **Perceived behavioral control**, which was measured both indirectly and directly. Indirect perceived behavioral control was assessed in regards to two aspects: control beliefs (15 items; i.e., “Because of hearing about exercise from the media, I will find performing a physical activity....”) and, perceived power (15 items; i.e., “If I hear about exercise from media, the likelihood that I will perform physical activity will be....”). Each control belief item had possible responses ranging from 1 = “very difficult” to 5 = “very easy,” while each perceived power item had possible responses ranging from 1 = “very unlikely” to 5 = “very likely.” Eight of the items were stated negatively and, thus, required reverse scoring prior to calculation of the total score. Calculation of the total score for the indirect perceived behavioral control items, which could range from 15 to 375, involved multiplication of the numerical score for each control belief item by its corresponding perceived power item, and then summing the multiplied scores across all items. Higher total scores suggested greater perceived behavioral control over performing physical activity during pregnancy. Direct perceived behavioral control was measured by three items that focused on control over performing physical activity during pregnancy (i.e., “For me, to perform physical activity during pregnancy would be...; and “If I wanted to, I could easily perform physical activity during pregnancy.”) Possible responses to the items, depending upon how the item was stated, ranged from 1 = “very difficult” to 5 = “very easy” or 1 = “strongly disagree” to 5 = “strongly agree.” Calculation of the total score for direct perceived behavioral control, which could range from 3 to 15, was obtained by summing the response values across the three items. Higher scores indicated higher perceived behavioral control over performing physical activity during pregnancy.
4. **Intention**, which was determined by eight items that focused on one’s intent to perform specific activities during pregnancy. The items addressed household/caregiving, transportation, exercise and occupation (i.e., “I intend to engage in physical activity while I am doing housework or caregiving in the forthcoming month”, and “I will try to engage in physical activity while I am doing housework or caregiving in the forthcoming month.”). Each item, depending upon how it was stated, had possible responses ranging from 1 = “definitely do not” to 5 = “definitely do” or 1 = “definitely not true” to 5 = “definitely true.” The total score for intention, which could range from 8 to 40, was calculated by summing the response values across the eight items. Higher scores indicated greater intention to perform specific physical activities during pregnancy.

**Procedure:** Women meeting the inclusion criteria and consenting to participate in the study were instructed about and then administered, by the PI, the Demographic Data Questionnaire and the modified Theory of Planned Behavior Questionnaire. Information concerning gravida and gestational age were obtained, by the PI, from the subjects’ medical records. Both questionnaires were administered, which took approximately 30 minutes, while the women were waiting to be seen, in the antenatal clinics, by their respective physician. The PI was available, at all times, to respond to questions the subjects had about responding to each questionnaire. Upon completion of the questionnaires, they were retrieved by the PI who then checked them for completeness. Incomplete questionnaires were excluded from the study. In keeping with Thai traditions, all subjects received a small gift (container of baby powder) as a token of appreciation.

**Data analysis:** Descriptive statistics were performed to assess the subjects’ demographic characteristics and to calculate scores on the various components of the modified version of the TPB.

Pearson’s Product Moment correlation was used to determine relationships among the variables. The Linear Structural Relationship program (LISREL) was used to perform preliminary analysis and principle analysis for model testing. Path analysis was performed to test the causal relationships among the variables, within the revised modified TPB model, predicting physical activity intention.

**Results**

Correlation coefficients for the variables measured are shown in Table 2. All direct measures (attitude toward physical activity, subjective norms and perceived behavioral control) were found to be positively correlated with intention to perform physical activity. Similarly, all indirect measures (indirect attitude, indirect subjective norms and indirect perceived behavioral control) were found to be positively correlated with intention to perform physical activity.

Positive correlations were found between: indirect attitude and attitude toward physical activity; indirect subjective norms and subjective norms; and, indirect perceived behavioral control and perceived behavioral control. The modified TPB causal model was tested and revised until a theoretically meaningful and statistically acceptable model was fitted to predict physical activity intention.

Data testing met the theoretical and statistical assumptions for path analysis. As shown in Figure 1, path analysis validated the causal model of physical activity intention, while LISREL revealed a significant fit with a chi-square. The final model showed that all goodness-of-fit indices of physical activity intention, predicted by the modified TPB model, concurred with the empirical data. As shown in Table 3, the findings indicated that indirect attitude (TBB), indirect subjective norms (TNM), and indirect perceived behavioral control (TCP) had significant positive direct influence on attitude toward physical activity,
subjective norms and perceived behavioral control, respectively. Additionally, attitude toward physical activity, subjective norms and perceived behavioral control had significantly positive direct influence on intention.

**Table 2** Correlation Matrix of the Study Variables (n = 272)

<table>
<thead>
<tr>
<th>Variables</th>
<th>TBB</th>
<th>TNM</th>
<th>TCP</th>
<th>ATT</th>
<th>SN</th>
<th>PBC</th>
<th>INT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TBB</strong></td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TNM</strong></td>
<td>.452**</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TCP</strong></td>
<td>.405**</td>
<td>.398**</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ATT</strong></td>
<td>.480**</td>
<td>.510**</td>
<td>.533**</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SN</strong></td>
<td>.369**</td>
<td>.577**</td>
<td>.420**</td>
<td>.569**</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PBC</strong></td>
<td>.419**</td>
<td>.373**</td>
<td>.520**</td>
<td>.628**</td>
<td>.464**</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td><strong>INT</strong></td>
<td>.336**</td>
<td>.432**</td>
<td>.368**</td>
<td>.387**</td>
<td>.368**</td>
<td>.431**</td>
<td>1.000</td>
</tr>
</tbody>
</table>

**Note:** *p ≤ 0.05; **p ≤ 0.01

TBB = Indirect attitude (behavioral beliefs x outcome evaluations); TNM = Indirect subjective norms (normative beliefs x motivation to comply); TCP = Indirect perceived behavioral control (control beliefs x perceived powers); ATT = Attitude toward physical activity; SN = Subjective norms; PBC = Perceived behavioral control; INT = Intention

**Figure 1** Modified Model of Pregnant Thais Physical Activity during the 2nd Trimester

**Note:** **p ≤ .01; ***p ≤ .001

TBB = Indirect attitude (behavioral beliefs x outcome evaluations); TNM = Indirect subjective norms (normative beliefs x motivation to comply); TCP = Indirect perceived behavioral control (control beliefs x perceived powers); ATT = Attitude toward physical activity; SN = Subjective norms; PBC = Perceived behavioral control; INT = Intention
Table 3  Effects Decomposition of Predictive Factors in the Modified Model (n=272)

<table>
<thead>
<tr>
<th>Affected Variables</th>
<th>$R^2$</th>
<th>Effects</th>
<th>Causal Variables (Standardized Value)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>TBB</td>
</tr>
<tr>
<td>ATT</td>
<td>0.92</td>
<td>IE</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TE</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SN</td>
<td>0.82</td>
<td>IE</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TE</td>
<td></td>
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<tr>
<td>PBC</td>
<td>0.77</td>
<td>IE</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TE</td>
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</tr>
<tr>
<td></td>
<td>0.21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INT</td>
<td></td>
<td>IE</td>
<td>0.13**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TE</td>
<td>0.13**</td>
</tr>
</tbody>
</table>

Note: $t > 1.96$, $p \leq .05$; $t > 2.58$, $**p \leq .01$; $t > 4.00$, $***p \leq .001$

TE = Total effect; DE = Direct effect; IE = Indirect effect
TBB = Indirect attitude (behavioral beliefs x outcome evaluations); TNM = Indirect subjective norms (normative beliefs x motivation to comply); TCP = Indirect perceived behavioral control (control beliefs x perceived powers);
ATT = Attitude toward physical activity; SN = Subjective norms; PBC = Perceived behavioral control; INT = Intention

Among three indirect measures (indirect attitude, indirect subjective norms and indirect perceived behavioral control), three paths indicated indirect relationships between the causal variables and intention, via attitude toward physical activity, subjective norms and perceived behavioral control, respectively. The statistical analysis showed that indirect attitude had a significant positive indirect effect on intention via attitude toward physical activity and indirect subjective norms had a significant positive indirect effect on intention via subjective norms, while indirect perceived behavioral control had a significant positive indirect effect on intention via perceived behavioral control. The modified model accounted for and explained 21% ($R^2 = 0.21$) of the variance on intention.

Discussion

Consistent with prior research, the findings supported the ability of the TPB constructs to have both direct and indirect effects on physical activity. All direct measures (attitude toward physical activity, subjective norms and perceived behavioral control)
and all indirect measure (indirect attitude, indirect subjective norms, indirect perceived behavioral control) were correlated with each other, respectively. In addition, all direct measures and all of the indirect measures were found to be positively correlated with intention to perform physical activity.

The study findings illustrated that both direct and indirect measures had influence on physical activity intention. However, since there was not a direct link between indirect measures and physical activity intention, direct measures (attitude toward physical activity, subjective norms and perceived behavioral control) appeared to have more influence on physical activity intention than all indirect measures (indirect attitude, indirect subjective norms and indirect perceived behavioral control). Indirect measures directly influenced attitude toward physical activity, subjective norms and perceived behavioral control. Subsequently, these three constructs indirectly influenced physical activity intention. The effects of indirect measures on physical activity intention, thus, were mediated by all direct measures.

Congruent with previous findings, attitude was found to be the degree to which the pregnant women had a favorable or unfavorable evaluation of performing physical activity. It can be presumed that the women, who held strong beliefs regarding the positive outcomes of performing physical activity (i.e. improvement in health, shorter labor and better weight control), tended to engage in physical activity during their pregnancy. In contrast, the subjects who believed performing physical activity might be harmful to their bodies or fetuses, tended to decrease or stop participation in physical activities during their pregnancy. As a result, the women with a more positive attitude toward physical activity had higher levels of intention to engage in physical activity behavior compared to the women who had less positive attitudes toward physical activity.

The results confirmed the proposition that both direct and indirect subjective norms were significant predictors of physical activity intention. In forming subjective norms, the subjects took into account the normative expectations of important others in performing their physical activity. They considered whether specific individuals or groups thought they should or should not engage in physical activity, and they utilized this information to arrive at their subjective norms. With regard to the TPB, intention is determined by subjective norms. Thus, the women may have intended to engage in physical activity when they believed that significant referents (i.e. husband, mother, and physicians/nurses) wanted them to perform this behavior. Conversely, if the subjects believed significant referents did not want them to perform physical activity, they would not intend to engage in such behavior. Moreover, subjective norms were found, in this study, to be the strongest determinant of physical activity intention.

The fact that the findings demonstrated that indirect perceived behavioral control had a significant positive indirect effect on intention, via perceived behavioral control, was consistent with the TPB (i.e. perceived behavioral control is predicted by control beliefs). Control beliefs could have been developed from the pregnant women’s evaluations of whether performing physical activity could be difficult or easy and from their perceived power over opportunities/resources available for performing the behavior. It can be supposed that some of the women believed certain factors (e.g., physical limitations, tiredness, and fear of harming self and/or fetus) would obstruct physical activity, while others believed performing physical activity would improve their health and, thus, easily engaged in physical activity during their pregnancy.

In summary, the findings showed the pregnant Thais had a strong intention to engage in physical activity when they: evaluated it positively (attitude); believed significant others (e.g., husband, mother and physicians/nurses) desired for them to participate in the behavior (subjective norms); and, perceived it to be under their control (perceived behavioral control).
The modified model supported the theoretical propositions of the TPB and the findings supported the proposed hypotheses.

Limitations and Recommendations

There are some limitations, in this study, that need to be taken into consideration when utilizing the results. First, because of the use of purposive sampling, the results cannot be generalized to the entire pregnant Thai population. Next, the major measure (modified version of Ajen’s Theory of Planned Behavior Questionnaire) used was developed, by the PI, based on the TPB. It was, however, evaluated, prior to use, for content validity by a panel of experts. In the future, this measure needs to be assessed for construct validity. Lastly, the method of self-report was used for completion of all measures. Thus, one has to assume the responses given were truthful and did not reflect bias.

Replication of the study is needed using a sample that is more diverse and from multiple geographic areas throughout Thailand. In addition, since it may prove to be more beneficial for drawing conclusions regarding the causal relationships among the constructs of the TPB, the use of a longitudinal design is recommended.

Acknowledgements

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References

Using Theory of Planned Behavior to Predict Physical Activity Intention among Pregnant Thais


การใช้ทฤษฎีพฤติกรรมตามแผนทํานายความตั้งใจในการทํากิจกรรมทางกายของสตรีมีครรภ์ไทย

บังอร ศุภวิทิตพัฒนา, กอบกุล พันธ์เจริญวรกุล, Soen Ae Yeo, นิตยา สินสุกใส, ธวัชชัย วรพงศธร

บทคัดย่อ: การวิจัยเชิงบรรยายครั้งนี้มีวัตถุประสงค์เพื่อศึกษาปัจจัยที่มีอิทธิพลต่อความตั้งใจที่จะทํากิจกรรมทางกายของสตรีที่อยู่ในระยะไตรมาสที่สองของการตั้งครรภ์โดยใช้ทฤษฎีพฤติกรรมที่มีการวางแผน (The Theory of Planned Behavior) เป็นกรอบแนวคิดในการศึกษาว่าจะมีอิทธิพลต่อความตั้งใจการทํากิจกรรมทางกาย, ความเชื่อเกี่ยวกับการทํากิจกรรมทางกาย, ความเชื่อในบรรทัดฐานของบุคคลสําคัญ, ความเชื่อในความสามารถควบคุมพฤติกรรม, ทัศนคติ, บรรทัดฐานของบุคคลสําคัญ, การรับรู้ความสามารถในการควบคุมพฤติกรรม (Perceived Behavioral Control) และความตั้งใจที่จะทํากิจกรรมทางกาย (Intention) ในระยะไตรมาสที่สองของการตั้งครรภ์ กลุ่มตัวอย่างที่ทําการศึกษาได้แก่ สตรีมีครรภ์ที่อยู่ในระยะไตรมาสที่สองที่มาฝากครรภ์ที่โรงพยาบาลมหาราชนครเชียงใหม่และโรงพยาบาลส่งเสริมสุขภาพเชียงใหม่ จำนวน 272 ราย ผู้วิจัยทำการสุ่มตัวอย่างวิธีการสุ่มแบบเจาะจงเครื่องมือที่ใช้ในการวิจัยได้แก่ แบบสอบถามข้อมูลส่วนบุคคล แบบวัดทัศนคติ แบบวัดบรรทัดฐานของบุคคลสําคัญ แบบวัดการรับรู้ความสามารถในการควบคุมพฤติกรรม และแบบวัดความตั้งใจที่จะทํากิจกรรมทางกาย

ผลการศึกษาพบว่า ในผลที่แสดงมีความสอดคล้องกับข้อมูลเชิงประจักษ์ และสนับสนุนทฤษฎีพฤติกรรมที่มีการวางแผนทํานายความตั้งใจ ความเชื่อเกี่ยวกับการทํากิจกรรมทางกายมีอิทธิพลต่อทัศนคติ, บรรทัดฐานของบุคคลสําคัญ, ความเชื่อเกี่ยวกับการทํากิจกรรมทางกายมีอิทธิพลต่อบรรทัดฐานของบุคคลสําคัญ, และความเชื่อเกี่ยวกับการทํากิจกรรมทางกายมีอิทธิพลต่อความสามารถในการควบคุมพฤติกรรม สำหรับปัจจัยที่มีอิทธิพลโดยตรงทางบวกต่อความตั้งใจที่จะทํากิจกรรมทางกายได้แก่ ทัศนคติ, บรรทัดฐานของบุคคลสําคัญ, ความสามารถในการควบคุมพฤติกรรม, ความเชื่อเกี่ยวกับการทํากิจกรรมทางกาย, และความเชื่อเกี่ยวกับการทํากิจกรรมทางกายมีอิทธิพลต่อความสามารถในการควบคุมพฤติกรรม สำหรับปัจจัยที่มีอิทธิพลโดยตรงทางบวกต่อความตั้งใจที่จะทํากิจกรรมทางกายได้แก่ ทัศนคติ, บรรทัดฐานของบุคคลสําคัญ, และการรับรู้ความสามารถในการควบคุมพฤติกรรม และพบว่าผลที่ปรับแล้วสามารถอธิบายความแปรปรวนของความตั้งใจที่จะทํากิจกรรมทางกายได้ร้อยละ 21

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คำสำคัญ: สตรีมีครรภ์, การทํากิจกรรมทางกาย, ความตั้งใจ, ทฤษฎีพฤติกรรมที่มีการวางแผน

Bungorn Supavititpatana et al.
Effectiveness of a School-based Cognitive Behavioral Therapy Program for Thai Adolescents with Depressive Symptoms

Sararud Vuthiarpa, Hunsa Sethabouppha, Pratum Soivong, Reg Williams

Abstract: This quasi-experimental study sought to ascertain the effectiveness of a school-based cognitive behavior therapy program on depressive symptoms among Thai adolescents. Seventy, randomly selected, Thai students, from two public high schools in central Thailand, were randomly assigned to either an experimental or control group. The 35 students assigned to the experimental group received a 12 week, school-based, cognitive behavior therapy program that included one therapy session per week. The 35 students assigned to the control group received usual care from the school nurses, but not the 12 weekly therapy sessions.

Quantitative evaluation of the program was conducted, via self-report questionnaires, three times: half way through the program; immediately after program completion; and, four weeks after program completion. Qualitative program evaluation also was conducted, via a focus group, upon completion of the program. The effects of the program were determined via MANOVA (quantitative data) and content analysis (qualitative data).

Significantly reduced depressive symptoms and increased social and adaptive functioning were found across all three quantitative evaluation times. Significantly reduced negative automatic thought also was evident upon program completion and four weeks after program completion. The qualitative data demonstrated that the participants benefited from the intervention by their stated improvement of depressive symptoms, negative automatic thought, and social and adaptive functioning (i.e. relationships with family and friends, and being more mindful of school work). The findings suggest the program may be useful, especially in a school setting, in decreasing depressive symptoms among Thai adolescents.

Keywords: Depression; School-based cognitive behavioral therapy; Thai adolescents

Background

Adolescents with depressive symptoms, in a school setting, is a common, debilitating and recurrent public health problem that often is unrecognized and/or untreated. The Department of Mental Health, Ministry of Public Health, in Thailand, has indicated that Thai adolescents, who represent the future hopes and resources for the country’s development, are at...
high risk of depression. However, fewer than 5% of depressed Thai adolescents receive adequate treatment. Adolescents with depressive symptoms appear to be prevalent across the world, with prevalence rates of 2.5% to 10% reported in developing countries, Asia, and some western European countries. Some 3.7% of Thai adolescents have been found to be depressed. It has been recognized that more than 12% of adolescents in the United States, who have experienced depression, will relapse within one year, with 33% of them relapsing within four years. These circumstances contribute to the fact that by 18 years of age more than 30% of adolescents meet the criteria for a diagnosis of major depressive disorder.

Depressed adolescents, including those in Thailand, are known to experience depressive symptoms, including negative automatic thought, and deficits in social and adaptive functioning. In addition, they often exhibit learning difficulties, low academic achievement, drug and alcohol abuse and suicidal ideations, family conflicts, poor relationships with peers and teachers, and behavioral problems. They also are at high risk of attempting suicide.

It has been hypothesized that depression among adolescents results from the interaction between their biological, psychological vulnerabilities and environmental factors. The biological factors are comprised of genetic and neurochemical components, while the psychological vulnerabilities consist of cognitive factors (i.e. negative automatic thought and environmental factors, such as various disruptive and maladaptive social patterns). The interaction of these factors is believed to trigger the depressogenic process that leads to the development of one becoming depressed. In this regard, prior research has focused on interventions that target cognitive and social behavior factors with respect to prevention and treatment of clinical depression among adolescents.

One approach that has been used to prevent and decrease depressive symptoms among adolescents has been school–based delivery of cognitive behavioral therapy (CBT). Generally, adolescents appear to perceive school–base CBT to be less stigmatizing than a traditional, clinic–based treatment program for depression. Among Asian countries, where cultural values encourage conformity to norms, school–based CBT may prove to be more beneficial. This is because adolescents, who know their friends are undergoing the same treatment that they are undergoing, often are more encouraged to normalize their behavior. Although adolescents in Western countries have been found to benefit from participation in school–based CBT programs for depressive symptoms, no known study has investigated whether Thai adolescents may benefit from a similar program. Thus, the aim of this study was to evaluate, in adolescent Thais with depressive symptoms, the effectiveness of a 12–week, school–based CBT program for reducing depressive symptoms and negative automatic thought, and enhancing social functioning.

Conceptual Framework:

The CBT program was based on Beck’s Model of Cognitive Behavior Therapy (CBT) and the Social Cognitive Learning Theory (SCLT). According to the CBT model, negative automatic thought is the main cause of depression. Negative automatic thought has been described as consisting of a negative cognitive triad (a negative view of oneself, the environment and the future) that arises from a maladaptive developmental history that leads to depression.

In addition, SCLT has been postulated as containing cognitive and social domains, with one’s cognitive domain giving rise to negative automatic thought that leads to depression. Negative thought, according to the SCLT, can lead to misperceptions of events and low levels of perceived adaptive competence, so as to preclude achievement of positive outcomes. The SCLT also suggests, with respect to social domain,
that depression may be caused and maintained by the stressful life events that lead to disruptions in one’s social functioning. Such disruption seems to be more severe for those who experience deficits in their behavioral self-regulation skills (e.g., using pleasant activities to elevate one’s mood). Thus, school-based CBT programs have targeted individuals’ cognitive and social factors by restructuring their negative automatic thought and enhancing their social and adaptive functioning.

Method

Design: A quasi-experimental design was used.

Ethical considerations: Approval to conduct the study was granted by the Research Ethics Review Committee of the primary investigator’s (PI) institution and the Directors of the two public high schools used as study sites. All potential participants and their parents or legal guardians were informed about the study’s: purposes; intervention program; confidentiality and anonymity issues; and, potential risks and benefits. They also were told: what their voluntary participation would entail; they could withdraw without repercussions; and, the focus group discussion would be tape-recorded. All potential subjects and their parents or legal guardians who consented to participate were asked to sign an assent or a consent form.

Setting: The study was conducted at two public high schools in central Thailand. The PI surveyed the high schools in central Thailand that used the same school health policies and health services system, prior to randomizing the schools, via lot drawing, using each school’s identification number.

Sample: The sample size was determined via a power calculation based on the mean scores of a randomized controlled trial that used CBT in treatment for adolescents with depression. Therefore, a sample size of 32 subjects per group (intervention and control) was determined to be needed for a total of 64 participants. Estimating a potential 20% attrition over the data gathering period, 76 subjects (38 per group) were determined to be needed.

The PI received permission, from the Director of each school, to conduct depression screening at the respective schools. After the screening, the PI and research assistants (RAs) verified that the potential subjects met the inclusion criteria. The inclusion criteria consisted of Thai adolescents who: were 14-17 years of age; had a mild to moderate depressive symptom score of 16 to 24 on the Center for Epidemiologic Studies Depression Scale (CES-D); were willing to participate; and, had one parent or legal guardian who gave consent for their participation. Potential subjects were excluded if they had a history of severe depression (score > 24 on CES-D). The PI and RAs pair matched the adolescents in the experiment and control group based on their: age; gender; GPA; and, depressive symptom score. The sample consisted of 74 adolescents (37 per group). During the study, two subjects in each group dropped out because of not wanting to miss a school activity and feeling uncomfortable in the group. Recruitment, matching and randomized selection of the subjects, as shown in Figure 1, occurred during the 2009 academic year. As shown in Table 1, no significant differences were noted between the experimental and control group subjects.

Instruments: Data were obtained from each subject via use of four self-report instruments and a focus group guide. The instruments included the: Demographic Data Form (DDF); Center for Epidemiologic Studies Depression Scale (CES-D); Children’s Automatic Thought Scale (CATS); Child and Adolescent Social and Adaptive Functioning Scale (CASAFS); and, Focus Group Guidelines (FGG). The PI-developed Demographic Data Form (DDF) was used to obtain information regarding each participant’s: age; gender; religion; grade point average (GPA); and, family monthly income.
Figure 1  Flow Chart of Recruitment and Matched Pairs Procedure
### Table 1  Comparison of Demographic Characteristics by Group

<table>
<thead>
<tr>
<th>Demographic Characteristics</th>
<th>Experimental Group (n = 35)</th>
<th>Control Group (n = 35)</th>
<th></th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (year)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>15–16</td>
<td>15–16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>15.57(0.50)</td>
<td>15.51(0.51)</td>
<td>-0.47</td>
<td>68</td>
<td>0.43ns</td>
</tr>
<tr>
<td><strong>CES-D Score</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Range</td>
<td>16–24</td>
<td>16–24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>19.73(2.51)</td>
<td>19.51(2.68)</td>
<td>0.14</td>
<td>68</td>
<td>0.88ns</td>
</tr>
<tr>
<td><strong>GPA in School</strong></td>
<td></td>
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<tr>
<td>Range</td>
<td>1.54–3.81</td>
<td>1.50–3.65</td>
<td>0.58</td>
<td>68</td>
<td>0.75ns</td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>2.63(0.57)</td>
<td>2.71(0.56)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>9 (25.70%)</td>
<td>9 (25.70%)</td>
<td>0.00b</td>
<td>1</td>
<td>1.00ns</td>
</tr>
<tr>
<td>Female</td>
<td>26 (74.30%)</td>
<td>26 (74.30%)</td>
<td></td>
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<tr>
<td><strong>Religion</strong></td>
<td></td>
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<tr>
<td>Buddhism</td>
<td>35 (100%)</td>
<td>35 (100%)</td>
<td>.0a</td>
<td>-</td>
<td>- m</td>
</tr>
<tr>
<td><strong>Household Income (baht/month)</strong></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>≤ 20,000</td>
<td>18 (51.40%)</td>
<td>10 (28.60%)</td>
<td>3.81b</td>
<td>1</td>
<td>0.054ns</td>
</tr>
<tr>
<td>&gt; 20,001</td>
<td>17 (48.60%)</td>
<td>25 (71.40%)</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Note:** a = No statistics were computed. Religion was constant
b = 0 cells (0.0%) had an expected count of less than 5
ns = no significance

The Thai translated version\(^{35}\) of the 20–item Center for Epidemiologic Studies Depression Scale (CES–D)\(^{35}\) was utilized to measure the adolescents’ symptoms of depression, including: depressed affect (i.e., blues, depressed, lonely, cry, sad); positive affect or well-being (i.e., good, hopeful, happy, enjoy); somatic symptoms (i.e., appetite, sleep); and, interpersonal problems (i.e., unfriendly, dislike).\(^{23,36-38}\) Each item consisted of one statement that described depressive symptoms. Respondents were asked to rate the past week’s experience of depression on a 4–point, Likert–like, scale, ranging from 0 = "rarely or none of the time" to 3 = "most all or all of the time." A summary score was calculated by adding each of the responses after reversing the score on four negatively worded items. The total score indicated the level of depression. For example, a score of: <16 = non-depressed; 16 to 24 = mild to moderate depression; > 24 = severe depression.\(^{39}\) The Cronbach’s alpha for the instrument, in this study, was 0.98 for the experimental group and 0.89 for the control group.

The Thai version\(^{34}\) of 40–item Children Automatic Thought Scale (CATS), developed by Schniering and Rapee,\(^{40}\) was used to assess negative beliefs across internalization and externalization difficulties. The CATS measures negative automatic
thought on four distinct factors (physical threat, social threat, personal failure and hostility) among persons 7–16 years of age. Respondents were asked to rate the frequency with which they experienced each thought, during the past week, on a 5-point Likert-like scale ranging from 0 = “not at all” to 4 = “all the time.” The rating for each of the items was summed to provide a maximum total score of 160. The higher the score, the greater the frequency of negative automatic thought. In this study, the overall CATS had a Cronbach’s alpha of 0.91 for the control participants and 0.93 for the experimental participants. The internal consistency of the subscales ranged from: 0.75 to 0.78 (physical threat); 0.74 to 0.88 (social threat); 0.84 to 0.85 (personal failure); and, 0.83 to 0.84 (hostility).

The 24-item, self-report Child and Adolescent Social and Adaptive Functioning Scale (CASAFS), developed by Price, Spence, Sheffield and Donovan, was used to examine the adolescents’ social and adaptive functioning. The CASAFS consisted of four subscales that measured social role functioning (school performance, peer relationships, family relationships and home duties/self-care). Respondents were asked to respond, on a 4-point Likert-like scale (1 = “never” to 4 = “always”), to each of the social and adaptive functioning items. Negatively-worded items required reverse-scoring before calculation of the total score which could range from 24 to 96. The higher the total score, the higher the level of social functioning. In this study, the CASAFS had an overall Cronbach’s alpha of 0.75 to 0.78. The internal consistency of the subscales revealed a coefficient alpha of: 0.65 to 0.79 (school performance); 0.61 to 0.51 (peer relationships); 0.75 to 0.68 (family relationships); and, 0.62 to 0.63 (home duties/self-care). To ensure stability of the instrument, the test–retest method was applied. A significant correlation (r = 0.78 to r = 0.79) was found between the CASAFS initial participation scores and the scores obtained four weeks later. The test–retest correlation coefficient of the subscales revealed a significant correlation of: 0.66 to 0.79 (school performance); 0.59 to 0.73 (peer relationships); 0.58 to 0.73 (family relationships); and, 0.56 to 0.72 (home duties/self–care). After receiving permission, the PI translated the CASAFS into Thai before it was back–translated by three bilingually fluent individuals. The back–translated version of the instrument then was compared to the original one to assure no changes in meaning had occurred during translation. With respect to any discrepancy, the PI sought consensus among the three translators.

The PI developed the Focus Group Guidelines (FCG) based on review of the literature for the purpose of exploring adolescents’ opinions regarding the effectiveness of the CBT program. The FCG included five open-ended questions that were reviewed and critiqued by three experts in CBT and focus groups. The questions were: “How valuable was the information presented in this program?”; “How did this program affect your mood, thoughts, and behaviors?”; “How did you apply or practice the skills presented in this study?”; “What did you think of the length of the sessions and the overall 12 weeks?”; and, “What would be your suggestions about activities after completion of the study?”

**Intervention:** The purposes of the CBT program were to: decrease high school, Thai adolescents’ depressive symptoms and negative automatic thought; and, enhance their social and adaptive functioning. The program was guided by a modified version of the original CBT manual, after permission was obtained from the original developers of the CBT manual. The PI utilized the key constructs and concepts covered in the CBT intervention (overall design, structure to the process of CBT, and main cognitive and behavioral contents) in modifying the original CBT manual. Modification made in the original manual focused on Thai adolescents’ behavioral and social activities
(i.e. role playing, discussion-related topics, learning tasks and homework), all within the context of Thai adolescents’ depression, learning, living styles and culture. The program’s feasibility was examined for content validity by five experts, including two nursing faculty with clinical experience in cognitive behavioral strategies, a psychologist, and two child and adolescent psychiatrists with cognitive behavior therapy experience. The details of the program are presented in Table 2.

Table 2  Schedule, Objectives and Activities of the School–Based CBT Program

<table>
<thead>
<tr>
<th>Session</th>
<th>Goals</th>
<th>Activities</th>
</tr>
</thead>
</table>
| Session 1 | 1. To begin to establish relationships and acquaintances, and guidelines for each program session.  
2. To explain depression and CBT.  
3. To teach mood monitoring using the “Emotions Thermometer”. | 1. Introduce self, obtain names of participants, introduce the “Get Acquainted Activity” and explain guidelines.  
2. Teach about depression, and explain the rationale for the school–based CBT and how this treatment can help depression.  
3. Explain and discuss the meaning and recording of daily mood monitoring, and the assigning of homework. |
| Session 2 | 1. To review homework for mood monitoring.  
2. To teach goal setting. | 1. Review homework assignment and reinforce progress made.  
2. Review initial goals, create sub–goals and relate goal–setting to other skills.  
3. Assign homework addressing sub–goals. |
| Session 3 | 1. To review homework and progress in goal setting.  
2. To teach the importance of involvement in pleasant activities and create an activity schedule. | 1. Review homework assignment and reinforce progress made.  
2. Explain and discuss association between depression and the lack of active and enjoyable activities, and how doing pleasant activities can improve emotions, thoughts and behaviors.  
3. Identify and select pleasant activities in which to engage.  
4. Assign homework to increase involvement in pleasant activities (i.e. going to a movie, watching TV, reading or being with friends). |
| Session 4 | 1. To review homework and progress made in involvement in pleasant activities.  
2. To teach problem–solving. | 1. Review progress made regarding involvement in pleasant activities.  
2. Explain and discuss how problem–solving can be used to deal with issues and incidents.  
3. Teach and practice problem–solving, using a scenario.  
4. Assign homework to integrate problem–solving with increased involvement in pleasant activities. |
| Session 5 | 1. To review homework and progress made in mood monitoring, and involvement in pleasant activities.  
2. To teach recognition of cognitive distortions. | 1. Review homework assignment and reinforce progress made.  
2. Review reasons for and recognition of negative automatic thought (NAT) and how to record its presence.  
3. Assign homework to record presence of NAT. |
Table 2  Schedule, Objectives and Activities of the School-Based CBT Program (continued)

<table>
<thead>
<tr>
<th>Session</th>
<th>Goals</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session 6</td>
<td>1. To review homework and progress made on recording NAT.</td>
<td>1. Review homework assignment and reinforce progress made.</td>
</tr>
<tr>
<td></td>
<td>2. To continue to identify NAT.</td>
<td>2. Work on recognizing and labeling NAT.</td>
</tr>
<tr>
<td></td>
<td>3. To increase the ability to formulate and use realistic counter-thoughts.</td>
<td>3. Confront and change NAT with the use of Socratic questioning, role playing, role reversal and formulation of counter-thoughts.</td>
</tr>
<tr>
<td></td>
<td>4. To review progress made toward goals.</td>
<td>4. Assign homework to address the use of realistic counter-thoughts.</td>
</tr>
<tr>
<td>Session 7</td>
<td>1. To review homework and progress made in applying realistic counter-thoughts.</td>
<td>1. Review homework assignment and reinforce progress made.</td>
</tr>
<tr>
<td></td>
<td>2. To improve basic skills for meeting people.</td>
<td>2. Explain and discuss rationale for social skill training and the fact that changing behavior is one way to change emotions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Improve social skills through role playing (i.e. starting a conversation, breaking into a group conversation, listening and ending a one-to-one or group conversation).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Assign homework for practicing social skills and increasing involvement in pleasant activities.</td>
</tr>
<tr>
<td>Session 8</td>
<td>1. To review homework and progress made in improving social skills.</td>
<td>1. Review homework assignment and reinforce progress made.</td>
</tr>
<tr>
<td></td>
<td>2. To improve understanding of differences between passive, assertive and aggressive behavior.</td>
<td>2. Present content related to possible problems encountered, during difficult situations, when trying to stand up for one’s self or when trying to ask for help.</td>
</tr>
<tr>
<td></td>
<td>3. To identify underlying beliefs that inhibit one’s use of assertive behavior.</td>
<td>3. Provide examples of assertive and non-assertive responses, and discuss reactions to these responses.</td>
</tr>
<tr>
<td></td>
<td>4. To increase use of assertiveness behavior.</td>
<td>4. Provide assertiveness training through use of the “I” statement, role playing and tailored techniques.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Assign homework regarding recording of cues that help with the use of assertive behavior.</td>
</tr>
<tr>
<td>Session 9</td>
<td>1. To review homework and progress made in using assertive behavior.</td>
<td>1. Review homework assignment and reinforce progress made.</td>
</tr>
<tr>
<td></td>
<td>2. To improve listening skills and understanding of others thoughts and beliefs.</td>
<td>2. Explain and discuss rationale for listening to others, even when conflicts are present.</td>
</tr>
<tr>
<td></td>
<td>3. To practice compromise.</td>
<td>3. Practice listening skills, using role playing, during “debates” on one or two current controversial issues.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Relate difficulties in communication of possible NAT.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Explain and discuss rationale for compromising in order to increase support, and reduce conflict and depression.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. Relate compromising to problem-solving and teach how to compromise, using role-playing scenarios.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8. Assign homework on the use of compromise, as a problem-solving technique, with family, friends and/or teachers.</td>
</tr>
</tbody>
</table>
Table 2  Schedule, Objectives and Activities of the School-Based CBT Program (continued)

<table>
<thead>
<tr>
<th>Session</th>
<th>Goals</th>
<th>Activities</th>
</tr>
</thead>
</table>
| Session 10 | 1. To review homework and progress made in applying listening and compromising skills. | 1. Review homework assignment and reinforce progress made.  
2. Identify situations that can lead to stress and discuss what approaches have been used to deal with stress.  
3. Explain and discuss rationale for using relaxation techniques.  
4. Teach and practice relaxation techniques: deep breathing, counting backwards, guided imagery, meditation and progressive muscle relaxation.  
5. Identify which relaxation techniques to practice, during the coming week, and assign use of these methods as homework. |
|          | 2. To improve ability to relax.                                           |                                                                          |
|          | 3. To identify effective relaxation techniques.                           |                                                                          |
| Session 11 | 1. To review homework and progress made in practicing relaxation techniques. | 1. Review homework assignment and reinforce progress made.  
2. Explain and discuss rationale for keeping emotions under control and identify precipitators of emotional distress.  
4. Plan specific coping actions to control emotional distress (i.e. taking a walk, going out with family members, going to the temple, engaging in pleasant activities or using relaxation techniques).  
5. Work on connecting control of emotional distress with the other skills learned (i.e. problem-solving, use of assertive behavior, formulating realistic counter-thoughts and compromise).  
6. Identify one or two stressful situations that might occur and discuss how to apply coping actions when situations arise.  
7. Assign homework related to creating list of steps to take when control of emotional distress is required and then practice carrying out the steps. |
|          | 2. To enhance ability to control emotional distress.                      |                                                                          |
|          | 3. To develop a plan for coping with situations that trigger emotional distress. |                                                                          |
| Session 12 | 1. To review homework and progress made in controlling emotional distress. | 1. Review homework assignment and reinforce progress made.  
2. Inform participants that this is the last program session.  
3. Review progress made throughout program.  
4. Review all of the skills covered and identify which ones are most helpful.  
5. Encourage use of various skills learned, during the program, to assist in dealing with future situations.  
6. Thank the subjects for participating in the program. |
|          | 2. To review progress toward accomplishment of program goals.             |                                                                          |
|          | 3. To review cognitive and behavior skills covered in program             |                                                                          |
|          | 4. To determine which skills have been most helpful.                      |                                                                          |
Procedure: After the adolescents and their parents/guardians gave consent for participation, the 35 subjects assigned to the intervention group were provided information about the time, place and schedule for the 12 week CBT program. They then were divided into six sub–groups of 5–10 participants each based on the each subject’s availability to attend the program. Then the school–based CBT program, which lasted for one hour each week for 12 weeks, was implemented. The subjects assigned to the control group did not receive the CBT program, but were provided usual care by the school nurses.

The PI conducted all session activities. One RA assisted in facilitation of the groups. The other RA collected data, via administration of the CES–D, CATS, and CASAFS, in both the experiment and control groups at the mid–point of the program (week six), immediately upon the completion of the intervention (week 12), and four weeks after the completion of the intervention (week 16). The control group subjects were offered an opportunity to participate, during the school break, in the school–based CBT after the post–program data were collected. However, they chose not to participate in the program. Thus, the PI provided all of them the CBT manual and workbook, as well as a relaxation CD.

Data Analysis: Descriptive statistics, Chi–square and t–test were used to analyze the demographic data. Multivariate analysis of variance (MANOVA) was utilized for testing the differences in depressive symptoms, negative automatic thought, and social and adaptive functioning between the experimental and control group. A paired t–test was used to compare the mean changes within the groups over time. Data from the focus group were analyzed via content analysis.

Results

Quantitative findings: As shown in Table 3, significant interaction effects were found between the experimental and control group with respect to depressive symptoms and negative automatic thought. Also, significantly higher social and adaptive functioning scores were noted in the experimental group compared with the control group.

The experimental group’s depressive symptoms were found to improve across treatments and during follow–up (see Table 4). Their depressive symptoms also decreased across the intervention phase, yielding significant main effects regarding group and time interaction (F=5.09; p<0.01). In addition, the experimental group’s negative automatic thought scores were found to be significantly lower than the control group’s negative automatic thought scores upon completion of the intervention, as well as upon follow–up.

As reflected in Table 5, the experimental group’s social and adaptive functioning showed improvement over time, compared to the control group. Social and adaptive functioning was found to increase across the intervention phase, yielding a significant main effect on groups (F=4.34, p<0.05).

Qualitative findings: Upon completion of the intervention, 12 subjects were randomly selected to participate in a focus group. The focus group guidelines covered the value and effects of the information presented in the program, and the participants reflected on whether they had improved via participation in the program. They noted a decrease in the level of depressive symptoms they exhibited prior to taking part in the program. For example, one participant said, “I’m getting better. I can arrange time to do things. I can stay home after school and I can consider what to do to lessen my depressed mood.” As indicated in this quote, this participant expressed an improvement in negative affect. Another participant mentioned that the PI helped her to become less sad (i.e., “I liked being in this group because I don’t feel I’m alone. More, I don’t feel bad because I have been taught that there are other people who go through the same thing as me and they improved after using skills from the program.”).

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Table 3  Main Effects and Interactions, between Experimental and Control Groups, Regarding Depressive Symptoms, Negative Automatic Thought, and Social and Adaptive Functioning

<table>
<thead>
<tr>
<th>Group</th>
<th>Time of Evaluation</th>
<th>Group effect</th>
<th>Time effect</th>
<th>Group* Time effect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Depressive symptoms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experiment</td>
<td>19.66</td>
<td>2.57</td>
<td>18.54</td>
<td>4.99</td>
</tr>
<tr>
<td>Control</td>
<td>19.74</td>
<td>2.52</td>
<td>21.26</td>
<td>5.13</td>
</tr>
<tr>
<td>Negative automatic thought</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experiment</td>
<td>33.51</td>
<td>16.15</td>
<td>32.09</td>
<td>17.50</td>
</tr>
<tr>
<td>Control</td>
<td>22.86</td>
<td>17.53</td>
<td>33.23</td>
<td>16.73</td>
</tr>
<tr>
<td>Social and adaptive functioning</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experiment</td>
<td>65.11</td>
<td>6.82</td>
<td>67.23</td>
<td>7.34</td>
</tr>
<tr>
<td>Control</td>
<td>67.11</td>
<td>6.61</td>
<td>65.29</td>
<td>8.61</td>
</tr>
</tbody>
</table>

Note: Time 1 = baseline assessment; Time 2 = six weeks after starting program; Time 3 = immediately after program completion; Time 4 = four weeks after program completion

Table 4  Simple Effects on Depressive Symptoms and Negative Automatic Thought, between Experimental and Control Groups, at Various Time Periods

<table>
<thead>
<tr>
<th>Variable</th>
<th>Time</th>
<th>Experimental Group</th>
<th>Control Group</th>
<th>F</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>Depressive</td>
<td>Time 1</td>
<td>19.66</td>
<td>2.57</td>
<td>19.74</td>
<td>2.52</td>
<td>0.02</td>
</tr>
<tr>
<td>Symptoms</td>
<td>Time 2</td>
<td>18.54</td>
<td>4.99</td>
<td>21.26</td>
<td>5.13</td>
<td>5.03</td>
</tr>
<tr>
<td></td>
<td>Time 3</td>
<td>15.38</td>
<td>4.91</td>
<td>20.20</td>
<td>5.86</td>
<td>11.45</td>
</tr>
<tr>
<td></td>
<td>Time 4</td>
<td>12.91</td>
<td>6.13</td>
<td>19.26</td>
<td>5.74</td>
<td>19.97</td>
</tr>
<tr>
<td>Negative</td>
<td>Time 1</td>
<td>33.51</td>
<td>16.15</td>
<td>26.86</td>
<td>17.53</td>
<td>2.73</td>
</tr>
<tr>
<td>Automatic</td>
<td>Time 2</td>
<td>32.09</td>
<td>17.50</td>
<td>33.23</td>
<td>16.73</td>
<td>0.08</td>
</tr>
<tr>
<td>Thought</td>
<td>Time 3</td>
<td>24.77</td>
<td>13.92</td>
<td>34.11</td>
<td>17.37</td>
<td>6.17</td>
</tr>
<tr>
<td></td>
<td>Time 4</td>
<td>21.69</td>
<td>14.36</td>
<td>32.54</td>
<td>17.49</td>
<td>8.06</td>
</tr>
</tbody>
</table>

Note: ns = not significant; Time 1 = baseline assessment; Time 2 = six weeks after starting program; Time 3 = immediately after program completion; and, Time 4 = four weeks after program completion.
Table 5  Comparison of Mean Scores, between Experimental and Control Groups, on Social and Adaptive Functioning at Various Time Periods

<table>
<thead>
<tr>
<th>Variable/Group</th>
<th>Time of Evaluation</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>Social and Adaptive Functioning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experiment</td>
<td>65.11</td>
<td>6.82</td>
<td>67.23</td>
</tr>
<tr>
<td>Control</td>
<td>67.11</td>
<td>6.61</td>
<td>65.29</td>
</tr>
</tbody>
</table>

Note: ns = not significant; Time 1 = baseline assessment; Time 2 = six weeks after starting program; Time 3 = immediately after program completion; and, Time 4 = four weeks after program completion

In addition, the subjects reported a reduction in the frequency of their negative automatic thoughts, an increase in their social and adaptive functioning, improved relationships with family and friends, and being more mindful of their school work. As one participant indicated, “Now I can notice my negative thoughts and I know I can think differently. When I feel down I think differently, I feel better.” The participants appeared to use their communication skills to solve relationship problems with their family and friends. As two participants stated: “I talk with my mom more. I knew from the program that I should express my feelings to her in the right way…I better understood my mom. I felt better. I felt more positive in my home situation”; and, “I did the method of starting communication with friends and joining friends’ activities. Before attending the program, I just didn’t feel like I could talk to my friends. I felt like my friends thought I was strange.”

Overall, the findings suggest the School-based Cognitive Behavioral Therapy Program had a positive influence on the participating adolescents’ levels of depression. As indicated by the subjects’ responses, the program provided them knowledge and skills they could use when contending with their symptoms of depression.

Discussion

The findings revealed that prior to the school-based CBT program no significant differences existed between the experimental and control group of adolescents with mild to moderate depression with respect to their depressive symptoms, negative automatic thought, or social and adaptive functioning. However, upon completion of the intervention program, as well as 4 weeks later, the results provided evidence of a significant decline in self-reported depressive symptoms and negative automatic thought, as well as enhanced social and adaptive functioning over the usual care, among the adolescents in the experimental group. In addition, the subjects indicated the CBT program was acceptable in that they had an appreciation for the positive changes they experienced, as well as the fact they did not incur any adverse effects while undergoing the intervention.

The mechanism underlying the subjects’ improvement may be due to the following.
Effectiveness of a School–based Cognitive Behavioral Therapy Program for Thai Adolescents with Depressive Symptoms

stage (session 1–5) of the CBT program was aimed at reducing their depression scores to a normal range via behavioral techniques that helped them monitor their ability to change their life experiences. The students learned to change their behavior by: setting goals; monitoring how they felt (mood); being more active, especially in enjoyable or pleasant activities; improving their social skills; and, developing effective communication, assertive training, compromising and problem–solving skills. These techniques seemed to enable them to increase their normal activity experiences with their peers and prevent them from encountering potentially adverse effects (i.e. opting out of and avoiding interactions at school. Thus, the adolescents were more able to gain a sense of achievement from the accomplishment of behavioral tasks, as well as from learning new skills.

The second stage (session 6) of the CBT program focused on identification and challenge of the negative automatic thoughts they adolescents experienced. Thus, their negative thoughts were analyzed and modified via substitution of positive thoughts, thereby changing their depressive symptoms. These changes perhaps were most evident in the comments from the students assigned to the focus group where they stated they understood the connections among their emotions, thoughts and situations. They also indicated they were aware of the activities that made them feel better, happy and more active, and that they should engage in more such activities. In addition, these subjects stated recognition of the fact that restructuring their thought processes would help them alleviate their feelings of sadness, guilt and conflicts, and make them happier.

The third stage (session 7–12) of the CBT program sought to teach the subjects how to monitor their mood via regulation of their emotions and utilization of relaxation techniques. In addition, the adolescents were taught how to improve their social skills, use effective communication skills and implement problem–solving skills, so as to enhance their social functioning and increase their number of pleasant activities and social contacts.

Even though this study demonstrated the effectiveness of a school–based CBT program, the process of running such a program requires nurses with CBT training. With diligence and care, nurses with CBT knowledge and experience can provide effective treatment that can be part of the school curriculum. Additionally, the program was quite time consuming; therefore, five to eight sessions of this program, but that still cover the essential details, are recommended.

Limitations and Recommendations

This study, like all studies, has limitations. Ten percent of the subjects dropped out of the study prior to its completion. This may have been due to the school–based CBT requiring the active participation of students even though some of them may not have been: comfortable being in a group; interested in joining other activities; and, allowed, by their parents, to participate. In addition, a threat to the internal validity of the study may have occurred since the PI conducted the focus group. Thus, it is recommended that an external evaluator conducts the focus group discussions in future studies.

Since the subjects expressed a need for their parents to better understand their depression and the CBT program, it is recommended that replication of this study be conducted with parental involvement in the program. Also, randomized clinical trials need to be conducted with different age groups and a wider range of schools to better evaluate the benefits of the program. In addition, a prospective follow–up study, regarding the effectiveness of the program, needs to be conducted at 3, 6 and 12 months, post–intervention, to evaluate the long–term benefits of the program. Perhaps most importantly, a training guide needs to be developed for school nurses to use in implementing the program throughout Thailand.
Acknowledgements

Gratitude is expressed to the Thailand Nursing and Midwifery Council, and to the King Prajadhipok and Queen Rambhai Barni Memorial Foundation, for the grant provided for conduct of this research.

References

Effectiveness of a School–based Cognitive Behavioral Therapy Program for Thai Adolescents with Depressive Symptoms


ประสิทธิผลของโปรแกรมการบําบัดทางความคิดและพฤติกรรมโดยใช้โรงเรียนเป็นฐานในเด็กวัยรุ่นไทยที่มีภาวะซึมเศร้า

สารัตถ์วัฒนกิจ, ทรง.recipe, ประพัฒน์, ร.ว. วงศ์, Reg Williams

บทคัดย่อ: การวิจัยกึ่งทดลองนี้เพื่อศึกษาผลของการบําบัดทางความคิดและพฤติกรรมโดยใช้โรงเรียนเป็นฐานต่ออาการซึมเศร้าในวัยรุ่นไทยนักเรียนจำนวน 70 รายถูกสุ่มเข้าสู่โปรแกรม 2 โรงเรียน และจัดให้เป็นกลุ่มทดลองและกลุ่มควบคุม โดยกลุ่มทดลองนักเรียนจำนวน 35 รายถูกสุ่มเพื่อรับโปรแกรม 12 สัปดาห์ สัดส่วน 1 ครั้ง ส่วนกลุ่มควบคุมนักเรียนจำนวน 35 รายถูกสุ่มเพื่อรับการดูแลตามปกติจากพยาบาลประจำโรงเรียน โดยไม่ได้รับโปรแกรม 12 สัปดาห์ การประเมินผลจากการบําบัดมีการทำในแบบสอบถามจำนวน 3 ครั้ง คือ การประเมินผลก่อนโปรแกรม สิ้นสุดโปรแกรมทันที และ 4 สัปดาห์หลังโปรแกรมสิ้นสุด การประเมินผลควบคุมการกีดกันผลกระทบด้านการสังคมที่สูงสุดแต่พอสมควร มีการสืบสัมพันธ์ระหว่างโปรแกรมก่อนและหลังโปรแกรมสิ้นสุด 4 สัปดาห์ มีผลในการบําบัดที่มีความสัมพันธ์กับภาวะซึมเศร้า ความคิด อัตโนมัติทางลบ และการปรับตัวทางสังคม (เช่น สัมพันธภาพกับครอบครัวและเพื่อนๆ ที่ดีขึ้นและมีความสามารถในการเรียนมากขึ้น) ผลการศึกษาครั้งนี้สามารถใช้เป็นแนวทางในการปฏิบัติการบําบัดโดยการใช้โปรแกรมเพื่อลดอาการซึมเศร้า ดังนั้น โปรแกรมนี้จะเป็นประโยชน์ในการป้องกันและลดภาวะซึมเศร้าของวัยรุ่นที่มีปัญหาทางการสังคมในโรงเรียนต่อไป

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คำสำคัญ: ซึมเศร้า การบําบัดทางความคิดและพฤติกรรมโดยใช้โรงเรียนเป็นฐาน วัยรุ่นไทย
Development and Evaluation of a Community–based Fall Prevention Program for Elderly Thais

Kamonrat Kittipimpanon, Kwanjai Amnatsatsue, Patcharaporn Kerdmongkol, Suchinda Jarupat Maruo, Dechavudh Nityasuddhi

Abstract: This action research was conducted to develop a community-based fall prevention program for elderly Thais, living in an urban Bangkok community, and to evaluate the program's effectiveness. Qualitative and quantitative data were collected via a four-phase plan that included: situation analysis of falls; program development; program implementation; and, program evaluation. The community-based fall prevention program was based on community participation and a PRECEDE-PROCEED framework, as a multi-factorial intervention, that consisted of: a fall campaign; multi-factorial risk assessment; fall education; a balance/exercise program; home visits for medication review and home hazard management; and, a fall management system.

All qualitative data were evaluated via content analysis. Effectiveness of the fall prevention program (quantitative data) was evaluated in terms of: changes in the incidence of elderly falls; changes in elders’ fall prevention behaviors; changes in elders’ physical performance; modification of environmental hazards; community stakeholders’ participation; and, elders’ and community stakeholders’ satisfaction with the program. A paired t-test was used to examine the difference in mean scores of fall prevention behaviors, while the Wilcoxon Signed Rank Test was used to examine differences in physical performance. Descriptive statistics were used to examine changes in fall incidence; modifications of environmental hazards; level of community stakeholders’ participation; and, elders’ and community stakeholders’ satisfaction with the program.

After implementation of the fall prevention program, elders’ fall incidence was reduced 24.86%. In addition, within the same time frame, the elders’ fall prevention behaviors improved, as did their physical performance. Modifications made to home environmental hazards included: use of anti-slip mats in the bathroom; spraying different colors on steps and doorsills to enhance their presence; and, changing the style of toilet. Modifications made to community environmental hazards included: posting warning signs around hazardous areas; and, notifying the organizations responsible for making corrections to hazardous areas within the community. The level of stakeholders’ participation with each other was found to be consistent. The elders and the community stakeholders were highly satisfied with the fall prevention program. Thus, the findings suggested the community-based fall prevention program was an effective intervention.

Background

Falls, because of their prevalence and impact, have become a worldwide public health problem among older adults. Approximately 28–35% of individuals 65 years of age and over fall at least once a year, with 32% to 42% of those over 70 years of age falling yearly. Similarly, 18.5% of Thais over 60 years of age have been found to fall every six
months. A recent national health survey revealed that older Thais, living in Bangkok, fell one to two times more than older Thais living in other regions of the country, with 34.3% of elders living in urban Bangkok experiencing one or more falls every six months and 38.4% of them having recurrent falls.

Sustaining a fall can have physical, psychological and social impacts. Specifically, falls have been found to be the second leading cause of severe physical injuries. Approximately 72.3% of older Thais reportedly have sustained physical injury, including hospitalization, secondary to a fall. In addition, over two-thirds of elderly Thai, who have fallen, have expressed being fearful of falling again, as well as lacking confidence to perform activities of daily living. Since severe injuries often require long and expensive hospitalizations, the economic consequences of a fall can have a significant impact on patients and their families, especially since 32% to 80% of those who fall, and survive their initial hospitalization, encounter permanent disabilities.

Various risk factors (i.e. personal, behavioral and environmental) have been found to contribute to the occurrence of falls among elders, with females being at a higher risk of falls than males. In addition, health problems, poor vision, gait impairment, poor balance, and muscle weakness have been found to be related to the incidence of falls. The incidence of falls also been found to be related to: lack of awareness of surroundings (i.e. uneven surfaces) and inappropriate footwear/clothing; consumption of psychotropic medications and anti-depressants; and, daily intake of four or more medications. Environmental hazards, such as, slippery floors and hazardous stairs, inadequate lighting, and damaged or obstructed walkways, also have been shown to contribute to the occurrence of falls.

Prior research has shown that multifactor interventions are the most effective means of reducing falls and fall–related injuries. Thus, multifactor interventions, such as risk assessment (i.e., vision testing, identification of medication side effects, home safety analysis), targeted treatments (i.e., exercise, education and home modifications based upon a safety analysis), and appropriate referrals (i.e., care by physicians and physical therapists) for reducing the incidence of falls, should be taken into consideration when developing any type of fall prevention program. However, limited data exists regarding the determinants of fall risk factors among elderly Thais. Furthermore, prior research has failed to demonstrate the importance of the use of a multifactor or community-based approach in the reduction of fall risk factors. Rather, the focus has been on a single intervention being implemented at the individual level.

Although multifactor interventions have proven effective for fall prevention among communities within Western cultures, they have not been applied among communities within the context of the Thai culture. Since community participation has been shown to provide the means for development of suitable fall prevention programs that lead to sustainable behavioral changes that reduce falls and fall–related injuries, the aim of this study was to develop and evaluate the effectiveness of a “Community-based Fall Prevention Program for Elderly Thais” living in urban Bangkok.

Conceptual Framework

The PRECEDE–PROCEED model was used as a framework, for this study, because it provided a comprehensive structure for creating a community health promotion intervention/program. The model consists of two components: PRECEDE (Predisposing, Reinforcing and Enabling Constructs in Educational Diagnosis and Evaluation) and PROCEED (Policy, Regulatory, Organizational Constructs in Educational and Environmental Development).

The premise of the PRECEDE component is that a diagnosis is needed prior to development and implementation of an intervention plan. The PRECEDE component is comprised of four phases, including...
identifying and setting the: ultimate desired results; priorities among the health or community issues, and behavioral and environmental determinants that stand in the way of achieving desired results; predisposing, enabling and reinforcing factors that can affect the behaviors, attitudes and environmental factors identified in phase two; and, administrative and policy factors that influence what can be implemented. The premise of the PROCEED component of the model is that the development, implementation and evaluation of the intervention/program is based upon the diagnoses determined during enactment of the PRECEDE component. The PROCEED component of the model also includes four phases. They are the: design and implementation of the intervention/program; evaluation of the process of what is being done in the intervention/program; evaluation of the impact of the intervention/program on the target population; and, evaluation of the outcome of the intervention/program.

Method

**Design:** Action research was used to accomplish the purposes of the study.

**Ethical Considerations:** Approval to conduct the study was obtained from both the primary investigator’s (PI) academic institution and the Bangkok Metropolitan Administration. All potential participants were informed about: the nature of the study; what their participation would involve; confidentiality and anonymity issues; and, the right to withdraw at any time. Those who agreed to participate were asked to sign a consent form.

**Setting:** One community, of five in the catchment area of Ramathibodi Hospital, was selected as the study site. This particular community was chosen because it had: the highest incidence of falls among the five communities in the selected catchment area; strong community leadership; health volunteers and an elderly club; and, strong community networks that focused on fall prevention.

**Sample:** The sample consisted of two groups: 41 elders and 18 community stakeholders. The selected community had 102 identified elders of whom 41 met the inclusion criteria and consented to participate. The 41 elders were accessed by way of a community broadcast system. Inclusion criteria for the elders were: being 60 years of age or older; living in the selected study site community; being able to verbally communicate in Thai; being willing to participate; and, demonstrating adequate cognitive function. The 41 elders ranged in age from 62 to 86 years (mean = 72.93 years). Thirty one (75.6%) of them were women. The elders tended to: be married or have been married (n = 18; 43.9%); have a primary school education (n = 28; 68.3%); be housewives (n = 27; 65.9%); have universal health care coverage (n = 21; 51.2%); have a monthly family income of less than 3,000 Baht (n = 19; 46.7%); be financially supported by either their children or grandchildren (n = 14; 34.1%); report having at least one illness (n = 36; 87.8%) with the most common being hypertension (n = 28; 68.3%) and diabetes mellitus (n = 19; 46.3%); and, take four or more types of medications daily (n = 16; 39%). Thirteen (31.7%) of the elders reported falling, during daylight hours, within the last year. Of those 13, six (46.2%) recently had fallen. The most common causes of falls were slipping (n = 6; 46.1%) and tripping (n = 3; 23.1%). Most (n = 9; 69.2%) falls occurred outside the home (i.e., in the local market, on a community walkway). Eleven (84.6%) elders, who had fallen over the past year, sustained a moderate injury (i.e., bruising and sprains), while two (23.1%) of them fractured an arm. The vast majority, who had fallen, took care of themselves (n = 9; 69.2%), while 30.8% (n = 4) of them visited the emergency room. The 18 community stakeholders included: three community leaders; four public health volunteers; five representatives from the elder club (one was the club’s president); one public health nurses; three Crown Property Bureau representatives; and, two District Office representatives.
**Instruments:** Seven measures were used during the development and evaluation of the effectiveness of the fall prevention program. The measures included the researcher-developed Demographic Data and Fall History Questionnaire; Thai Fall Risk Assessment Test; researcher-developed Fall Prevention Behavior Questionnaire; Environment Hazard Assessment Questionnaire; four-part Physical Performance Test; researcher-modified Partnership Checklist; and, researcher-developed Satisfaction with the Fall Prevention Program Questionnaire.

The researcher-developed Demographic Data and Fall History Questionnaire (DDFHQ) was used to obtain information, from each elder, regarding his/her: age; gender; marital status; education; occupation; income; source of income; health problems; name and dosage of medications used; and, detailed history of falls (i.e., number, cause, time, place, injuries and treatments). It took approximately five minutes for each subject to complete the questionnaire.

The Thai Fall Risk Assessment Test (Thai-FRAT) was used to identify elders at risk of falling. The instrument assessed six factors, including: history of falls; body balance; gender; medications used; visual acuity; and, style of house. Examples of assessment factors and possible responses included: “Is there a history of falls?” (“yes” = 5 or “no” = 0); “Are there body balance problems [i.e., performing a full tandem stand < 10 seconds]?” (“yes” = 2 or “no” = 0); “Is the gender female?” (“yes = 1 or “no = 0); “Are more than four types of medications used per day or are any of the following medications being used: diuretics, antihypertensive, psychotropics or anti-depressants?” (“yes = 1 or “no = 0); “Is low visual acuity present [< 6/12]?” (“yes” = 1 or “no” = 0); and, “Are stairs present within the home?” (“yes” = 1 or “no” = 0). A total score, which could range from 0 to 11, was obtained by summing across all items. Higher scores indicated a higher risk of falls. Using 4-point cut-off increments, the instrument has been found to have a sensitivity of 0.92% and a specificity for high risk falls of 0.83%. It took approximately 10 minutes for the researcher to administer the instrument to each elder.

The researcher-developed Fall Prevention Behaviors Questionnaire (FPBQ) consisted of 20 items and was used to assess five areas: fall prevention practices (9 items; i.e., “I wear suitable clothing/shoes”); regular vision assessment (1 item; i.e., “I get my eyes checked every year”); medication use (2 items; i.e., “I consult with my doctor regarding symptoms related to my medications”); exercise (2 items; i.e., “I exercise at least 30 minutes, three times a week”); and, home environment (6 items; i.e., “I turn on the lights before walking into a dark room”). Possible responses to each of the items were: 1 = “don’t practice” to 4 = “regularly practice.” To obtain a total score, which could range from 20 to 80, the response values were summed across all items. A high total score indicated a high level of fall prevention behavior. The content validity index and reliability of the instrument, in this study, were found to be 0.85 and 0.64, respectively. It took approximately ten minutes to administer the instrument to each elder.

The 22-item Environment Hazard Assessment Questionnaire (EHAQ) was used to assess four environmental areas: general home area (8 items; i.e., “Are the floors in your home slippery?”); bathroom in home (5 items; i.e., “Do you have devices to help you get on and off the toilet?”); stairs in home (3 items; i.e., “Is their sufficient lighting on the stairs in your home?”); and, community (6 items; i.e., “Is there damage to the walkways in your community?”). Each item required either a “yes” or “no” response. For each response that identified an environmental hazard, a score of “1” was assigned. For each response that did not identify an environmental hazard, a score of “0” was assigned. A total score, which could range from 0 to 22, was obtained by summing the response scores across all items. A high total score suggested a
high presence of environmental hazards. Prior to use in this study, the content validity index of the instrument was assessed by four experts (a gerontological physician and three doctorally prepared professors in geriatric nursing) and found to be 1.00. It took approximately five minutes to administer the instrument to each elder.

The four-part Physical Performance Test (PPT) was used to assess upper body muscle strength, lower body muscle strength, balance, and balance and gait. Upper body strength (i.e. hand grip strength) was assessed with each elder sitting in a chair, holding a handgrip dynamometer with his/her dominant hand, and having the elder’s elbow holding the dynamometer against his/her body. Handgrip strength was determined by the number of kilograms the elder was able to apply, and hold for 5 seconds, when squeezing and applying maximum strength to the dynamometer. A high value indicated a high amount of upper body muscle strength. Older adults who have handgrip strength of less than 18 kilograms (low muscle strength) are known to be at a high risk of sustaining falls. The test-retest reliability of the handgrip test, in this study, was 0.91. Lower body strength was assessed using the “five times sit to stand” activity. This activity required the elder to move from a sitting to a standing position, as quickly as possible, five times. The longer it took the elder to accomplish the activity, the less lower body muscle strength he/she had. Elders who spend more than 15 seconds to complete the activity have been identified as being at a high risk for falls. Test-retest reliability of this activity, in this study, was found to be 0.78. Balance was assessed using the “360 degree turning” activity. The elder was asked to completely turn around (360 degrees) as quickly as possible. Older adults, spending more than 3.8 seconds to accomplish this task, have been found to be at a high risk of sustaining falls. Test–retest reliability of this activity, in this study, was 0.73. Both balance and gait were assessed using the activity of “timed up and go.” To accomplish this activity, the elder was instructed to sit with his/her back against the chair. He/she then was instructed to stand upright and walk, at a normal pace, for three meters (marked with a line on the floor). The elder then was asked to walk around a cone placed on the line on the floor, return to the chair, and sit down. Each elder was timed, in seconds, from when he/she stood up until returning to a seated position in the chair. Elders who spend more than 12 seconds to complete this activity have been determined to be at a high risk of sustaining falls. Test–retest reliability of this activity, in this study, was found to be 0.90.

A modified version of the Partnership Checklist (PC) was used to assess the success and sustainability of the partnerships established during development and implementation of the intervention/program in this study. Modification of the checklist involved restating the instrument items so they specifically addressed the fall prevention program. For example, the item, “There is a shared understanding of, and commitment to, this goal among all potential partners,” was changed to “There is a shared understanding of, and commitment to, the goal of the fall prevention program among all potential partners.” The 35–item modified PC was used to assess seven areas: determining the need for a partnership; choosing partners; making certain the partnership works; collaborative planning; implementing collaborative action; minimizing barriers to partnerships; and, reflecting on continuing the partnership. Examples of the items were: “Partners share common ideologies, interests and approaches regarding the fall prevention program” (choosing partners); “All partners are involved in planning and setting priorities for collaborative action in the fall prevention program” (collaborative planning); and, “There is an investment in the partnership of time, personnel, materials or facilities in the fall prevention program (implementing collaborative action). Possible responses for each of the items were 0 =
“strongly disagree” to 4 = “strongly agree.” A total score, which could range from 0 to 140, was computed by summing across all items. Determination of the level of the partnership was based on a score of: 0 to 49 = partnership should be questioned; 50 to 91 = partnership moving in the right direction, but needed more attention; and, 92 to 140 = partnership based on genuine collaboration, with challenge to maintain and build on current success. The content validity and reliability of the instrument, for this study, was 1.00 and 0.95, respectively. It took each stakeholder approximately 10 minutes to complete the questionnaire.

The research–developed Satisfaction with the Fall Prevention Program Questionnaire (SFPPQ) was used to determine both the elders’ and stakeholders’ satisfaction with the fall prevention program. The questionnaire consisted of seven items addressing the: overall fall prevention program; multi–factor risk assessment activity; education activity; balance/exercise activity; home visit; environment activity; partnership; and, social networks. Examples of items included: “How satisfied were you with the program’s fall risk assessment activity?”; “How satisfied were you with the overall program?”; and, “How satisfied were you with the support provided by the various stakeholders (partners) in the program?” Possible responses for each of the items were 1 = “very low satisfaction” to 5 = “very high satisfaction.” A total score, which could range from 7 to 35, was calculated by summing the responses across all items. A high score suggested a respondent’s satisfaction with the program. It took each elder and stakeholder approximately 3 minutes to complete the questionnaire.

Since the PC was the only instrument originally written in English, it required translation and back translation by two individuals fluent in Thai and English. All other instruments were either originally written in Thai or required the researchers to interpret the instrument’s instructions for implementation (i.e. PPT).

The Community–based Fall Prevention Program: The program consisted of three major phases. These included: situational analysis; development of the fall prevention program; and, implementation and evaluation of the effectiveness of the program.

Situational analysis was conducted in order to explore the fall phenomenon and examine fall risk factors that existed in the selected community. Four stakeholders (public health nurse; elder club president; and, two public health volunteers) were recruited and trained, as members of the analysis team, to administer the DDFHQ; Thai–FRAT; FPBQ; EHAQ; and, PPT to the 41 elders. The assessment process took approximately 30 to 40 minutes to complete. In addition, two focus groups were held for the purposes of: discussing the existence of fall risks among the elders; identifying environmental risks that existed within the community; and, identifying strategies addressing fall prevention. The focus groups included: 10 of the 41 elders who had experienced a fall and eight of the stakeholders (three public health volunteers; the elder club president; a public health nurse; and three community leaders). Data obtained from the administered instruments and focus groups supported the need for development of the fall prevention program.

Development of the fall prevention program was accomplished by way of a PI–lead workshop using Appreciation–Influence–Control (AIC) techniques. The workshop participants included three elders and six stakeholders (one public health nurse; two public health volunteers; elder club president; and, two community leaders) who had been involved in the focus groups during the situational analysis phase. The workshop focused on: reflecting on and analyzing elders’ falls; identifying the community’s need for a fall prevention program; identifying partnerships, with public and private organizations, that would support a fall prevention program; and, designing activities for
a fall prevention program. Five organizations (Public Health Center; District Office; Property Bureau; local temple; and, local market) were identified that would support the fall prevention program. Also, the activities for a six-component, individual (fall prevention campaign; multifactor fall risk assessment; education program; balance/exercise group; home visit) and community (fall management system) level, fall prevention program were developed.

The fall prevention campaign was developed to inform community elders about the focus of the program; Fall Notification Center; and, teams that would be responsible for fall risk assessments, strengthen and balance training exercises, and home and community fall hazard assessments. The campaign was designed to be implemented, once yearly, in partnership with the Public Health Center. The public health nurse and identified leaders of the fall prevention teams (three public health volunteers, five members of the elder club, one District Office representative, and three elders who had modified their home environment) were to wear a polo shirt advertising the program and walk throughout the community, and visit the homes of elders and their families. Also, stickers with printed slogans and messages, about fall prevention, were to be distributed to elders and their family members. In addition, letters of invitation to participate in the fall prevention education class were to be distributed. During the home visits, the public health nurse and team members were to encourage family members to be aware of and sensitive to the occurrence of falls among their respective elders.

The multifactor risk assessment, to be implemented once yearly, was designed as a baseline assessment regarding fall risk factors among elders in the community. The public health nurse was to be responsible for training the team members regarding the activities they were to implement (multifactor fall risk assessment; balance/exercise class; and, home visit). The fall prevention team was to consist of two groups: the zone team (eight members) and the environment team (three members). The zone team members (three public health volunteers and five elder club members), all of whom were housewives, were to be assigned six to eight elders living near their residences, so that all zone team members would be familiar with the elders to whom they were assigned. The environment team members were to consist of a community leader, the elder club president and an elder who had modified his/her home environment. A leader for the two types of fall prevention teams was to be identified by each respective team. All fall prevention team members were to be trained in personal, behavioral, physical, and home environment assessment of elders using the: DDFHQ; Thai–FRAT; FPBQ; EHAI; and, PPT. The Public Health Center was to provide support for this component of the program.

The fall education program, to be implemented once yearly, was designed to increase the elders’ knowledge and self-awareness regarding behaviors that could lead to fall prevention. The education program, carried out by the public health nurse and the leaders of the fall prevention teams, in a group setting, was to focus on fall risk factors and prevention strategies (i.e., fall prevention behaviors, yearly vision screening, medication use and side effects, balance/exercise strategies, and environment management). The teaching methods were to include: discussion; sharing of experiences; relationship building between elders and fall prevention team leaders; and, distribution of printed fall prevention strategy material to elders. The Public Health Center was to provide support for this activity.

The balance/exercise group activity, designed to promote muscle strength and balance, was to be taught and performed in a community setting, by the zone team leader, in bi-weekly 45-minute sessions for 12 weeks. In addition, the elders were to be encouraged to perform the balance/exercise activity daily, on a regular basis. The teaching strategies were to include
one formal class on the balance/exercise activity and distribution of take-home printed materials on each of the balance/exercise activities. The zone team leader was to monitor the elders’ participation (i.e., group activity attendance and daily recording of balance/exercise activity). Notification about the date and time of the exercise group was to occur, via billboards and radio broadcasts, one week prior to implementation of the exercise program. The Crown Property Bureau was to provide support for this activity.

The home visit was designed to be implemented, twice yearly, for: review of medication use and side effects (i.e., dizziness, vertigo, orthostatic hypotension, fatigue, and muscle weakness); and, identification of and suggestions for modifications of home environmental hazards. Review of medication use and side effects was to be carried out by the zone team members. Identification of and suggestions for modifications of home environmental hazards were to be done by the environment team members, with a 6-month follow-up by the environment team leader to see if the hazards had been corrected. All of these activities were to be reported to and monitored by the public health nurse. The Public Health Center was to provide support for this activity.

The fall management system, to be implemented throughout the year, was designed to monitor the incidence of elders’ falls. This system was to consist of both surveillance and environmental hazard management. Surveillance was to involve: creation of the Fall Notification Center, where the incidence of falls and fall risk hazards, within the community, were to be reported; development of a form for recording the incidence of falls and fall risk hazards within the community; and, development of guidelines for the public health nurse to use when visiting an elder in his/her home and evaluating fall incidences/fall risk factors. Environmental hazard management was to focus on: fall prevention team members assessment of the fall risk factors in the community (i.e., walkways and public areas); reporting identified fall hazards to the District Office; and, working with appropriate individuals, associated with the temple and market, regarding identification and correction of fall risk factors within their respective environments. The District Office was to provide support of this activity.

Implementation and Evaluation of the Effectiveness of the Community-based Fall Prevention Program: Implementation and evaluation of the effectiveness of the fall prevention program was accomplished, over 10 months, with 28 of the 41 elders. All 41 elders were invited to take part in the program, but only 28 consented. These elders had a mean age of 72.93 years (range of 63 to 86 years) and, primarily, were: female (n = 22; 78.6%); married or previously married (n = 13; 46.4%); primary school graduates (n = 19; 67.9%); housewives (n = 20; 71.4%); and, receiving financial support from their children or grandchildren (n = 11; 39.3%). They also had a monthly income less than 3,000 Baht (n = 12; 42.9%) and health insurance (n = 14; 50%).

After the fall prevention program was developed, the 28 elders were administered, for a second time, the DDFHQ, FPBQ, EHAQ, and PPT. After the instruments were administered, the program was implemented. Upon completion of program implementation, the effectiveness of the program (i.e., changes in elders’ fall prevention behaviors, physical performance and incidence of falls, and elders’ satisfaction with the program) was assessed through administration of the FPBQ, EHAQ, PPT and SFPPQ. In addition, the PI asked the elders if they experienced any falls while they were in the program (i.e., “Have you ever fallen during the 10 months of participation in the fall prevention program?”). Upon program completion, the 18 stakeholders were administered the SFPPQ and PC to: determine their satisfaction with the program; and, assess the sustainability of the community partnerships.

Data analysis: Content analysis was used to assess the qualitative data obtained from the two focus
groups. Descriptive statistics were used to analyze: demographic characteristics; scores for each instrument administered; fall incidence; and, number of environmental modifications accomplished. The paired t-test was used to examine the difference in mean scores, before and after implementation of the fall prevention program, regarding the elders’ fall prevention behaviors. The Wilcoxon signed rank test was used to examine the difference in mean scores, before and after implementation of the prevention program, regarding the elders’ physical performance.

Results

Effectiveness of the “Community-based Fall Prevention Program for Elderly Thais” was assessed in terms of: reduction in the fall incidence rate; improvement in fall prevention behaviors and physical performance; and, environmental hazard modifications. Moreover, sustainability of the program was assessed in terms of community stakeholders’ participation, as well as satisfaction, of the elders and community stakeholders, with the program.

Reduction in fall incidence rate: Only two (7.14%) of the 28 elders reported falling during implementation of the program. Prior to the program, 32% (n = 9) of the elders had experienced a fall. Thus, the incidence of falls was reduced by 24.86%. The two elders who fell tripped over an uneven walkway surface. Both received bruises to their knees, which they cared for themselves.

Fall prevention behaviors: A significant improvement in overall fall prevention behaviors was found after elders completed the fall prevention program (t = 8.255; p ≤ .001).

Physical performance: The elders demonstrated a significant improvement, after program completion, in lower body strength, balance, and balance and gait (i.e., “five times sit to stand” [Z = 4.517; p ≤ .001]; “turn 360 degrees” [Z = 3.097; p ≤ .01]; and, “timed up & go” [Z = 4.509; p ≤ .001]). Upper body strength, measured by handgrip strength, improved slightly (not statistically significant) after program completion.

Environmental hazards: Prior to program implementation, two common home environmental hazards were noted: slippery bathroom floors (n = 90; 71.4%); and, presence of steps (n = 10; 35.7%). After program implementation, all households (100%) with slippery bathroom floors were using anti-slip floor mats and all households (100%) with steps had painted the steps and doorsills in colors that made them more noticeable to elders. Some home environmental hazards had been dealt with, but only minimally due to economic limitations or the existing structure of the house. For example, only one household was able to change a “squatting toilet” to a “sitting toilet.” Regarding community environmental hazards, warning signs were posted where uneven walkways existed and the District Office was notified regarding the need to correct existing environmental hazards.

Community stakeholders’ participation: The fall prevention program involved five organizations (Crown Property Bureau, District Office, Public Health Center, local temple and local market). The participation scores for these organizations, in descending order were, the: Public Health Center (122); District Office (110); Crown Property Bureau (100); temple (96); and, market (96). Thus, based upon their scores, these organizations all demonstrated genuine collaboration with the program, and accepted the challenge of maintaining and building on their successes.

Satisfaction with the fall prevention program: The elders’ mean score for satisfaction with all components of the program was 31.19 (range: 24–35; SD ±3.28). Regarding the individual components of the program, with which the majority of elders were most satisfied, were the: exercise activity (4.61 ± 0.567); multi-factor risk assessment activity (4.57±.573); and, community environment activity (4.32±.612). The 18 stakeholders’ mean score for
satisfaction with all components of the program was 32 (range: 26–35; SD ± 2.89), while the individual components of the program, with which the majority of them were most satisfied, were the: exercise activity (4.78 ± 0.428); multi-factor risk assessment activity (4.72±.461); and health education (4.56±.511).

Discussion

This study revealed the use of a multi-factorial approach was an effective means for reducing elders’ falls in the selected community. This outcome is congruent with prior evidence-based fall prevention interventions that have reduced the incidence of falls from 7% to 30%. Each program component appeared to assist in improving fall prevention behaviors, as well as physical performance. For example, although prior studies have shown that health education can be a helpful component in multi-factorial interventions, few have directly addressed the effect of health education on fall prevention behaviors. This study, however, assessed the effect of health education on elders’ fall behaviors.

In terms of physical performance, the elders were found to improve their lower body strength, balance, and balance and gait, as a result of the specific strength and balance training exercises that were provided during the program. This finding is congruent with prior research that has found specific exercises can be helpful in enhancing one’s physical performance. However, no significant improvement in upper body strength was found in this study. It is possible the reason this occurred was because the specific exercises taught, during the program, failed to adequately enhance improvement in upper body strength.

The fact a number of elders were able to adequately address home environmental hazards was the result of support and assistance on the part of family members. This finding is similar to prior studies that have indicated the importance of family support and access to funds for home modification in reducing the incidence of falls among elders. Regarding community environmental hazards, appropriate actions were taken to address possible areas of concern where elders could fall (i.e., posting of warning signs around dangerous areas and notification of hazards areas to appropriate organizations). Although community environmental hazards have been shown to contribute to the occurrence of falls, no existing studies emphasized community environmental modifications for preventing falls. This study included community environmental modifications because the community environment was a common location for the occurrence of elders’ falls. This finding showed that the environmental modifications, which could be provided by the community, could reduce the incidence of falls.

The fact that sustainability of the program was found to exist was reassuring. This finding is supported by prior research wherein factors promoting sustainability, which were similar to those found in this study, have been noted. A factor supporting sustainability was that the 18 stakeholders had taken active roles in the development and/or implementation of the program and, therefore, had a vested interest in the program’s success. In addition, a sense of ownership was found to exist among members of the two community-based fall prevention teams.

Finally, both the elders and community stakeholders were highly satisfied with the fall prevention program. No doubt this was due to the fact that noticeable changes were observed, among the elders, regarding the occurrence of falls, fall prevention behaviors, and physical performance. In addition, a sense of pride for having taken part in the development and implementation of an important community-based program may have had an effect on everyone’s sense of satisfaction.

Limitations and Recommendations: Like all studies, this study has some limitations. First, the study was conducted in one community within an urban area. Thus, generalizability, to communities not similar to the community used in this study, is limited. In addition, more than three-quarters of the elders...
involved in implementation and evaluation of the effectiveness of the program were women. Therefore, applicability of the findings to elder males may be limited. The study examined the effectiveness of the fall prevention program only upon program completion. As a result, no determination was made regarding what long term effects the program may or may not have on falls among elders. Finally, the home and community environmental modifications that were made were limited in nature. This appeared to be due to families’ available financial resources and the time needed, by responsible organizations, to make modifications within the community setting. Thus, generalizability of the effectiveness of the environmental modifications that were made is very limited.

Future studies need to address a replication of this study, across Thailand, in other urban geographic locations, as well as in rural settings. Since this study included primarily elderly females, future studies need to consider the inclusion of more male elders. It also would be helpful to conduct longitudinal studies for the purpose of determining if the program provides positive, long-term effects on the prevention of falls among elders. Finally, in regards to environmental modifications, future studies may need to consider the availability of financial resources for assisting families with needed modifications, as well as the time frame required by responsible organizations to make needed modifications within the community.

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References
การพัฒนาและประสิทธิผลของรูปแบบการป้องกันการพลัดตกหกล้มของผู้สูงอายุไทย โดยใช้ชุมชนเป็นฐาน

กมลรัตน์ กิตติพิมพานนท์, ขวัญใจ อานาจสัตย์ซื่อ, พัชราพร เกิดมงคล, สุจินดา มารุโอ จารุพัฒน์, เดชาวุธ นิตยสุทธิ

บทคัดย่อ: การวิจัยครั้งนี้เป็นการวิจัยเชิงปฏิบัติการเพื่อพัฒนาและศึกษาผลของการพัฒนารูปแบบการป้องกันการพลัดตกหกล้มของผู้สูงอายุที่อาศัยอยู่ในเขตเมืองกรุงเทพมหานคร โดยใช้ชุมชนเป็นฐาน การค้นคว้าข้อมูลประกอบด้วยข้อมูลเชิงปริมาณและเชิงคุณภาพ แบ่งออกเป็น 4 ระยะ คือ 1) การวิเคราะห์สถานการณ์การหกล้ม 2) การพัฒนารูปแบบการป้องกันการหกล้ม 3) การดำเนินกิจกรรม และ 4) การประเมินผล

รูปแบบการป้องกันการพลัดตกหกล้มของผู้สูงอายุ โดยใช้ชุมชนเป็นฐาน ใช้การมีส่วนร่วมของชุมชน และแบบจำลอง PRECEDE-PROCEED เป็นกรอบแนวคิด โดยรูปแบบเป็นการจัดการเฉพาะปัจจัย ประกอบด้วย 1) การรณรงค์ป้องกันการหกล้มของผู้สูงอายุในชุมชน 2) การประเมินความเสี่ยงต่อการหกล้มหลายปัจจัย 3) การให้ความรู้ 4) การออกกำลังกายเพื่อเพิ่มความสามารถในการทรงตัว และ 5) การป้องกันการหกล้มในบ้าน และ 6) การสำรวจระบบในการป้องกันการหกล้มในชุมชน

ประสิทธิผลของรูปแบบการป้องกันการพลัดตกหกล้ม ประเมินจากอัตราการเกิดการหกล้ม พฤติกรรมการป้องกันการหกล้ม พฤติกรรมการมีส่วนร่วมของชุมชน ความพึงพอใจของโปรแกรม ของผู้สูงอายุและผู้มีส่วนร่วมได้รับสัมผัสและเห็นข้อดีของโครงการ โดยใช้สถิติ Paired T-Test ทดสอบความแตกต่างของพฤติกรรมการป้องกันการหกล้ม และสถิติ Wilcoxon Signed Rank Test ทดสอบความแตกต่างของสมรรถภาพทางกาย และสถิติบรรยายเพื่อวิเคราะห์การเปลี่ยนแปลงของอัตราการหกล้ม การปรับเปลี่ยนสิ่งแวดล้อม การมีส่วนร่วมของชุมชน และความพึงพอใจต่อโปรแกรมของผู้สูงอายุและเครือข่าย

ภาคหลังเข้าร่วมโครงการพบว่า อัตราการเกิดการหกล้มของผู้สูงอายุลดลงร้อยละ 24.56 ผู้สูงอายุที่เข้าร่วมโครงการมีพฤติกรรมในการป้องกันการหกล้มและมีมิตรภาพทางภาษาที่ดี การปรับเปลี่ยนสิ่งแวดล้อมที่เสี่ยงภายในบ้าน ได้แก่ การใช้แผ่นกันลื่น การพ่นสีบริเวณพื้นต่างระดับ และการใช้แผ่นกันลื่น ที่เสี่ยง และการปรับเปลี่ยนสิ่งแวดล้อมในชุมชนประกอบด้วย การติดป้ายเตือนในร้านที่เสี่ยง และรายงานสถานการณ์ที่รับผิดชอบทราบเพื่อแก้ไข การดำเนินงานพบว่าผู้สูงอายุและเครือข่ายมีความร่วมใจในการอย่างสม่ำเสมอ ผู้สูงอายุและเครือข่ายที่มีความสนใจต่อรูปแบบการป้องกันการหกล้มในระดับสูง ซึ่งสนับสนุนรูปแบบการป้องกันการหกล้มในผู้สูงอายุที่พัฒนาขึ้นมีประสิทธิผลในการป้องกันการหกล้มของผู้สูงอายุไทยในชุมชน

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คำสำคัญ: รูปแบบการป้องกันการหกล้มโดยใช้ชุมชนเป็นฐาน, ผู้สูงอายุไทย, ชุมชนเมือง, วิจัยเชิงปฏิบัติการ
The Development and Effectiveness of a Violence Prevention Program for Thai High School Adolescents

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Abstract: Violence among adolescents has increasingly become recognized as a critical social problem. The purpose of this study was to develop and evaluate the effectiveness of a violence prevention program for Thai high school adolescents. The program was based on Orem’s Self-Care Deficit Theory of Nursing.

A within group repeated measures design was used. The sample consisted of 45 Thai adolescents, 12-15 years of age, with moderate to high scores of aggressive behavior and favorable attitudes toward violence. Subjects were purposively selected to receive the 12-week violence prevention program, after being tested and observed. Data were collected via: a researcher-developed Personal Data Sheet; a modified version of Buss’ and Perry’s Aggressive Behaviors Scale; Buss’ and Perry’s Observational Aggressive Behavior Scale; a modified version of Brillhart’s, Jay’s and Wyers’ Attitude Toward Violence Scale; a researcher-developed Violence Management Skills Test; and, a researcher-developed Student Satisfaction with the Violence Prevention Program Questionnaire. Data were analyzed using descriptive statistics and repeated measures one-way ANOVA.

Scores for aggressive attitudes and behaviors were obtained and compared three times, including at baseline; twelve weeks later, but prior to participation in the intervention program; and, upon completion of the 12-week intervention program. The adolescents’ aggressive attitudes significantly decreased, while their violence management skills (i.e. interpersonal relationship skills, coping with emotions and stress, problem solving skills, and social responsibility skills) significantly increased. The frequency of their observed physical and verbal aggressive behaviors also decreased after they completed the program. The students’ satisfaction with the 12-week program was high.

Keywords: Adolescent students; Self-Care Deficit Theory of Nursing; Violence; Violence prevention program

Background

Violence has become recognized as a critical social problem and is part of the human experience, especially among adolescents, throughout the world, that requires global attention.1,2 Approximately 875,000 children and adolescents, under the age of 18 years, die annually, worldwide, as a result of
violence. Violence among adolescents is known, globally, to lead to injury, loss of competence, disability and death, and affects not only the adolescents, but also their families, communities and society. Throughout Thailand, the number of deaths and disabilities caused by violent acts has led to violence becoming a leading public health issue. In addition, violence has been found to be a major risk factor that directly affects the physical and psychological health of Thai adolescents.

The correlates of violence, among adolescents, can be classified as either physical or psychosocial violence. The prevalence of physical violence among high school students has been found to be associated, most often, with five risk behaviors, namely: sexual intercourse; attempted suicide; substance abuse; episodic heavy drinking; and, fighting. With respect to the psychosocial correlates, adolescents who engage in violence often: suffer from a recent loss; feel disappointment or rejection; feel alienated or disenfranchised; experience academic failure; and/or, become involved with alcohol or other drug abuse. Many times, adolescents attempt to solve problems through drug dependence, avoidance of stress–causing situations, and/or inflicting harm upon themselves. The psychological correlates can affect not only adolescents, directly, but also their classmates, teachers, families, and society.

Recently, the availability of information, throughout Thailand, regarding school violence, violence in adolescents and violence prevention, as well as research regarding the promotion of mental health, the prevention of violence among adolescents and violence prevention programs, have increased. Prior studies have indicated that various violence prevention programs may be effective ways to increase life–long violence management and self–care among adolescents. School health promotion programs also have been found to help improve adolescent health. Successful violence management programs for adolescents appear to be built around activities that foster the adolescents’ abilities to: gain knowledge about difficulties that occur during adolescence; cultivate a negative attitude toward the use of violence; and, acquire new violent management skills.

Promotion of adolescent’s self–care capabilities has been recognized as an important aspect in the development of management strategies to prevent negative physical and psychological outcomes. Nurses can help adolescents acquire self–care capabilities that foster engagement in: effective decision management; control of violent tendencies; and, use of appropriate health service resources (i.e. family, school and community). Although prior Thai research has focused on the educational and psychological aspects of violence management, prevention intervention studies, developed from a nursing perspective, have not been conducted in Thailand. Therefore, the aim of this study was to develop and evaluate the effectiveness of a violence prevention program for Thai high school adolescents. The focus of the program was to motivate Thai adolescents to carry out self–care practices to control their signs of violence, aggressive behaviors, and unfavorable attitudes toward violence.

It was hypothesized that increased knowledge of self–care practices, related to violence, would cultivate negative attitudes toward the use of violence and help the adolescents develop violence management skills. It was felt that an effective program could foster new guidelines for improving self–care practices among Thai adolescents.

**Conceptual Framework**

The violence prevention program, in this study, was based on Orem’s Self–Care Deficit Theory of Nursing (SCDT) and a concept analysis of violence. According to Orem, self–care involves the activities an individual initiates and performs to maintain his/her life and well–being. Thus, it is important to foster
adolescents’ capabilities to respond to their self-care needs for managing violence through the three phases of self-care: estimative, transitive and productive. The estimative phase involves, for those capable of gaining knowledge, having insight into their situation, and knowing the signs of violence, violence risk factors and effective violence prevention. This phase also incorporates evaluation of one’s health history, via physical examination and assessment of health compromising behaviors, including his/her: developmental stage; cognitive functioning; support systems; ability to make appropriate decisions; and, self-care abilities. The transitive phase involves one’s ability to attend to decision-making. This phase is a crucial step in self-care and a time when health care providers should ask adolescents how they feel (i.e. satisfied, regretful or guilty) about their symptoms of violence and/or violent encounters. By so doing, one can assess whether an individual is trying to manage his/her signs of violence and perform self-care, as well as whether his/her behavior is associated with self-care activities in respect to management of violence. The productive phase focuses on determination of one’s level of competence in achieving self-care agency. Such determination is needed to assess what an adolescent needs to do to manage his/her signs of violence, so as to judge whether the person performed a suitable action and controlled his/her behavior, as well as the effect and outcome of his/her decision making.

**Method**

**Design:** This study utilized a within-group repeated measures design to examine the effectiveness of a violence prevention program for Thai adolescents.

**Ethical Considerations:** Approval to conduct the study was granted by the Institutional Review Board of the Faculty of Nursing of the primary investigator’s (PI) academic institution. The adolescent students’ counseling teachers, who served as research assistants (RA), called the students’ parents and sent them an information letter explaining the study’s purpose, procedure and benefits. In addition, potential adolescent subjects were verbally informed about: the purpose of the study; what their involvement would entail; anonymity and confidentiality issues; and, the right to withdraw at any time without repercussions. Parents who allowed their children to participate were asked to sign a consent form. Adolescents, who consented to take part in the study, after their parents’ approval was obtained, were asked to sign an assent form.

**Sample and Setting:** The sample was obtained from a high school within a province in southern Thailand. The school was selected because it supported a health promotion policy that was attentive to preventing inappropriate behavioral problems among adolescent students, and its population was representative of adolescents who had signs of violence. The names of potential subjects were obtained via advertisement (a brochure posted on the information board of the school and an announcement in the classroom). Seventy students responded to the advertisement, however, only 45 of them met the inclusion criteria.

Inclusion included adolescent students who were: enrolled in the high school selected as a study site; 12 to 15 years of age; demonstrating moderate to high aggressive behavior, favorable attitudes toward violence and mild to moderate violent management skills; willing to participate, with parental approval, in the study; and, not participants in any program related to violence management. Subjects were excluded if they had been diagnosed with, or treated for, violent behavior or substance abuse.

The 45 adolescents, predominantly, were: 12 to 15 years of age (mean = 13.44 years); Buddhist (n = 43; 95.5%); female (n = 28; 62.2%); and, living with parents (n = 39; 86.67%) who were married (n = 40; 88.89%). Forty-two (93.33%) of them had one to three siblings. Three (6.67%) other students had four to six siblings. Their five most favorite leisure activities were: listening to music...
(n = 8; 17.78%); reading books or magazines (n = 7; 15.56%); playing sports (n = 6; 13.33%); playing computer games (n = 6; 13.33%); and, caring for pets (n = 5; 11.12%). The majority (n = 23; 51.1%) of their families had monthly incomes of less than 5,000 baht. In addition, 46.6% (n=21) of their fathers and 40% (n=18) of their mothers had a secondary school education, with 40% (n=18) of their fathers and 31.1% (n=14) of their mothers being an employee. Only 28.9% (n = 13) of the adolescents had experienced violence within the family, while 80% (n = 36) of them had experienced violence in school. Their experiences with violence, within the family included: fighting with siblings (n = 6; 46.15%); parents quarreling (n = 4; 30.77%); and, parents punishing their children (n = 3; 30.55%). Their experiences with violence in school included: gang or peer fighting (n = 11; 30.55%); harming others (n = 10; 27.78%); rudeness (n = 7; 19.44%); assault among high school seniors (n = 6; 16.67%); and, punishment, by teachers, of offending students (n = 2; 5.56%).

Instruments: Data were collected via six instruments, including: a researcher-developed Personal Data Sheet; a modified version of Buss’ and Perry’s Aggressive Behaviors Scale;21 Buss’ and Perry’s Observational Aggressive Behavior Scale;22 a modified version of Brillhart’s, Jay’s and Wyers’ Attitude Toward Violence Scale;16 a researcher-developed Violence Management Skills Test; and, a researcher-developed Student Satisfaction with the Violence Prevention Program Questionnaire. None of the instruments, used in this study, were copyrighted. All of the questionnaires were either originally written in Thai or previously been translated into Thai.

The 13-item Personal Data Sheet (PDS) was used to obtain information regarding each subject’s demographics, including his/her: gender; religion; parental marital status; number of persons living in the household; number of offspring in the family; leisure activities; family’s monthly income; parents’ educational levels; parents’ occupations; violence experienced in the family, including types of violence; and, violence experienced at school, including types of violence. The subjects took about 5 minutes to complete the PDS.

Buss’ and Perry’s Aggressive Behaviors Scale (ABS)22 was modified and translated into Thai by Sutin.19 The modified Thai version of the ABS (T-ABS), in which the language was modified to match the Thai culture, was used in this study. The T-ABS was a 58-item, uni-dimensional, instrument consisting of two subscales: one that required self-assessment of verbal (i.e. criticizing or blaming) aggressive behavior and one that required self-assessment of non-verbal (i.e. pulling or snatching at clothes) aggressive behaviors. An example of a verbal aggressive behavior item was: “I shout loudly to others: You’re so stupid.” An example of a non-aggressive behavior item was: “When I am dissatisfied with others, I sometimes make their books dirty.” The subjects rated their experiences involving the use of violence on a scale of 0 = “never” to 4 = “frequently.” The total score was computed by adding the response scores across items, for a possible score of: 0 to 77 = mild aggression; 78 to 155 = moderate aggression; and, 156 to 232 = high aggression. As in prior studies,19 the internal consistency reliability of the T-ABS, in this study, was 0.95. It took the subjects approximately 20 minutes to complete the T-ABS.

Buss’ and Perry’s 23-item Observational Aggressive Behavior Scale (O-ABS)22 was used to measure, via observation, the frequency of verbal (8 items: i.e. blaming) and physical (15 items: i.e. messing things up) aggressive behaviors during a typical day. An observer was to count, for 50 minutes, the frequency of behaviors in three different settings: inside the classroom, outside the classroom and during home room. A total score was determined by adding the number of observed behaviors, within 50 minutes, in each setting. The higher the number of observed verbal and physical behaviors, the higher the incidence
of aggression. Two RAs trained, by the PI, in use of the instrument, simultaneously observed each adolescent. Both of the RAs were the students’ counseling teachers. Although, no clear inter–rater reliability was reported in prior research, the inter–rate observer reliability, in this study, was 0.74 (Kappa).

The 33–item Thai–Attitude Toward Violence Scale (T–ATVS)\textsuperscript{23} was a modified version of the ATVS questionnaire developed by Billhart, Jay and Wyers.\textsuperscript{16} The instrument was used to measure, via self–report, cognitive (11 items: i.e. “I use violence as a means of problem solving”), affective (12 items: i.e. “I don’t like to see fighting among others”) and behavioral components (10 items: i.e. “I usually control myself, when I am teased, without using violence”) of positive and negative attitudes toward violence. Respondents rated their positive and negative attitudes toward violence on a 4–point scale (1 = “strongly disagree” to 4 = “strongly agree”). The total score, which could range from 1 to 4, was determined by summing the response values across all items and then dividing the score by 33 to obtain an average score. No determination of subscale scores was made. Interpretation of the total score was the same as that used by Pandaeng,\textsuperscript{23} whereby: 1.00 to 2.00 = mild attitude toward violence; 2.01 to 3.00 = moderate attitude toward violence; and, 3.01 to 4.00 = high attitude toward violence. It took subjects approximately 10 minutes to complete the questionnaire. Prior research found the T–ATVS to have an internal consistency reliability of 0.85.23 The internal consistency reliability of the instrument, in this study, was 0.96.

The researcher–developed Violence Management Skills Test (VMST) consisted of two–parts that incorporated instruments developed by Limparatanagorn\textsuperscript{20} and Tungklave.\textsuperscript{24} The VMST was used to assess the adolescents’ ability to utilize various skills (i.e. problem solving, coping with emotions and stress, interpersonal relationships skills and social responsibility) in managing violent behavior. Part I of the VMST, an unmodified version of Limparatanagorn’s instrument, contained 44 items within three subscales that measured: problem–solving skills (12 items: i.e. “I like to view problems in different ways.”); ability to cope with emotions and stress (19 items: i.e. “I am calm and rarely get mad with others.”); and, interpersonal relationships skills (13 items: i.e. “I always think carefully before speaking.”).\textsuperscript{20} All items were self–ratings using the possible responses: 1 = “not true;” 2 = “somewhat true;” and, 3 = “true.” A score for each of the subscales, which could range from 1 to 3, was determined by summing the response values across the items in each respective subscale and then dividing the score by the number of items in the respective scale, so as to obtain an average score. A total score for the VMST, which could range from 1 to 3, was obtained by summing the response values across all items and then dividing by 44 to obtain an average score. Interpretation of the total score was the same as that used by Limparatanagorn,\textsuperscript{20} whereby: 1 to 1.66 = mild use of problem–solving, coping, and interpersonal relationships skills; 1.67 to 2.33 = moderate use of problem–solving, coping, and interpersonal relationships skills; and, 2.34 to 3.00 = high use of problem–solving, coping, and interpersonal relationships skills.\textsuperscript{20} Prior reliabilities of the three subscales (problem–solving skills, ability to cope with emotions and stress, and interpersonal relationships skills) were 0.64, 0.82 and 0.74, respectively.\textsuperscript{20} The reliabilities for the three sub–scales, in this study, were: 0.94 (problems solving skills); 0.91 (coping with emotions and stress); and, 0.94 (interpersonal relationships skills). Part II of the VMST consisted of a modified version of Thungklave’s instrument, which was designed to measure social responsibility.\textsuperscript{24} Item wording was modified so as to make the items more understandable by the adolescents. Part II contained 47 self–rated items (27 positively and 20 negatively stated) that were organized within four categories: political responsibility; responsibility to family; responsibility to school; and, responsibility
to friends. Examples of positively stated items from each of the four categories were: “I turn off the lights every time I leave the room” (political responsibility); “I help my mother clean the house” (responsibility to family); “I submit all school assignments on time” (responsibility to school); and, “I always help my friends when they are faced with problems” (responsibility to friends). Examples of negatively stated items from each of the four categories were: “I throw garbage anywhere I want” (political responsibility); “I don’t think cleaning plates after a meal is my responsibility, since I am young” (responsibility to family); “I don’t like it when the teacher gives me too much homework, since I want to rest” (responsibility to school); and, “When the teacher assigns group work, I frequently leave it for my friends” (responsibility to friends). The possible responses to both the positively and negatively stated item responses where: 4 = “very true;” 3 = “true;” 2 = “somewhat true;” and, 1 = “not true.” A total score was calculated by summing the response scores across items and then dividing by 47 to obtain an average score. Interpretation of the score was the same as that used by Thungklave, whereby: 1 to 1.66 = mild use of social responsibility; 1.67 to 2.33 = moderate use of social responsibility; and, 2.34 to 3.00 = high use of social responsibility.²⁴ The internal consistency reliability for the second part of the VMST, in this study, was 0.96. It took the adolescents approximately 30 minutes to complete the entire instrument.

The PI-developed 12-item self-report Student Satisfaction with the Violence Prevention Program Questionnaire (SSVPPQ) was used, after completion of each of the three phases of the program (estimative, transitive and productive), to assess the adolescents’ satisfaction with the effectiveness of the program activities. Questionnaire items were generated from a literature review regarding evaluation of violence projects.²⁵ Prior to its use, the content validity and item clarity of the SSVPPQ were assessed by a psychiatric nurse with expertise in Orem’s Self-Care framework, a community health nurse, two psychiatrists, and two psychologists. The results of the experts’ assessment of the SSVPPQ lead to no changes being made in the instrument. Examples of items from the questionnaire included: “I am satisfied with the program” and “I am satisfied with what I have learned about managing my violent behavior.” Each item was rated from 1 = “low satisfaction” to 5 = “high satisfaction.” A total score was obtained by summing across the responses to the 12 items and dividing by 12 to obtain a mean score. Scores were interpreted as: 1 to 2.67 = mild satisfaction; 2.68 to 4.35 = moderate satisfaction; and, 4.36 to 5.00 = high satisfaction. The internal consistency reliability of the instrument, in this study, was 0.94.

**Violence Prevention Program:** Development of the program involved three types of key stakeholders (two teachers who had experience in dealing with adolescents manifesting violent behavior; 12 adolescents who were not part of the study, but were similar to the study subjects; and, six parents of the 45 adolescent subjects). These stakeholders shared their views on violence and strategies suited for adolescents’ management of violence via two, PI-lead, focus groups. Each focus group, which lasted approximately 45 minutes, consisted of six students, one teacher and three parents. Each focus group was held in the counseling room of the adolescents’ school. As a result of the focus groups’ findings, the PI developed 12 program activities and an activity program guide. Each of the activities took 50 to 60 minutes to complete. The adolescents participated, as a group, in one activity each week over 12 weeks. The PI directed the weekly activity, each Thursday, in a school classroom.

The first component of the program, the estimative phase, focused on examining positive aspects of self-awareness and engaging in self-investigation. During this phase, the adolescents participated in two activities: self-investigation of feelings/emotions and self-examination of various
responses to feelings/emotions. Self-investigation of feelings/emotions required them to think about their own feelings/emotions and then verbally share their feelings/emotions with others involved in the activity. Self-examination of feelings/emotions involved the adolescents examining a variety of facial pictures that reflected various feelings/emotions (i.e., sad, happy, loving or violent) and then discussing, with group members, what they believed the pictures represented, and if and when they had such feelings/emotions.

The second component of the program, the transitive phase, focused on: managing negative feeling/emotions that can lead to violence; using behaviors that prevent violence; and, recognizing attitudes and behaviors that discourage violence. Four activities were implemented during this phase: examination of how specific situations influence feelings/emotions, which, subsequently, can lead to violent behavior; use of coping techniques for dealing with feelings/emotions that can lead to violent behavior; development of relationship skills, through effective communication, that can facilitate the prevention of violent behavior; and, learning about empathetic understanding, so as to prevent violent behavior, focused on use of active listening and reflective words for the purpose of understanding what others were trying to say. The content was presented, by the PI, by way of lecture. The students then were required to practice, with group members, how to actively listen and use reflective words.

The third component of the program, the productive phase, focused on: enhancing the use of behaviors that prevent or reduce, via problem-solving in everyday life, the likelihood of violence; doing self-evaluation; and, internalizing new responsibilities/new attitudes toward violence prevention in society. Six different activities were implemented during this phase of the program: applying interpersonal relationship skills to prevent violent behavior; learning how problem-solving skills can prevent violent behavior; developing problem-solving skills for real life; learning different problem-solving approaches; learning about social responsibility; and, applying social responsibility skills in real life. Applying interpersonal relationship skills to prevent violent behavior required the adolescents to review another scenario, reflecting a difficult situation, and identify the coping techniques used within the scenario to prevent violent behavior. The students then were asked to practice, in a group setting, coping techniques (i.e., seeking guidance from others, consulting with a teacher, and demonstrating self-control) identified in the scenario. Development of relationship skills that can facilitate the prevention of violent behavior involved the students learning about effective verbal and non-verbal communication. This task was carried out by having each student write on one 3 x 5 card a word that can lead to violent behavior and on another 3 x 5 card a word that can prevent violent behavior. The PI then presented and discussed, with the group, all of the words the students had written. The focus of this activity was to show how effective communication can facilitate development of good relationships with others which, in turn, can help prevent situations that can lead to manifestation of violent behavior. Finally, learning about empathetic understanding, so as to prevent violent behavior, focused on use of active listening and reflective words for the purpose of understanding what others were trying to say. The content was presented, by the PI, by way of lecture. The students then were required to practice, with group members, how to actively listen and use reflective words.
behavior involved the adolescents discussing and sharing, with group members, how to go about solving problems described in a specific violence-provoking scenario. The focus of this activity was to demonstrate, to the students, how problem-solving skills can foster appropriate versus inappropriate behavior. Learning different problem-solving approaches required the adolescents to present ideas to the group, from an assigned scenario, using the techniques they learned in previous activity sessions (i.e. coping techniques, communication skills, active listening, and using reflective words). Each adolescent was asked to present how he/she would go about not using violent behavior in dealing with the situation described in the scenario. Developing problem-solving skills for real life required the students to write down the various problems and/or personal situations they had encountered that lead to their use of violent behavior. Each adolescent then shared, with the group, his/her problems/situations and told what he/she should have done to prevent the use of violent behavior. The purpose of this activity was to focus on how each student could prevent using violent behavior when faced with a difficult situation. Learning about social responsibility involved the adolescents sharing examples of activities in which they demonstrated various types of social responsibility (i.e. political, family, school and friends). Through sharing their social responsibility experiences they learned new ways of demonstrating responsible behavior. The last activity in this phase, applying social responsibility skills in real life, required the students to work in a small group (i.e. six to seven students per group) for the purpose of proposing a social project and the roles they each would play in developing and implementing the project. Each small group then presented their project ideas to all of the other adolescents.

Procedure: After consent/assent was obtained, the PI administered, in a school classroom as a baseline measure, the PDS, ABS, T-ATVS, and VMST. In addition, the two RAs, using the O-ABS, observed and recorded the students’ behaviors in their respective classrooms, home rooms, and outside the classroom, but in the school setting. All 70 adolescents, who initially consented to be in the study, were administered the questionnaires and observed for the purpose of determining if they met the study’s inclusion criteria. Only 45 of the 70 adolescents were found to meet the inclusion criteria and, as a result, were retained as subjects. The other adolescents were thanked for their time, but informed they would not be continuing in the study.

After the questionnaires were administered, two focus groups were held for the purpose of providing the PI information that could be used in the development and implementation of the Violence Prevention Program activities. Twelve weeks from the baseline testing, the ABS, T-ATVS and VMST again were administered to the students. Then the 12-week Violence Prevention Program was implemented. At the end of each of the three phases of the program (estimative, transitive and productive), the adolescents were administered the SSVPPQ to determine their satisfaction with the program activities in each respective phase. Upon completion of the 12-week program, the students were administered, for the third time, the ABS, T-ATVS and VMST, and observed, for a second time, using the O-ABS.

Data Analysis: Descriptive statistics were used to assess the demographic characteristics of the adolescents and to compute the scores for the instruments used in the study. Repeated measures analysis of variance (RM-ANOVA) was employed to examine the outcomes at three different assessment times, including: baseline (0 week), pre-intervention (12th week) and post-intervention (24th week). Frequencies and percentages were used to compare observed events of physical and verbal aggressive behavior at baseline and post-intervention. Means and standard deviations were computed to examine scores for student satisfaction with the activities implemented during the three phases of the violence prevention program.
Results

The mean scores for attitudes toward violence after program completion (M = 2.09; SD = 0.35) were significantly lower \( F_{(2,88)} = 53.37; p \leq 0.001 \) than the mean scores found at pre-intervention (M = 2.51, SD = 0.27). No significant difference in the mean scores for attitudes toward violence were found between the baseline scores and pre-intervention scores (M = 2.57, SD = .33; M = 2.51, SD = 0.27).

The aggressive behavior mean scores at post-intervention (M = 0.85; SD = 33) were significantly lower \( F_{(2,88)} = 116.48; p \leq 0.001 \) than at pre-intervention (M = 1.67, SD = 24). No significant difference in the aggressive behavior mean scores were found between the baseline scores and the pre-intervention scores (M = 1.67, SD = 0.24; M = 1.72, SD = 0.25). Moreover, many of the adolescent students’ observed physical aggressive behaviors were found to be less frequent after program completion compared to their observed physical aggressive behaviors at baseline. The frequencies of observed events involving physical and verbal aggressive behaviors, during these two periods, are illustrated in Figures 1 and 2.

Figure 1: Frequency of Observed Physical Aggressive Behaviors

1 = Harmful to others; 2 = Caused object or property damage; 3 = Pulled or snatched clothes; 4 = Pushed somebody; 5 = Ridiculed; 6 = Threw things at another; 7 = Forced others to do something unwillingly; 8 = Messing things up; 9 = Hid other students’ things; 10 = Hit somebody; 11 = Had fights; 12 = Pushed over property; 13 = Put up feet or middle figure to imprecate; 14 = Made faces; 15 = Banged table loudly.

Figure 2: Frequency of Observed Verbal Aggressive Behaviors

1 = Blaming; 2 = Teasing about a friend’s and family’s name; 3 = Criticizing; 4 = Shouting loudly; 5 = Gossiping; 6 = Speaking sarcastically; 7 = Rudeness; 8 = Threatening
Regarding the adolescents’ violence management skills, a significant increase \( [F(2,88) = 77.99; p < 0.001] \) in interpersonal relationship skills means scores was found from pre-intervention (M = 1.93; SD = 0.29) to post-intervention (M = 2.39; SD = 0.24). No significant difference was found in mean scores between baseline and pre-intervention (M = 1.87, SD = 0.24; M = 1.93, SD = 0.29). Comparisons of the problem-solving skills mean scores indicated a significant increase \([F(2,88) = 4.76; p < 0.05]\) between pre-intervention and post-intervention (M = 2.14, SD = .26; M = 2.29, SD = .25). No significant difference was found in problem-solving skills mean scores between baseline (mean = 2.17, SD = 0.33) and pre-intervention (mean = 2.14, SD = 0.26). The mean scores for coping with emotions and stress were found to be significantly higher \([F(2,88) = 28.51; p \leq 0.001]\) at post-intervention (M = 2.39; SD = 0.21) than at pre-intervention (M = 2.18; SD = 0.19) No significant differences were found in the coping mean scores between baseline (M = 2.18; SD = 0.19) and pre-intervention (M = 2.19; SD = 0.30). The mean scores for social responsibility were found to be significantly higher \([F(2,88) = 13.12; p \leq 0.001]\) at post-intervention (M = 3.20; SD = 0.23) than at pre-intervention (M = 2.96; SD = 0.30). No significant differences were found in scores between baseline (M = 2.84; SD = 0.35) and pre-intervention (M = 2.96; SD = 0.30).

Mean scores for the students’ satisfaction with the program activities, which was assessed at the end of each phase of the program, reflected a high level of satisfaction (4.36 to 5.00). The mean scores for each of the phases were: estimative (M = 4.38; SD = 0.39); transitive (M = 4.36, SD = 0.53); and, productive (M = 4.36, SD = 0.55).

### Discussion

The research-developed, 12-week Violence Prevention Program was found to be successful. After completion of the program, the adolescents’ aggressive attitudes and behaviors decreased, while their violence management skills (i.e., interpersonal relationship skills, coping with emotions and stress, problem-solving skills, and social responsibility skills) increased. In addition, the students’ satisfaction with the 12-week intervention program was high.

The fact the adolescents were able to decrease their aggressive attitudes and behaviors, and increase their violence management skills, after completion of a violence prevention program that focused on self-care, was similar to findings in prior research. For example, Cutler found that a person’s improvement in self-care can lead to autonomy and ongoing behavioral management, as well as a lower chance of recidivism into violence. Furthermore, it has been noted that a reduction in aggressive behavior can occur concurrently with the development of self-care skills, which, in turn, can lead to marked improvement in behavior. McCaleb and Cull found, among adolescents from various socio-cultural backgrounds, instruction on self-care practices needs to be incorporated into an overall violence prevention program. In addition, it has been noted that when adolescents are confronted with aggression from others, highly aggressive adolescents tend to have difficulty arriving at non-aggressive solutions and believe aggression is the answer to adverse treatment by others. Most related literature suggests that changing self-care behavior promotes well-being among adolescents. Similarly, a positive relationship between health-promoting self-care behavior and self-care efficacy, in the adolescent population, has been found. The success of the program, most likely, was due to the self-care focus of the program and its design. Prior studies have pointed out that changing an adolescent’s self-care behavior enhances his/her sense of well-being. In addition, a positive relationship between health-promoting self-care behavior and self-care efficacy has been noted among adolescents.
The Development and Effectiveness of a Violence Prevention Program for Thai High School Adolescents

The fact the violence prevention program included the use of self-care methods, which has been encouraged by other researchers, may have had an influence on the effectiveness of the program. The program was developed around a series of goals and activities that focused on providing adolescents with direction regarding how to engage in self-care.

The violence prevention program involved a weekly session, for 12 weeks, that lasted 50 to 60 minutes. The length and number of sessions was consistency with suggestions from prior work on violence among adolescents. It is important to note the length and intensity of a violence prevention program must be sufficient for participants to gain mastery of violence knowledge and management skills, as well as produce significant behavioral changes when in a social setting.

The findings suggest the length and intensity of the content presented, in this study, was sufficient to bring about change in the adolescents' attitudes, behaviors, and management skills related to violence. It must be kept in mind, however, that the approach and optimal time for presenting a violence prevention program may vary, depending upon the demographics of the program participants. In addition, this study's program employed the use of multiple measurement procedures (i.e. self-assessments, self-reports, and observations) to determine changes made in the adolescents' attitudes, behaviors, and management skills related to violence. These measures were similar to those used in prior studies on adolescent violence. Utilization of multiple sources of measurement helps decrease bias and supports psychometric standards appropriate for the specific aim of a program.

The adolescents indicated high satisfaction with all phases of the program and appeared to want to participate in each weekly activity, as well as attend each weekly session. This could have been related to the type of activities used in the program, as well as the fact the students were doing something with their peers.

Limitations and Recommendations

Prior to using the study’s findings, the limitations of the study must be taken into account. The study involved predominately females and was conducted among students in only one high school. Also, a repeated measures design was used in the study without involvement of a randomized control group. Thus, since baseline and pre-intervention tests cannot adequately serve the same function as a control group, there may have been uncontrolled threats to the study’s validity. In addition, a longitudinal follow-up was not accomplished so as to assure sustainability of the program’s outcomes, over time. Thus, no guarantee can be made that the adolescents will be able to sustain use of non-violent behavior. The study also failed to include examination of environmental variables that could have supported or impeded the students’ attitudes toward violent behavior. This is important, at the individual level, since adaptation of behaviors is known to not likely persist if the behavior adaptations are not supported by a suitable environment.

As one might suspect, it was not possible to control the type of information or experiences the adolescents encountered, during the study, related to violence. This factor could have influenced the results of the various assessments (baseline, pre-intervention, post-intervention testing). Finally, because of the structure and values of the school system, the researchers were somewhat limited regarding the program content that could be taught.

Based upon these limitations, the following factors need to be considered when conducting future research regarding development and implementation of a violence prevention program: inclusion of an equal number of male and female students; use of multiple schools located in various geographic areas throughout Thailand; inclusion of a control group; longitudinal designs to address the long-term effects of a program; and, examination of environmental variables that could support or impede adolescents’ attitudes toward violent behavior.
behavior. Given the nature of research dealing with the development and implementation of a violence prevention program, it may not be possible for researchers to control the information and experiences encountered by adolescents, related to violence, or the content and activities included in a prevention program when it is offered within a school environment. Both of these issues are realities related to addressing violence among adolescent students. Furthermore, future studies also need to consider comparing the program needs of adolescents who have moderate violence tendencies versus those with severe violence tendencies, as well as those with mental health problems who manifest violent behavior.

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References


การพัฒนาและประสิทธิผลของโปรแกรมการป้องกันความรุนแรง ต่อความรุนแรงของนักเรียนวัยรุ่นไทย ในโรงเรียนมัธยมศึกษา

วินีกาญจน์ คงสุวรรณ, วันดี สุทธรังษี, แสงอรุณ อิสระมาลัย, Sandra J. Weiss

บทคัดย่อ: การใช้ความรุนแรงในวัยรุ่นมีจำนวนมากขึ้น และเป็นปัญหาสังคมที่ควรได้รับการดูแล การศึกษาครั้งนี้มีวัตถุประสงค์เพื่อศึกษาประสิทธิผลของโปรแกรมการป้องกันความรุนแรงของนักเรียนวัยรุ่นไทยในโรงเรียนมัธยมศึกษา โปรแกรมสร้างขึ้นจากทฤษฎีความพร่องในการดูแลตนเองและแนวคิดความรุนแรง ทำการทดลองประสิทธิผลโดยใช้แบบวัดวิจัยเชิงทดลอง ซึ่งศึกษาเป็นระยะเวลาสองช่วงเวลาที่มีกลุ่มตัวอย่างเป็นนักเรียนวัยรุ่น 45 คน อายุ 12-15 ปี ประเมินประสิทธิผลของโปรแกรมโดยใช้แบบวัดพฤติกรรมการข้ามขั้นตอนการใช้ความรุนแรง แบบวัดทักษะการจัดการความรุนแรง โดยทบทวนการสร้างสัมพันธภาพระหว่างบุคคล การเผชิญกับอารมณ์และความเครียด การจัดการสภาวะภัยพิบัติ และความรู้สึกชอบต่อสังคม และการสังเกตพฤติกรรมการใช้ความรุนแรงทางกาย และทางวาจา จากระยะเริ่มต้นในสิ่งแวดล้อม หลังจากนั้นนักเรียนต้องได้รับการดูแลตามสภาพแวดล้อมของโรงเรียนตลอด 12 สัปดาห์ และการดูแลที่มีประสิทธิผลตามโปรแกรมการป้องกันความรุนแรงอีก 12 สัปดาห์ โดยประเมินความสามารถในการป้องกันความรุนแรงของโปรแกรม โดยใช้แบบสอบถามความพึงพอใจในการปฏิบัติการดูแลตนเอง 3 ระยะคือระยะของการพิจารณา ระยะการตัดสินใจซึ่งจะนำไปสู่การปฏิบัติ และระยะการปฏิบัติ และประเมินความสามารถในการปฏิบัติ วิเคราะห์ผลของโปรแกรมโดยใช้วิธีการวิเคราะห์การวิเคราะห์ความแตกต่างและความสามารถในการปฏิบัติ วิเคราะห์ผลของโปรแกรมโดยใช้วิธีการวิเคราะห์การวิเคราะห์ความแตกต่างและความสามารถในการปฏิบัติ

ผลการศึกษาพบว่า คะแนนพฤติกรรมการข้ามขั้นตอนการใช้ความรุนแรงลดลงหลังจากนักเรียนได้รับโปรแกรมการป้องกันการใช้ความรุนแรง และยังพบว่าคะแนนทักษะการจัดการความรุนแรงสูงขึ้นในทุกขั้นตอนการสังเกต พบว่ามีความสูงขึ้นของการจัดการสภาวะภัยพิบัติและพฤติกรรมการแก้ไขทางกาย และพฤติกรรมการแก้ไขทางวาจาตลอดในทุกขั้นตอน

ผลการประเมินความพึงพอใจของนักเรียนในการเข้าร่วมโปรแกรม พบว่ามีค่าเฉลี่ยอยู่ในระดับสูงถึง 3 ระดับในการปฏิบัติการดูแลตนเอง จึงเป็นไปได้ว่า โปรแกรมการป้องกันความรุนแรงมีประสิทธิผลในการลดพฤติกรรมการข้ามขั้นตอน และลดพฤติกรรมบางขั้นตอนการใช้ความรุนแรงได้ และยังพัฒนาทักษะในการจัดการความรุนแรงโปรแกรมนี้สามารถนำไปใช้ในการศึกษาขั้นตอนนี้เพื่อขยายผลต่อการจัดการศึกษา และนำไปประยุกต์ใช้ในระบบบริการทางกายภาพ รวมถึงหน่วยงานที่มีภารกิจต่อการป้องกันความรุนแรงในสังคมไทยต่อไป

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Manuscripts are to be written in English, using Microsoft Word, and double-spaced, with 12 point type and Times New Roman font. The Cover Letter, Title Page, Abstract and Key Words, Acknowledgements, and each Figure, Table and Appendix, are to begin on separate pages.

Word Count:

The text word counts, as shown, are not to be exceeded. Abstract (250 words); Concept Analysis (4000 words); Quantitative Research (5000 words); Qualitative Research (6000 words); and Literature Review (6000 words).

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The Cover Letter is to indicate: the manuscript and/or any significant part thereof, previously has not been published and currently is not being considered for publication by another publisher; each author has read and agrees with the manuscript, as written and submitted, and has contributed, in a significant manner, to the development of the content therein; the research protocol was approved and complied with guidelines of the institution(s) of the author(s) and data collection site(s); participants were informed of their rights, gave informed consent, and had their confidentiality and anonymity preserved; and, whether any financial support was received, or relationship(s) existed, that may have posed a conflict of interest.

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The abstract is to follow the order of the content presented, and contain no more than 250 words. Abbreviations, references, statistical information and/or headings are not to be included.

Each manuscript is to have a duplicate abstract written in Thai. Abstracts of non-native Thai authors will be translated into Thai, by the Editors, after the manuscript has been accepted for publication. Each abstract is to be on a separate page, with the title of the manuscript listed.

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No more than five (5) key words that accurately identify the manuscript’s subject, purpose, method and focus are to be listed in alphabetical order. Key words found in Medical Subject Headings (MeSH®), PubMed or CINAHL are preferred.

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The first time a synonym is used, all words explaining the meaning of the synonym must be stated, followed by the synonym in parentheses ( ). Thereafter, the synonym, without parentheses, may be used.

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References for Concept Analysis and Research papers are not to exceed 40 references. No limit is placed on the number of references cited for Literature Review papers.

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Citations in the text are to be made using superscript Arabic numerals in the order in which the citations appear. All references are to be listed as citations in the text, and all citations are to correspond with the appropriate reference. References are to be listed in order of appearance in the text.

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All tables and figures are to be self-contained and complement, but not duplicate, information in the text. No more than a total of five (5) Tables and Figures, each on a separate page, are allowed.

Tables (i.e. Table 1) and Figures (i.e. Figure 1) are to be numbered consecutively, with Arabic numbers, and titled to describe the content contained in each.

A legend, explaining symbols, abbreviations and units used, is to appear below each Table and Figure.

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If Appendices are used, each one is to be numbered with a Roman numeral. If the content is written by someone other than the author of the manuscript, the name of the author of the appendix is to appear below the appendix title.

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