Online Health Education Program to Prevent Tobacco Use for Student Teachers during COVID-19 Pandemic in Thailand: Design, Challenges, and Outcomes

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Abstract

This study developed an online health education program by applying the Health Belief Model with social support to prevent tobacco use by student teachers and evaluated the effectiveness of the program during the COVID-19 pandemic in Thailand. This involved mixed method research divided into 2 phases, with phase 1 combining an online focus group discussion (n=8) and a literature review to develop an online health education program to prevent tobacco use, while phase 2 involved evaluating the effectiveness of the program. Phase 2 used a randomized pretest-posttest control group design consisting of an intervention group (n=30) and a control group (n=30) selected by simple random sampling for both groups from student teachers in academic years 1–5 in the Faculty of Education, Kasetsart University, Bangkok, Thailand. The result from phase 1 for the proposed program for the intervention group involved 8 weeks of online activities, including exercise, meditation, music, games and lectures by experts in public health, health education, and experiences shared by ex-smokers. Leaflets were provided to all participants in both the intervention and control groups. The results from phase 2 showed significant differences in knowledge ($p < 0.000$; $p < 0.007$), attitude ($p < 0.000$; $p < 0.034$) and risk behavior to tobacco use ($p < 0.004$; $p < 0.025$) for both the intervention and control groups at 8 weeks post-intervention compared to pre-intervention, respectively. The program could support, guidance, and contributions of the many individuals and organizations that have been involved in the online process.

Keywords: online health education program, prevent tobacco use, COVID-19 pandemic

1. Introduction

Currently, the COVID-19 pandemic has had a global impact. Many countries have adopted lockdown measures, including Thailand (Wetchayont, 2021). The COVID-19 pandemic has changed the way of learning for all levels of education, with educational institutions having to change the techniques they apply to help students gain knowledge. Teaching and learning activities that are usually carried out using face-to-face meetings have turned into virtual meetings in various online learning applications. Online learning has been widely adopted during the COVID-19 pandemic to ensure the continuation of school and university activities (Simamora, 2020). Kasetsart University in Bangkok, Thailand has conducted online learning since the first wave of the COVID-19 pandemic in Thailand.

Shastri et al., (2021) examined current data from available studied on the possible relationship between smoking and COVID-19. From the results found that patients with a smoking history having developed more severe

symptoms of COVID-19 disease than non-smokers. Smoke exposure results in infiltration of inflammatory cells into the mucosa, submucosa, and glandular tissue. It induces the excess production of mucus, causes epithelial-cell hyperplasia, interruption of tissue repair, thickened airway walls, emphysema, and impairment of lung function, including gas exchange (Goni, 2020).

The tobacco epidemic is one of the biggest public health threats the world has ever faced, killing more than 8 million people a year globally (Claire et al., 2020). Approximately 7 million of those deaths were the result of direct tobacco use, while approximately 1.2 million were the result of non-smokers being exposed to second-hand smoke. Nicotine from smoking tobacco, specifically its metabolite cotinine, has negative effects on human health causing lung cancer, chronic obstructive pulmonary disease (COPD), and non-respiratory problems (Manavi et al., 2020). Cigarette smoking is the most common form of tobacco use worldwide. Other tobacco products include waterpipe tobacco, various smokeless tobacco products, cigars, cigarillos, roll-your-own tobacco, pipe tobacco, bidis, and kreteks. All formulae of tobacco are harmful, and there is no safe level of exposure to tobacco. Smokeless tobacco use is highly addictive and harmful to health. Smokeless tobacco contains many cancer-causing toxins and it increases the risk of cancers of the head, neck, throat, esophagus, and oral cavity (including cancer of the mouth, tongue, lips, and gum), as well as various dental diseases (World Health Organization, 2021). Over 80% of the 1.3 billion tobacco users worldwide live in low and middle-income countries, where the burden of tobacco-related disease and death are heaviest. Tobacco use contributes to poverty by diverting household spending from basic needs, such as food and accommodation. The economic costs of tobacco use have been substantial and include essential treating cost for the diseases caused by tobacco use (Lakra & Rajan, 2021).

Theodore & Panagiota (2013) stated that health education programs for smoking prevention achieved short-term aims by increasing total knowledge and three sub-scores measuring the normative, informative social influence, and physical consequences of smoking. The intervention group showed higher knowledge after the program. However, the health education profession (teacher education programs) was committed to quality assurance and credentialing of both individuals and higher education professional preparation programs for all health educators, including those who teach health education in higher education. Maintaining high standards for the professional preparation and professional development of school health educators ensures that they are well-prepared to help students to acquire the health-related knowledge and skills to prevent tobacco use (Birch et al., 2019)

The Health Belief Model (HBM) aimed to achieve optimal behavior change by facilitating the target to successfully perceive barriers, benefits, self-efficacy, and threats (Jones et al., 2015). This model emphasized that tobacco use was determined by an individual's perceptions regarding personal vulnerability to illness caused by tobacco uses, the seriousness of tobacco as a problem, treatment cost and effectiveness (the benefits of taking action), barriers to quitting, and cues to change tobacco use behavior (Champion & Skinner, 2008).

Social support plays a critical role in one's psychological and physical well-being. (Soulakova et al., 2018). Social support has an important role on the quality of life. Improving the quality of life seemed to be one of the main goals; it was very important to provide psychosocial support with pharmacological treatment by evaluating the medical, mental, and social needs of the dependent person (Ates et al., 2019). Social support was an important factor after a community rehabilitation program because it motivated and helped the person to live a life of sobriety based on the following key social support structures: creating a supporting formal and informal social network; and involving the family, loved ones, friends, co-workers, NGO, public institutions, rehabilitation center personnel, self-help groups, and individuals. The related materials to support this were finding residences and surrounding emotional support with understanding, and professional advice.

However, the current study aimed to develop an online health education program to prevent tobacco use for student teachers during the COVID-19 pandemic by exploring the process, challenges, and effectiveness of the online program for preventing tobacco use and evaluated the effectiveness of the program during the COVID-19 pandemic.

2. Research Method and Results

2.1 Study Design and Setting

This study aimed to develop an online health education program by applying the health belief model with social support to prevent tobacco use by student teachers and to evaluate the effectiveness of the program during the COVID-19 pandemic. The study was divided into 2 phases. Phase 1: This involved 3 steps: 1) online focus group discussion via the Zoom program; 2) a literature review regarding developing a health education program to prevent tobacco use; and 3) developing a health education program by applying the health belief model with social support to provide online health education on a one-to-one basis. Phase 2 involved evaluating the

effectiveness of the program by surveying student teachers via online program activity.

2.2 Study Population and Sampling

Phase 1

Eight student teacher participants were involved in the focus group discussion as key informants from academic years 1–5 in the Faculty of Education, Kasetsart University, Bangkok, Thailand. The sampling process selected key informants according to the specified qualifications. Prior to any data collection, informed consent was obtained from all key informants who were allowed to withdraw from the study at any point without penalization. Most of the key informants were female (62.5%) and 37.5% were aged 21 years, with the most key informants (37.5%) being in their 5th academic year. The general characteristics of the key informants are listed in Table 1.

Table 1. Characteristics of key informants of remote focus group discussion (n=8)

Characteristic	Criterion	f	%
Gender	Male	3	37.5
	Female	5	62.5
Age	18 years	1	12.5
	19 years	2	25
	20 years	2	25
	21 years	3	37.5
Academic year level	1	1	12.5
	2	2	25
	3	1	12.5
	4	1	12.5
	5	3	37.5

2.3 Method and Measurement Tools

Phase1

Step 1: Development of online health education module: the data were collected from key informants via online focus group discussion during February 2021 when Thailand was under community lockdown, including movement restrictions in Bangkok and neighboring regions (including Kasetsart University, which was the study site). The Zoom online program was used for approximately 60 minutes for the session. Online focus group discussions started by building a relationship via a friendly atmosphere to assess the opinions to develop an online health education program to prevent tobacco use. The key informants were asked to provide demographic data via a questionnaire using Google form. We concluded by sharing lessons learned, including experience and innovations for maximizing participant engagement and comfort to elicit rich qualitative data (Reisner et al., 2018). with the questions as shown in Table 2.

Table 2. Key questions and answers from key informants of online focus group discussion (n=8)

Focus group discussion	
Question	**Answer**
-What kind of activities do the students think will help promote the non-smoking behavior of student teachers in public universities?	-Expertise to provide health education -Cost comparison between cigarette and other things, such as clothing, food, and soft drinks -Experience of smoking -Case study
-What are the characteristics or details of the activities mentioned above that these student teachers want?	-Competition -Present results of smoking impact -Slogan contest -Cost comparison based on statistics
-Where will all activities be held during the COVID-19 pandemic?	-Online
-When will all activities be held during the COVID-19 pandemic?	-After class (evening time) 1 hour/session
-What should be the duration of the online health education program?	-8 weeks
-What kind of project evaluation format?	-Pre-test, post-test -Assessing, knowledge, attitude, and risk behavior

The focus group data showed similar trends across modalities. The activities that key informants thought would help to develop an online health education program to prevent tobacco use of student teacher (Table 1) should include providing health education, a cost comparison between cigarettes and other things such as clothing, food, and soft drinks, and mentioning intervention activity. The experience from ex-smokers and a case study should be proposed. The activities could include competitions, providing information about the results of smoking and its impacts, and a slogan contest to encourage healthy competition among the participants. All activities were held during the COVID-19 pandemic via online, after classes and for 1 hour/session. Pre-testing, post-testing, assessing knowledge, attitude, and risk behavior were evaluated for the online health education program.

Step 2: Literature review to develop health education program to prevent tobacco use: Health education program/prevention program/policy

Theodore & Panagiota (2013) stated that health education intervention achieved its short-term aim with increases in total knowledge and three sub-scores measuring normative, informative social influence, and the physical consequences of smoking, as well as a reduction in the number of cigarettes smoked per day and increasing self-esteem.

Nădăşan et al., (2013) found that participants in the intervention group, who had never smoked were 35% less likely to report smoking initiation 6 months after the baseline assessment. Reduced smoking initiation was observed most notably among participants who were exposed to at least 75% of the program.

Tahlil et al., (2013) stated that prevention programs provided positive effects on health and related knowledge among adolescents in Indonesia.

Golechha (2016) stated that health promotion program for smoking prevention and cessation are associated with public by social marketing and mass media interventions; the individual by a motivation interview and peer education; although the community reacted best to community mobilization and changing the environment by media advocacy, while setting-based intervention seemed to be an extremely effective method of encouraging smoking prevention and cessation.

Galanti et al., (2014) summarized evidence on the effectiveness of school anti-tobacco policies (exposure) in preventing tobacco use (outcome) among high school students. The evidence concerning the effectiveness of a school policy alone in preventing youth tobacco use was weak and inconclusive. Experimental studies or observational studies with a longitudinal design are warranted, applying clear definitions of policy components and careful control to avoid confounding factors.

Step 3: Design online health education program by applying Health Belief Model with social support: Health education was given via online activities. The following constructs of the Health Belief Model were used to develop the health education program:

1) The person's susceptibility: A person's opinion regarding how serious smoking caused chronic diseases and short-term and long-term health effects that could occur in later adulthood, such as asthma, COPD, and lung cancer, and could be fatal. However, the short-term health effects caused by smoking can appear in smokers instantly or after they start smoking which was frequently in adolescence (Bonnie et al., 2015).

2) Perceived susceptibility to illness: A person's opinion on the chances of getting a health effect condition and believing that the person is susceptible to the disease effects of tobacco use regarding the seriousness of various disease and the effects from related conditions from tobacco use reaching the person's brain, heart, and other organs.

3) Perceived benefits: A person's opinion of the benefits to prevent tobacco use, for example knowing about dental/oral hygiene, general health, well-being, and the cost savings from not using tobacco.

4) Perceived barriers: These were the barriers to a person taking action to prevent tobacco use, such as lack of knowledge, risk factors from friends, and social pressure. However, non-smokers should weigh the benefits of improving their quality of life by considering the barriers preventing tobacco use.

5) Cues to action: These stimulate their decision-making into two ways, with some of them being internal (such as all types of tobacco products contain chemicals that can be harmful to their health, loss of appetite, reduced immunity, premalignant lesions, and oral cancer in the case of tobacco users), while others are external (such as disturbed communication between people due to bad breath and stained teeth). Furthermore, there are non-smoker opinions regarding the tangible costs of tobacco smoking.

6) Self-efficacy: Involves a person's confidence in the ability to prevent tobacco use.

7) Social support: Benefits from the social support offered to non-tobacco uses who participate in this program.

It is commonly advised to seek social support from friends, family, community, and shared experiences from ex-smokers (Baker et al., 2011).

8) Short lectures from experts in public health and health education for knowledge of chronic diseases and short-term and long-term health effects, of the chemicals in tobacco products that can be harmful to health, and a case study.

9) For health education program development: as a part of health education, leaflets were prepared based on well-known guidelines for both the intervention and control groups (Hasanica et al., 2020). The information in leaflets for all participants was prepared based on the Thailand Guidelines; Operation Manual of Non-smoking and Alcoholic Educational Institutions (Department of Disease Control, Ministry of Public Health Thailand., 2020). The information packages consisted of the types of tobacco products, the disease-effects of tobacco use, and the benefits of not smoking that were depicted in pictorial form using an online design in full color. The expert panel assessed the leaflets and suggested corrections were made accordingly.

Table 3. Session/timetable, activities and goals of online health education program to prevent tobacco use by student teachers during COVID-19 pandemic in Thailand

Session/Timetable	Activity	Goal
Module 1_week 1 -Behavior dissolution activity -Clarify the objectives of the study -Collect data before the experiment using an evaluation form	-Organize recreational activities to build relationships with intervention group and control group -Explain and clarify the objectives of the study -Obtained online consent form -Collecting prior data using a pre-experimental evaluation form for both groups -Distribute leaflets	-To assess the behavior of participants and develop relationships with them -To provide research objectives
Module 2_week 2 -To provide education about smoking and the dangers of cigarettes in various fields	-Lecturer provides educational information about types of tobacco and dangers of the chemicals in tobacco -Compare the cost spent on cigarettes with alternative consumable products	-The intervention group became aware of the dangers of tobacco -Awareness of the management of expenses incurred from the purchase of tobacco
Module 3_week 3 -Exchange and learn about the dangers of tobacco use -Invite the participants to a campaign activity "The penalties from using tobacco" to be publicized for others to know through social media -Make media or banners to campaign to publicize others to be aware of the dangers of tobacco -The slogan invites people not to smoke	-Lecture on the topic "The harm caused by cigarettes" -Developing campaign activity "The penalties from using tobacco" to be publicized for others to learn about through social media -To encourage the participants, to create slogans on the topic "Invite people not to smoke" by presenting their slogans and sharing their opinions on slogans	-Recognize the dangers of tobacco -Using creative ideas to disseminate the dangers of tobacco through various media - An invitation to stay away from tobacco use through slogans
Module 4_week 4 -Share smoking experience from an ex-smoker	-To exchange experiences of ex-smokers; outcome of health after tobacco use, attitude toward tobacco use	-Learning through case studies
Module 5_week 5 -Group discussion to exchange ideas and experiences about the dangers of tobacco	-To discuss self-experience or of close friends who smoke regarding the effects of tobacco and finding ways to prevent tobacco use	-A systematic analysis of the effects of smoking and a plan of action to prevent tobacco use among the group
Module 6_week 6	-Game activities regarding diet to reduce the	-Promote proper

-Practice behaviors to prevent tobacco use	risk of non-communicable diseases (NCDs) -Proper online exercise activity to prevent tobacco use -Stress relief through attention-based recreational activities, such as meditation and music	consumption to reduce NCDs incidence -Acknowledge basic exercise -Improve the quality of life and well-being via stress relief through meditation and music
Module 7_week 7 -Conduct a campaign activity "The penalties from using tobacco" to be publicized for others to learn about through social media	A campaign activity "The penalties from using tobacco " to be publicized for others to learn about through social media -Competition: The participants present posters and slogans inviting people not to smoke -Vote and announce the award	-Using creative ideas to disseminate information using social media on the dangers of cigarettes -An invitation to stay away from cigarettes through slogans
Module 8_week 8 -"Saphan Jai, Friends Help Friends" Understanding and consulting Activities -Summarize and evaluate the online health education program results in practice	-The researcher reminds and encourages the intervention group to share their opinions, knowledge, and attitude among group members to prevent risk factor behavior by listing components of Health Belief Model and social support -Announce three awards for participants who participated and co-operated well in organizing this program -Summarize and evaluate the online health education program results including the researcher answering any queries from participants -Collecting data after the program with a post-experimental evaluation form for both groups	-Understand the process of proper behavior in preventing tobacco use -Self-awareness -Self esteem -Evaluation of the program

The activities of online health educution program to prevent tobacco use by student teachers during COVID-19 pandemic in Thailand

Figure 1. Online health education program to prevent tobacco use by student teachers during COVID-19 pandemic in Thailand activity's photos

Phase 2

Table 4. Socio-demographic of participants of online health education program to prevent tobacco use by student teachers during COVID-19 pandemic in Thailand

	Intervention group (n=30)		Control group (n=30)	
	No. of participants (n)	(%)	No. of participants (n)	(%)
Characteristic				
Gender				
Male	13	43.3	7	23.3
Female	17	56.7	23	76.7
Age				
18 years	7	23.3	2	6.7
19 years	5	16.7	4	13.3
20 years	11	36.7	8	26.7
21 years	2	6.7	8	26.7
22 years	3	10.0	6	20.0
23 years	2	6.7	1	3.3
24 years	0	0	1	3.3
Academic year				
1	11	36.7	4	13.3
2	7	23.3	5	16.7
3	7	23.3	12	40.0
4	3	10.0	6	20.0
5	2	6.7	3	10.0

The participants were student teachers in the academic years 1–5 in the Faculty of Education, Kasetsart University, Bangkok, Thailand. Sixty participants were involved in the intervention (n=30) and control (n=30) groups. Simple random sampling was assigned to allocate subjects to the intervention or control groups to ensure that the treatment groups not substantially different prior to the program. Informed consent was obtained from all participants prior to any data collection. The intervention group was predominantly female (56.7%) and 36.7% of the participants were aged 20 years, with 36.7% being in their 1st academic year. The control group was overwhelmingly female (76.7%) and 26.7% of the participants were aged 20 and 21 years, with 40.0% being in their 3rd academic year.

Table 5. Comparison statistics for knowledge, attitude, and risk behavior of tobacco use before and after intervention for student teachers in intervention and control groups

	Group	Prior to intervention (Week 1)			Post intervention (Week 8)				
		Min-Max	Mean	SD	Min-Max	Mean	SD	t	Sig. (2 tails)
Knowledge	Intervention (n=30)	8-20	15.03	3.011	17-25	21.20	2.140	11.191	.000
	Control (n=30)	12-21	15.23	1.906	12-22	16.10	1.989	-2.904	.007
Attitude	Intervention (n=30)	2.21-4.85	4.238	.539	3.92-5.00	4.665	.247	-5.052	.000
	Control (n=30)	2.60-4.92	4.294	.435	3.46-5.00	4.427	.374	-2.219	.034
Risk behavior	Intervention (n=30)	1.00-2.22	1.279	.271	1.00-1.77	1.198	.176	3.120	.004
to tobacco use	Control (n=30)	1.00-1.77	1.223	.154	1.00-1.55	1.176	.131	2.359	.025

Note: p-value <0.05

The participants in the intervention group had significant increased knowledge and attitude and at post-intervention (week 8) measurement. However, the participants in the control group also had significantly increased knowledge and attitude at post-intervention (week 8) but scores for knowledge, attitude and risk behavior were lower compared to the means for the intervention group. All participants in both groups were at low behavior risk to exposure to tobacco use.

2.4 Data Collection/ Data Collection Tools

For this study in both phases, video and audio recordings were obtained using the Zoom program. All personal data gathered were coded so individual's details were anonymous. The data were stored on password-protected computers. The participants were advised that all data would be destroyed after study completion and publication of the findings.

Phase 1: Online focus group discussion

Each key informant provided written informed consent prior to the focus group discussion. The consent form stated that the discussions would take place online. Once everyone had agreed to participate, they sent their informed consent forms back to researcher. The data collection tools for phase 1 were:

1) Demographic data, consisting of gender, age, and academic year level were collected from key informant via a Google form questionnaire.

2) Focus group discussion questionnaires were created to gauge the opinions of the key informants to develop the online health education program based on the 6 questions shown in Table 2.

Phase 2: Online health education program

All participants provided online written informed consent prior data collection using the study questionnaires in week 1. The data collection tools for phase 2 were:

1)   Demographic data, consisting of gender, age, and academic year level, were collected from participants via a Google form questionnaire.

2)   Pre-test and post-test questionnaires regarding knowledge, attitude, and risk behaviour regarding tobacco use were collected from participants via a Google form questionnaire.

3)   Eight weeks of the online health education program were conducted with the participants in the intervention group.

2.5 Data Analysis

Phase 1

Data were collected from 8 student teachers in the academic years 1–5 in the Faculty of Education, Kasetsart University via online focus group discussion during February 2021. After the focus group discussion, the researchers examined the quality and reliability of the data according to the guidelines from Urwongse (2019) as follows: 1) transcribing the interview-the researchers did not skip any sentences because some sentences that the researcher might initially decide were unimportant could later be used in the review period; 2) data management-the qualitative research did not focus on the use of tools to collect information. Therefore, it was necessary to take note of information from the collected data. Various methods were applied to provide the recorded data as files so that this information could be used in the data analysis; 3) coding-the data were categorized using certain words; 4) memoing data reduction-the researchers made provisional conclusions and truncated data to reduce the amount of data, so that the unwanted data was deleted; 5) displaying data for analysis and presentation-the conclusions were used to answer the research problems and included preparing charts, tables containing content (matrices), a network of causes and effects (causal network), and classification of words and ideas (taxonormies or ethnoclassifications); 6) drawing and verifying conclusions-planning, pattern analysis, grouping, and factor analysis were used to identify the relationships among events and concepts to link the theory and findings; and 7) proof of conclusions-this linked abstract conclusions back to concrete new events to ensure that the conclusions were appropriate. The reliable methods that researchers used to verify the validity of a conclusion included checking the representation of the data (whether it came from a representative source), examining the researchers themselves for bias based on triangulating the data, validation to assess the quality of the information, and possibly reviewing the conclusions obtained with the contributors to ensure appropriate conclusions. Finally, the results of the process were compiled into a report for further dissemination.

Phase 2

Data analysis in this research used statistical analysis software to obtain: 1) descriptive statistics, with the general characteristics analyzed using the mean, percentage, and standard deviation; 2) inferential statistics to analyze the average scores pre-test and post-test for knowledge, attitude, and risk behavior for tobacco use by the intervention and control groups were determined using a paired t-test statistic.

2.6 Ethics Consideration

This study was approved by the Human Research Ethics Committee, Kasetsart University, Bangkhen, Thailand (number KURDI code no. COE63/238) on 25 November 2020.

3. Findings and Discussion

The online health education program focused its evaluation efforts on monitoring, assessing the program's activity, and educational material (Figure 2).
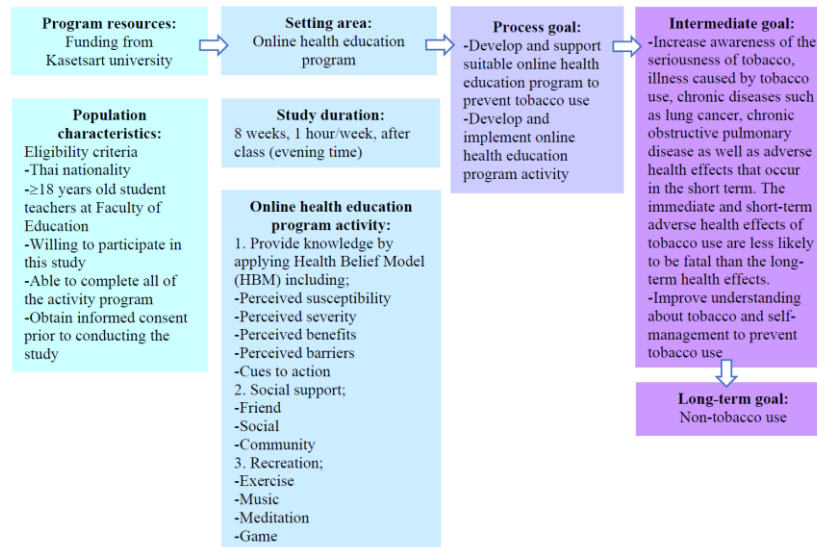
Figure 2. Online health education program applying Health Belief Model with social support to prevent tobacco use by student teachers
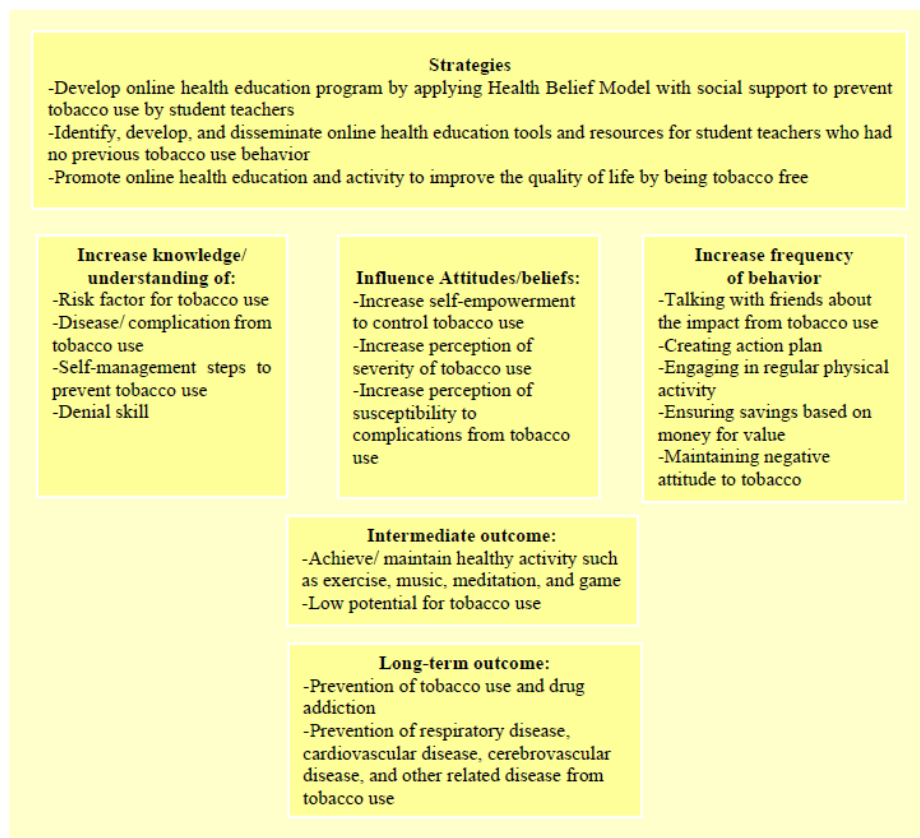
Figure 3. Strategies and outcomes of online health education program to prevent tobacco use by student teachers during COVID-19 pandemic: Design, challenges, and outcomes

3.1 Covid-19 in Thailand

With the outbreak of the COVID-19 pandemic around the world, many countries announced lockdown measures, including Thailand (Wetchayont, 2021). Thailand was considered among the top countries in handling its first wave of the outbreak from 12 January - 31 July 2020 (Triukose et al., 2021). However, the country went from

generally controlling the virus by mid-2020 to experiencing a severe second wave of outbreaks beginning in December 2020, so the Education Ministry ordered all public and private schools and vocational training centers to close down until the end of January 2021 (Channelnewsasia, 2021). The third wave started in April 2021. As at 23 November 2021, there had been 259,094,944 reported cases and 74,167 new cases of COVID-19 globally, including 5,184,373 deaths, the majority of which have been reported in the USA (48,835,216) and India (34,535,763) (Our World in Data, 2021).

3.2 Relationship of Tobacco to Severe Symptoms of Covid-19

Tobacco smoking is a known risk factor for many respiratory infections and increases the severity of respiratory diseases; the causal role of smoking has been firmly demonstrated regarding lung cancer and chronic obstructive pulmonary disease. For example, a review of studies by public health experts convened by WHO on 29 April 2020 found that smokers are more possible to develop severe disease with COVID-19 compared to non-smokers (World Health Organization, 2020). Although there have not been many studies investigating this link specifically, a wealth of evidence suggests that smoking suppresses the immune function in the lungs and triggers inflammation. Both long-term smokers and e-cigarette users are at a heightened risk of developing chronic lung conditions, which have been associated with more severe cases of COVID-19 (Lewis, 2020). From results based on available data, Shastri et al., (2021) found that patients with a smoking history having developed more severe symptoms of COVID-19 disease than non-smokers.

3.3 Online Health Education Program to Prevent Tobacco Use by Student Teachers during Covid-19 Pandemic

The developed online health education program focused on: preventing tobacco use by student teachers as individuals and in their communities to prevent serious smoking causing chronic diseases in the short-term and long-term health effects and related causes in the future; the benefits in preventing tobacco use regarding well-being and cost savings without tobacco use by applying the Health Belief Model with social support. The program was intended to raise student teachers' awareness and self-efficacy to protect themselves from tobacco exposure. This study used an 8 weeks online health education program conducted based on online activity, information, and communication technology for computers and mobile learning. Was this consistent with Bajpai, (2019) who stated that online education was one of the most popular and rapidly evolving approaches to teaching and learning in professional health education. It also enables individuals to acquire knowledge and skills in a timely and cost-effective manner with greater personal control. Additionally, it can restrict the Covid-19 pandemic through social distancing by using technology to learn remotely rather than via face-to-face options (Both, 2021). The online health education program included expert input in leaflets supporting the program.

Knowledge of the dangers from the substances in tobacco and the diseases caused by smoking were provided in the first, second, and third weeks of the online activities, regarding susceptibility and the perceived severity of the illness. The activities in week 2 focused on the benefits by preventing tobacco use based on comparing the cost spent on tobacco with other items instead. In addition, exchanges regarding the experiences of ex-smokers in week 4 explored the outcome of health after tobacco use. The attitude toward tobacco use considered cues to action that stimulated decision-making by participants, thereby raising their awareness and providing a better attitude toward non-smokers. Self-efficacy and social support in week 5 involved group discussion about self-experience or that of close people who smoked regarding the effects of tobacco and finding ways to prevent tobacco use. The program involved a campaign activity "The penalties from using tobacco" in week 3 and awards in week 7 that were publicized through social media. This was consistent with Carson et al., (2010) who stated the effectiveness of mass media campaigns such as television, radio, newspapers, billboards, posters, leaflets, or booklets at influencing the smoking behavior of young people under the age of 25 years. Lastly, week 8 focused on the perceived barriers to a person taking action to prevent tobacco use, such as lack of knowledge and risk factor from friends, society, and the community. However, non-smokers should weigh up the benefits of improving their quality of life by considering the barriers to help avoid tobacco use. The control group participated in weeks 1 and 8 in the pre-test and post-test data collection and also participated in the program in week 7 for the slogan and poster contest to promote non-smoking, thereby raising their awareness and improving their attitude toward non-smokers.

Based on the results, the participants in the intervention group had significantly increased knowledge and attitude at post-intervention (week 8) measurements. This was consistent with Mohamad et al. (2020) who stated health education can be explained as a process by which individuals or groups learned to behave in a manner conducive to the promotion, maintenance, or restoration of health. However, effective health education intervention has its own setbacks and challenges. The current result was also consistent with Daly et al., (2016) who found an intervention program by healthcare professionals could reduce tobacco smoke exposure in

children. On the other hand, the participants in the control group also significantly increased knowledge and attitude at post-intervention (week 8) but their scores were lower compared to the mean values for the intervention group. For risk behavior regarding tobacco use, there were no significant differences between the pre-test and post-test scores for all participants (both groups), perhaps because all would become future teachers. Usually, teachers are role models for student to encourage those under their care to be positive. Teachers have the ability to shape the leaders of the future in the best way for society to build in a positive way and to inspire future generations, both on the local and global scales; it is not just for the student themselves, but for the lives of all.

Leaflets were utilized, based on well-known guidelines, for both the intervention and control groups, to present information on the types of tobacco products, the ill-effects from tobacco use, and the benefits from not smoking being depicted in pictorial form and printed in full color; they were effective for both groups. An expert panel assessed the leaflets and made any necessary corrections, in line with Hasanica et al., (2020). The current study was consistent with Piddennavar et al., (2014) who considered the effectiveness of the Health Belief Model to improve the knowledge, attitude, and behavior of participants by using a leaflet and video to support health education. Therefore, the educator could provide a leaflet covering all information that should increase the knowledge and awareness of participants in a limited time and as part of a distance education program.

4. Conclusion

The online health education program to prevent tobacco use by student teachers during the Covid-19 pandemic was conducted in Thailand. It provided the process and outcomes for an online program that was conducted based on the Health Belief Model and social support to improve the knowledge and attitude of participants. The program could assist in educating student teachers and other stakeholders regarding useful, feasible, appropriate, and accurate measures for evaluating a multifaceted public and professional health education program with the support, guidance, and contributions of the many individuals and organizations that have been involved in the online process.

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