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# Properties of a Persuasive Quit-Smoking Message Based on The Elaboration likelihood Model (ELM) from Medical Students' Perspective: A Structured Content Analysis

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#### Abstract

**Background:** Smoking is one of the biggest problems of the young generation. Several strategies have helped to reduce smoking among young people. ELM is a theoretical approach that provides guidance on developing messages that meet these needs. In this study, we decided to use the model of mental processing of beliefs as one of the effective approaches in persuasion, to investigate the process of persuasive messages to quit smoking in young people.

**Method:** The present study is a qualitative content analysis study that was conducted on 28 students. Structured interviews were used to collect data. Data analysis was done after each interview until data saturation was reached.

**Findings:** 28 students participated in this study. In this study,4 main issues of how to send the message, how to send it to the person, when to deliver the message, and the way/means of delivering the message were found. Out of the 12 extracted sub-classes,8 sub-classes were related to the peripheral path and 4 sub-classes were related to the central path of the model.

**Conclusion:** The views of medical students who are related to the future of society's health can be very valuable for smoking cessation.

Keywords: Quit-Smoking Message, Elaboration Likelihood Model, Content Analysis

### Introduction

Cigarette smoking is a major threat to public health, a deadly factor which increases the overall burden of diseases and mortality risk factors in developed and developing countries. Cigarette smoking develops a kind of mental and psychological dependence within an individual which, as defined by the World Health Organization (WHO), leads to a mental and sometimes physical condition caused by the mutual effects of drugs or narcotics and the living being on each other. It is characterized by behavioral reactions and their symptoms. Smoking is a major

cause of respiratory, cardiac, vascular and cancer diseases and is the most common preventable cause of mortality worldwide [1-3].

There has been an increase in the rate of smoking among youngsters especially those between 18 and 24 years mostly the university students. About 80% of smokers proved to experience cigarette smoking before the age of 18. As estimated by WHO, the number of mortalities induced by smoking will increase from 4 to 10 million deaths annually in 2025. Among these, 7 million cases will occur in developing countries . According to the latest estimates of the prevalence of smoking in Iran, the findings showed that 25% of the Iranian population between 18 and 65 are smokers [4-6].

In Iran, the rate of smoking has been on the rise among youngsters, especially among students. This is seen as a cultural and social damage which threatens the youth's health. The young population of a country is considered an asset and a valuable social capital worldwide. Smoking is a major threat to Iran too. The prevalence of smoking, especially among students is an issue of a high significance because students are the educated population of a society that can affect all other populations. Of note is that tobacco consumption among medical students, despite their awareness of the detrimental effects, is also increasing [7-8].

This issue needs to be solved by universities, as university life can be time ripe for the initiation of this risky behavior among the young . Smoking is influenced by different factors, including individual, family and social factors. Factors such as availability, economic and social inequalities, unemployment, family factors, fashion, social pressure, parental conflict and individual factors can be considered as some other factors that can lead to the smoking behavior. The most important motive for smoking among teenagers is to show off. By smoking, they may tend to show others they are grown up and already left childhood behind. Among the other factors that influence the high rate of smoking among teenagers are the majority of role models being smokers, easy access to cigarettes, low price of cigarettes, parents and friends buying and lighting cigarettes, and the invitation to smoke by others. Recurrent smoking is a major factor accounting for the continued unhealthy behavior [9-10].

The aforementioned growing rate of smoking among students can be explained by several factors including the reduced stress, peer pressure, difficulties in life, social acceptance, family history of smoking, low level of parents' education, desire to develop one's personality, sex (mostly masculinity), high income, socializing with friend smokers, gaining prestige, academic year (junior and senior compared to freshmen), smoking while depressed, growth of a thriving market for the sale and transit of tobacco in the third world countries and Iran, failure to meet emotional needs, low academic achievement, unemployment, and family quarrels.

The young generation of a country is the main human source and capital of that country. The size of the young population in the national demographic pyramid points to the significant dynamic role this population plays in the country and its effect on different sectors and policy-making. Thus, full attention needs to be devoted to the young population's health and prevent their risky behaviors which needs to be investigated to stop any threat to this group and society.

Students comprise a significant portion of the young population of a country on whom the future of the country mainly depends. Therefore, attention to this population and prevention of their social misbehaviors, such as smoking, is of a greater significance. The first step to fight back smoking is to educate teenagers and the young at schools, universities, barracks, etc.; however, be-

fore any plan, the public behavior should be changed. At the core of smoking cessation is the condition that the individual has achieved self-awareness and self-monitoring. Awareness can help to quit smoking at a low cost but effectively and significantly [11-12].

For long, different strategies have been used to reduce smoking among the young population. The effectiveness of strategies may decrease over time, which requires the employment of new approaches to prevent and quit smoking in the young. The evaluation likelihood model (ELM) is a theoretical approach that can guide the development of messages that meet the needs. As individuals are exposed to a mine of information, it is only possible to process messages that are highly relevant. According to the ELM, if someone motivated to and capable of processing information related to an important subject is exposed to a message, s/he is likely to invest in central processing. Also, if someone is not adequately motivated to or capable of processing information accurately, s/he probably uses peripheral methods to process information. Since health-related reminder messages are an effective way to change people's attitudes, the present study aimed to use the mental processing model of beliefs as an effective approach in persuasion, to determine the path of processing reminder messages to quit smoking among the youth [13].

#### Materials and methods

The present qualitative study received the ethics code of #IR. HUMS.REC.1401.146. It aimed to determine the descriptive features of a persuasive quit-smoking message based on the ELM, through a structured content analysis. The research was conducted in 2022 at Bandar Abbas Nursing-Midwifery College, a well-known scientific and research center in Iran. The research population consisted of the alumni of Hormozgan University of Medical Sciences, selected through a purposive sampling according to the inclusion criteria. The inclusion criteria were studying medical sciences as their major, willing to participate in the interview and signing an informed letter of consent to take part in the research.

The sampling continued until data saturation which means no new information was produced, the previous information is confirmed or repeated by the subjects. The data were collected by one of the researchers through interviews while keeping the required social distance. The interviews were conducted upon prior arrangements to see the interviewees in a quiet place in the faculties of medical sciences and at a suggested time preset by the interviewee. Throughout the interview, the interviewee's convenience was prioritized.

In qualitative research, data collection and analysis are done simultaneously. In the present study, data analysis was done after each interview to achieve data saturation. In this study, a structured approach was used to qualitatively analyze the content of interviews. In structured content analysis, categories are directly extracted from textual data and the researcher gets a deeper understanding of the phenomenon of interest. The researcher confirms the conceptualization of the categories and allows the categories and their naming to follow from the data. The most important outcome of a structured content analysis is the development of a theme or the construction of a pattern.

In this study, data analysis was done by repeatedly reading the textual data and extracting the overall meaning from the data and going on until the researcher was deeply immersed in the data. Before the analysis, attention was devoted to both explicit and implicit content. Then the units of analysis, i.e., sentences with specific meanings, were identified and the main concepts in each unit of analysis were classified as semantic units. Each semantic unit was given a superior code and then sub-codes were determined and placed in each superior code. Then the top codes with similar meanings were grouped and formed the categories.

The main themes were also created based on the comparison and integration of similar categories. Ethical considerations such as the right to withdraw at any stage of the study, the confidentiality of information and the anonymity of participants were observed in this study. Observance of the principle of diversity in the interviews, including male and female students, dormitory and non-dormitory residents, students of all levels of education (graduate and undergraduate) and different majors (nursing, operating room, anesthesia, midwifery) were also considered.

To increase the internal validity of the study, the member checking method was used. For this purpose, after each interview, the interview was transcribed and returned to the participants to check its accuracy. In order to increase the external validity, the method of rich and in-depth description of the data sets was used. To increase the reliability, the method of organizing the data recording process was used in the data collection and extraction phase (audit trail).

## Results

A total number of 28 nursing students participated in this qualitative study, whose average age was  $22.2 \pm 4.6$ . Among them, 57.14% were male. Nine male participants and one female participant had a history of smoking. Overall, 48.6% lived in the dormitory, and 41% lived with their cigarette smoking families. The average duration of the interviews was 48 minutes. In this study, 4 main categories and 12 subcategories were extracted. The main categories included the features of the message, how to send the message, when to send the message, and the mode of the message. Out of the 12 extracted sub-categories, 8 were related to the environmental path and 4 to the central path of the model, as summarized in Table 1.

Table 1: Main Categories and Sub-Categories Based on the Evaluation Likelihood Model

Evaluation path	Sub-category	Main category
Features of the message	Clear and unambiguous	peripheral
	motivational	central
	informative	central
	warm and friendly	peripheral
	recurrent	peripheral
How to send the message	Sent individually	peripheral
	Sent in group	peripheral
Time to send the message	Customized accepted once made aware	Central central
Mode of sending the message	verbal	peripheral
	visual	peripheral
	virtual	peripheral

# **Features of The Message**

Most of the nursing students admitted to the persuasive quality of the quit-smoking messages. They perceived the features of the message as the main characteristics of content and impact. The four subcategories of features were: clear and simple, motivating, informative, friendly and respectful. All interviewed students emphasized the clarity and simplicity of the message as an important feature to convince the smoker to cease smoking. Student #2 mentioned "if the message is intended to convince a person to quit smoking, it should be simple and clear, and without clichéd sentences such as the threat of smoking to health; the statements should be simple and purposeful". Student #22 also mentioned that "the clearer the quit smoking message, and the lower the sarcastic or ambiguous content, the more convincing it will be". Another student also pointed to the simplicity and transparency of the message as an important feature (student #1-17-20).

Concerning the features of the message, the students also emphasized the motivating power of the message. Motivational messages are those that target the smoker's desire to quit smoking. Student #1 stated "I think people's motivation to quit smoking matters, and if we are to send a quit-smoking message to someone, we'd better consider his/her motivation as well. For example, for those holding office jobs, probably a pay rise or promotion at work can play a motivating role in ceasing smoking. If this motivation is integrated within the message, I think it works". With this respect, student #26 mentioned "the message will convince a person to quit smoking if it is encouraging. That is, it encourages the person to quit smoking, for example, by asking to what extent the lung function can improve if smoking is stopped, or what chances are created to be live longer with family if one stops smoking". Another dimension of the message was the extent to which it was informative.

Students believed that quit-smoking messages could convince smokers to quit smoking if they were adequately informative. The purpose of the informative nature of the message was to inform the person of the consequences of smoking and its damage to physical health. With this point in mind, student #4 said, "evidently, smoking is harmful to health, it has side effects for hair, teeth, heart, and other body organs. I think a high awareness makes it easier for a smoker to choose to stop smoking". Student #19 emphasized the importance of the informative feature of quit-smoking messages and argued that "awareness is a prelude to a change of behavior. Of course, it may not always be sufficient, but I think it is necessary for a smoker to be scientifically aware of the consequences of smoking. For example, it helps to develop an application or software that shows the outcomes of smoking on human body in time intervals, for example 5 or 10 years.

Another feature that the student participants perceived important for quit-smoking messages was the respectful and friendly quality. They believed when the quit-smoking have this feature, they can better convince people to quit smoking. The message should be respectful and friendly; in other words, the tone should be friendly and void of any insult or contempt. With this respect, student #9 mentioned "I have been smoking for 2 years. If someone talks to me in a harsh or derogatory tone to quit smoking, or if I see a message somewhere that is not respectful, I will not only be discouraged to quit smoking but get upset too.

A friend sent me a video clip about life with and without smoking. That video clip portrayed a smoker like a mentally unbalanced idler, so I was discouraged to watch the rest. I was eve offended by the friend who offered to watch the video because it was humiliating". Student #7 talked about the respectful and friendly quality of the quit-smoking messages "perhaps the number of girls smokers like me is small. Every time they tell me you are a girl, so why do you smoke? Don't you care about your skin? You don't think about your future for sure. Or the like stuff. What do all these commentaries mean? Are they not simply humiliating? This does not convince me to quit smoking at all."

The last feature of a persuasive quit-smoking message, as perceived by the students, was the recurrent nature of the message. Some students believed that important health-related messages should be sent repeatedly and regularly. In other words, they suggested the messages be sent at regular intervals. With this respect, student #25, a boy with a history of smoking for 4 years, commented "of course, I don't smoke all the time, I smoke a cigarette a day for fun, but I know it is not a healthy habit and I know it is harmful to health, but honestly, if regularly, I mean, every day and every time I smoke, someone reminds me to stop smoking or if I receive a text or picture message as a reminder, that can probably convince me to quit". Some other students (#10, 26, 11 and 5) also pointed out the continuity of quit-smoking messages and its relationship with the persuasive effect of the message.

#### How to Send the Message

The second category extracted from the interviews was how to send the message. It means whether to send the message individually or in a group. Thus, the two subcategories are individual and group-based. What the interviewed students suggested was individually directed messages, in other words, the face-to-face messages. The interviewees admitted that direct messages were more convincing. Student #19, a 20-year-old girl, said "I think we should face a smoker directly and advise him/her to quit smoking and how that can be done. A face-to-face conversation can actually bridge people's worlds. When the communication is direct and in person, I think it works, and the audience can prepare to quit smoking as a result". Student #2, a 24-year-old girl, stated "I think it works better in a one-to-one conversation.

I mean the privacy is preserved in direct and face to face acts of reminding. When the speaker breaks the ice and the smoker interlocuter feels at ease to talk, he can learn about the difficulties of quitting smoking. Other students (#8, 12, 27, 28) also recommended sending direct messages. Student #3, a 20-year-old boy, emphasized the personal feature of sending messages and said "this message should be sent by those who are close and intimate to the smoker, for example close friends or a family member who is open to the smoker, I mean someone who listens carefully and does not judge the person while attempting to encourage the smoker friend to quit".

Another subcategory is sending the message in a group. As the transcripts showed, sending a message in groups means when more people are affected by or exposed to the quit-smoking message, and sending the message is altered from a personal mode to a group mode with more audiences. Student #11, a 28-year-old boy who smoked for a short time and quit by the time of interview, stated "in group meetings, when smokers and quitters get together at the same time, the latter talk about their success and experiences. I think this is effective and the smoker accepts it more easily because he finds himself in a group where all others are like him in terms of smoking. He can use first-hand experiences of those people.

It can be face-to-face or even virtual in the form of various channels and groups in the cyberspace. Student #20 showed a preference for group messages and said, "In online channels or pages, people can very well receive advice to quit smoking, both from smokers who have quit, and from counselors and experts. When an audio file or video clip about the side effects of smoking is made available to a large number of people who are already members of that page, even when you put up a quit-smoking billboard in the city, it addresses a lot of people. In my opinion, messages are more effective when addressed to a group rather than an individua. In general, I think it is effective not to tell the person directly and, rather, to convey the message collectively and indirectly. This can be more persuasive to quit smoking".

# When to Send the Message

The third category extracted from the interview manuscripts was the time to send the message. When the individual audiences are supposed to receive the message matters. The subcategories included appropriateness to the receiver's conditions and the acceptance of the message. The former means to consider the smoker's state, moods and condition at the time of conveying the quit-smoking message. The interviewees thought sending the message at any time was not effective the same. Student #16, a 35-year-old ex-paramedic woman, said "There is always a right time to convince a smoker to quit smoking. By the right time, I mean we should assess the smoker's condition and decide on

the best time to send the message. To exert the best effect on the individual smoker, it is very important to find the right time. When a smoker is tired or angry, or when he is sad, happy, or in pain, or when he is not in a good mood to talk, we should not approach him at all. I am a nurse and work in the emergency unit of a small hospital. When a patient was transferred to the hospital in heart pain, I saw the emergency doctor immediately tell the patient or his companion to quit smoking. Do you think that works? Not at all".

Student #6 emphasized the right time to convey the quit-smoking message, He said from his own experience, "a classmate of mine had turned to smoking for some reason; I did my best to stop him, but finally, one day after suctioning a COPD patient who had massive secretions we spent a long time in the break room. I asked him, "What do you think causes so much secretion? He replied that was because he was a patient with COPD. I said I knew what led to all this. He said he had smoked for 50 years. I looked at him and asked how long he intended to continue like that. He paused a little and said he am wrong, and I think he was completely impressed at that moment, because I said this to him at the right time". Students #3 and 28 believed the right time to send the message should be decided by the smoker himself. They believed the right time to send the message could be negotiated with the smoker. If the time is set by the smoker himself, the acceptance of the message and its persuasive effect will be stronger.

Another subcategory was the acceptance after the awareness-raising phase. It refers to the acceptance of the message content, belief in it and attempts to do as recommended. Student #21 stated that "the current world is a world of information and communication technology. People have access to many sources of information. If we provide people with the right information about smoking and its side effects, they will have a clear view of the issue and the chances of acceptance to quit get higher". Student #15 pinpointed the significance of awareness: "Relevant awareness and information is as useful as the light of a lamp in the dark or like the rain for a barren land. The light penetrates into darkness like awareness that eliminates ignorance.

Likewise, the rain revives the dead earth. Awareness revives the desire to change a misbehavior. When a smoker receives correct, sufficient and up-to-date information, he can change his view to smoking and probably he can quit. Of course, I know that awareness is not always sufficient, I think it is always necessary". Student #18 drew attention to the acceptance after awareness, and admitted "awareness is the first step and is a prerequisite for the smoking cessation behavior, and I believe even before people get involved in smoking, they should be sent an awareness-raising message to get convinced not to smoke at all or to quit."

#### **Mode of Sending the Message**

The final category extracted from the interview content was the modes of conveying the message. It implies the means of sending the quit-smoking messages. The subcategories were verbal, visual and virtual. All student participants mentioned verbal conversation as the fundamental means of communication to send the quit-smoking message. They believed the message could be conveyed to the smoker through conversations. If this conversation is well-established, it can be convincing. With this regard,

student #23 commented "I think speaking is more effective than any other way such as playing a movie or putting up a poster.

An effective appropriate speech can do miracles. People perceived to be valuable to a smoker can help by making an appropriate and effective speech. People should be familiar with the rules of discourse and observe them, such as respect, humility, self-restraint, even silence when needed and listening well to the other interlocutor". The students who participated in the interviews deemed it necessary to talk to the smoker and convey the quit-smoking messages. They said persuading the smoker by conversation depends on the correct and appropriate way of speech. Student #14 pinpointed the extent to which our everyday conversations have a meaningful and emotional load, a logical conversation, a sympathetic conversation with a smoker, especially by important people to that person, for example, a brother, father, mother, or someone to whom the smoker feels close and tends to obey. These helps to better persuade the smoker not to smoke anymore. Probably a single trial does not work, but if it is persistent, it will finally work.

Another subcategory was the visual mode which entails the presentation of message content through pictures or videos. The students believed that sometimes showing a picture or video can convey the message very quickly and clearly, and complex and long text messages can be presented as images. Student # 24 pointed to the significance of visual messages to convince people to quit smoking: "An image was put up on a billboard downtown illustrating, on the tip of a cigarette, the path of life. The more the cigarette burned, the sooner the life came to an end. The smoker's life and health were falling down with the ashes. Well, this was very interesting to me. It quickly conveyed the message of the threats of smoking."

The last sub-category of the modes of sending the message was virtual. It refers to the use of the cyberspace in conceptualizing the content. Most of the interviewees admitted that due to the wide and diverse nature of the cyberspace, message transmission was more effective and because most people had smart phones, the message could be widely shared in the form of text, image, video and games. He even brought games to people (students #14, 9, 20, and 23). Confirming the effectiveness of virtual messages in smoking cessation, student #13 commented "Now we can access a world of information through a simple download. We can easily find all relevant animated movies and interesting videos on social networks.

I watched an animated movie on cigarette smoking. I guess it was Korean or Japanese. It showed the effect of smoking on the body attrition over time. It was interesting and effective, and messages like this in cyberspace can be effective when they are of a high graphical quality. Student #7 drew attention to the importance of sharing messages in the cyber space and explained "For now just take the example of the Instagram, and see what pages you've got there. There are pages that are very useful for material development and have many followers. With a mobile phone, on Instagram or local webpages, a smoker can watch a video clip of a smoker's future life, about the adverse effects on the body and the associated physical and financial costs. Then, he can be convinced to quit smoking or at least prepare to quit smoking.

As the content of the interviews showed above, the participants discussed different aspects of persuasive quit-smoking messages to from their point of view. These viewpoints shared by nursing students is even more important because nurses and nursing students play a key role in providing health services. They are significantly involved in qualitative studies and also in planning health policies. Choosing to include the young educated population's perspectives can play a major role in forming the future of a community's health policies.

#### Discussion

The young generation of a country comprises the main human force and capital of that country, and students are an important and extensive portion of the youth and an effective determinant of the future of the country. The youth and more importantly the educated youth (especially university students) comprise a significant portion of society. Particularly the latter act as a model for the former. Thus, it is necessary to consider this population more than others to prevent misbehaviors such as smoking. Therefore, the present study was conducted with the aim of identifying the features of a persuasive quit-smoking message based on the Elaboration Likelihood Model (ELM). According to the ELM, the main categories included how to send the message, when to send the message and the mode of sending the message.

As perceived by the university students, a smoker needs to reach a self-awareness to quit, and it is not possible to quit until s/he decides to do so, which shows the role of awareness, recognition and knowledge of smoking. Brown et al. also pinpointed the role of self-awareness in their study and concluded that a smoker's self-awareness significantly increases the effectiveness of the smoking cessation program and that self-awareness plays an effective role in promoting healthy behaviors at a low cost. Perhaps it developed an insight beyond the mere quit-smoking behavior too [14].

In their study, concluded that education has a positive effect on raising students' awareness of the detriments of smoking, and the simplest way to prevent the adoption of risky behaviors such as smoking was to raise people's awareness. Also, the findings of Masiero's study showed that smokers' knowledge of the threats of smoking is significantly lower than non-smokers in most countries, and this lack of knowledge may cause fewer smokers to quit smoking. Visual reminders about the hazards of tobacco products, including cigarettes, in the form of graphic labels, and forming a social campaign to increase knowledge are among the strategies that increase knowledge, reduce the prevalence of smoking, increase the efforts to quit, and increase the success in smoking cessation [15].

Correcting cognitive biases by influencing subtle cognitions of tendency-avoidance and correcting smokers' attention bias can also reduce smoking dependence in adult smokers. This intervention can be effectively used in smoking cessation programs. Self-monitoring has a growing effect on the effectiveness of reduced smoking relapse [16].

Sending motivating and promising messages was also raised by the student interviewees. The results of the studies also confirm the important role of motivation in smoking cessation. In Armitage's study, those who showed a stronger motivation to quit initially were more successful in quitting smoking. Taking motivational and voluntary measures could increase the effectiveness of smoking cessation programs at the workplace. The best time to start smoking cessation treatment programs is when the person who is ready to quit has a higher motivation. Also, the reasons for smoking are among the factors affecting smoking cessation, so the reasons for smoking should be included in the cessation programs [17-18].

Concerning how to send message to smokers to help them quit smoking, the role of group meetings was also emphasized. The findings reported by Badrouh showed that group training can help to quit smoking through increasing motivation. Therefore, group training programs can be developed to lead to higher motivation and the lasting cessation behavior . Also, a body of research showed that peer education is effective as a method of behavior change in adolescent smokers, and it was suggested that peer education be used as a preferred means of behavior change for adolescents in quitting smoking. Also, the workplace may be a suitable environment for cessation interventions. Presence in public areas, for example, in work environments with colleagues, can contribute to success in smoking cessation [19-20].

As perceived by students, how to send the message can be in different ways. Sometimes the messages can be conveyed face-to-face in the form of a friendly conversation, and sometimes on TV, as documentaries, media, social networks, advertising and education at school. The results of a study by Skov-Ettrup et al. showed that preventive telephone counseling was more effective in achieving long-term abstinence for 12 months than a self-care program for smoking cessation. Social media also provide an effective platform to discuss smoking cessation treatment and, thus, reduce the effects of smoking. Social support groups are effective in helping people quits smoking. Also, warning images on cigarette packages increase the intention to quit by increasing the perceived negative effect of unhealthy behavior [21-23].

The results of the study by Ophir also showed that clear warning labels can increase engagement, which is in turn associated with the increased intention to quit. Through emotional and mental engagement, it can affect smoking cessation . In a study by Staten, the students' views on smoking cessation were examined, and it was contended that emotional and cognitive strategies of dealing with temptations to smoke should be included in smoking cessation programs. It was also argued that the cost and convenience were two significant factors underlying these programs . Also, phone programs and applications that adjust the content of the intervention in real time can be used conveniently [24].

Concerning convenience, most interventions involve appropriate programs at a low cost, and perhaps these programs are similar in terms of effectiveness to traditional and face-to-face counseling programs. Adding a supportive robot to a popular smoking cessation program can improve user interactions for more than twice. Therefore, it is possible to use the findings of different related studies and the views of medical students who somehow relate to the future of a society's health to help smokers to quit smoking. Methods can be developed that require specialists' time, skill and knowledge to be implemented. This complex behavioral phenomenon should help and be used in planning the policies related to this social issue [25].

## **Conflict of Interest**

None to declare.

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#### References

- Bayat, M., Jabbari, S., Soraya Tayfeh Dallali, K., & Atadokht, A. (2021). The role of loneliness, educational exhaustion, and sleeping quality in predicting smoking tendency in students. Razi Journal of Medical Sciences, 28(4), 46-56.
- 2. Baharluoei, M., Naseri, M., & Rabbani, A. (2021). The interpretation of non-native students from the experience of smoking at university (Case study: Non-native students of the University of Isfahan). Strategic Research on Social Problems in Iran University of Isfahan, 10(1), 23-46.
- 3. Panahi, R., Javanmardi, K., Ramezankhani, A., Osmani, F., Ahmadi, A., Koohi, R., et al. (2019). The effect of educational intervention based on Health Belief Model on university students' attitude towards smoking prevention in Shahid Beheshti University of Medical Sciences, Tehran. Rahavard Salamat Journal, 4(1), 39-47.
- Heydari, G., Ramadan Khan, A., & Masjedi, M. R. (2008). Study of smoking habit in male medical and non-medical students of Shahid Beheshti University in 2008. Medical Research, 34(2), 132-136.
- Rezakhani Moghaddam, H., Shojaezadeh, D., Sadeghi, R., Pahlevanzadeh, B., Shakouri Moghaddam, R., & Fatehi, V. (2013). Survey of prevalence and causes of the trend of hookah smoking in Tehran University students of Medical Sciences (2010–2011). Toloo-e-Behdasht, 11(4), 103-113.
- Panahi, R., Ramezankhani, A., Rezaei, M., Tavousi, M., Pishvaei, M., & Niknami, S. H. (2018). The effect of education on knowledge and attitude towards the harmful effects of smoking among students of Shahid Beheshti University of Medical Sciences, Tehran. Journal of Health in the Field, 6(3), 10–18.
- Sabkatkin Rizi, G. H., Moradi, H., Salmani, F., & Ardashiri Manesh, N. (2022). Investigating the social factors related to smoking among students of Kharazmi University. Social Issues of Iran, 12(2), 137-154.
- 8. Panahi, R., Ramezankhani, A., Rezaei, M., Osmani, F., Javanmardi, E., & Niknami, S. (2019). Relationship between health literacy skills and adoption of preventive smoking behaviors among university students. Scientific Journal of Ilam University of Medical Sciences, 27(2), 11-20.
- 9. Panahi, R., Ramezankhani, A., Anbari, M., & Javanmardi, K. (2020). Adoption of smoking preventive behaviors and its related factors among dormitory students of Shahid Beheshti University of Medical Sciences in Tehran 2016. Journal of Health in the Field, 8(1), 22-31.

- Flynn, B. S., Worden, J. K., Bunn, J. Y., Connolly, S. W., & Dorwaldt, A. L. (2011). Evaluation of smoking prevention television messages based on the elaboration likelihood model. Health Education Research, 26(6), 976-987.
- 11. Brown, E. M., Smith, D. M., & Armitage, C. J. (2018). Self-incentives uniquely boost cessation in community-based stop smoking programs: Randomized controlled trial. Annals of Behavioral Medicine, 53(5), 442-452.
- 12. Van Osch, L., Lechner, L., Reubsaet, A., Wigger, S., & de Vries, H. (2008). Relapse prevention in a national smoking cessation contest: Effects of coping planning. British Journal of Health Psychology, 13(3), 525–535.
- 13. Silva, M. M. J., & Clapis, M. J. (2021). Depression during pregnancy risk scale: Elaboration of a theoretical model. Journal of the School of Nursing USP, 55, e03780.
- 14. Masiero, M., Lucchiari, C., Mazzocco, K., Veronesi, G., Maisonneuve, P., Jemos, C., & Pravettoni, G. (2019). E-cigarettes may support smokers with high smoking-related risk awareness to stop smoking in the short run: Preliminary results by randomized controlled trial. Nicotine and Tobacco Research, 21(1), 119–126.
- Montazeri, M., Makvand Hosseini, S. H., Bigdeli, I., & Sabahi, P. (2017). Effectiveness of therapeutic intervention of cognitive bias modification (CBM) on cigarette dependency. Psychological Achievements Journal, 24(2), 1–22.
- 16. Armitage, C. J. (2007). Efficacy of a brief worksite intervention to reduce smoking: The roles of behavioral and implementation intentions. Journal of Occupational Health Psychology, 12(4), 376–390.
- 17. Heydari, G. R. (2009). Good time for starting smoking cessation programs. Pajoohandeh, 14(2), 53–57.
- 18. Badrooh, A., Mozaffari, N., Barikani, A., & Dadkhah, B. (2019). Comparison of the effect of group and individual training on smoking cessation motivation in coronary artery disease patients. Journal of Health Communication (JHC), 21(2), 99–107.
- 19. Van den Brand, F. A., Nagtzaam, P., Nagelhout, G. E., Winkens, B., & van Schayck, C. P. (2019). The association of peer smoking behavior and social support with quit success in employees who participated in a smoking cessation intervention at the workplace. International Journal of Environmental Research and Public Health, 16(16), 2831. https://doi.org/10.3390/ijerph16162831
- 20. Skov-Ettrup, L. S., Dalum, P., Bech, M., & Tolstrup, J. S. (2016). The effectiveness of telephone counselling and internet- and text-message-based support for smoking cessation: Results from a randomized controlled trial. Addiction, 111(7), 1257–1266.
- Al Onezi, H., Khalifa, M., El-Metwally, A., & Househ, M. (2018). The impact of social media-based support groups on smoking relapse prevention in Saudi Arabia. Computer Methods and Programs in Biomedicine, 159, 135–143.

- 22. Hébert, E. T., Stevens, E. M., Frank, S. G., Kendzor, D. E., Wetter, D. W., Zvolensky, M. J., ... & Businelle, M. S. (2018). An ecological momentary intervention for smoking cessation: the associations of just-in-time, tailored messages with lapse risk factors. Addictive behaviors, 78, 30-35.
- 23. Ophir, Y., Brennan, E., Maloney, E. K., & Cappella, J. N. (2019). The effects of graphic warning labels' vividness on message engagement and intentions to quit smoking. Communication Research, 46(5), 619–638.
- 24. Staten, R. R., & Ridner, S. L. (2007). College students' perspective on smoking cessation: "If the message doesn't speak to me, I don't hear it." Issues in Mental Health Nursing, 28(1), 101-115.
- 25. Perski, O., Crane, D., Beard, E., & Brown, J. (2019). Does the addition of a supportive chatbot promote user engagement with a smoking cessation app? An experimental study. Digital Health, 5. https://doi.org/10.1177/2055207619880676

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