BMJ Open

Association between loneliness and cigarette smoking attitudes among university students in Iran: a cross-sectional study

Hamideh Zahedi [1,2] Seyyede Leila Sajjadi,[1,3]
Mohammad Hasan Sahebihagh [4] Parvin Sarbakhsh[5]

For numbered affiliations see end of article.

Correspondence to
Dr Mohammad Hasan Sahebihagh;
sahebihagh@tbzmed.ac.ir

ABSTRACT

Objectives During the last two decades, cigarette smoking witnessed a global increase in use, especially among youth. Loneliness is one of the possible psychosocial determinants of smoking. This study examined the association between loneliness and attitudes towards cigarette smoking among university students of Iran.

Design Cross-sectional study.

Setting and participants This study was conducted among 538 university students, who were recruited using the cluster random sampling method. Loneliness and smoking attitudes of the samples were assessed using the revised version of the University of California Los Angeles Loneliness Scale and the Scale of Cigarette Smoking Attitude (CSA). Descriptive statistics, Pearson's correlation coefficient and multivariable regression analysis were used to analyse the data.

Results From a total of 538 participants, 301 (59.9%) students were young women. The mean age of the students was 22.2±2.9 years. Only 56 (10.4%) of the students were married and 370 (87.9%) of them were lived with their families. 131 (24.3%) students experienced cigarette smoking. In terms of university-related characteristics, 205 (38.1%) of the students studied in the faculty of medicine. Also, 30% of the students had a positive or indifferent attitude towards smoking, while 26.4% of the students reported feeling lonely. The mean scores for loneliness and CSA were 41.42±11.29 and 48.64±11.2, respectively. Statistically, a significant positive correlation was found between loneliness and CSA (r=0.289; p<0.001). After controlling for potential confounders by regression analysis, loneliness scores were also positively associated with CSA scores (B: 0.14; 95% CI 0.097 to 0.18).

Conclusions According to the positive association between loneliness and students' CSA, paying more attention to the state of loneliness in college students, examining situations and reasons that increase it and identifying the interventions that might reduce it are necessary. Reducing loneliness among college students can correct their attitudes towards smoking.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ The study findings have significant implications for university students and the health system.
⇒ With the type of cross-sectional design, the longitudinal changes are not controlled.
⇒ The self-reported data may pose a potential risk to the validity of the measurements.
⇒ The influence of social desirability bias should be considered, as it may impact the accuracy of responses in self-report questionnaires, particularly given that the participants were studying in a health-related field.

poses one of the greatest public health challenges worldwide[1] and one of the main risk factors for a healthy lifestyle.[2] The serious health consequences of cigarette smoking often appear later in life. Smokers have a higher risk of developing cancer, chronic lung disease, heart disease and stroke.[3] Additionally, some health consequences of smoking, including alcohol use, risky driving, relational abuse, depression and reduced exercise, can appear soon after smoking initiation.[4]

During the last two decades, cigarette smoking has experienced a global increase in use, particularly among youth in low-income countries.[5][6] In recent years, smoking prevalence in Iran has also increased, especially among youth and women, and smoking ages have decreased.[7] A meta-analysis found that the smoking prevalence of students in Iran was 7.9%. 10.6% of men and 4.5% of women were smokers. Furthermore, the prevalence of smoking among students in the northern regions of Iran was 22.4%, which was higher than in other regions of this country. Men in the northern (22.4%) and women in the western regions (5.3%) were more likely to smoke.[8] Smoking prevalence among Iranian youth has increased from 2.5% to 17%. Furthermore, the speed of becoming

BACKGROUND

Cigarette smoking is the most preventable cause of death and premature disability and

a smoker adolescent in Iranians is high.[9] Smoking behaviour, attitude and social norms about smoking vary greatly across countries and cultures. University students generally had positive results in preventing and stopping Cigarette Smoking Attitude (CSA).[10–12] For instance, the results of a study in Lithuania indicated that dental students had positive attitudes towards smoking cessation in their patients.[13]

Therefore, it is important for those who are interested in cigarette smoking control to discover associated factors with smoking and identify strategies to strengthen interventions for smoking cessation. Also, smoking prevention in non-smoker population is essential. The sociocultural environment influences attitudes, values and behaviour. Additionally, loneliness has been identified as an important social determinant of youth health risk behaviours and smoking cigarettes.[14]

Loneliness is an unpleasant mental experience that results from the difference between the expected social status and the current state of the individual.[15] Feelings of loneliness as a debilitating mental state and weakness in interpersonal relationships are common among students.[16]

Over 15% of students reported feeling lonely, with figures worse for Asian, Black, and Minority Ethnic, disabled and international students, and those living at home.[17] A study at Maragheh University in the northwest of Iran found that 50.5% and 31.6% of students had moderate and severe loneliness, respectively, with gender being a predictor.[18] Also, around 10.5% of the general population in the western Mid-Germ had loneliness.[19] It is recommended that universities pay more attention to the mental health status of students and teach effective coping strategies to them. In addition, they should execute the university's intervention plans. In this case, mental health nurses and community health nurses can help students to talk about their mental issues and change their behaviour and lifestyle.[20]

Only a few empirical studies have examined the relationship between loneliness and attitude towards smoking; however, available evidence has suggested that loneliness has a significant influence on smoking behaviour.[16 21] Some studies showed that loneliness and smoking are likely associated,[22 23] yet others fail to find an association.[24 25] There are no adequate studies in Iran. Our study aimed to investigate the association between loneliness and attitudes towards smoking status among Iranian university students.

METHODS
Study design and participants
From September to December 2019, a cross-sectional study was conducted at Tabirz University of Medical Sciences, Iran. All full-time students at the university (bachelor, dentist, pharmacy and medical) were eligible to participate, except those with a severe illness that prevented them from answering the questionnaires, students in clinical fields and those who did not answer the questionnaires completely or did not provide informed consent to participate in the study.

The sample size was calculated 558 students, considering a level of significance of 0.05, a 0.95 CI, a 0.04 effect size and a 0.95 ability to indicate the population. To ensure an accurate representation of the population, one or two classes from each faculty were randomly chosen using the proportional sampling method. All students in the selected classes (n=580) were invited to participate in the study, with an additional 5% added to account for expected attrition. Of those, 24 declined the invitation to participate in the study, and 556 students filled out the questionnaires. After excluding 18 incomplete questionnaires, 538 were available for analysis (response rate: 92.8%).

Data collection tools
The data in this study were collected using demographic information, CSA scale and the Loneliness questionnaire, using self-administered survey.

The demographic information questionnaire
The form was composed of age, sex, marital status, residence, faculty, current year at university and experience of cigarette smoking.

CSA scale
The scale developed by Riahi *et al* in 2009 was used to evaluate CSAs in students.[26] This questionnaire consists of 32 questions, divided into 3 distinct categories: cognitive (9 questions), emotional (11 questions) and behavioural (12 questions). According to psychologists, attitude is a durable system that includes three cognitive, emotional and behavioural dimensions. The cognitive dimension consists of personal opinions and beliefs; the emotional dimension is a kind of emotional feeling that is linked to our beliefs, and the behavioural dimension is the readiness to respond in a particular way. The items scored with (1) disagree, (2) no agree no disagree and (3) agree. The score of each item was 1–3 and the total score of the instrument ranges from 32 to 96, (32–53) indicating negative attitude, (54–74) indifferent attitude and (75–96) positive attitude.[26] The instrument's reliability was assessed using Cronbach's α by Riahi *et al*, for CSA the scale (total), and cognitive, emotional and behavioural dimensions were 0.87, 0.74, 0.82 and 0.87, respectively. Also, in this study, the obtained values were 0.91, 0.75, 0.88 and 0.90, respectively. Here are some examples of CSA scale:

Cognitive category: smoking is only harmful if it continues for a long time. Smoking two cigarettes can also lead to addiction. Emotional category: smoking cigarette is an interesting and exciting experience. Smoking cigarette is a good way to reduce mental tension. Behavioural category: I enjoy friendship and socialising with smokers; when I am with my friends, I am willing to smoke with them.

Loneliness questionnaire

The revised version of the University of California Los Angeles Loneliness Scale was used to measure subjective feelings of loneliness.[27] This scale contains 9 positive and 11 negative items ranging from 1 (never) to 4 (always). The overall score ranges from 20 to 80 and a higher score represents a higher level of loneliness. The cut-off values for the scale were calculated using the mean, and a score of 42 or more (out of a total of 80 standard loneliness scores) was taken as experienced loneliness.[28] Some examples of the items in this questionnaire include the following: (1) My interests and ideas are not shared by those around me, (2) It is difficult for me to make friends, (3) I feel completely alone. The test–retest reliability of the scale was verified by Russell *et al* as 89%.[29] The validity of the loneliness scale was also validated by Alaviani *et al*.[18] Cronbach's alpha was 0.98 for the Loneliness scale in the present study.

After obtaining informed consent, the participants were assured the confidentiality and anonymity of the data.

DATA ANALYSIS

Data were processed, coded and analysed using SPSS V.22 software. Descriptive statistics, such as frequency, mean, percentage and SD, were used to summarise the students' general characteristics, their attitudes towards cigarette smoking and their loneliness. One-way analysis of variance and an independent t-test were used to compare demographic variables and attitudes towards cigarette smoking. Variables with a p value <0.1 (age, gender, year of study, history of cigarette smoking) were candidates and were included in the multivariable linear regression analysis as potential confounders. Pearson's correlation analysis was used to examine the association between loneliness and attitudes towards cigarette smoking. In addition, a multivariable linear regression analysis was performed to test the association between loneliness and attitudes towards cigarette smoking. The level of statistical significance was set at p <0.05.

PATIENT AND PUBLIC INVOLVEMENT

No patient involved.

RESULTS

The demographic information of the study participants is shown in table 1. From a total of 538 participants, 301 (59.9%) students were young women. The mean age of the students was 22.2±2.9 years. 282 (52.4%) of the participants aged 21 and lower years. Only 56 (10.4%) of the students were married and 370 (87.9%) of them were living with their families. 131 (24.3%) students experienced cigarette smoking. In terms of university-related characteristics, 205 (38.1%) of the students were studying in the faculty of medicine.

Table 1 Demographics information of participants and analysis of CSA score according to variables (n=538)

Study variables	N (%)	Mean (SD)	P value
Sex			
Male	237 (44.1)	–	<0.001*
Female	301 (55.9)	–	
Age (years)			
21 and lower	256 (47.6)		0.087*
22 and above	282 (52.4)		
Marital status			
Single	482 (89.6)	–	0.352*
Married	56 (10.4)	–	
Residence			
With family	370 (68.7)	–	0.287*
Dormitory	168 (31.3)	–	
Year of study			
First	112 (20.8)	–	<0.001†
Second	256 (47.6)	–	
Third	86 (16.0)	–	
Fourth and above	84 (15.6)	–	
History of smoking cigarette			
Positive	131 (24.3)	–	<0.001*
Negative	407 (75.7)	–	
Faculty of study			
Medicine	205 (38.1)	–	<0.567†
Dentist	96 (17.8)	–	
Pharmacy	55 (10.2)	–	
Nursing and midwifery	60 (11.2)	–	
Health and nutrition	122 (22.7)	–	
Total CSA	–	48.64±11.28	
Cognitive	–	13.29±3.39	
Emotional	–	17.11±4.71	
Behavioural	–	18.14±5.63	
Loneliness	–	41.42±11.29	

*Independent t-test.
† Analysis of variance (ANOVA).
CSA, cigarette smoking attitude.

Total scores of loneliness, CSA and its subscales are presented in table 1. The mean scores of loneliness and CSA were 41.42±11.29 and 48.64±11.28, respectively.

The Pearson correlation reflected a significant positive correlation between loneliness and attitudes towards cigarette smoking (r =0.289, p <0.001). The results of the multivariable linear regression analysis are shown in table 2. With the control of demographic covariates, the model indicated that loneliness was positively associated with CSAs. The attitude towards cigarette smoking was

Table 2 Multivariable linear regression of the relationship between cigarette smoking attitudes and loneliness

Variables	B	95% CI	P value*
Age (reference: 22 and above)			
21 and lower	0.03	−0.03 to 0.09	0.36
Gender (reference: female)			
Male	0.10	0.05 to 0.15	<0.001*
Year of study (reference: fourth and above)			
First	−0.15	−0.25 to −0.04	0.004*
Second	0.001	−0.07 to 0.08	0.97
Third	−0.06	−0.15 to 0.02	0.15
History of cigarette smoking (reference: negative)			
Positive	0.33	0.27 to 0.39	<0.001*
Loneliness	0.14	0.09 to 0.18	<0.001*

*Statistically significant association.

more positive among male students than among female students (B =0.10, 95% CI 0.05 to 0.15). The year of the study was significantly associated with CSAs (B =−0.15, 95% CI −0.25 to −0.04). First-year students showed a negative attitude compared with those in the fourth year and above. In addition, students who had (current or past) smoking experience showed a more positive attitude towards smoking than those without smoking experience (B =0.33, 95% CI 0.27 to 0.39).

DISCUSSION

This research was conducted to determine the association between attitudes towards smoking and loneliness in university students.

Based on the results of the study, it was found that most of the students had a negative attitude towards cigarette smoking, with 26.4% of the students also reporting feelings of loneliness. Furthermore, the study results revealed a significant positive correlation between loneliness and attitudes towards cigarette smoking. Additionally, the attitude towards cigarette smoking was found to have a significant relationship with factors such as sex, year of study and history of cigarette smoking.

About attitude towards smoking, the lowest score was related to the cognitive dimension, which is consistent with previous studies. For instance, a study among dental students showed their positive attitude towards smoking cessation and avoidance. In Latvia and Lithuania, dental students stated that smoking prevention and cessation should be part of training for healthcare staff.[13 30]

Learning can play an important role in smoking; however, this requires a positive attitude towards smoking cessation among students.[13] A study by Hohman *et al* showed that antismoking messages can have a significant impact on adolescent behaviours.[31] A study in Iran indicated that students' attitudes and knowledge were moderate about the effects of smoking.[32] In contrast, a study conducted in Indonesia found that the majority of students were aware that cigarette smoking causes heart disease, lung cancer, addiction and health problems, and it is harmful during pregnancy.[33] This conflict can be due to the different education and health system of Indonesia and Iran.

The current study showed that high feeling of loneliness, being a senior student, male sex and having had a smoking experience are associated with more positive attitudes towards smoking. So the students with a high feeling of loneliness held more positive attitudes towards cigarette smoking. Based on the results of the present study, 26.4% of the students' felt lonely, and students who indicated that they had smoked cigarettes before or now felt more lonely compared with non-smokers. This result is consistent with other similar studies. For instance, the results of a study among students at a Chinese university found that students who smoke had significantly higher loneliness scores than non-smokers.[16] The results of another study demonstrated that smokers suffer from higher psychological problems than non-smokers.[34]

This study found that compared with male students, CSA was more negative among female students. A systematic review of cigarette smoking prevalence among Iranian adolescents and young adults also found that cigarette smoking is prominent among Iranian young adults, particularly boys and university students[35] while a study in Lithuania showed that there was no relationship between gender and smoking attitudes.[13]

Also, freshman students had more negative attitudes towards smoking than fourth-grade students. A study of Yemen university students showed that smoking rates increased with years of study and age, establishing a significant association between student age and smoking propensity (p<0.001).[36] This may be due to older students' prolonged contact with older smokers in the university environment (teachers, friends, workers, etc) which could strongly influence their attitudes, and possibly because of family pressures against smoking in young people, which decrease as individuals become more free.

The results of the present study showed that there is a significant correlation between a smoking experience (current or in the past) and the attitude towards smoking. This is consistent with a study in Indonesia, which found that the attitudes that can lead to smoking behaviour in students differ significantly between current smokers and non-smokers in most cases. It was found that smokers were more curious about cigarette smoking than non-smokers.[33]

CONCLUSIONS

The findings of this study revealed a significant positive association between loneliness and students' CSA. These results raise important concerns for future healthcare providers and emphasise the need to address loneliness among university students.

Loneliness among university students is a pressing issue that requires attention from university managers and administrators. By recognising the detrimental impact of loneliness on students' attitudes towards smoking, proactive measures can be taken to reduce students' feelings of loneliness and prevent their inclination towards smoking. University managers should prioritise the improvement of recreational and cultural services, creating opportunities for social engagement and fostering a sense of community. By enhancing social support networks and promoting a supportive campus environment, universities can play a crucial role in reducing loneliness among students and subsequently improving their attitudes towards smoking.

LIMITATIONS

There are some limitations in the study. For example, a cross-sectional design was used to examine the association between loneliness and smoking attitude. With this type of design, the longitudinal changes are not controlled. So, longitudinal studies are needed to examine socio-psychological factors in university students. In addition, a self-report questionnaire was used for data gathering. Social desirability is a factor that may affect the accuracy of the responses in self-report questionnaires, especially since the participants were studying in a health-related field. So, the participants were given privacy to complete the questionnaires, and the anonymity of the survey was ensured.

Author affiliations
[1]Student Research Committee, Tabriz University of Medical Sciences, Tabriz, Iran
[2]Department of Community Health Nursing, Nursing & Midwifery Faculty, Tabriz University of Medical Sciences, Tabriz, Iran
[3]Department of Medical Surgical Nursing, Nursing & Midwifery Faculty, Tabriz University of Medical Sciences, Tabriz, Iran
[4]Professor of Nursing Education, Tabriz Health Services Management Research Center and Department of Community Health Nursing, Tabriz University of Medical Sciences, Tabriz, Iran
[5]Ph.D in Biostatistics, Department of Statistics and Epidemiology, School of Public Health, Tabriz University of Medical Sciences, Tabriz, Iran

ORCID iDs
Hamideh Zahedi http://orcid.org/0000-0001-9449-1856
Mohammad Hasan Sahebihagh http://orcid.org/0000-0002-5585-1457

REFERENCES

1 Jha P. The hazards of smoking and the benefits of cessation: a critical summation of the Epidemiological evidence in high-income countries. *Elife* 2020;9:e49979.
2 Sun C, Liu H, Xu F, *et al*. Combined Lifestyle factors on mortality among the elder population: evidence from a Chinese cohort study. *BMC Geriatr* 2022;22:474.
3 Omare MO, Kibet JK, Cherutoi JK, *et al*. A review of tobacco abuse and its Epidemiological consequences. *J Public Health (Berl)* 2022;30:1485–500.
4 Halperin AC, Smith SS, Heiligenstein E, *et al*. Cigarette smoking and associated health risks among students at five universities. *Nicotine & Tobacco Research* 2010;12:96–104.
5 Organization WH. WHO Global Report on Trends in Prevalence of Tobacco Smoking 2015. World Health Organization, 2015.
6 Ng M, Freeman MK, Fleming TD, *et al*. Smoking prevalence and cigarette consumption in 187 countries, 1980-2012. *JAMA* 2014;311:183–92.
7 Ravaghi H, Tourani S, Khodayari-Zarnaq R, *et al*. Agenda-setting of tobacco control policy in Iran: a retrospective policy analysis study. *BMC Public Health* 2021;21::2288.
8 Nazarianpirdosti M, Abdi A, Abdi A, *et al*. Smoking among high school students in Iran: a meta-analysis study. *Iran J Psychiatry* 2021;16:226:226–37:.
9 Ataeiasl M, Sarbakhsh P, Dadashzadeh H, *et al*. Relationship between happiness and tobacco smoking among high school students. *Epidemiol Health* 2018;40:e2018009.
10 Messer LB, Calache H. Oral health attitudes and behaviours of final-year dental students. *Eur J Dent Educ* 2012;16:144–55.
11 Sinha DN, Rinchen S, Palipudi KM, *et al*. Tobacco use, exposure to second-hand smoke, and cessation training among the third-year medical and dental students in selected member states of South-East Asia region: a trend analysis on data from the global health professions student survey, 2005-2011. *Indian J Cancer* 2012;49:379:379–86:.
12 Venkitachalam R, Prathap A, Joseph J, *et al*. Prevalence of tobacco use and attitudes towards tobacco CES-sation counselling among Healthcare professionals: a cross sectional study. *Amrita Journal of Medicine* 2019;99:7.
13 Zaborskis A, Volkyte A, Narbutaite J, *et al*. Smoking and attitudes towards its cessation among native and international dental students in Lithuania. *BMC Oral Health* 2017;17:106.
14 Dyal SR, Valente TW. A systematic review of loneliness and smoking: small effects, big implications. *Substance Use & Misuse* 2015;50:1697–716.
15 Fakoya OA, McCorry NK, Donnelly M. Loneliness and social isolation interventions for older adults: a scoping review of reviews. *BMC Public Health* 2020;20::129.
16 Zhang C-L, Xu Y-M, Zhong B-L. The association between smoking and loneliness among Chinese University freshmen. *Ann Transl Med* 2020;8:649.
17 Ellard OB, Dennison C, Tuomainen H. Review: interventions addressing loneliness amongst university students: a systematic review. *Child Adolesc Ment Health* 2023;28:512–23.
18 Alaviani M, Parvan R, Karimi F, *et al*. Prevalence of loneliness and associated factors among Iranian college students during 2015. *J Arch Mil Med* 2017;5.
19 Beutel ME, Klein EM, Brähler E, *et al*. Loneliness in the general population: prevalence, determinants and relations to mental health. *BMC Psychiatry* 2017;17:97.

20 Kılınç G, Aylaz R, Güneş G, *et al*. The relationship between depression and loneliness levels of the students at the faculty of health sciences and the factors affecting them. *Perspect Psychiatr Care* 2020;56:431–8.

21 Wootton RE, Greenstone HSR, Abdellaoui A, *et al*. Bidirectional effects between loneliness, smoking and alcohol use: evidence from a Mendelian randomization study. *Addiction* 2021;116:400–6.

22 Peltzer K. Prevalence and correlates of substance use among school children in six African countries. *Int J Psychol* 2009;44:378–86.

23 Christopherson TM, Conner BT. Mediation of late adolescent health-risk behaviors and gender influences. *Public Health Nurs* 2012;29:510–24.

24 Grunbaum JA, Tortolero S, Weller N, *et al*. Cultural, social, and Intrapersonal factors associated with substance use among alternative high school students. *Addict Behav* 2000;25:145–51.

25 Cacioppo JT, Hawkley LC, Crawford LE, *et al*. Loneliness and health: potential mechanisms. *Psychosom Med* 2002;64:407–17.

26 Riahi M, Aliverdinia A, Soleimani M. Attitude of the boy's students toward the cigarette smoking in Ghaemshar city. *Iranian Journal of Epidemiology* 2009;5:44–54.

27 Russell D, Peplau LA, Ferguson ML. Developing a measure of loneliness. *J Pers Assess* 1978;42:290–4.

28 Dagnew B, Dagne H. Year of study as predictor of loneliness among students of University of Gondar. *BMC Res Notes* 2019;12:240.

29 Russell D, Peplau LA, Cutrona CE. The revised UCLA loneliness scale: concurrent and discriminant validity evidence. *J Pers Soc Psychol* 1980;39:472:472–80:.

30 Virtanen JI, Filppula M, Maldupa I, *et al*. Smoking and attitudes towards it and its cessation among dental students in Latvia. *Acta Odontol Scand* 2015;73:421–6.

31 Hohman ZP, Crano WD, Niedbala EM. Attitude ambivalence, social norms, and behavioral intentions: developing effective antitobacco persuasive communications. *Psychol Addict Behav* 2016;30:209–19.

32 Panahi R, Ramazankhani A, Tavousi M, *et al*. Knowledge and attitude of dormitory students of Shahid Beheshti University of medical sciences about smoking in 2016. *Health Education & Health Promotion* 2016;4:51–61.

33 Nurmansyah MI, Umniyatun Y, Jannah M, *et al*. Knowledge, attitude and practice of cigarette smoking among senior secondary school students in Depok, Indonesia. *Int J Adolesc Med Health* 2019;33:20180124.

34 Habibi M, Hosseini F, Darharaj M, *et al*. Attachment style, perceived loneliness, and psychological well-being in smoking and non-smoking university students. *J Psychol* 2018;152:226–36.

35 Aryaie M, Sharifi H, Khorrami Z, *et al*. Prevalence of cigarette smoking in Iranian adolescents and young adults: a systematic review and meta-analysis. *East Mediterr Health J* 2021;27:612–28.

36 Nasser AMA, Salah BAM, Regassa LT, *et al*. Smoking prevalence, attitudes and associated factors among students in health-related departments of community college in rural Yemen. *Tob Induc Dis* 2018;16:31.