Research Paper: The Effectiveness of Training based on the Theory of Planned Behavior (TPB) on Tobacco Consumption Patterns among Students of Gonabad University of Medical Sciences

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ABSTRACT

Background: It is estimated that tobacco use, as the second leading cause of death, is responsible for one-tenth of all deaths worldwide. This study aimed to determine the effectiveness of training based on the Theory of Planned Behavior (TPB) on tobacco consumption patterns among students of Gonabad University of Medical Sciences.

Methods: This study was quasi-experimental that was performed on 65 students of Gonabad University of Medical Sciences who were assigned by random sampling design with proportional allocation in the experimental and control groups. After collecting the baseline data, the researcher-made questionnaire was designed based on the Theory of Planned Behavior (TPB) and tobacco consumption's questions with acceptable validity and reliability of the training program in six sessions for the experimental group. Two months after the training, the same questionnaires were completed by both groups. Data were analyzed by independent t-test, Chi-squared test, and Fisher's exact test with SPSS-20 at a significance level of $P<0.05$.

Results: The mean (standard deviation) age of the participants in the experimental and control groups was 21.46 (1.96) and 22.22 (3.02), respectively ($P = 0.076$). Before the intervention, there was no statistically significant difference between demographic characteristics, pattern of tobacco consumption, and TPB model constructs. After the intervention, the mean score of the constructs of TPB, except for subjective norms, and knowledge of the intervention group increased ($p<0.05$). Besides, use of cigarette and hookah was significantly decreased in this group ($P=0.003$).

Conclusion: The results showed that training based on the Theory of Planned Behavior (TPB) and providing preventive skills is a significant effect on consumption and refusal to use tobacco.

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Introduction

Tobacco use accounts for one-tenth of all deaths and the second leading cause of death in the world [1]. In addition, the risk of developing health-related problems such as coronary heart disease, peripheral arteries, and cancers is strongly associated with tobacco use [2]. Annually, more than 5.4 million people die due to tobacco use complications. This rate is more than the rate of deaths caused by drug abuse, AIDS, suicide, homicide, and accidents [3, 4]. Moreover, half of these deaths occur in middle-aged and productive groups of peoples, reducing the life expectancy of 35-61 years of people to 20 to 30 years [4]. The prevalence of tobacco use in Iran's population, aged 15 to 64 is estimated to be 12.5% and more than 50,000 deaths per year have been due to tobacco use in Iran [5, 6]. Tobacco use is not only harmful to its consumers, but many non-smokers suffer from unintended exposure to tobacco smoke and the risk of developing diseases associated with exposure to tobacco smoke [7]. The rate of disease and death caused by tobacco use is associated with the rate of using tobacco, deep inhalation of tobacco smoke, nicotine content in tobacco, and duration of tobacco use [8]. While the harmful effects of tobacco use on health have been known, many young people, including students, are involved in this risky behavior. The high prevalence of tobacco use among young people will be followed by the risk of dependency to it and negative health consequences. Tobacco use among University all students, especially medical students, is increasing, while its harmful consequences have been proven [9-11]. Young people and adolescents aged 15-29 years include one-third of Iran's population and they have been considered the social capital of the country, so high prevalence of tobacco use among people can be a serious threat to the country. It seems that the first priority in combating with tobacco use is planning for educating the adolescents and young people in schools, universities and garrisons [10,12].

Education plays a key role in modifying and improving unhealthy behaviors. Additionally, the value of educational programs depends on the effectiveness of these programs, and the effectiveness of educational programs largely depends on the properly use of theories and models [13]. Accordingly, Fishbein and Ajzen proposed the theory of Planned Behavior in 1987. This model predicts the occurrence of a particular behavior, provided that an individual intends to perform it. Based on this model, intention to perform a behavior is predicted by three factors including attitudes toward behavior, abstract norms and perceived behavioral control [14]. The effectiveness of this theory in predicting, perceiving, and intending to quit and prevent tobacco use has been proven by various researchers in different countries [18-15]. In a study conducted by Pakpour et al, educational intervention using the theory of Planned Behavior significantly reduced the intention to use tobacco in students [13]. The study conducted by Barati et al on the effectiveness of educational intervention based on the theory of planned behavior showed that the interventions reduced intention as well as ecstasy abuse in students of the intervention group compared to students of the control group [19]. In a study conducted by Karimi et al on the effectiveness of planned behavior in prevention of smoking, the rate of smoking and the intention to smoke in the intervention group decreased significantly, compared to the control group [20]. The importance of paying attention to tobacco use in students and the increasing trend of tobacco use and paying attention to health of students by changing the pattern of tobacco use in them encouraged the researchers to carry out this research on the students. In addition, according to the researchers, most studies conducted on tobacco use in a population of students have focused on the prevalence and causes of students' tendency to tobacco use, and fewer studies have focused on the effect of educational interventions on the tobacco use among the students. In addition, educational interventions in the area of tobacco use by students have less used appropriate models such as theory of planned behavior. Hence, the present study was conducted to evaluate the effect of education based on the theory of planned behavior on tobacco use among students of Gonabad University of Medical Sciences.

Methods

In this quasi-experimental study, by applying proportional stratified random sampling method on the semester 2 and higher students of Gonabad University of Medical Sciences in 2013, a total of 65 students was estimated in each group by the two means comparison formula and considering 95% confidence, 18% probability of drop out in students, and 80% test power (mean and SD was 23 ± 9.5 in the test group and 18.3 ± 6.2 in the control group), based on the study conducted by Jowini et al [18]. The criterion used to select students in each of the test and control groups was in this way that by using Balanced Block Randomization method, male and female students in 3 faculties of Health, Nursing and Midwifery and Basic Sciences, Medicine were allocated to test and control groups. The research inclusion criteria included studying at university during the study and, willingness and consent to participate in the study and exclusion criteria included the lack of consent to participate in the study, the absence in two educational sessions, and the lack of completing the questionnaire. Ajzen argues that there

is no standard questionnaire to carry out a study based on the theory of Planned Behavior in different parts of the world, and a new questionnaire appropriate to the desired behavior and population is needed [20]. Thus, in order to design a questionnaire to assess the effects of the educations provided in this study, a questionnaire based on the theory of Planned Behavior according to the recommended process of Ajzen and searching valid scientific and library resources [21, 22]. The designed questionnaire included three sections. The first section consisted of demographic questions, the second section was designed to assess the status of tobacco use and the pattern of tobacco use of the studied students based on Global Youth Tobacco Survey (GYTS) questionnaire, and the third section consisted of questions of knowledge and structures of theory of Planned Behavior.

Initial questionnaire was provided for 8 health education professionals to examine the validity and quality of the tool in terms of grammar, use of appropriate words, and the use of questions appropriate to each structure in proper place. After collecting their opinions, each question was scored based on opinions of these eight professionals. Then, ambiguities and defects in the questionnaire were resolved based on their opinions. Content validity was quantitatively evaluated by two methods of content validity ratio (CVR) and content validity index (CVI). In this study, the criterion of 0.75 was considered to confirm the CVR and the criterion of 0.7 was considered to confirm the CVI according to an eight-member expert panel and based on the lawshe table. A criterion above 0.7 was used to confirm the content validity index. In the last step, the reliability of the questionnaire was assessed on 200 students (so that the opinions of the majority of students be applied in the questionnaire and be a basis for educational need assessment) and confirmed by Cronbach's alpha test.

Finally, the final form of the questionnaire consisted of three sections was obtained. The first and the second sections included demographic questions and the pattern of tobacco use with 25 questions and the third section included 11 questions on knowledge with a minimum score of zero and a maximum score of 11 and Cronbach's alpha 0.71, 13 planned behavior theory questions on 5-point Likert 5-point scale with a minimum score of zero and a maximum score of 52 and Cronbach's alpha of 0.90, 8 questions on abstract norms on a 5-point Likert scale with a minimum score of zero and a maximum score of 24 and a Cronbach's alpha of 0.74, 8 questions on perceived behavioral control on Likert scale with a minimum score of zero and a maximum score of 32 and Cronbach's Alpha of 0.82, 3 behavioral intention questions with three options ranging from never (score 1) to always (3) with a minimum score of 3 and a maximum score of 9 and a Cronbach's alpha of 0.78. This questionnaire was completed by all the subjects before the intervention and after the random allocation step, the subjects of the test group received the required educations in six sessions of 45 minutes in 10 to 15-member groups according to the needs assessed by the researcher.

The educational planning in this study was based on active learning, and educational techniques of lecture, video slides and educational pamphlets revolving around the skill of saying no to offer of smoking and the adverse consequences of tobacco use During the educational intervention, the students actively participated in the educational program by using brainstorming and question and answer. The last ten minutes of each session, an educational video on the adverse consequences of tobacco use and skills of saying no to tobacco use were displayed for students. The educational content presented in the program included life skills and resistance against the peers' pressure such as the ability of saying no to tobacco use and self-assertiveness skill as the most important predictors of behavioral intention were based on the information need assessment of 200 students, the adverse consequences of smoking on the individual, family and community, and the benefits of quitting tobacco use. Finally, subjects in both test and control groups completed the same questionnaire two months after the intervention. This study was performed after the approval by the Council of Graduate Studies and the necessary coordination with the relevant university authorities. Verbal informed consent was taken from all subjects, and they were ensured that their questionnaire would remain anonymous and the principles of confidentiality would be observed, and would have a right to withdraw the study at each stage. The data collected from the questionnaires before and after the educational intervention were entered into SPSS software. The data were analyzed using independent t-test, chi-square and Fisher's exact test at a significance level of $p < 0.05$.

Results

The mean (standard deviation) age of the participants in the test and control groups was 21.46 (1.96) and 22.26 (3.02); respectively, ($P = 0.026$). (Table 1) illustrates the demographic characteristics of the subjects in both test and control groups. Before the intervention, 10.8% of the students in the intervention group were smokers, which decreased to 3.10% after the educational intervention. (Table 2) illustrates the frequency distribution of smoking status in status and control groups. The mean scores of knowledge and structures of theory of Planned Behavior before intervention did not show a significant

difference between the two groups. However, after the intervention, mean scores, except for abstract norms, showed a significant increase in the test group compared to the control group, (Table 3) illustrates the status of the structures of the theory of Planned Behavior in the test and control groups before and after the intervention.

Table 1. Relative frequency distribution of the subjects based on demographic variables

Gender	Test group N (%)	control group N (%)	P (chi-square)
Male	(69.2)45	(69.2)45	1
Female	(30.8)20	(30.8)20	
Level of education			
Associate/bachelor	(95.40)62	(89.20)58	0.188
Master/PhD	(4.60)3	(10.80)7	
Faculty			
Faculty of health	(21.50)14	(32.30)21	0.596
Faculty of nursing and midwifery	(61.50)40	(55.40)36	
Others	(16.90)11	(12.30)8	
Living status			
With family	(4.60)3	(6.20)4	Fisher test 1
At dormitory	(95.40)62	(93.80)61	

Table 2. Frequency distribution of subjects before and after the intervention

	Test group N (%)		Control group N (%)		
Cigarette smoking	Yes	No	Yes	No	P n (%)
Before	(10.80)7	(89.20)58	(20.00)13	(80.00)52	0.145
After	(3.10)2	(96.90)62	(18.80)12	(81.20)52	0.005
Hookah smoking					
Before	(15.40)10	(84.60)55	(18.50)12	(81.50)53	0.640
After	(4.70)3	(95.30)61	(20.30)13	(79.70)51	0.008

Table 3. Comparison of knowledge, attitude, abstract norms, perceived behavioral control, and intention scores before and after educational intervention in intervention and control groups

	Test group mean (SD)	control group mean (SD)	p
Knowledge			
Before education	(2.44)7.90	(2.17)7.44	0.257
After education	(1.32)9.12	(1.93)7.87	0.001
Attitude			
Before education	(8.18)40.80	(11.12)39.44	0.431
After education	(4.48)45.06	(9.28)40.85	0.001
Abstract norms			
Before education	(4.36)19.60	(4.30)18.96	0.408
After education	(3.65)18.67	(4.51)17.89	0.284
Perceived behavioral control			
Before education	(6.61)23.89	(6.61)23.18	0.543
After education	(4.28)26.37	(6.37)22.93	0.001
Intension			
Before education	(1.71)7.24	(1.69)7.04	0.505
After education	(0.92)7.96	(1.63)7.09	0.001

Discussion

This study was conducted with the aim of examining the effect of educational intervention based on the theory of planned behavior on tobacco use among students of Gonabad University of Medical Sciences. Paying attention to tobacco use especially in medical students in addition to modifying part of their lifestyle can be effective in providing practical behavioral styles for patients and the clients. The results of the study showed that there was a significant difference between the tobacco use and structures of knowledge, attitude, perceived behavioral control and intention of the subjects in the test and control groups after the educational intervention. However, this difference was not significant in the structure of abstract norms. The results also revealed a significant reduction in tobacco use in the test group compared to the control group after the intervention, which is consistent with the results of the study conducted by Jowini et al [18], Karimi [20], Rise et al [17], and Gerrard et al [24].

Accordingly, given the growing trend of tobacco use among students, the implementation of educational interventions to reduce and control its use among students seems to be essential. The mean score of knowledge in the test group was significantly higher than that of the control group after the intervention. This result was expected, since implementation of educational interventions can have a positive effect on participants' knowledge of educational courses. This result is comparable with the results of the studies that have investigated the effect of planned educational intervention on enhancing the level of knowledge of people in different health issues and behaviors based on the structures of the theory of the Planned Behavior [25-29].

In this article, the mean score of attitude of students in the test group was significantly higher than that of the control group after the intervention. The results of the effectiveness of the educational program in strengthening the negative attitudes towards tobacco suggest a very effective role of educational program in strengthening the negative attitudes towards tobacco in the test group. This result is consistent with the results of the studies conducted by Jowini et al [18], Karimi et al [20], Bashirian et al [30], and Tyc et al [31], and Parrot et al [32]. Attitudes are considered as antecedents of behavior, and several studies have revealed a relationship between attitude and behavior [33, 13]. Therefore, providing appropriate education such as emphasizing on the adverse and unfavorable consequences of tobacco use and learning the skill of saying no to tobacco use which can be effective in promoting students' negative attitude toward tobacco use seem to be necessary in universities. The results of the study revealed a significant difference between the mean scores of perceived behavioral control structure in the test and control groups after the intervention, which is in line with the results of the study conducted by Mohammadi Zeidi et al [13], Karimi et al [20], Caron et al [34], Zhang et al [35], and Nehl et al [15].

Based on the theory of Planned Behavior, perceived behavioral control is the degree to which a person feels doing a behavior is under his or her voluntary control [20]. In this study, problem solving, saying no, and stress control skills were used to strengthen the perceived behavioral control. In this article, educational intervention increased the mean score of behavioral intention structure in the test group, and this increase was significant, compared to the control group. The results of the present study are consistent with those of the research conducted by Jowini et al [18], Karimi et al [20], Conner et al [34] and Gerrard et al [24]. There was no significant difference between the two groups after the intervention, which was in line with the results of the research conducted by Tabatabaei et al [25] and Parrot et al [32], while they were inconsistent with the result of the research conducted by Karimi et al [20] and Nazari et al [26].

The reason for this difference might be attributed to different research tools and the studied population. However, it seems that providing education for students alone does not play a role in modifying the norms with regard to pattern of tobacco use, so that involvement of parents, teachers, and friends is essential to modify the students' abstract norms. Therefore, similar educational intervention involving the groups that can influence students' abstract norms is recommended. As any study, this study had its strengths and limitations. The way of confirming the validity and reliability of the questionnaire, the type of sampling and the use of various educational methods during the intervention can be considered as the strengths of this study. One of the limitations may be related to data collection stage. As tobacco use is one of the issues that may have consequences for the students, the self-reporting questionnaire was necessarily completed in order to avoid reduced student cooperation and observe the ethical considerations. Thus, the quality of the answers, especially in terms of being true or false, was strongly influenced by the subjects' answers. Moreover, the results of evaluation period in this study it was only 2 months after the educational intervention that it was Hence, longer periods are to be considered in future studies for better evaluation of the outcomes of fol-

low-up education.

Conclusion

Modifying life style, such as reducing and eliminating tobacco use in communities, is one of the main goals of health education. The educational programs designed to promote healthy behaviors usually emphasize on the skills that improve the ability to recognize high-risk behavioral situations, express opposition in situations where saying no is necessary, and controlling the anxiety should be increased. Based on the results of this study, it seems that designing and implementing educational interventions based on the theory of planned behavior can be effective in reducing tobacco use among the students. The results of this study can be used by cultural authorities of the universities as well as educational authorities of universities. Implementation of pattern-based educational programs can reduce tobacco use among students. As this study was carried out only in one university of medical sciences, it is recommended that educational intervention based on theory of Planned Behavior to be conducted more widely in medical universities of different regions of Iran with a higher sample size. Implementation of this program can also be recommended for universities covered by the Ministry of Science, Research and Technology, Islamic Azad University and, Payam-e Noor University.

Ethical Considerations

Compliance with ethical guidelines

The research plan was approved by the Ethics approval with code 99/10093 date 22 June 2020.

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Authors' contributions

Study design: Ali Alemi, Mehdi Meshki; Data collection and analysis: Ali Alemi, Mohammad Hadi Rezaeian; Manuscript preparation: Ali Alemi, Mohammad Hadi Rezaeian.

Conflict of interest

The authors declared no conflict of interest.

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