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ORIGINAL ARTICLE

Predicting Factors of Quit Attempt in Thai Adolescents

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ABSTRACT
The most important precursor to the performance and success of quitting smoking is the quit attempt. This correlational study aimed to examine the direct and indirect relationships between the influencing factors and quit attempt in Thai adolescent smokers. The theoretical framework was developed based on Bandura's social cognitive theory and research-literature review. Multi-stage random sampling was used to recruit the sample. They were 463 adolescent smokers in grades 7-12 from 12 schools that belonged to the Teacher's Network against Tobacco (TNT) in all regions of Thailand and had attempted to quit smoking within the past three months. Data were gathered from October to December 2013. The majority of the subjects were Buddhist (95.46%) and males (94.20%). Half of the subjects studied in grade 8-9 (52.70%). The average age was 15.20 years (SD=1.38). Most of them started smoking before 14 years of age (80.13%). Path analysis (LISREL 8.53) was used to analyze data. Time spent with peer smokers, self-efficacy to resist smoking, nicotine dependence, motivation to quit, and intensity of smoking cessation intervention had significant relationships with quit attempt at the .05 level and could explain 50% of the variance of the quit attempt. To be effective with adolescents' quit attempts and long-term smoking abstinence, nurses should intervene early on to help adolescent smokers perform the quit attempt, before they are highly addicted to nicotine creating more difficulty with being able to quit.
Keywords; *Quit attempt, Adolescent smokers*

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INTRODUCTION

Smoking is the leading cause of various health problems in adolescents. When adolescents become smokers, they are more likely to have long-term problems concerning their physical and mental well-being, such as respiratory infections, decreased athletic ability, and cognitive impairment [1, 2]. The earlier smokers quit, the greater the health benefits [3]. Quitting smoking is identified as an important behavior in improving adolescent smokers' health, and reducing smoking-related diseases and deaths [4]. The most important precursor to the performance and success of quitting smoking is the quit attempt [5, 6]. Therefore, encouraging adolescent smokers to successfully perform quit attempt is essential.

The quit attempt refers to the number of times that smokers stopped smoking for at least 24 hours [5]. Adolescent smokers who made any quit attempts that lasted longer than 24 hours were more likely to succeed in quitting smoking than those who had not sustained such an attempt for that period of time. About 70% of adolescent smokers in Western and Asian countries, including Thailand, have tried to stop smoking within 30 days, but most of them have failed [7, 8]. Adolescent smokers need an effective smoking cessation intervention provided by health professionals that they can understand and will help them in their attempt to quit. Most interventions are provided in hospital or outpatient departments [9]. However, only adolescent smokers with a high level of nicotine addiction are referred to cessation services. Thai adolescent smokers tend to be to moderately addicted to nicotine and some have just started or only want to experiment with smoking. Most Thai adolescents have been taught in schools

about health problems due to smoking and have received advice on quit attempt, but smokers have had fairly low success rates [8, 10, 11].

Success rates are hard to figure out for many reasons. One problem is that the majority of smoking cessation programs for adolescents are provided separately by different disciplines and experts, such as teachers and nurses. Interdisciplinary teamwork is beneficial and important for treatment of adolescent smokers. For example, teachers and other ancillary school personnel can assist with gathering and reporting information regarding behaviour and peer interactions; and paediatric nurses can offer important information about adolescents' behaviours and advise them on the quit attempt [12, 13].

In order to encourage adolescent smokers to perform and succeed at the quit attempt, predictors of quit attempt need to be explored. An understanding of such predictors can offer insight for to nurses when promoting quit attempt. Many previous studies have demonstrated the possible factors that influence adolescents' quit attempt, but what remains unclear concerns the direct and indirect relationships to the quit attempt [14-17].

THEORETICAL MODEL

The interrelationship between person and environment is a central concept in the nursing paradigm. Bandura's social cognitive theory (SCT) indicated that an individual's decision to adapt healthy behaviours is influenced by both distal and proximal environments, as well as his/her personal characteristics [18]. Therefore, the SCT was used to guide the selection of factors included in this study. Possible factors that influence quit attempts among adolescent smokers were reviewed. Five variables were expected to relate with quit attempts among Thai adolescent smokers: the personal factors included self-efficacy to resist smoking, motivation to quit, and nicotine dependence; whereas the environment factors included time spent with peer smokers, and intensity of smoking cessation intervention (see Figure 1).

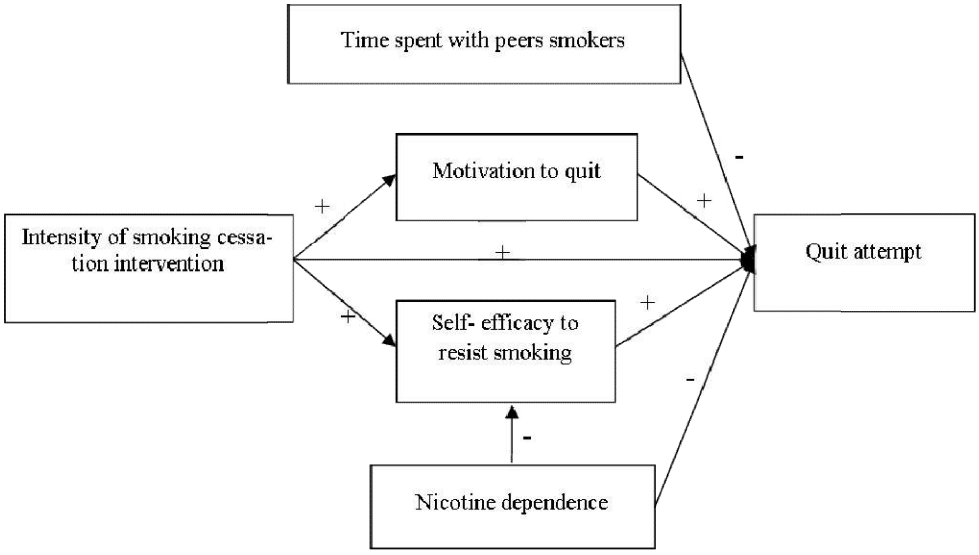


Figure 1 Theoretical Model of Quit Attempt in Thai Adolescents

MATERIALS AND METHODS

A correlational research was used to examine the direct and indirect relationships between the influencing factors and quit attempt.

STUDY PARTICIPANTS

Recruiting adolescent smokers into tobacco use research could be a challenge [19]. Adolescent smokers often report being uninterested in participating in tobacco use research, particularly cessation studies, because they are afraid of punishment from parents or teachers [20]. It is difficult to determine the actual prevalence rate of smokers because this information has seldom been reported. Fortunately, schools that belong to the Teacher's Network Against Tobacco (TNT) are places that have data on Thai adolescent smokers. In 2012, there were approximately 1,000 schools in the network, and their students ranged from elementary to high school level. Adolescent smokers in TNT and non-TNT schools are similar in terms of individual characteristics and environmental surroundings [21]. Therefore, the TNT schools in

all parts of Thailand, including the northern, central, north-eastern, eastern, and southern regions were used as the study setting.

A multi-stage random sampling procedure was used for a probability sample of Thai adolescent smokers from five regions. The inclusion criteria were: 1) students in grades 7 to 12; 2) current or ex-smoker (current smoker refers to adolescents who were smoking daily, and ex-smoker refers to adolescent who had stopped smoking for 1 day to three months); 3) attempted quitting smoking within the past 3 months; 4) no diagnosis of learning disability, attention deficit hyperactivity disorder, or mental retardation, and 5) willingness to participate in the study. As a result, there were 549 adolescent smokers in the TNT schools from all regions, and 486 (88.52%) of those met the inclusion criteria (see Figure 2).

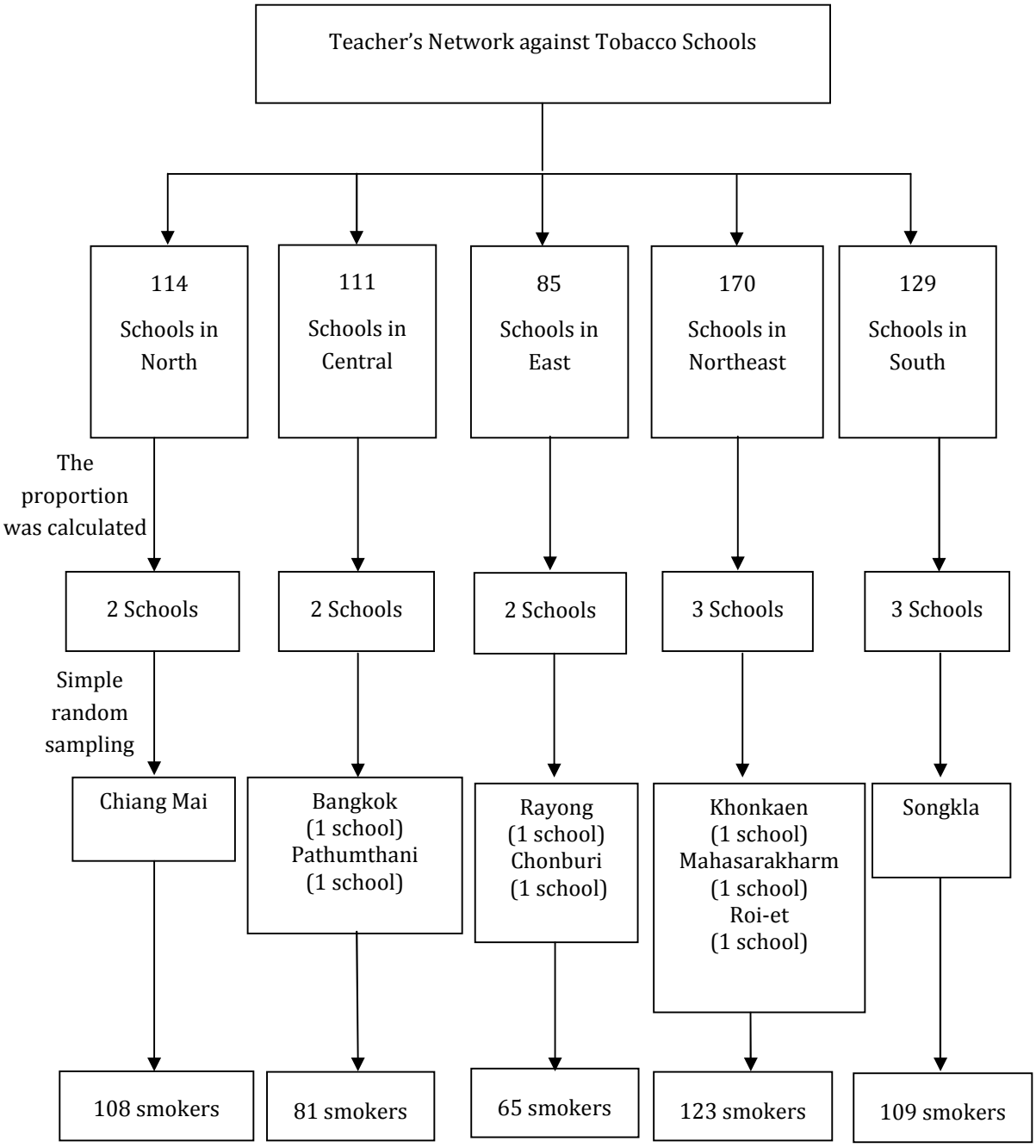


Figure 2 Sampling method of the study

A total of 486 adolescent smokers participated in the study. After considering the criterion of outliers in all variables (absolute Z score > 3), 23 subjects were excluded. In summary, data from 463 adolescent smokers were analysed. As shown in Table 1, almost all of the subjects were male (94.17%) and Buddhist (95.46%). Most of the subjects lived with their parents (88.76%). About half of the subjects were 14-15 years old and in grades 8-9 (52.70%). The age of the subjects when they began smoking ranged from 5-18 years, with 35.42% of the subjects starting smoking when they were in primary school and 57.67% starting smoking during secondary school. Nearly half of the subjects had smoked 1 cigarette per day (40.41%).

Table 1 Number and percentage of subjects' demographic characteristics (n=463)

Demographic characteristics	n	%
Gender		
Male	436	94.17
Female	27	5.83
Age		
12-13	48	10.37
14-15	231	49.89
16-17	160	34.56
18	24	5.18
Level of education		
Grade 7	32	6.91
Grade 8	112	24.19
Grade 9	132	28.51
Grade 10	76	16.41
Grade 11	89	19.23
Grade 12	22	4.75
Religion		
Buddhist	442	95.46
Muslim	14	3.02
Christian	7	1.52
Residing		
Alone	6	1.30
With parents	411	88.76
With friend	2	0.44
With relatives	44	9.50
Age when smoking began (years old)		
5-8	8	1.73
9-12	156	33.69
13-15	267	57.67
16-18	32	6.91
Number of cigarettes smoked per day (cigarettes)		
1-5	396	85.53
6-10	58	12.53
11-15	5	1.08
16-20	3	0.64
>20	1	0.22

MEASURES

Quit attempt refers to the number of times that adolescent smokers stopped smoking for 24 hours and was measured by asking "How many times during the past 30 days have you stopped smoking for 24 hours"? [22]. Additionally, an open-ended question was added asking the respondent to report, the number of quit attempts (e.g., 0, 1, 2, etc.). Two-week test retest reliability was conducted based on the questionnaire. Pearson's correlation coefficient was .85.

Self-efficacy to resist smoking refers to the adolescent smokers' belief in their ability to refrain from smoking in situations in which people frequently smoke. The Self Efficacy to Resist Smoking Scale-Thai Version was used to assess self-efficacy to resist smoking, which was a modified version of Vaid's Self Efficacy to Resist Smoking Scale [23]. The scale asks respondents to answer the following question with regard to the part 3 months: "How do you feel about being able to resist smoking in the following situations—at home, at a friend's house, at a party, at school, when bored, and when stressed out?" Response options are presented using a 5-point Likert-type scale (completely sure I could keep from smoking to completely sure I could not keep from smoking). Higher scores indicate greater self-efficacy to resist smoking. In this study, Cronbach's alpha was .82, and all fit indices of the measurement model were acceptable.

Motivation to Quit refers to the adolescent smokers' desire to stop smoking based on intrinsic and extrinsic forces. A desire originating from within an individual (e.g., health concerns and self-image) is an intrinsic motivation, whereas extrinsic motivation refers to a desire that comes from external sources or outside of the individual (e.g., social concerns, financial considerations, and anti-smoking policies). Motivation to quit was measured by the Motivation to Quit Scale (MTQS) [24]. The MTQS consists of 36 items with a 5-point Likert-type scale (not at all agree to extremely agree). Higher scores indicate greater motivation to quit. In the current study, Cronbach's alpha was .96.

Nicotine dependence refers to the adolescent smokers' difficulty in refraining from smoking and was measured by the Hooked on Nicotine Checklist-Thai Version (HONCT), which was modified by the researcher from DiFranza et al.'s HONC [25]. The HONCT consists of 10 dichotomous items. Respondents are asked to report nicotine dependence during the past 3 months. Higher scores indicate higher dependence. A CFA provided support for construct validity (χ^2 = 49.05, df = 27, GFI = 0.97, AGFI = 0.94, RMSEA = 0.05). The current study, the Cronbach's alpha coefficient was .83.

Time spent with peer smokers refers to the amount of time that adolescent smokers spend with friends who smoked, which was measured by the Time Spent with Peer Smokers Questionnaire-Thai Version. For the purposes of the present study, the researcher modified Jones et al.'s Time Spent with Peer Smokers Questionnaire [26]. Respondents were asked the following: 1) Do you have friends who smoke?, 2) If you have friends who smoke, how often do you see them (day(s)/week), and 3) How much time do you spend with the smoking friends you see? (hour(s) or minute(s)/day).The reported time with friends who smoke was converted into minutes. This scale established reliability by the test-retest method. The Pearson's correlation coefficient was .92

Intensity of smoking cessation intervention refers to the amount of individual or group counselling/advice, self-help materials, and follow-up services that adolescent smokers received from healthcare professions (physicians, nurses, psychiatrists, and dentists) in a wide variety of settings (hospitals, communities, schools, telephone quit line, and public/private health department clinics). This variable was measured using the Intensity of Smoking Cessation Intervention Questionnaire (ISCIQ), which was developed by the researcher. The ISCIQ consists of 10 dichotomous items. Participants were asked to respond to a series of questions on smoking cessation interventions that they may have received during the past 3 months. First, participants are asked, "Have you ever received any leaflets, pamphlets, manual books, CD/DVD/video, and computer programs about quitting smoking from any healthcare professionals?" If "No," the item scored 0. If "Yes," participants are asked, "Have you ever read or used it?" If "No," the items is scored 0. If "Yes," the item is scored 1. The score was computed by summing the scores obtained for each item and then dividing by the number of items in which there was a response. Higher scores indicate higher intensity of smoking cessation intervention. The Cronbach's alpha coefficient was .79. All fit indices of the measurement model were acceptable.

Demographics data consist of ten open-ended questions regarding participant's age, gender, religion, level of education, grades from the previous semester, siblings, residence, smoking history, age when smoking began, and number of cigarettes smoked per day.

ETHICAL CONSIDERATIONS

This study was approved by the Ethical Review Committee for Research Involving Human Research Subjects, Health Sciences Group, Chulalongkorn University. Verbal permission for collecting the data was

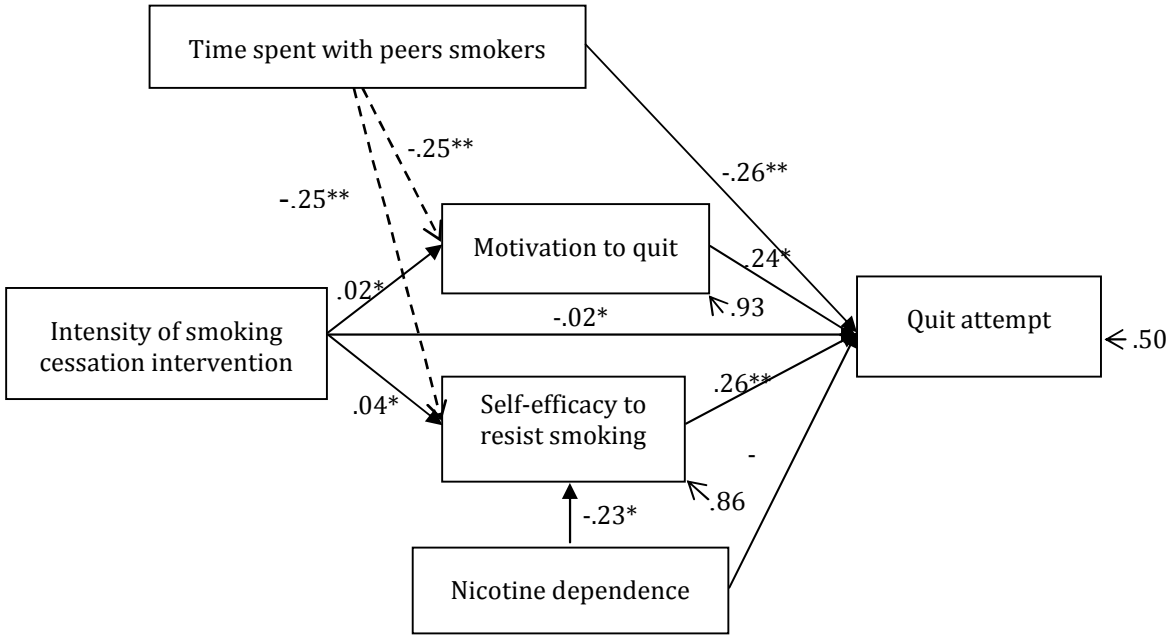
obtained from the participants. Informed consent from the parents was not obtained, as most are generally not aware of their children's smoking status; thus, a request for informed consent from a parent may have had a negative effect on the participants.

STATISTICAL ANALYSIS

After the researcher prepared and completed the data screening, the assumptions underlying the multivariate analysis for path analysis including normality, linearity, homoscedasticity, and multicollinearity were tested. There was no violation of the assumptions. The path analysis command in Lisrel 8.53 was used to examine the direct, indirectly mediated, and total contribution to quit attempts.

RESULTS

The theoretical model of quit attempt in Thai adolescents was tested (see Figure 1). The results showed that goodness-of-fit was rejected. The initial model explained 44% (R^2 = .44) of the variance of the quit attempt. Then, the researcher applied modification indices to improve the model [27]. Two pathways were added based on the literature. Time spent with peer smokers had a negative indirect effect on the quit attempt through self-efficacy to resist smoking and motivation to quit. As for the path coefficients, it was found that all independent variables significantly predicted quit attempt. As shown in Figure 3, the path coefficients for nicotine dependence had the most impact on the quit attempt (ß = -.30), followed by self-efficacy to resist smoking (ß = .26), and time spent with peer smokers (ß= -.26). The final path model explained 50% (R^2 = .50) of the variance of the quit attempt (Figure 3). The goodness-of-fit was in the acceptable range.



Note. *p<.05, **p<.01, n= 463, χ^2–test= 14.64, χ^2/ df= 2.09, p-value=0.05 GFI= 0.99, AGFI=0.97, CFI= 0.99, RMSEA .049, R^2=.50)

Figure 3 A path model of the quit attempt among Thai adolescent smokers

DISCUSSION

All factors significantly predicted quit attempt at the statistical significance level of .05. Bandura's SCT stated that individual behaviours can be affected based on personal and environmental factors. The variables that significantly predicted quit attempt are considered personal and environmental factors. The findings are congruent previous studies that have found self-efficacy to resist smoking [28, 29], motivation to quit [16, 30], nicotine dependence [31], time spent with peer smokers [26], and intensity of smoking cessation intervention could significantly predict quit attempt [32, 33].

The group factors in this study predicted 50% of the variance in quit attempt based on the results of path model. There is no study on the quit attempt model specific to adolescent smokers. In a study of adults, Fagan and colleagues [22] indicated that employment status, the number of cigarettes smoked per day, having a usual type of cigarette, time to the first cigarette, and nicotine dependence were significantly associated with quit attempt in the adjusted multivariate model. In another study by Zhou and colleagues

[6], the model for quit attempt in adult smokers in the United States consisted of age, motivation to quit, intention to quit, previous quit attempt, and nicotine dependence. There are several different predictors in the previous studies when compared to the present study such as age, employment status, the number of cigarettes smoked per day, having a usual type of cigarette, and time to the first cigarette. These predictors are non-applicable for an adolescent population, and adults have characteristics, smoking patterns, lifestyles, and attitudes that differ from those of adolescents.

Two additional pathways were found in the path model: time spent with peer smokers had a negative indirect effect on the quit attempt, through self-efficacy to resist smoking (path 1) and motivation to quit (path 2). Due to the lack of previous research on time spent with peer smokers and quit attempt, the researcher could not find the evidence to draw these particular pathways, that is, the negative indirect effects reported herein. However, a plausible explanation of the findings can be found in SCT, which describes the importance of four sources of self-efficacy for achieving behavioural change: physiological and affective states, vicarious experience, enactive mastery experience, and verbal persuasion [34]. Adolescent smokers who spent time with peer smokers may be less likely to have these sources of self-efficacy. Because of an environment of smoking, they lacked the opportunity to achieve self-efficacy through role models, personal experiences of actual performance of quitting smoking with others, and having no one who persuades them to quit [35]. As mentioned earlier, previous research revealed that peers are an important motivator to help adolescents stop smoking [36]. Adolescent smokers who spend more time with peer smokers lack the desire from both inside and outside the self. The possibility also remains that spending more time with friends that smoke infers spending less time in non-smoking environments, resulting in a lack of motivation to quit.

Surprisingly, intensity of smoking cessation intervention was found to have a negative direct relationship with the quit attempt. This result is contrary to expectations. One possibility is that adolescent smokers rarely used any of the materials or sources of intervention to help them quit smoking; including self-help books, free telephone lines, chat rooms on the Internet, teachers, smoking consultants, and nurses [37]. The study showed that only 27% of the subjects received smoking cessation counselling from healthcare professionals. Only 2-6 subjects received follow-up services. As reported in a previous study, most young smokers often do not receive counselling and follow-up [32]. Adolescent smokers who received cessation services were referred by teachers or parents. One barrier may be that adolescent smokers are reluctant to seek help from healthcare professionals if it requires revealing their smoking behaviour to friends or parents. Adolescence is the period of identity development. If an adolescent is forced to do something despite him/her being reluctant about it, he/she will oppose it.

Although the direct and indirect path coefficients of intensity of smoking cessation intervention indicate a low relationship to quit attempt, Chin [38] stated standardized paths should be at least .20. If this variable is excluded from the model, the goodness-of fit index will reject. It was shown that intensity of smoking cessation intervention is the important predictor for quit attempt among Thai adolescents. Over the years, many studies have evaluated a variety of public and private multicomponent cessation programs, such as physician-directed counselling, community-based counselling, and school-based programs. However, the smoking cessation interventions for adolescents are not really effective, and how to promote adolescents' participation in smoking cessation programs is still in doubt.

CONCLUSIONS

The findings demonstrated that the strongest factors influencing quit attempt were nicotine dependence, followed by time spent with peer smokers and self-efficacy to resist smoking. To be effective with adolescents' quit attempts and long-term smoking abstinence, nurses should intervene early on to help adolescent smokers perform the quit attempt, before they are highly addicted to nicotine creating more difficulty with being able to quit. Smoking cessation interventions should be provided as soon as possible and consider the factors that were found to predict quit attempt. Additionally, nurses should work together with the family and school to organize and manage activities or projects for improving adolescent smoker's motivation and self-efficacy. Such activities can be of benefit in helping adolescents develop good habits as well as distract from spending time with peer smokers.

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COMPETING INTERESTS

The authors have no competing interests.

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