Cognitive Factors Related to Cigarettes Smoking among College Students: An Application of Theory of Planned Behavior

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Abstract: Smoking is one of the main risky factors to develop different types of diseases, especially in relation to non-communicable diseases. The aim of this study was determine prevalence and cognitive factors related to cigarettes smoking based on the theory of planned behavior among students in Kermanshah University of Medical Sciences.This cross-sectional study, conducted among college students in Kermanshah University of Medical Sciences, the West of Iran, a total of 620 students were randomly selected to participate voluntarily in the study. Participants filled out a self-administered questionnaire including the background data and theory of planned behavior constructs. Data were analyzed by SPSS version 21 using bivariate correlations, linear and logistic regression statistical tests at 95% significant level. Almost 11.6% of the participants had a history of smoking. The TPB variables accounted for 38% of the variation in the outcome measure of the intention to cigarette smoking. The best predictors for cigarette smoking was subjective norms with odds ratio estimate of 1.361 (95% CI: 1.223, 1.515) and attitude with odds ratio estimate of 1.041 (95% CI: 1.025, 1.058). Based on the result it seems that designing and implementation of educational programs to reduction positive attitude and subjective norms toward prevention cigarette smoking among college students could be useful result to cigarette smoking prevention.

Key words: College students, cigarette smoking, attitude, subjective norms, variables

INTRODUCTION

Smoking has been known as a common harmful behavior which threatens millions of people around the world. Studies reported that the emitting smoke from cigarettes included 4000 chemical materials 40 of which were known to be carcinogen to human. Also, over 80% of lung cancer deaths and 30% of total death rates results from smoking (Shahnazi *et al.*, 2014). However, tobacco is known as a controllable reason to death (Annadurai *et al.*, 2014; Borgan *et al.*, 2014; Jafarabadi *et al.*, 2012). World health organization reported that 6 million people die in a year due to smoking tobacco (Annadurai *et al.*, 2014). Furthermore, about 4% of disability-adjusted life years in developed and 13% in developing countries are attributable to smoking, respectively (Rezaei *et al.*, 2015). It is predicted that by the end of 21st century one billion people will die due to smoking tobacco (Borgan *et al.*, 2014). Considering the reports from centers of disease

control, CDC, over the 80% of smokers started smoking before the age of 18 (Shahnazi *et al.*, 2014; Abedini *et al.*, 2014). There are several problems resulting from smoking at lower ages as an example, nicotine addiction is higher among smokers who started smoking at lower ages and accordingly there is less opportunity to quit smoking (Shahnazi *et al.*, 2014). Also, they tend to continue smoking in their adulthood. Furthermore, smoking forms the basis to risky behaviors, lower health conditions and several psychological problems (Gharlipour *et al.*, 2013). On the other hand, studies suggested that teenagers and young adults' smoking leads to drug abuse such as heroin, marijuana, etc. (Shahnazi *et al.*, 2014; Jafarabadi *et al.*, 2012). Research reported high rates of smoking among young adults ranging from 14.2-39 around the world (Jafarabadi *et al.*, 2012). A study in Iran among medical college students reported 22% of students was reporting had history of smoking (Hamed *et al.*, 2013). In another study, young adults smoking rate was reported

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to be 19.4% during their whole life (Rezaei *et al.*, 2015). Research in developed countries suggested the increasing levels of smoking among college students and introduced college years as a specific period of time when smoking rate significantly increases (Jalilian *et al.*, 2014a). Therefore, it seems essential to consider the effective factors to increase smoking rates among college students; it has even been suggested that smoking rate among college students may represent smoking index for all young adults (Divsalar and Nakhaei, 2008). In addition, the epidemiological researches is first step to develop substance abuse preventive programs (Barati *et al.*, 2015). Also, it is known that human behavior is a reflect of several factors and recognizing the causative network is considered important to influence effective factors to behavior which have been investigated by behavioral science experts and making use of theories could be a help to the experts to comprehend effective factors to behavior (Glanz *et al.*, 2008). In this regard, Theory of Planned Behavior (TPB) which has been used in several studies on predicting behavior and introduces behavioral intention as the primary determiner to behavior which suggests "individual's stimulation to take a behavior" and introduces behavior intention as the result of: individual's attitude to behavior, individual's conception of other people and environment subjective norms and individual's perceived behavior control (Ajzen, 1991).

The TPB based study focused on exploring cognitive factors related to the cigarettes smoking among Kermanshah University of Medical Sciences students in the West of Iran.

MATERIALS AND METHODS

This cross-sectional study was conducted among 620 college students in Kermanshah University of Medical Science in the West of Iran. Considering various collages as clusters, samples were chosen randomly based on probability proportional to size of each cluster. Then, participants were asked to respond to a researcher developed survey to the aim of the study and the required data to the study were gathered. Participants were confirmed about the aim of the study, study conduction and data security. Also, they reported their willingness to attend the study. Of the population of 620, 601 (96.9%) signed the consent form and voluntarily agreed to participate in this study which has been approved by the Institutional Review Board at the Kermanshah University of Medical Sciences (KUMS.REC.1394.445).

The required data were gathered a self-report survey that included two parts. The first part investigated demographic information (11 items on students' personal information) such as age (year), gender (male, female), their attending college (medical, dentistry, pharmacology, health and nutrition, nursing and midwifery, paramedical), educational level (BSc, MSc or MD), marital status (single, married), staying in a dormitory (yes, no), economic status (very poor, poor, average, well, very well), parents education level (under diploma, diploma, academic), smoking (yes, no) and initiation age for smoking (year).

The second part includes constructs of the TPB were derived from the scales of substance abuse including 17 items for four major constructs of TPB (Jalilian *et al.*, 2014b; Karami *et al.*, 2014; Allahverdipour *et al.*, 2012; Ataee *et al.*, 2014). To confirm the reliability of the questionnaires, a pilot test was conducted on 30 students and their Cronbach alpha was estimated. Furthermore, experts panel were consulted on questionnaires validity.

Attitude toward smoking: The questionnaire included 9 items which aims to investigate participants' attitude toward smoking in different aspects of enjoyment, excitement, etc. in a 7-point Likert scale. The higher the score, the more positive the attitude was to smoking. The reliability of the questionnaire was high ($\alpha = 0.96$).

Subjective norms toward encourage smoking: The questionnaire included 3 items (e.g., "my friends encourage me to smoke"). Higher scores interpreted stronger subjective norms to encourage smoking. Cronbach alpha of the questionnaire was reported 0.76.

Perceived behavior control toward avoid smoking: It had 2 items (e.g., "how self-confidence are you to avoid smoking?"). The higher the gained score, the better was the perceived behavior to avoid smoking. Its reliability was estimated 0.78.

Behavior intention toward smoking: The questionnaire included 3 items (e.g., "I am planning to quit smoking in a next month"). The higher the scores, the stronger was the intention behavior to smoking. Cronbach alpha was reported 0.68. The data were analyzed by the SPSS Software for windows (version 21.0) using bivariate correlations, linear and logistic regression statistical tests at 95% significant level.

RESULTS

The mean age of participants was 22.19 years (SD: 3.03), ranged from 18-42 years. Almost, 42.1% (253/601) were male and 57.9% (348/601) were female. The 14.1% participants (85/601) were married and 85.9% (516/601) were single. The 4.5% (27/601) of participants were

Table 1: Predictor variables of cigarettes smoking based on bivariate correlation analysis

Variables	Mean (SD)	X^1	X^2	X^3
X^1: Attitude	18.60 (14.83)	1.000		
X^2: Subjective norms	4.06 (2.100)	0.272**	1.000	
X^3: Perceived behavioral control	7.53 (2.870)	-0.256**	-0.301**	1.000
X^4: Behavioural intention	3.39 (6. 60)	0.425**	0.504**	-0.334**

**Correlation is significant at the 0.01 level (2-tailed)

Table 2: Logistic regression analysis for TPB variables related to cigarettes smoking

			Odds	95% confidence intervals		
Variables	B	SE	ratio	Lower	Upper	p-values
Step 1						
Attitude	0.041	0.008	1.042	1.025	1.059	0.001
Subjective norms	0.311	0.058	1.367	1.220	1.532	0.001
Perceived behavioral control	0.013	0.055	1.013	0.910	1.128	0.814
Step 2						
Attitude	0.040	0.008	1.041	1.025	1.058	0.001
Subjective norms	0.308	0.055	1.361	1.223	1.515	0.001

Table 3: Predictors of the perceptual variables in cigarettes smoking behavioural intention

Variables	B	SE	β	t-values	p-values
Attitude	0.065	0.009	0.278	7.302	0.001
Subjective norms	0.638	0.062	0.397	10.266	0.001
Perceived behavioral control	-0.187	0.046	-0.157	-4.056	0.001

SE = Standard Error adjusted R^2 = 0.38, F= 98.171 and p<0.001

reported their parents' divorce. Furthermore, 11.6% (70/601) of participants had history of cigarettes smoking in his life.

In addition, mean initiation age for cigarette smoking was 17.62. Also, 3.3% (20/601) of participants was daily smoker.

Table 1 shows mean, standard deviation and bivariate correlations between the TPB constructs which were statistically significant at either 0.01 level. A backward step-wise model building procedure was conducted and finally on 2nd step the procedure stopped and the best model was selected, among the TPB constructs: subjective norms (OR = 1.361) and attitude (OR = 1.041) were the more influential predictor on cigarettes smoking (Table 2). As can be seen in Table 3, TPB variables were statistically significant for predicting cigarettes smoking which they were accounted for 38% of the variation in intention to use the cigarettes smoking (Adjusted R^2 = 0.38, F = 98.171 and p<0.001).

As mentioned in statistical analyses, a step-wise model building procedure was conducted and among the background variables: male gender (OR = 3.902) and parents' divorce (OR = 7.897) were major factors to predict cigarettes smoking among the college students (Table 4).

Table 4: Logistic regression analysis for socio-demographic characteristics related to cigarettes smoking

Variables	Crude OR	p-values	Adjusted OR	p-values
Sex				
Female	1.000	-	1.000	-
Male	3.748	0.001	3.902	0.001
Parent divorce				
No	1.000	-	1.000	-
Yes	8.375	0.001	7.897	0.001

DISCUSSION

The aim of our study was to determine cognitive factors related to cigarettes smoking among Kermanshah University of Medical Sciences students in the West of Iran based on the theory of planned behavior. The findings showed that attitude and subjective norms were the most influential predictors on cigarettes smoking.

According to the results, 11.6% of the participants had experience of cigarettes smoking at least once. In this regard, Hamed *et al.* (2013) carried out a research on Tehran University students of medical sciences and reported that 22% of the participants had history of cigarettes smoking. Jalilian *et al.* (2015a) stated that 19.4% of Iranian medical college students had history of cigarettes smoking during the past 3 months. In addition, Xu *et al.* (2015) and Mohanan *et al.* (2014) reported that 21.8 and 7.2% of the subjects in their studies had history of cigarettes smoking respectively. Also, Shemmari *et al.* (2015) reported that 24% of students in Ajman, United Arab Emirates had history of cigarettes smoking. In other study prevalence of cigarettes smoking among students 18-23 years old was reported 14.9 and 8.6% (Saddleson *et al.*, 2015; Eid *et al.*, 2015). It could be inferred that there were various rates of smoking prevalence in different countries which may be affected by various cultures, religions, family norms or economics. Furthermore, mean initiation age for cigarette smoking was 17.6 years. The results of similar to studies confirm these finding. For example, Hamed *et al.* (2013) in their study among Tehran University students of Medical Sciences reported initiation age for cigarette smoking was 17 (SD = 4.5) years (Jalilian *et al.*, 2014b). Mohanan *et al.* (2014) reported that initiation age for cigarette smoking in Ajman, United Arab Emirates was 16.8 years. However, the age has decreased through the recent years (Shahnazi *et al.*, 2014; Rezaei *et al.*, 2015; Gharlipour *et al.*, 2013). Asghari reported that initiation age for cigarette smoking among Iranian teenagers decreased to 13.93 years (Rezaei *et al.*, 2015). Such a decrease in smoking age could result in several consequences the most important could be chronic cardiovascular diseases, diabetes, etc. On the other hand, smokers may tend to use drug and psychedelics that even increase the problem

(Shahnazi *et al.*, 2014; Rezaei *et al.*, 2015). This findings could warn health organizers in Iran and shows the importance to conduct preventive interventions in lower ages.

Another findings of this study indicated the prevalence of daily smoker among college students was 3.3%. In this regard, Dania *et al.* (2015) carried out a research among medical students in Lagos, Nigeria and reported that 1.2% of the participants were daily smoker. Furthermore, Multani *et al.* (2012) in their study among young people in the India reported high rate (47.8%) of regular smokers among them.

The results indicated among the socio-demographic characteristics boy gender and students who reported the parents' divorce were predictive cognitive factors to cigarettes smoking. The results of similar to studies confirm these finding. For example, many study reported higher risk of experiencing such as smoking among male than female students (King and Chassin, 2007; Hicks *et al.*, 2007). In addition, Jalilian *et al.* (2015b) reported parents' divorce was a strong factor for alcohol drinks among the college students.

Due to the numerous complications of substance abuse (Farnia *et al.*, 2014; Ahmadi *et al.*, 2014), it is necessary to design preventive intervention program especially among high risk groups (Jalilian *et al.*, 2015a). In other hand other, study suggested cognitive factors related to substance abuse could be beneficial in designing preventive programs (Jalilian *et al.*, 2015b). The findings indicated, the three predictor variables of, attitude, subjective norms and perceived behavioral control accounted for 38% of the variation in the outcome measure of the intention to cigarettes smoking. Furthermore, logistic regression analyze showed the best predictors for cigarettes smoking were subjective norms, and attitude. The results of similar to studies confirm these finding. For example, Jalilian *et al.* (2015a) showed that attitude, outcome expectancies and subjective norms were the most influential predictors for drug abuse among Iranian college students. In addition, relationship between subjective norms and ecstasy use among Iranian adolescents was showed in another study (Jalilian *et al.*, 2015b).

The study has several strengths such as theory based design, high response rate and high sample size. Furthermore our study have certain limitations such as data collection was based on self-reporting which is usually prone to recall bias.

CONCLUSION

The results indicated that subjective norms were strong predictor for cigarettes smoking among college students. In addition, positive belief related to cigarettes smoking have an important role to persuade college students to cigarettes smoking. It seems that designing and implementation of preventional programs to reduction positive attitude and subjective norms toward cigarette smoking among medical college students could be usefulness result to cigarette smoking prevention.

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