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<p>Website: www.jehp.net</p>
<p>DOI: 10.4103/jehp.jehp_1667_20</p>

# Designing an educational campaign intervention on smoking preventive behaviors in students: A protocol

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## Abstract:

**BACKGROUND:** Today's human lifestyle has faced significant changes, and this lifestyle has caused health problems. The increase of smoking, among young people, is one of the risk factors and incorrect lifestyle factors. The present study will design an educational campaign intervention based on the protection motivation theory (PMT) on smoking preventive behaviors in students.

**MATERIALS AND METHODS:** In designing this study, five phases are considered. (1) needs assessment and determination of the current situation are considered. In this phase, the required communication is established to form a planning team with key and influential people and experts, (2) tool design, (3) educational intervention (educational campaign) is designed. Some individuals will be selected and trained as facilitators to start entering the target population, have a better access to the target group, and implement the interventions in the target group. (4) the implementation of the educational plan, in which the designed educational intervention (educational campaign) will be implemented on the students of the studied universities. (5) the educational evaluation, which will be conducted 2 months after the intervention of the educational campaign. The posttest will be based on before and after the implementation of the educational campaign. In the prevention of the second type in smoking students, the salivary cotinine levels of smoking students will be measured and comparisons will be made before and after educational using appropriate statistical tests.

**RESULTS:** The present study addresses the needs and strategies for smoking prevention using a training campaign based on the PMT and web.

**CONCLUSION:** Designing a campaign which will lead to smoking preventive behaviors causes lifestyle changes, prevent health problems such as cancer, cardiovascular diseases, and other chronic diseases, reduce treatment costs, and increase life expectancy.

## Keywords:

Behavior, protocol, smoking prevention, students

## Introduction

Today's human lifestyle has faced significant changes, and this lifestyle has caused health problems such as cancer, increased cardiovascular diseases, and other chronic diseases. The increase of smoking, especially adolescents is one of the risk factors and incorrect lifestyle factors.<sup>[1]</sup> Health-promoting behaviors are essential beliefs and actions to develop and

sustain the adolescent health; however, people with inadequate health literacy have poorer health status. Health literacy and practicing real-life scenarios can improve the adolescent lifestyle.<sup>[2]</sup> Smoking is one of the main causes of different diseases such as lung disease 70%, heart disease 50%, total cancers 30%, and lung cancer 90%.<sup>[3]</sup> 1% of all deaths in the world is due to smoking.<sup>[4]</sup> Smoking is the fourth risk factor for increasing the overall burden of disease, affecting all aspects of human

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**How to cite this article:** Mahmoodabad SS, Abdollahi SZ, Lotfi MH. Designing an educational campaign intervention on smoking preventive behaviors in students: A protocol. J Edu Health Promot 2021;10:381.

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Received: 26-12-2020  
Accepted: 05-03-2021  
Published: 29-10-2021

health as a global problem.<sup>[5,6]</sup> It should be noted that more than half of all deaths due to smoking occur at the ages of 35–59 years.<sup>[4]</sup> Smoking behavior is affected by different factors including individual – family and social factors.<sup>[7,8]</sup> Smoking is a significant risk factor for health and development and should be regarded as a disruptive factor in the studies analyzing potential environmental pollutants.<sup>[9]</sup> In addition to the high prevalence of smoking as a health problem, the threats caused by cigarette smoke for those exposed to it are an additional barrier which is very ponderable.<sup>[10-12]</sup> Many studies indicated the increasing prevalence of smoking throughout the world. Youth is a period of human life cycle which increases the probability of inappropriate and deviant behaviors. During this period, young people encounter major biological, psychological, social, and cultural changes and enjoy more freedom and independence than during the childhood and adolescence, and this will be a warning alarm for inappropriate behaviors such as smoking.<sup>[13]</sup> Young people form a large part of the community and health training in this group causes the transfer of information to the family and community. As a result, it provides a basis for the expansion of health promotion to the whole community.<sup>[14]</sup> Due to the high prevalence of COVID-19 and the fact that coronavirus damages the lungs, those who smoker are highly susceptible to this disease. Because of the destructive effects of smoking on the disease and the severity of COVID-19 infection, the significance of prevention and smoking cessation among young people is highly critical and obvious.<sup>[15-17]</sup> One of the significant elements of development in the province is its higher education which is in line with the provincial plans. In addition, the studies conducted among students, it is decided that educational intervention should be performed and the promotion of students' health literacy concerning the smoking prevention should be promoted at universities considering the topic of culture.

A community-based health promotion plan is a comprehensive, systematic, and coordinated approach with a long-term effect on health aimed to affect the community norms through training and organizing the community.<sup>[18]</sup> One of the community-based educational strategies is educational campaign which aims to convey persuasive messages to perform specific behaviors in the target group. Campaigns invite health, people, and officials to participate publicly and consider the collective interests.<sup>[19,20]</sup> Campaigns have the highest penetration rate among all of the intervention strategies and encounter fewer threats compared to other strategies.<sup>[21]</sup> Selecting a health education model is the first and most significant step in the process of designing an educational plan.<sup>[22]</sup> One of the most significant theories in health education for behavior change is PMT which was developed by Rogers in 1975 to explain the effects of fear

on health attitudes and behaviors. This theory assumes that accepting the recommended health (protective) behaviors is the result of motivation for protection.<sup>[23]</sup> The PMT is based on the value expectation model and was developed to explain the effects of fear on health attitudes and behaviors and the fact that the induction of fear has a significant effect on choosing behaviors.<sup>[24]</sup> Based on PMT, environmental and personal factors are merged to raise a potential health threat which initiates two cognitive processes including threat appraisal and coping appraisal.<sup>[25]</sup> These two processes of mediation-cognitive appraisal are merged along to form a protection motivation. Thus, adapting to a healthy behavior is a transient process of converting motivation into intentional behavior.<sup>[26]</sup> This study aims to investigate the effect of educational campaign intervention based on PMT on smoking preventive behaviors in students.

## Materials and Methods

### Study design and setting

In designing this study, five phases are considered. In the first phase, needs assessment and determination of the current situation are considered. In this phase, the required communication is established to form a planning team with key and influential people and experts. The predicted members are divided into two groups. The first group of this team involves key decision makers and those in power (student-related officials) such as university heads, faculty heads, university security, municipality, health deputy and city health center, IRIB agent, heads of faculty and faculty members, university cafeteria officials, seller of university or faculty store, and service officials. The second group included volunteer students and the student committee, i.e., the same members of the target community and representatives of the students at each university. The role of this group is providing advice, support, participation in the plan design, implementation, and appraisal. In the second phase, the tools are made. The data related to the phases of face validity, content validity (content validity index [CVI], content validity ratio [CVR]), and reliability (internal consistency) and determining the predictive constructs of PMT are collected. In the third phase, educational intervention (educational campaign) is designed. Some individuals are selected and trained as facilitators to start entering the target population, have a better access to the target group, and implement the interventions in the target group. The fourth phase is the implementation of the educational plan, in which the designed educational intervention (educational campaign) is implemented on the students of the studied universities. The fifth phase is the educational evaluation, which is conducted 2 months after the intervention of the educational campaign.

The posttest is based on the PMT questionnaire and the collected results of the educational campaign are based on before and after the implementation of the educational campaign. In the prevention of the second type in smoking students, the salivary cotinine levels of smoking students are measured, and comparisons are made before and after educational using appropriate statistical tests. Figure 1 shows the Execution steps diagram.

**Aim**

This study aims to design and implement an educational campaign based on the PMT on smoking preventive behaviors in students for increasing awareness and changing students’ attitudes. In addition, it is designed to reduce their exposure to smoking and changes lifestyle to prevent health problems such as cancer, increase cardiovascular diseases and other chronic diseases, reduce treatment costs, and increase life expectancy.

**Research hypotheses**

Based on the main objective of this study, some hypotheses have been considered based on the opinions of health education experts, psychiatrists, and specialists of smoking cessation clinics that the mean score of perceived sensitivity, perceived severity, perceived response efficiency, perceived self-efficacy, perceived response cost, internal reward, perceived fear, adjustment appraisal, threat appraisal, protection motivation is higher after educational intervention than before intervention. In addition, the mean score of smoking preventive behavior in students is significant before and after the educational campaign.

**First phase: (Needs assessment) and specifying the current status**

In this phase, first, the required communication is established to form a planning team with key influential people and experts. The predicted members are divided into two groups. The first group of this team involves key decision makers and those in power (student-related officials) such as university heads, faculty heads, university security, municipality, health deputy and city health center, IRIB agent, heads of faculty and faculty members, university cafeteria officials, seller of university or faculty store, and service officials. The second group included volunteer students and the student committee, i.e., the same members of the target community and representatives of the students at each university. The role of this group is providing advice, support, participation in the plan design, implementation, and appraisal. In addition, this group has an effective supervision on intervention strategies and training materials in terms of faculty of speech, cultural relevance and comprehensiveness, manner and duration of intervention, and selection and use of facilitators.<sup>[27]</sup> In the group meetings, the goals of the plan and the role of organizations and individuals in this plan will be explained to the members of the planning team.

**Second phase: Tool-making**

Then, the data related to the phases of face validity, content validity (CVI and CVR), reliability (internal consistency), and determining the predictive constructs of PMT are collected. After reviewing the relevant texts, articles, and journals, a questionnaire will be designed accordingly and its validity and reliability will be obtained through a panel of experts. This questionnaire had two parts. The first part includes demographic information such as age, field of study, parents’ level of education, smoking by student, parents, and friends, parents’ job, residence status, native and nonnative, and financial status. The second part of the researcher-made questionnaire will be designed and completed based on the PMT. The analysis of the results in the descriptive part will specify the main components of the intervention. The designed interventions and messages will be pretested in a meeting at the presence of the planning team and considered as the final message by reviewing the factors such as the audience perception of the message, proportion to the level of literacy, and culture of audience, attractiveness, credibility, and acceptance.

**Third phase: Design of educational intervention (educational campaign)**

Some individuals will be selected and trained as facilitators to begin entering the target community, have a better access to the target group, and implement interventions in the target group. These individuals will

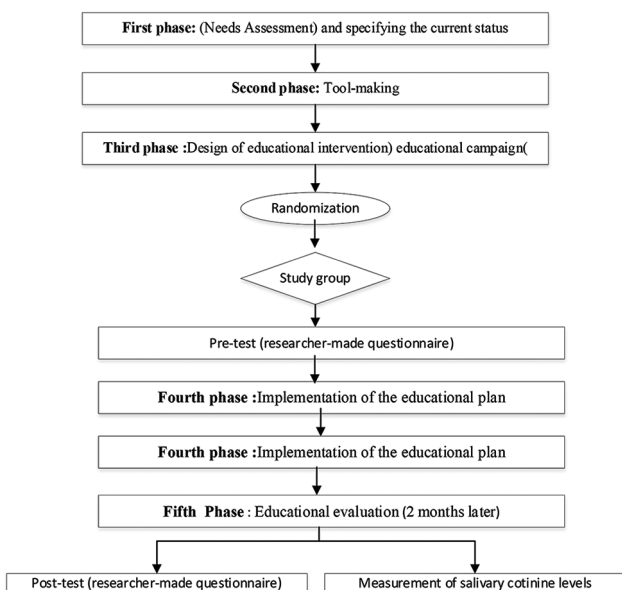


Figure 1: Diagram execution steps

be selected voluntarily from both groups to cooperate with the presenter by having the required interest and motivation in all phases of the plan.

### *Educational campaign*

One of the strategies of community-based educational plans is health information mobilization, which has increased during the recent years and its aim is to convey persuasive messages for having a specific behavior in the target group. A set of coordinated information, communication, and educational activities using a combination of different information channels to convey the desired messages to a specific community during a specific and limited period in line with the goals of the plan is called information mobilization. Health campaigns invite people and officials to public participation and pay attention to collective interests, but if information is not appropriate to achieve, this goal cannot be achieved.<sup>[20]</sup>

Campaign actions are divided into two groups:

1. Strengthening the collective action to attract participation with partner organizations in health. In order to prevent and reduce smoking, joint coordination meetings are held to increase intersectoral cooperation and coordinated action among health-related organizations (municipality, IRIB, vice chancellor for health, heads of universities, faculties, faculty members, etc.) and their participation
2. Facilitators' cooperation with the executive: holding educational meetings with educational methods used in educational classes based on lectures with PowerPoint, questions and answers, group discussions through videos and photos related to the adverse effects of smoking on health and smoke for others, and also a risk factor for increasing the risk of Corona, forming self-help groups to train peers, and reducing the access of the target group to cigarettes.

The types of educational messages for implementing part of the educational campaign are described in Table 1.

Suitability assessment of materials (SAM) technique will be used to evaluate the suitability of the provided material. The SAM provides a percentage score for each medium that falls into one of the three categories: excellent, appropriate, or inappropriate. In this regard, all 22 SAM titles (distributed under six general groups) are evaluated and scored; the excellent, appropriate, or inappropriate options receive two, one, and zero scores, respectively. In the case that the mentioned factor is not applicable for the media the sign (N/A) or "No Items" will be assigned. The total score is calculated by adding the scores and dividing them by the total number of cases. The resulted score will be reported in percent. Scores for an excellent,

appropriate, and inappropriate media fall in the ranges of 70%–100%, 40%–69%, and 0%–39%, respectively. In the case that the media are inappropriate, the required corrections will be made, and the respective scores will be recalculated.<sup>[28]</sup>

The readability assessment of materials (RAM) technique will be used to evaluate the readability of the media. This technique examines the difficulty associated with reading an educational medium (specialized contents and typographical errors).<sup>[29]</sup> To hit this target, the educational content will be sent to the faculty members and some target group members. These individuals will be required to comment on the educational contents using a checklist. Finally, the educational content will be revised based on the received feedback.<sup>[29]</sup>

### *Experts team*

The content and visual validity of the questionnaire and educational program will be measured, and the comments received from the panel of experts. The panel of experts will be included six professionals from health education and health promotion field, three experts from the field of psychology, and psychiatrists and two experts from the field of epidemiology.

### **Fourth phase: Implementation of the educational plan**

At this stage, a randomized clinical trial is designed to evaluate the effectiveness of the prepared protocol. Participants are randomly divided into a pre- and post-intervention group. In the group, after completing the questionnaire and after testing the saliva of smoking students, we will implement our designed protocol.

## **Study participants and sampling**

### **Study environment and population**

The universities of Yazd, including state, Azad, nonprofit, etc., were considered for the intervention.

### **Study sample**

The target participants of this educational intervention study (educational campaign) will include all of the students studying at Yazd universities including state, Azad, nonprofit, etc., during 2020–2021 ( $n = 43,600$ ).

### **Sampling method**

The sample size is considered as 300 subjects by considering 5% significance level and 80% test power and based on the similar study<sup>[30,31]</sup> as well as the standard deviation of the prevention behavior score  $s = 1.5$  to achieve a significant difference of at least 7 units in the mean score of behavior in the intervention group than the control group of 265 people with the calculation of 10% fall. Sampling will be probably multistage stratified

**Table 1: Types of messages in the educational intervention package based on reviewing the texts and opinion of the panel of experts**

Types of messages	Strategies
Educational messages	Such as the content on smoking and its complications in form of pamphlet, poster, texts posted on the internet, and reminder software (e.g., cigarette smoke is a risk for corona disease)
Perceived and perceived sensitivity messages	Including the content to remind students of the complications of smoking (including the photo of the lung requesting not to smoke at home, weekend reminder messages)
Self-efficacy promotion messages	Breaking complex behaviors into simple steps, using role model in briefing and pamphlets (e.g., simple smoking cessation steps and protection strategies, key phrases on the ability of cessation, expressing a smoker's experiences on the history of cessation and the intention for cessation)
Effective response messages	The messages which work by emphasizing the recommended response and is effective in repelling the threat or reducing the chances of experiencing a health threat. By asking for help from students as teaching assistants to support other students, self-help groups for smoking cessation, group discussion, role model, presenting pamphlets, mass media, sending text messages, forming groups on the internet
Fear messages	Including the images and animations (e.g., the images included in pamphlets and animations related to smoking and its complications)
Internal and external reward messages	Reducing the internal and external reward factors which cause smoking in students (rewarding messages of smoking, enjoyable brain stimulation, etc.)
Response cost messages	Messages which reflect the benefits of smoking cessation versus the costs related to cessation
Behavioral messages	Including simple steps to smoking cessation and protection against the smoke which will be presented at the briefings and pamphlets (e.g., keep matches and ashtray away from yourself)

random so that the samples were selected as stratified random after preparing a list of universities. Then, one faculty at each university will be randomly determined, and after preparing a list of graduate and education departments, the students will be selected by random sampling method, and this sample size of 300 subjects will be divided based on the university population. Thus, the size of the random sample will be selected based on the names of the students required for the study.

### Blinding

The staff and investigators involved in delivering aspects of the intervention, by necessity, are not blind to allocation. However, all other investigators and participants are blind to allocation.

### Inclusion criteria

Inclusion criteria for the intervention phase will be attending the faculty at least until the end of the research, the Student's willingness to participate in the study, and being a student.

### Exclusion criteria

Exclusion criteria for the intervention phase will be drug addiction, being a student for <6 months, being absent at more than 10% of training sessions, and the unwillingness of students to participate in the study.

### Data collection tool and technique

In this section, data collection will be performed in two phases before and after the intervention as pretest and posttest using a designed questionnaire. The data collection tool will include a researcher-made questionnaire. This questionnaire had two parts. The first

part will include the demographic information (such as age, parents' education level, smoking in the student, parents and friends, parents' occupation, residence status, native and nonnative, financial status, etc.) and the second part of the researcher-made questionnaire will be designed and completed based on the PMT.

### Data analysis

We will apply  $X^2$  and independent  $t$ -test and paired  $t$ -test to analysis our data using using SPSS version 26 produced by IBM located at New York.

### Outcome measures

#### *Constructs of the protection motivation theory in students regarding smoking*

The mean score of the constructs of students' PMT regarding smoking will be measured using a researcher-made questionnaire in the pretest and posttest stages.

#### *Students' self-report on smoking*

History of smoking, being a smoker at the current time, the number of cigarette per day, and the duration of its use, etc., which will be obtained as a self-report from the students.

#### *Students' saliva cotinine*

Students' saliva will be collected and frozen in special containers and transported to the laboratory by preserving the cold chain. After that, it will be measured and reported using a cotinine kit based on ELISA test.

#### *Primary of study outcomes*

Knowledge, attitude, and practice score and structures of protection motivation model (PMT) - reduce students' exposure to smoking – percentage of smoking students.

### Secondary of study outcomes

Lifestyle improvement – prevent health problems such as cancer, increase cardiovascular disease and other chronic diseases, reduce treatment costs, and increase life expectancy.

### Ethical consideration

This paper was extracted from a health education and promotion PhD thesis by Ethical approval for this study by the ethics committee affiliated with Shahid Sadoughi University of Medical Sciences, Yazd, Iran (IR.SSU.SPH.REC.1399.174). Registration of this randomized control trial has been completed with the Iranian Registry of Clinical Trials, IRCT20200908048656N1. All participants will sign and complete informed consent form, and they will free to discontinue participating in this study whenever they wishe.

## Discussion

Different studies indicated the effect of educational plans and campaigns on smoking prevention such as a study by Yang *et al.* study in 2019, indicating that the media had a significant effect on personal attitudes related to smoking and social attractions, which affected their intention to smoke. Furthermore, the effectiveness of the media was depending on family and school channels so that if the family and school delivered antismoking messages, the effect of the media would be more among adolescents.<sup>[32]</sup> Pardavila-Belio *et al.* conducted the project of predicting smoking cessation among students in a randomized controlled trial on student smokers with less nicotine dependence, preparedness for cessation, and self-confidence in smoking cessation and these factors had a good predictability.<sup>[33]</sup> Wong and Cappella conducted a study entitled “Evaluating efficacy and perceived threats against smoking: The effect of training sessions on smoking cessation intention in low- and high-prepared people.” The results indicated that both efficacy and threat phases were significant for smokers with low readiness for cessation, but efficacy was more significant among smokers with high readiness. The results of this study had a good direction for discussing antismoking campaigns.<sup>[34]</sup> MacDonell *et al.*, conducted a study entitled “The PMT scale” to study smoking among Chinese adolescents. Their findings indicated that seven constructs of PMT were related to adolescents’ real intention and behavior for smoking.<sup>[35]</sup> Truth campaign is one of the largest campaigns launched by the American Heritage Foundation in 2001 to prevent young people from smoking. The results of this campaign indicated that the percentage of the students who smoked during the past 30 days reduced from 18.5% to 8.6%, while this percentage for high school students varied from 27.4% to 20.9%.<sup>[36]</sup> Another national campaign was launched in Australia in 2003, entitled “Does the anti-smoking

campaign prevent adolescents from smoking?” The results indicated the more awareness of adolescents on the risks of smoking.<sup>[37]</sup> In a campaign by Huang *et al.* in China in 2015, a cohort study aimed at evaluating the effect of a mass media campaign on Chinese smokers’ knowledge of the risks and attitudes related to smoking than the rewards of smoking showed that the program increased knowledge about the risks of smoking, leading to smoking cessation. This study presented some evidence for supporting the development of future activities to deal with the tobacco epidemic in China effectively.<sup>[38]</sup> A campaign was launched by Juster *et al.* at the New York State Department of Health in 2016 to increase cessation in collaboration with a health-care provider, a media campaign aimed to provide health services that messaging was based on the addictive nature of tobacco products and evidence-based intervention. The target providing media were the gal to a promising approach for achieving the health-care providers.<sup>[39]</sup> In Karimi *et al.* study that was a quasi-experimental intervention health literacy program on improving health-promoting behaviors among female students at high schools. The intervention was performed in four educational sessions of a problem-based learning (PBL) health literacy program using related scenarios for 90 min. There were significant differences comparing the mean score of health literacy dimensions in numeracy, use, communication, access, and self-efficacy ( $P < 0.001$ ).<sup>[2]</sup> The present study provided good information on educational strategies and campaigns, awareness score, attitudes, and constructs of PMT, reduced exposure to smoking, improved lifestyle, prevention of health problems such as cancer, and the increase of cardiovascular disease and other chronic diseases. In addition to improving lifestyle, it can affect the reduction of the cost of treatment and medical care but increase life expectancy. In designing the present intervention, a community-based campaign was implemented for preventing the first and second types of smoking among the students of Yazd universities and web-based campaigns were used to prevent smoking due to the prevalence of COVID-19. The strength of this intervention was the use of the biochemical index of cotinine along with self-report on exposure to cigarette smoke for measuring the amount of exposure.

### Acknowledgments

The authors would like to thank all the universities of Yazd, especially Shahid Sadoughi University of Medical Sciences, for their active support and cooperation in this research.

### Financial support and sponsorship

This research protocol was funded by the Shahid Sadoughi University of Medical Sciences, Yazd, Iran.

## Conflicts of interest

There are no conflicts of interest.

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