



Research Paper

The Relationships Between Smoking Intention and Various Dimensions of Health Literacy Among University Students



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ABSTRACT

Background: Cigarette Smoking plays an important role in causing chronic diseases around the world and its consumption among adolescents is quickly increasing. Significant relationship has been reported between the smoking status and health literacy.

Objectives: This investigation aimed at recognizing the relationships between smoking intention and various dimensions of health literacy in university students.

Materials & Methods: In the current cross-sectional investigation, 542 students of Mashhad Universities of Applied Sciences were collected using cluster sampling method. Data collection tools were sociodemographic, health literacy, and smoking intention questionnaire. Data were analyzed through SPSS software, version 24.0.

Results: Among the various investigated dimensions of health literacy, the decision making and health information application dimension has the lowest score and the reading skills and access dimensions have the highest score, respectively. Results showed that the smoking intention was associated significantly with decision making ($\beta=-0.27$; 95% Confidence interval (CI): -0.03, -0.01) and health information application and access dimensions ($\beta=-0.3$; 95% CI: -0.03, -0.02). Furthermore, decision making and health information application dimension was the strongest smoking intention predictor.

Conclusion: Recognizing the skills that are most strongly associated with smoking decision-making can help designers develop clear, informative, and actionable programs and training. The findings of this investigation indicated the fact that in order to reduce the intention of smoking and in contrast to increase carrying out preventive and healthy behaviors among university students, specific consideration must be had to the factor of health literacy and its effective dimensions.

Keywords: Health literacy, Smoking, Intention, University, Students

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1. Introduction

Cigarette Smoking is an important predisposing factor for numerous diseases [1]. Studies have indicated that smoking is not only damaging for smokers, but it is harmful for non-smokers who are exposed to smoke [2]. It is estimated that the number of smokers would be increased from 1.3 to 1.6 billion by the year of 2025 [3, 4]. Previous study showed that smoking behavior was increasing among Iranian students [5]. In another research, significant relationship has been reported between the smoking status and health literacy [6]. Health literacy is a multidimensional concept that includes the people's ability to attain the goals, communicate, and understanding the primary health information required to make proper health care decision [7]. Health literacy is propounded as an important social component and has a considerable role in health promotion [8]. Previous investigations have indicated that health literacy is a better predictor for health condition than the race, socio-economic situation, sex, education status and occupation [8]. The results of investigation of Tavousi et al. indicated that approximately 44% of the Iranian population had insufficient health literacy [9]. Moreover, study findings of Sajadi et al. [10] and Dehghankar et al. [11] demonstrated that rather than one third of university students did not have adequate health literacy. limited health literacy is related to damaging health consequences and has been associated with unhealthy behaviors, such as smoking [12, 13]. In addition, studies indicated that the lower levels of health literacy are linked with smoking recurrence predictors like positive attitudes of smoking, nicotine dependency, and low knowledge and low perceptions of smoking risk [14]. Persons who have low and insufficient health literacy are less informed of the harmful outcomes of cigarette smoking for health, and perhaps less capable to understand and utilize the services of smoking cessation.

Based on our best knowledge, few investigations have been conducted of the relationships between various dimensions of health literacy and intention of smoking in university students in Iran. Therefore, this investigation aimed at recognizing the relationships between smoking intention and various dimensions of health literacy in university students.

2. Materials and Methods

In the current cross-sectional investigation, 542 students of Mashhad Universities of Applied Sciences were collected using cluster sampling method. For sampling,

the desired university centers were first randomly selected with the cluster sampling method, and then students are randomly selected based on the list of students within the clusters. The research protocol was approved by the [Mashhad University of Medical Sciences](#). The inclusion criteria for the present study include: individuals' willingness to enter the study, being a student, and Iranian citizenship. Also, lack of consent to participate in the study and incomplete completion of the questionnaires were considered as exclusion criteria.

After getting informed consent, the paper questionnaires were given to the participants for completion. The prime part of the questionnaire includes demographic information of participants, including age (y), gender, marital status, and education. The second part of the questionnaire includes items related to health literacy. The health literacy questionnaire developed by Montazeri et al. in Iran [15]. The reliability of the tool according to Cronbach's alpha was 0.94. The health literacy questionnaire has 33 questions in 4 different dimensions: reading skills dimension (4 items) related to the ability of studying educational materials related to health, access dimension (6 items) related to availability of health information, understanding dimension (7 items) related to understanding the health concepts, assessment dimension (4 items) related to evaluation of health information, decision making and health information application dimension (12 items) related to behaviors of health. Each items were scored based on standard score from 0 to 100. The raw score of participants in different dimensions was got of the scores summation of that dimension which range from 0 to 100. In order to compute the total score, all dimensions' scores were summed together and divided by its number (5 dimensions).

The variable intention to smoke was evaluated applying a question: How likely are you to smoke cigarette in the next year? (very unlikely (1) to very likely (4). The questionnaire validity was affirmed by MacDonell et al. and Yan et al. [2, 16]. Moreover, Cronbach's alpha test method was used to measure the reliability on 30 students and the values were obtained 0.75.

Statistical analysis

Data were analyzed through SPSS software, version 24.0. Kolmogorov-Smirnov test was accomplished to analyze the normality of data distribution (SD). Descriptive analysis was performed using frequency, mean, percentages, and standard deviation. Furthermore, Linear regression was calculated with smoking intention and dimensions of health literacy scores. The level of significance was $P < 0.05$.

3. Results

Demographic information of the students is displayed in Table 1. The mean age of students was 21.64 ± 3.34 years and more than half of them (58.7%) were female.

The results presented in Table 2 are related to the mean and standard deviation of smoking intention and different dimensions of health literacy. The mean score of smoking intention was 2.64. As shown in the table, among the various investigated dimensions of health literacy, the decision making and health information application dimension has the lowest score and the reading skills and access dimensions have the highest score, respectively.

Results showed that the smoking intention was associated significantly with decision making and health information application and access dimensions (Table 3). As shown in the table, decision making ($\beta = -0.27$, Confidence interval: -0.03, -0.01) followed by health informa-

tion application dimension ($\beta = -0.3$, Confidence interval: -0.03, -0.02) were the strongest predictors of smoking intention ($P \leq 0.001$). The model account for 36% of variance in smoking intention.

4. Discussion

Health literacy is an important and decisive tool to promote social healthcare [17]. As investigators claimed that the health literacy factor in the community could be a more powerful predictor for health than other factors such as income, age, job status, and education [18]. The findings of different investigations showed the significant association between healthy behaviors and health variable [19]. Pervious study by Liu et al. showed that the individuals with higher scores of health literacy were considerably lower probable to adopt unhealthy behaviors including smoking, and also more likely to carry out regularly health checkups, rate well of their health, and access to adequate health information [6].

Table 1. Demographic characteristics of the participants

Demographic Characteristics		No. (%) / Mean \pm SD
Age (year)		21.64 \pm 3.34
Sex	Male	224 (41.3)
	Female	318 (58.7)
Education	Associate degree	331 (61.1)
	Bachelor science	211 (38.9)
Marital status	Married	155 (28.6)
	Single	387 (71.4)



Table 2. Mean scores and standard deviation of health literacy dimensions and smoking intention

Variables	Mean \pm SD	Range	
Reading skills	76.52 \pm 7.80	58-93	
Access dimension	74.29 \pm 8.33	57-93	
Dimensions of health literacy	Understanding dimension	69.69 \pm 11.29	41-89
	Assessment dimension	68.17 \pm 13.51	42-90
Decision making and health information application	62.93 \pm 15.75	41-90	
Smoking intention	2.64 \pm 0.97	1-4	



Table 3. Regression analyses for smoking intention based on dimensions of health literacy

Independent Variables	β Unstandardized	SE	β Standardized	P	95% Confidence Interval
Reading skills	-0.01	0.01	-0.06	0.20	(-0.02, 0.004)
Access dimension	0.004	0.005	0.04	0.44	(-0.01, 0.015)
Understanding dimension	-0.01	0.01	-0.07	0.42	(-0.02, 0.01)
Assessment dimension	-0.02	0.01	-0.27	0.002	(-0.03, -0.01)
Decision making and health information application	-0.02	0.002	-0.39	0.000	(-0.03, -0.02)

SE: Standard error



In current study, among the various investigated dimensions of health literacy, the decision making and health information application dimension had the lowest score and the reading skills and access dimensions had the highest score, respectively. Our findings were in line with Panahi et al.'s study that showed the lowest average score obtained by students belong to the dimension of decision-making skills and the application of health information [8]. However, in the studies of Ghanbari et al. [20] and Solhi et al. [21], dimension of decision-making dimension had the highest score and assessment had the lowest. In addition, in the investigation by Khoshravesh et al., reading skills and assessment dimensions had the lowest score, instead, dimension of understanding was more considerable than the others [22]. The variety in the findings can be caused by the individuals' various environmental status and the various characteristics and situations of the investigated community. Considering the fact that the low level of the dimension of using information compared to other dimensions, can lead to the lack of proper application of health knowledge [23], and considering that in the current study, the average score of the dimension of decision-making and applying of health information was lower than other dimensions; it can be concluded that the intention to smoke and the poor adoption of smoking prevention behaviors can be caused by the less scores of health literacy in the dimension of decision-making and the use of health information. A significant relation between the reading skill and smoking cessation in Martin et al.'s study was found; so that with every 1-degree increase in reading skills, the probability of quitting smoking increased by 8% [24].

In this investigation, a total of 36% of the smoking intention variable was explained by the different dimensions of the health literacy questionnaire. Panahi et al. have reported that there was a statistically relationship between the adoption of smoking prevention behaviors

and health literacy [25]. Liu et al.'s study showed that the participants who had higher levels of health literacy were less possible to engage in unhealthy behaviors such as smoking [6]. Study by Atri et al. indicated that increasing the health literacy levels can cause a change in individuals smoking-related behavior [26]. In this study, results showed that the smoking intention was associated significantly with decision making and health information application and access dimensions. The significant relationships in this study indicates that these dimensions together can play a decisive role on the intention to smoke and form the necessary abilities to adopt preventive behaviors against smoking. Recognizing the skills that are most strongly associated with smoking decision-making can help designers develop clear, informative, and actionable programs and training. These results were consistent with the study of Ziapour and Kianipour [27]. Moreover, in the Panahi et al.'s study, it was found that among all aspects of health literacy, there was a highest significant relationship between the dimension of decision-making and smoking behaviors [8]. Findings of the investigation by Martin et al. showed that the skill of health information application can influence people's decision to quit smoking [24].

Regarding the lack of significant relationship between other aspects of health literacy and the intention to smoke, it can be said that health literacy is a collection of capacities, proficiencies, and capabilities in various dimensions. These capacities and proficiencies are sometimes determined in the dimension of reading health-related information, sometimes in the dimension of understanding information, sometimes in the dimension of acquiring and obtaining them, sometimes in the dimension of processing and interpreting health-related information, and sometimes in the dimension of decision making and the application of them; and in this way it can affect the intention of smoking or adoption preventive and healthy

behaviors. In other words, in the present study, probably these capacities and proficiencies were able to appear only in the dimension of assessment and the dimension of decision-making and applying of health information, and have an impact on the intention to smoke. It is worth mentioning that the lack of significant relationship between three of the five dimensions of health literacy, i.e. reading skills dimension, access dimension, and understanding dimension, with the intention to smoke could be because in addition to health literacy, various other variables such as awareness, attitude, education, age, social and family norms, the presence of a smoker in the family and having smoking friends can affect the intention to smoke or adopt preventive behavior.

It seems that the present research is one of the few studies that investigate the relationships between each dimension of health literacy and smoking intention. Altogether, the findings of this investigation indicated the fact that in order to reduce the intention of smoking and in contrast to increase carrying out preventive and healthy behaviors among university students, specific consideration must be had to the factor of health literacy and its effective dimensions.

5. Conclusions

In this investigation, a total of 36% of the smoking intention variable was explained by the different dimensions of the health literacy questionnaire. Furthermore, results showed that the smoking intention was associated significantly with decision making and health information application and access dimensions. Recognizing the skills that are most strongly associated with smoking decision-making can help designers develop clear, informative, and actionable programs and training. The findings of this investigation indicated the fact that in order to reduce the intention of smoking specific consideration must be tailored to the factor of health literacy and its effective dimensions.

Limitation

In this study, self-report was the data collection method and this was one of the limitations of our investigation. Furthermore, using the method of cross-sectional is another limitation in this research. Longitudinal information is required to realize the accurate relationships in which these factors interact together.

Ethical Considerations

Compliance with ethical guidelines

The study was approved by the [Mashhad University of Medical Sciences](#) (Code: IR.MUMS.FHMPM.REC.1401.035). Furthermore, At the beginning of the research, informed consent was taken from all students studied.

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Authors' contributions

Participating in the writing and design of the study, performing the statistical analysis and drafting the manuscript: Sahar Mohammadnabizadeh; Participating in design of the study and statistical analysis: Vahid Ghavami; Both authors read and approved the final manuscript.

Conflict of interest

The authors declared no conflict of interest.

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References

- [1] Panahi R, Ramezankhani A, Tavousi M, Niknami S. Adding health literacy to the health belief model: Effectiveness of an educational intervention on smoking preventive behaviors among university students. *Iran Red Crescent Med J.* 2018; 20(2):e13773. [DOI:10.5812/ircmj.13773]
- [2] Yan Y, Jacques-Tiura AJ, Chen X, Xie N, Chen J, Yang N, et al. Application of the protection motivation theory in predicting cigarette smoking among adolescents in China. *Addict-behav.* 2014; 39(1):181-8. [DOI:10.1016/j.addbeh.2013.09.027] [PMID] [PMCID]
- [3] Mathers CD, Loncar D. Projections of global mortality and burden of disease from 2002 to 2030. *Plos Med.* 2006; 3(11):e442. [DOI:10.1371/journal.pmed.0030442] [PMID] [PMCID]
- [4] Lim HK, Ghazali SM, Kee CC, Lim KK, Chan YY, Teh HC, et al. Epidemiology of smoking among Malaysian adult males: Prevalence and associated factors. *BMC Public Health.* 2013;13:8. [DOI:10.1186/1471-2458-13-8] [PMID] [PMCID]

- [5] Panahi R, Tavousi M, Ramezankhani A, Sahraei M, Osmani F, Khalilipour Darestani M, et al. Smoking prevalence and its related factors among dormitory students of Shahid Beheshti University of Medical Sciences, Tehran, Iran. *Zahedan J Res Med Sci.* 2018; 20(8):e63037. [DOI:10.5812/zjrms.63037]
- [6] Liu YB, Liu L, Li YF, Chen YL. Relationship between health literacy, health-related behaviors and health status: A survey of elderly Chinese. *Int J Environ Res Public Health.* 2015; 12(8):9714-25. [DOI:10.3390/ijerph120809714] [PMID] [PMCID]
- [7] Panahi R, Namdar P, Siboni FS, Fallah S, Anbari M, Dehghankar L, et al. Association between health literacy and adopting preventive behaviors of breast cancer in Iran. *J Educ Health Promot.* 2020; 9:2241. [DOI:10.4103/jehp.jehp_313_20] [PMID] [PMCID]
- [8] Panahi R, Ramezankhani A, Tavousi M, Osmani F, Ghazanfari E, Niknami S. [Evaluation of health literacy and its influencing factors on dormitory students of Shahid Beheshti University of Medical Sciences in Tehran (Persian)]. *J Educ Community Health.* 2016; 3(3):30-6. [DOI:10.21859/jech-03035]
- [9] Tavousi M, Mehrizi A, Solimani A, Sarbandi F, Ardestani M, Hashemi A, et al. [Health literacy in Iran: Findings from a national study (Persian)]. *Payesh.* 2016; 15(1):95-102. [Link]
- [10] Alsadat Sajadi F, Sadat Sajadi H, Panahi R. [Health literacy of university students and its influential factors: A case study at Isfahan University (Persian)]. *J Educ Community Health.* 2020; 7(1):23-8. [DOI:10.29252/jech.7.1.23]
- [11] Dehghankar L, Panahi R, Kekefallah L, Hosseini N, Hasannia E. The study of health literacy and its related factors among female students at high schools in Qazvin. *J Health Lit.* 2019; 4(2):18-26. [DOI:10.22038/JHL.2019.40390.1055]
- [12] Berkman ND, Sheridan SL, Donahue KE, Halpern DJ, Crotty K. Low health literacy and health outcomes: An updated systematic review. *Ann Intern Med.* 2011; 155(2):97-107. [DOI:10.7326/0003-4819-155-2-201107190-00005] [PMID]
- [13] Hoover DS, Vidrine JJ, Shete S, Spears CA, Cano MA, Correa-Fernández V, et al. Health literacy, smoking, and health indicators in African American adults. *J Health Commun.* 2015; 20 Suppl 2(02):24-33. [DOI:10.1080/10810730.2015.1066465] [PMID] [PMCID]
- [14] Stewart DW, Cano MÁ, Correa-Fernández V, Spears CA, Li Y, Waters AJ, et al. Lower health literacy predicts smoking relapse among racially/ethnically diverse smokers with low socioeconomic status. *BMC Public Health.* 2014; 14(1):716. [DOI:10.1186/1471-2458-14-716] [PMID] [PMCID]
- [15] Montazeri AL, Tavousi M, Rakhshani F, Azin SA, Jahangiri K, Ebad M, et al. [Health Literacy for Iranian adults (HE-LIA): Development and psychometric properties (Persian)]. *Payesh.* 2014; 13(5):589-99.
- [16] Macdonell K, Chen X, Yan Y, Li F, Gong J, Sun H, et al. A protection motivation theory-based scale for tobacco research among Chinese youth. *J Addict Res Ther.* 2013; 4:154. [DOI:10.4172/2155-6105.1000154] [PMID] [PMCID]
- [17] Kickbusch I. Health literacy: An essential skill for the twenty-first century. *Health Educ.* 2008; 108(2):101-4. [DOI:10.1108/09654280810855559]
- [18] Adams RJ, Stocks NP, Wilson DH, Hill CL, Gravier S, Kickbusch I, et al. Health literacy—a new concept for general practice? *Aust Fam Physician.* 2009; 38(3):144-7. [PMID]
- [19] Peyman N, Amani M, Esmaili H. [The relationship between health literacy and constructs of theory of planned behavior and breast cancer screening tests performance among women referred to health care centers in Roshtkhar, 2015 (Persian)]. *Iran J Breast Dis.* 2016; 9(3):60-9. [Link]
- [20] Ghanbari A, Rahmatpour P, Khalili M, Barari F. The association between health literacy and health status among the staff of Guilan University of Medical Sciences, Iran. *Health Syst Res.* 2016; 12(3):60-9. [Link]
- [21] Solhi M, Jormand H. Assessment of health literacy of municipal employees in Shemiranat, Iran. *Electron Physician.* 2017; 9(12):6072-7. [DOI:10.19082/6072] [PMID] [PMCID]
- [22] Khoshravesh S, Moeini B, Rezapour-Shahkolai F, Taheri-Kharameh Z, Bandehelahi K. [Health literacy of employees of hamadan university of medical sciences and related demographic factors (Persian)]. *J Educ Community Health.* 2018; 5(1):19-26. [DOI:10.21859/jech.5.1.19]
- [23] Esna Ashari F, Pirdehghan A, Rajabi F, Sayarifard A, Ghadirian L, Rostami N et al. [The study of health literacy of staff about risk factors of chronic diseases in 2014 (Persian)]. *Avicenna J Clin Med.* 2015; 22(3):248-54. [Link]
- [24] Martin LT, Haas A, Schonlau M, Derose KP, Rosenfeld L, Rudd R, Buka SL. Which literacy skills are associated with smoking? *J Epidemiol Community Health.* 2012; 66(2):189-92. [DOI:10.1136/jech.2011.136341] [PMID] [PMCID]
- [25] Panahi R, Hosseini N, Ramezankhani A, Anbari M, Amjadian M, Dehghankar L, et al. Measuring the structures of the health belief model integrated with health literacy in predicting university students' adoption of smoking preventive behaviors. *J Prev Med Hyg.* 2022; 63(1):E51-8. [DOI:10.15167/2421-4248/jpmh2022.63.1.2236] [PMID]
- [26] Atri SB, Sahebihagh MH, Jafarabadi MA, Behshid M, Ghasempour M, Abri F. The relationship between health literacy and stages of change in smoking behavior among employees of educational health centers of Tabriz University of Medical Sciences (2016). *Int J Prev Med.* 2018; 9:91. [DOI:10.4103/ijpvm.IJPVM_259_17] [PMID] [PMCID]
- [27] Ziapoor A, Kianipoor N. [Predicting health literacy of students in Kermanshah University of Medical Sciences in 2016: The role of demographic variables (Persian)]. *J Health Lit.* 2016; 1(3):182-90. [DOI:10.22038/JHL.2016.10966]