



# Effect of Educational Intervention Based on Theory of Planned Behavior on the Reduction of Water Pipe Smoking in Women

## ARTICLE INFO

### Article Type

Original Research

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### How to cite this article

Hassani L, Aghamolaei T, Ezati Rad R, Ahmadzadeh Kh, Ghanbarnejad A. Effect of Educational Intervention Based on Theory of Planned Behavior on the Reduction of Water Pipe Smoking in Women. Health Education and Health Promotion. 2019;7(4):191-195.

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### Article History

Received: November 27, 2019

Accepted: December 5, 2019

ePublished: December 21, 2019

## ABSTRACT

**Aims** In modern communities, smoking is one of the most important causes of illness, disability, and premature death. It is regarded as a pervasive health problem in the world. The risk of death in the tobacco consumers is 80-90% higher than ordinary people. The aim of this study was to investigate the effect of educational intervention based on theory of planned behavior on the reduction of water pipe smoking in women.

**Materials & Methods** This quasi-experimental study was conducted on women over 15 years in Bandar Abbas who smoke water pipe at least once per day in 2015. The subjects were selected by multi-stage cluster sampling method from four health centers and randomly divided into intervention (N=64) and control (N=64) groups. Data were collected using a valid and reliable questionnaire based on the theory of planned behavior constructs and demographic information before and after the intervention. Data were analyzed by SPSS 19 software using independent t-test and Mann-Whitney test.

**Findings** Before intervention, the mean score of behavioral intention and subjective norms had no significant difference between two groups ( $p>0.05$ ), but after intervention a significant difference was observed between two groups ( $p<0.001$ ). Also, there was no significant difference between before and after intervention in control group ( $p>0.05$ ), but in intervention group the mean score of research variables significantly increased after intervention compared to before intervention ( $p<0.001$ ).

**Conclusion** Educational intervention based on theory of planned behavior is effective on the reduction of water pipe smoking in women.

**Keywords** Behavioral Intention; Subjective Norms; Women; Water Pipe Smoking

## CITATION LINKS

[1] Tobacco [2] The prevalence of waterpipe tobacco smoking among the general and specific populations: a systematic ... [3] Interventions for waterpipe smoking ... [4] Bidi and hookah use among Canadian youth: findings from the 2010 Canadian Youth Smoking ... [5] Evidence of emerging hookah use among university students: a cross-sectional comparison between hookah and cigarette ... [6] Students' perspectives in Tehran University of Medical Sciences about factors affecting smoking ... [7] Behavior and knowledge of Iranian professional athletes towards ... [8] Attitudes and normative beliefs as factors influencing behavioral ... [9] The theory of planned behaviour: reactions and ... [10] Prediction of leisure participation from behavioral, normative, and control ... [11] Theory-based behavior change interventions: comments on Hobbis and ... [12] Intention to quit water pipe smoking among Arab Americans: Application of the ... [13] Using social marketing to increase recruitment of pregnant smokers to ... [14] Cigarette smokers' intention to quit smoking in Dire Dawa town Ethiopia: an ... [15] Evaluation of theory of planned behavior-based education in prevention of ... [16] The effectiveness of healthy behavior training program in changing attitude of ... [17] A comparative study of systemic carcinogen exposure in waterpipe ... [18] Waterpipe smoking and nicotine exposure: a review of the current ... [19] Prevalence and correlates of waterpipe tobacco smoking by college students in ... [20] The effect of an educational program based on the Theory of Planned Behavior on ... [21] Effect of education based on the theory of planned behavior on adoption of oral health behaviors of pregnant women referred ... [22] Modeling the theory of planned behavior for intention to improve oral health behaviors: the impact of attitudes ... [23] Effect of educational interventions based on theory of planned behavior (TPB) in selecting delivery ... [24] The effect of educational programs based on the theory of planned behavior on parental supervision in ... [25] The effect of educational intervention on weight loss in adolescents with ... [26] Effect of educational intervention based on the theory of ...

## Introduction

Tobacco consumption is one of the causes of preventable deaths in the world. It is estimated that 5 million people die each year because of it, and it is expected to reach 8 million by 2030, with 80% of these deaths occurring in low-income and middle-income countries. Today there are more than 1.3 billion tobacco consumers in the world<sup>[1]</sup>. Through heat and burning charcoal filter by tobacco, water pipe drives smoke in a bowl of water and tubes<sup>[2]</sup>.

Water pipe smoking has significantly expanded in Europe and North America in recent years. One of the critical factors which has led to the acceptability of water pipe among the majority of people is that most of them think that water pipe is not only less harmful than cigarettes but also less addictive. On the contrary, water pipe consumption is associated with nicotine dependency and with many health risks of similar to other smoking behaviours<sup>[3]</sup>. Studies showed that the prevalence of water pipe among Canadian students was 10.1 percent in 2006 to 2010 which means it has increased by 6 percent<sup>[4]</sup>. Also, in another study, 46 percent of male and female students in one of the major universities in the south eastern United States consumed water pipe; it had the same pattern in male and female participants<sup>[5]</sup>. A study in Iran indicated that 33.9% of young people smoke water pipe; this rate is higher than cigarette smokers<sup>[6]</sup>. In addition, 42% of Iranian male athletes have experienced water pipe<sup>[7]</sup>. The prevalence of water pipe smoking in people can expose them to the risk of addiction to the products and its related complications.

A variety of factors cause water pipe smoking. It is expected that Theory of Planned Behavior (TPB) explains these factors very good. The first factor of TPB that affects people's intent to behave or not perform this behavior is the subjective norms that are related to the social factor. Subjective norms are associated with the individual understanding of social pressure that impose on a person to do something or forbid him/her from doing it. Social norms are regulators of standards for implementation that individuals can accept or reject<sup>[8]</sup>. The beliefs that are the basis of subjective norms are called normative beliefs. One of the other leading factors of TPB is individual's intention to perform a specific behavior. It is assumed that the intention controls the motivational factors influencing the behavior. Behavioral intention refers to the individual's intention to perform a specific behavior.

These mentioned factors determine an individual's behavior; it is possible to change unhealthy behaviors and lead people to healthy behaviors by changing their attitudes<sup>[8-11]</sup>. Most studies showed the positive effect of TPB and its constructs on changing behavior like quitting water pipe, cigarettes, and the choice of delivery method or reinforcement of negative

attitude toward smoking<sup>[12-16]</sup>.

Most studies in Iran represent only the prevalence of water pipe smoking; there is a lack of studies about factors influencing the consumption of water pipe and the effect of an educational program based on behavioral intention variable and subjective norms in women. In addition, according to the Ministry of Health Office, the population of Hormozgan is ranked fifth in terms of the percentage of people who use water pipe on a daily basis. These statistics show the high prevalence of this phenomenon in this province. In addition, the frequency of water pipe use in women in this province is two times higher than men, and 5 times higher than the country's average rate.

Regarding the regular daily smoking prevalence of water pipe in the female population of the Hormozgan province, the role a mother has as a model for her children, its impact on other members of family, and being a major risk factor to many diseases<sup>[3, 17-19]</sup>, this research tried to show the role of behavioral intention and subjective norms to reduce smoking water pipe with regard to the impact of the training program in women over 15 years old in Bandar Abbas. Although there were studies that show the effect of TPB on water pipe use reduction, these studies were conducted on different subjects other than women; because the consumption of water pipe in women in this province was significantly higher, authors tried to measure the effect of this theory on them. It should be mentioned that however, TPB consists of four constructs, but in this study, just two of them were investigated because of these reasons: First of all, behavioral intention is the primary factor of TPB to motivate a person to do a specific behavior, and this item affects behavior directly. Secondly, the subjects were women who were affected by a different person such as a family member, a spouse, and neighbors, etcetera (that refer to subjective norms).

The aim of this study was to investigate the effect of educational intervention based on theory of planned behavior on the reduction of water pipe smoking in women.

## Materials and Methods

This quasi-experimental study was conducted on women over 15 years in Bandar Abbas who smoke water pipe at least once per day in 2015. The minimum sample size for the study was 128 women who were randomly divided into intervention and control groups. The setting of the study was four areas of Bandar Abbas (Bandar Abbas city health center).

Sampling method was multi-stage cluster. In order to select the samples, Bandar Abbas city was divided into four geographic areas at first; then, a health center was selected randomly as a cluster. After that, two health centers were assigned to choose 64 subjects in the intervention group; the control group

was selected from the other remaining two health centers.

All of the participants filled the consent form and they were assured that their information would be confidential.

Data were collected using questionnaires through interviews with participants. The questionnaire consisted of two parts: Questions of the first part included age and a history of water pipe smoking. The questions of the second part were related to constructs of Theory of Planned Behavior (TPB). TPB has four constructs that this study examined two of them which are behavioral intention and subjective norms. Subjective norms consists of two subcategories including normative beliefs and motivation to comply.

The women were divided randomly into two intervention and control groups. Educational content and intervention program were developed based on the TPB and identified data in pre-test. The intervention was implemented on the intervention group based on the developed schedule. Post-test was performed two months after the intervention program, and to determine the effect of the intervention program on studied women both groups filled out the questionnaire.

Data were analyzed by SPSS19 Software using Independent T and Mann-Whitney tests.

## Findings

The mean age of the participants was 38.37±14.04 years old. The mean age of beginning to smoke water pipes was 24.12±9.22 years old. The mean of smoking background was 14.25±10.62 years (Table 1;  $p>0.05$ ).

**Table 1)** The mean of age, beginning of use age, and use background in intervention (N=64) and control (N=64) groups

Variables	Control Group	Intervention group
Age (years old)	37.8±13.67	38.94±14.49
Beginning of use age (years old)	25.17±9.85	23.06±8.49
Use background (years)	12.63±9.83	15.88±11.19

29 women of the control group and 23 women of the intervention group used the water pipe with their neighbors for the first time. Also, neighbors' house was mentioned as the place of using water pipe for the first time by 38 women from the control group and 34 women from the intervention group. The rest of places were in the next ranks. More than half of the women (61 in the control group and 54 in the intervention group) did not use other tobacco products (Table 2).

Before intervention, the mean score of behavioral intention and subjective norms had no significant difference between two groups ( $p>0.05$ ), but after intervention a significant difference was observed between two groups ( $p<0.001$ ). Also, there was no significant difference between before and after intervention in control group ( $p>0.05$ ), but in

intervention group the mean score of research variables significantly increased after intervention compared to before intervention ( $p<0.001$ ; Table 3).

**Table 2)** Frequency distribution of variables related to water pipe consumption in intervention (N=64) and control (N=64) groups

Variable	Control	Intervention	Total
<b>With whom used the water pipe for the first time</b>			
Family member	10 (15.6)	23 (35.9)	33 (25.8)
Neighbors	29 (45.3)	23 (35.9)	52 (40.6)
Friends	25 (39.1)	18 (28.1)	43 (33.6)
<b>The place of using water pipe for the first time</b>			
Traditional restaurant	1 (1.6)	0	1 (0.8)
Recreation place	2 (3.1)	3 (4.7)	5 (3.9)
Friends' house	23 (35.9)	27 (42.2)	50 (39.1)
Neighbors' house	38 (59.4)	34 (53.1)	72 (56.3)
<b>Use of other tobacco products</b>			
Cigarette	1 (1.6)	0	1 (0.8)
Tobacco	2 (3.1)	10 (15.6)	12 (9.4)
None	61 (95.3)	54 (84.4)	115 (89.8)

**Table 3)** Comparison of mean scores of research variables in control and intervention groups before and after the intervention

Constructs	Control group	Intervention group
<b>• Subjective norms</b>		
<b>Normative beliefs</b>		
Before	2.91±5.79	7.80±3.13
After	3.94±5.71	10.94±2.27
Difference of before and after	1.03±1.80	3.14±2.78
<b>Motivation to comply</b>		
Before	19.33±5.25	23.03±3.80
After	20.36±5.26	26.33±2.51
Difference of before and after	1.03±1.89	3.30±2.82
<b>Total</b>		
Before	21.70±30.60	47.12±23.46
After	27.45±31.72	72.86±17.83
Difference of before and after	5.75±11.05	25.73±21.54
<b>• Behavioral intention</b>		
Before	12.25±4.85	14.80±4.08
After	13.19±4.67	18.50±2.96
Difference of before and after	0.94±1.94	3.70±3.31

## Discussion

In this study, the difference between mean scores of subjective norms after the intervention was higher for intervention group compared to control group. It can be concluded that the education provided in this study could be the effective factor in increasing women's subjective norms.

Dehdari *et al.* reported an increase in mean score of subjective norms after the educational intervention in reducing smoking water pipe in the intervention group<sup>[6]</sup>. The study conducted by Mehri *et al.* showed that using the theory of planned behavior in using of motorcycle helmets by employees could increase subjective norms<sup>[20]</sup>. Also, Ebrahimipour *et al.* and Dumitrescu *et al.* showed that after the intervention, the average of all scores in the intervention group significantly increased compared to the control group<sup>[21, 22]</sup>. It is consistent with the findings of this study, and it demonstrates that application of this theory has increased subjective norms in the samples. The results of a study by Besharati *et al.* regarding the application of the

theory of planned behavior in choosing the delivery method in pregnant women prove the effectiveness of this model in improving subjective norms in samples<sup>[23]</sup>. Moshki *et al.* demonstrated that after intervention about less television watching, there were significant changes in intervention groups in subjective norms and behavioral intention dimensions<sup>[24]</sup>. Mazloomi *et al.* observed a significant increase in the mean score of this two dimensions after intervention which applied to weight loss in adolescents with overweight and obesity<sup>[25]</sup>.

This issue is very critical when a person decides to have a particular behavior. In this situation, he recognizes that the people who care about her (such as a spouse, a friend, a physician, or other people) would encourage her to do the action.

Results of the study by Ahmadi Tabatabaei *et al.* about the physical activities of Kerman Health Center's staff showed that the 6-week implementation of the theory of planned behavior base and lecture base has shown that mean score of subjective norms was not statistically significant between samples; it is inconsistent with the findings of this study. The reason may be due to the differences in educational content and target group characteristics such as age, cultural, economic, and environmental differences in those studies. It may be necessary to combine the theory of planned behavior with other patterns of health education for complex health issues<sup>[26]</sup>. Here, one can note the important and effective role of discussions to increase perceived behavioral control as well as role-playing to improve perceived power to reduce water pipe consumption. However, increase in score of subjective norms in the control group may be due to the role of the peer group and modeling influence of friends and family. It can be inferred that education, based on the theory of planned behavior is more effective in increasing subjective norms than other systematic training groups.

In this study, the mean difference score of behavioral intention in intervention group is higher than control group after the intervention. Dehdari *et al.* reported the significant difference in the mean score of behavioral intention between intervention and control groups after intervention<sup>[6]</sup>. In a study about the effects of an education plan based of the theory of planned behavior, Mehri *et al.* showed that the score of behavioral intention increased significantly in the Intervention group after intervention<sup>[20]</sup>. Ahmadi Tabatabaei *et al.* in their study titled "Effect of educational intervention based on the theory of planned behavior on the physical activities of Kerman Health Center's staff", did not find the significant difference in behavioral intention after intervention; it is contrary to the present research. This contradiction may be due to the different effectiveness of models and theories of health education in teaching. Proper use of patterns can

provide the basis for intervention<sup>[26]</sup>.

This research shows the effective role of discussion about increasing individuals' intention to reduce water pipe consumption. Since thinking about the reduction of water pipe consumption will lead to the reduction or withdrawal of its consumption, it is reasonable to argue that the concerns of this study were to find effective ways of changing the attitude and subjective norms in the subjects. Changing attitudes toward reducing consumption as well as the influence of this change on beliefs about higher acceptance by others could affect their intention. Increase in the score of behavioral intention in this research can be associated with the role of the media and health messages. It can be inferred that education based on the theory of planned behavior has a higher influence in the behavioral intention of the study group compared to other training methods. Given the importance and effect of education on subjective norms for reducing water pipe smoking, the strategy of using family members and close friends in intervention programs can be useful to reduce water pipe smoking in women. To reduce water pipe smoking in women, it is recommended to employ strategies and training programs developed in this study as a model. Considering the effect of education on intention and reduction of smoking water pipe, it is suggested to implement educational programs before the possible smokers reach adulthood; in this way, the severe side effects of smoking will not emerge at older ages by the institutionalization of a culture of life without smoke.

Many women did not trust the research team and did not provide accurate information because they considered hookah smoking a crime. This study was conducted among women and the results cannot be generalized to men. This research is in one city and cannot be compared with other cities.

## Conclusion

Educational intervention based on theory of planned behavior is effective on the reduction of water pipe smoking in women.

**Acknowledgements:** The authors express their gratitude to the Vice Chancellor of Research, Hormozgan University of Medical Sciences for funding this project. Also, authors thank the women that participated in the study.

**Ethical Permission:** The ethical committee of Hormozgan University of Medical Sciences approved the study.

**Conflicts of Interests:** The authors declare no conflicts of interests.

**Authors' Contribution:** Hassani L. (First Author), Introduction Writer (20%); Aghamolaei T. (Second Author), Assistant Researcher (20%); Ezati Rad R. (Third Author), Methodologist (20%); Ahmadzadeh K. (Fourth Author), Statistical Analyst (20%); Ghanbarnejad A. (Fifth Author), Discussion Writer (20%)

**Funding/Support:** The study was supported by the Vice Chancellor for Research, Hormozgan University of Medical Sciences.

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