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Predictors of Non- Hookah Smoking Among High-School Students Based On Prototype/Willingness Model

Sedigheh Abedini[1,2], *MohammadAli MorowatiSharifabad[1], Mosharafeh Chaleshgar Kordasiabi[1], Amin Ghanbarnejad[2]

[1] Department of Health Education and Promotion, Shahid Sadoughi University of Medical Science, Yazd, Iran
[2] Department of Public Health, Hormozgan University of Medical Sciences, Bandar Abbas, Iran

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***Corresponding Author:**
MohammadAli Morowatisharifabad
Tel: +98 9133530374;
e-mail:
morowatisharif@yahoo.com

ABSTRACT

Background: The aim of the study was to determine predictors of refraining from hookah smoking among high-school students in Bandar Abbas, southern Iran based on Prototype/Willingness model.
Methods: This cross- sectional with analytic approach was performed on 240 high-school students selected by a cluster random sampling. The data of demographic and Prototype-Willingness Model constructs were acquired via a self-administrated questionnaire. Data were analyzed by mean, frequency, correlation, liner and logistic regression statistical tests.
Results: Statistically significant determinants of the intention to refrain from hookah smoking were subjective norms, willingness, and attitude. Regression model indicated that the three items together explained 46.9% of the non-smoking hookah intention variance. Attitude and subjective norms predicted 36.0% of the non-smoking hookah intention variance. There was a significant relationship between the participants' negative prototype about the hookah smokers and the willingness to avoid from hookah smoking (P=0.002). Also willingness predicted non-smoking hookah better than the intention (P<0.001).
Conclusion: Deigning intervention to increase negative prototype about the hookah smokers and reducing situations and conditions which facilitate hookah smoking, such as easy access to tobacco products in the cafés, beaches can be useful results among adolescents to hookah smoking prevention.

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Introduction

Despite enormous and continuous attempts to reduce cigarette smoking, an increasing trend in using alternative tobacco products like hookah has been observed.[1] Hookah smoking is an old-fashioned way of smoking tobacco products[2, 3], used these days globally[4], so that WHO has considered it as a public health problem.[2] Hookah smoking is just as seriously dangerous as the cigarettes for the health. Although hookah smokers believe that it has less addictive effect than the cigarettes and is less harmful for the health.[4] Various toxics like carcinogens, heavy metals, and higher levels of nicotine and carbon monoxide are transfused through the hookah.[2, 4] While researches, policies and preventive attempts are mostly emphasizing on the cigarette smoking[5] hookah smoking is a

common problem especially in Asian countries like India, and Eastern Mediterranean region.[5-7] Unfortunately, in the Eastern Mediterranean Region, adolescents are using hookah smoking as fashionable way of tobacco use[8], and it is believed that hookah smoking to be more acceptable than cigarette.[9]

Although, youths are aware of negative consequences of smoking, a lot of them (more than 80%) start smoking under the age of 18 yr. An explanation for this matter is the social images related to this behavior.[10-12] The youth's social images on smokers or those who have addiction to alcohol in their age can play a great role on initiation of use of these materials.[13-15] In other words, having a positive image of a smoker can make it easier smoke among adolescents and the negative images is accompanied with a non-smoking behavior.[14]

The concept of social images or prototypes embedded into a theoretical model called the Prototype Willingness(PWM). According to this model, having a favorable prototypical image increase a favorable prototypical image increases probability for an individual to engage in risky behavior.[16, 17]

This model consists of two paths: the Reasoned reaction and Social Reaction, as it is indicated in Fig. 1.The reasoned reaction, reflects the fact that the young people have a previously planned and intended will to do some risky behaviors.[14] Most of the behavioral models hypothetically believe that the intention to do a behavior comes from a deep thought. First, every behavior is evaluated and then will be decided to be done or not.[18] This path includes the attitude and subjective norms, which predicts the behavioral intention. According to this path, the youth who have a positive attitude towards smoking and their perceived subjective norms will predict smoking as well, hold a strong determination to start smoking and likely begin to use tobacco products.[16]

The Social Reaction includes two factors: Prototype, i.e. social images on unhealthy behaviors and willingness, i.e. the inclination to perform the behavior. This path suggests that a hazardous behavior is not always in compliance with a previously planned and intended program, but the youth perform the behavior without any previous intention when they find themselves in the situations and conditions which make it easier for them to perform that behavior.[14] That is, when there is an adequate opportunity to perform the behavior, e.g. a party in which alcoholic drinks and cigarettes are available offered by their friends. This action can be observed particularly among the youth and teens that are more sensitive to the social effects.[10, 17]

The implemented studies are providing examples for the use of PWM structures in predicting the risky behaviors in teens and young people, of which application of the model in the study of factors which are effective on cigarette smoking, alcohol drinking, unauthorized medicines consumption and dangerous driving.[19]

Considering students as the potential and most valuable human resources in every country, and in view of the fact that they might be more exposed to the hookah smoking than the other age groups, this study was designed to determine predictors of refraining from hookah smoking among high-school students in Bandar Abbas, based on PWM. To the best of our knowledge this is the first study in Iran that focuses on application of the PWM in explaining behavior acquisition process of hookah smoking.

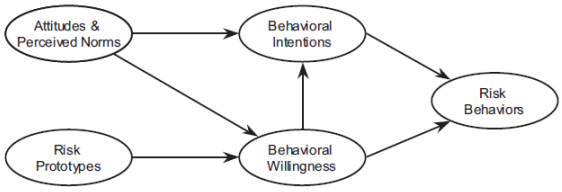

Fig. 1: The prototype/ Willingness Model

Material and Methods

Participants and procedure

This cross- sectional with analytic approach was conducted on 240 high school students (grade 9, 10, 11) which were recruited through cluster random sampling from Bandar Abbas, southern Iran. There

are two educational zones, and each zone has about 23 high schools for girls and the similar number for boys. First, we selected 4 high schools randomly out of each zone (two high schools for girls and two for boys).Then we distributed 60 questionnaires in each high school. Data collection was carried out in fall 2013.

After obtaining the consent of education department and schools authorities, we went to high schools and explained the aims of the research to the students. Participation in the study was entirely voluntary and the questionnaires were completed anonymously during class time.

Inclusion criteria in this study were high-school students who had volunteered to participate in research and participants who showed either missing value on the referred questionnaire or reported that had hookah smoking, "1-2 times a week","3-5 times a week" and "Every day" were excluded from the study.

Two hundred and eleven questionnaires out of the total of 240 distributed among the high school students were qualified to be included in the study (8 female and 9 male participants, due to hookah smoking 1 to 2 or 3 to 5 times in a week, and 12 questionnaires failed out incompletely).

Reliability measured by Cornbrash's α, content validity also achieved through the expert's opinions (including 10 faculty members in health education). The questionnaire was revised based on experts' opinions.

Measures

Demographics

Demographic characteristics included: age, gender, educational course (natural sciences; mathematics; human sciences), and grade of education (9, 10, 11).

Hookah smoking

Hookah smoking was measured by a single item, "Have you ever smoking hookah?"followed by a 5 point scale with (1)"Never", (2)"Seldom",(3)"1-2 times a week",(4)"3-5 times a week",(5)"Every day".

Willingness

Willingness toward avoiding hookah smoking was evaluated using a scenario:

Suppose you are at a party and many of your friends are smoking hookah. You are offered hookah smoking by one of your friends. What is your reaction to this? (1) "Take it and try it?" (2) "Tell him/her 'no thanks", or (3)"Leave the party" each followed by a 5-point scale from (1) "Very likely" to (5) "Very unlikely". The two latter items were reversed, so a high value reflects more willingness to avoid hookah smoking. Reliability analyses showed satisfactory reliability (α=0.72).

Prototypical images

The Prototypical images were assessed by asking: "Imagine one of your friends who smokes hookah, How would you describe this friend using the following characteristics?"

She/he is a cool, sexy, popular, smart, self-conscious, independent, sympathetic, unattractive, immature, confused, self-centered, and dull person.

Responses ranged from (1) "Fit very well" to (5) "Does not fit at all". Reversed coding was applied to negative characteristics, so a high value indicated a negative image about hookah smokers. Reliability analyses showed satisfactory reliability (α=0.79).

Behavioral intention not to use hookah

Behavioral intention was assessed using three questions as follows:

In the following year (1)" I intend not to smoke hookah", (2) "I will try not to smoke hookah, and, (3) "I will not start to smoke hookah", all evaluated on a 5-point scale from (1) "Very likely" to (5) "Very unlikely". All statements were reversed so that a high value indicated a more likely intention not to smoke hookah. Reliability analyses showed satisfactory reliability (α=0.89).

Attitude against hookah

Attitudes were measured by 7 statements as follows: For me hookah smoking is: good, not risky, reduces my anxiety, makes me

spend more time with friends, fun, reduces my anger, causing the odor. All items evaluated on a 5-point scale from (1) "Very likely" to (5) "Very unlikely". The last item was reversed, so a high value indicated a positive attitude toward not smoking hookah. Reliability analyses showed satisfactory reliability (α=0.82).

Subjective Norms against hookah use

Four statements used for measuring the subjective norms: 1) "My parents expect me not to use hookah", 2) "If I hookah smoke and my parents understands, I will deal with seriously", 3) "If I hookah smoke, most of my friends will not confirm it", and 4) If I smoke hookah, people do not like me". All evaluated on a 5-point scale from (1)"I strongly disagree" to (5) "I strongly agree". A high value indicated a more positive subjective norm not to hookah. Reliability analyses showed satisfactory reliability (α=0.81).

Ethical consideration

Ethical approval of this study was gained from the Research Ethics Committee, which at the time of the study was based at Shahid Sadoughi University of Medical Sciences, Yazd. Individuals were informed via an informed consent based on the Helsinki Declaration.

Statistical Analysis

All statistical analyses were performed by SPSS 19 software. Data were presented by mean (SD) and frequency (present) for quantitative and qualitative variables respectively. Correlation, liner regression and logistic regression analyses were used to determin the predictors of hookah smoking and *P*-values <0.05 considered to be as significant.

Results

Demographic

Demographic characteristics of participants are shown in Table 1.

Table 1: Demographic characteristics of participants (N=211)

Variable	Number	Percent
Age (yr)		
14	18	8.5
15	99	46.9
16	68	32.2
17	22	10.4
18	3	1.4
Sex		
Female	114	54.0
Male	97	46.0
Grade of study		
9	84	39.8
10	100	47.4
11	27	11.8
Course of study		
Mathematics	37	16.7
Natural sciences	81	38.4
Human sciences	11	5.2

One hundred and seventy-three of participants (82.0%) reported that they had never smoked hookah and 38 of students (18.0%) had history of (rarely) smoked hookah. The mean age of smoking hookah initiation was 13.8(SD = 1.7).

Descriptive of variables

Overall means, standard deviations, range and confidence interval for study variables are presented in Table 2.

The chi- square test showed that there is no relationship between demographic variables and hookah smoking. Therefore, there is no potential confounder based on the investigated variables.

Predictor variables

To investigate the prediction of intention by attitude, subjective norms, prototype and willingness, multiple linear regression analysis were conducted. Results of this analysis, presented in Table 3, indicate that the four variables together explained 46.9% of the variance in intention for not hookah smoking. Willingness was a significantly stronger predictor than other variables.

Table 2: Descriptive statistics for the variables under study (N=211)

	Mean	SD	Range	Confidence Interval for mean	
				Lower bound	Upper bound
SN	17.57	3.30	4 – 20	17.12	18.02
ATT	30.04	5.24	7 – 35	29.33	30.75
PT	41.88	10.44	12 –60	40.47	43.29
INT	13.33	2.94	3 – 15	12.93	13.73
WILL	11.27	2.93	3 – 15	10.87	11.67

Note: High average marks show more favorable evaluation of items, expected prototype, and less hookah smoking. /SN = Subjective Norm against hookah, ATT = Attitude against hookah, PT = Prototypical, INT = Intention to not use hookah, WILL = Willingness

Table 3: Multiple liner regression analysis for predicting of intention for not hookah smoking by the constructs of PWM

	B	SE	β	T	*P*-Value	R^2
Constant	1.73	0.96		1.80	0.070	
PT	<0.01	<0.01	<0.01	0.05	0.900	
WILL	0.41	0.06	0.40	6.46	<0.001	46.9%
SN	0.16	0.05	0.19	3.13	0.002	
ATT	0.12	0.03	0.22	3.53	0.001	

The linear regression analysis was used to test whether prototypes were related to students' willingness to avoid hookah smoking. Results showed that there is significant relationship between negative prototype and more willingness to avoid from hookah smoking (*P*=0.002).

Furthermore, liner regression analysis showed significant associations between subjective norms and attitude with intention (*P*<0.001) and the items together explained 36.0% of the non-smoking hookah intention variance.

The logistic regression analysis was conducted to predict hookah non-smoking by willingness and intention constructs. Result of this analysis, presented in Table 4.

Table 4: Adjusted effect of WILL and INT on hookah smoking based on logistic regression

	B	SE	Wald	df	*P*-Value	OR (95% CI)
Will	0.28	0.78	12.57	1	<0.001	1.32(1.13-1.54)
INT	0.13	0.07	3.39	1	0.060	1.13(0.99-1.30)

Discussion

The present study demonstrated that the participants' positive attitude to not smoking hookah was significantly associated to the intention of not smoking, which is consistent with other studies about cigarette and alcohol consumption.[20, 21] In addition, Taraghijah et al. (2010), indicated that the attitude to hookah smoking was the fourth (4th) suitable variable to predict of use the hookah.[22]

Nemme et al. (2010) showed that the positive attitude can predict reading intention and sending text message during driving.[23] The attitude can predict the intention to amphetamine consumption as it can do for speed and Ecstasy.[24]

Positive subjective norms about not smoking hookah correlated significantly with the intention to not smoking hookah. There are several studies in similar fields which deal with subjective norms.[14, 20, 25] In contrast, O'Connor and White (2010), quoted from Patch et al. (2005), and suggested that subjective norm could not predict intention to consume Omega 3 among the Australian participants.[26]

The present study provided evidence that subjective norm is a stronger predictor than the attitude to foresee the intention to refrain from hookah smoking. This was in accordance with Hukkelberg et al. (2009), suggesting that subjective norm was the most powerful predictor for the intention to not smoking the cigarette.[14]Subjective norm predicted a great deal of alcohol consumption.[27]Unlike this finding, a study by Litchfield et al. (2006) showed that the attitude had been presented as the most important determinant for intention to use amphetamine,[24] also result of the study by Forward (2009) showed that the attitude was the best determinant for drivers' intention to break the law.[28]

This difference can be explained by reasoned action theory. According this theory human is logical and they are able to use their available information to take a reasonable decision. But, depending on the type of the studied society and behavior, it will be cleared which of the two structures (i.e. attitude, subjective norm) is determining the behavioral intention.[29]

Willingness was a significantly stronger predictor than subjective norms and attitude for intention. But in a study by Hukkelberg et al. (2009) subjective norms was strongest predictor of intention.[14]

The findings also indicated that there is a significant relationship between the participants' negative prototype about the hookah smokers and the willingness to avoid hookah smoking. This finding is similar to the findings of earlier studies. A study had shown that the participants' negative prototype about cigarette smokers has a significant relationship with willingness to not smoke.[14]

Also, other studies showed that having a positive image on the users of tobacco products and/or alcoholic drinks is associated with the inclination towards using these substances[11,15], and likewise, smoking cigarette by film stars will likely increase cigarette smoking among the teen.[30]

Changes in the prototypes regarding a risky behavior can affect current or future behavior in a positive way. These prototypes can hold a great value to prevent risky behaviors (like hookah smoking, alcohol drinking, cigarette smoking, etc.) being spread out among the teenagers, particularly because it has been shown that the prototype can be easier targets for preventive interventions. The purpose of these interventions is not only to improve undesirable (negative) prototype about the smokers of the same age but also to replace these opinions with desirable (positive) prototypes about the non-smoker ones. The reason is that it seems that non-risky prototypes have more potentiality than the risky ones. Hence, the interventional programs should not emphasize only on the negative prototypes about the hookah smokers, but also increase the positive and desirable ones about the non-smokers.

Additionally, the findings of current study indicated that the willingness can predict the hookah non-smoking behavior in adolescents better than the intention. This is consistent with the other similar studies.[10, 14] It is in contrast with the findings of a study by Gibbons et al. (1998).[31]

One explanation for these contradictory findings may be age difference of participants between both studies. Whereas the present study was conducted among high school students (14-18 years), the earlier study was conducted among college students. The decision-making process is different among adults and adolescents. Adults are likely to have much more experience with risky behaviors and risk-conducive situations than adolescents. So adolescents are less likely to anticipate potential problems. Therefore, adolescents' behaviors are mostly a reaction to the conditions rather than being on the basis of a pre-intended and planned decision.[18]

Limitations

One of the limitations of the current study was collection of data about hookah smoking based on self-reports, that might be affected by recall and response bias due to feeling of pressure from the society. In general, "tobacco products" are prohibited by

the society and adults and they are no longer acceptable products. Thus, teens often are unwilling to report hookah smoking. We tried to solve this problem to some extent by emphasizing on the confidentiality of the participants' identities and anonymity of the information derived from the questionnaires.

Conclusion

The current study showed that PWM is a suitable framework to understand the willingness and intention of the non-smoker young people as the predictors of hookah smoking. This study also showed the importance of the social reaction path in the study of the risky behaviors. Furthermore, it was showed that compared with intention, willingness is significantly a stronger predictor for hookah smoking.

Therefore, it is recommended to control the situations and conditions which may facilitate the risky behaviors, such as easy access to tobacco products in cafés, beaches, etc. Besides, we suggest that an interventional study be conducted about hookah smoking reduction with special focus on reducing positive images about hookah smokers.

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Competing Interests

The authors declare that they have no conflict of interests.

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