Introduction
Waterpipe tobacco smoking (WTS) has long been known as a traditional method of smoking worldwide (1). The term “waterpipe tobacco smoking” generally refers to the method of using tobacco as the smoke passes through the water before being inhaled into the lungs (2). Tobacco is used in different ways such as smoking, WTS, and chewing (3). The history of using waterpipe tobacco goes back 400 years ago and originates in ancient India. WTS in eastern countries has been known as a traditional method of tobacco consumption for a long time (4).

Although WTS has attracted the attention of the elderly in the past, this method has gradually become popular among young people since 1980, and waterpipe tobacco consumption has significantly increased in the last 20 years (1). The results of some studies indicate that 100 million people around the world consume waterpipe tobacco every day, and a large population of them is youth and teenagers (5, 6). According to the report of the World Health Organization (WHO), tobacco is the annual cause of the death of 6 million people in the world, and if this trend continues, more than 8 million people, mostly in middle and low-income countries, will die by 2030 (7).

Contrary to the wrong beliefs about the lack of harmfulness of WTS, the conducted studies confirm its adverse effects on health (8). Tobacco products are one of the major causes of disease, disability, and premature death. Thus, the risk of death in tobacco users is 80% higher than in non-smokers of tobacco. The smoke from WTS contains concentrated carbon monoxide, nicotine, bitumen, and heavy substances. Thus, it has a higher risk of respiratory system diseases and cancer (1, 9). Tobacco smoke contains more than 4000 different chemical substances, most of which are produced during the burning process and combined with more than 40 carcinogenic substances (10). Nicotine in the blood of people who are daily waterpipe tobacco smokers is similar to people who smoke 10 cigarettes a day (10, 11). The ratio of carbon monoxide to nicotine in WTS and cigarette smoke is 50:1 and 16:1, respectively (12). Therefore, the amount of carboxyl in the blood hemoglobin of waterpipe...
tobacco smokers is more than that of cigarette smokers (10).

WTS causes dependence on nicotine and various diseases, including cardiovascular system problems, oral and dental diseases, respiratory infections, infectious diseases such as colds, hepatitis, tuberculosis, and herpes and increases the risk of lung, mouth, and bladder cancers (12-16).

Headache, dizziness, increased heart rate, nausea, weakness, and syncope following carbon monoxide poisoning are the other side effects of using WTS. In addition, it causes fertility problems and contributes to maternal and fetal complications during pregnancy. The results of some studies demonstrated that the birth weight of babies whose mothers are waterpipe smokers is lower than that of the other babies (12, 17). Despite increasing awareness and a better understanding of the health hazards of WTS, its use is surprisingly widespread among students (18). It is estimated that about 30% of students have a history of WTS during their studies (19). Based on the findings of a study conducted in Iran in 2020, 21% of students have experienced WTS (20). This issue is a serious concern not only in Middle Eastern countries but also in European and American countries (21-24). Considering the significant increase in the tendency of students to use hookah all over the world and the importance of finding the cause of this issue, the present study aimed at determining factors affecting the WTS trend in students.

Materials and Methods
This scoping review was conducted based on the approach proposed by Arksey and O’Malley. A scoping review method is an approach that examines all kinds of the available evidence around a specific research topic and provides the required information in a correct, short, and effective manner to policymakers and health practitioners. This approach consists of five steps, including the design of the research question, search, and extraction of studies related to the research, selection of relevant studies, summarization of information and data, and provision of the results (25).

Designing the research question: Reasons for students’ trends to waterpipe tobacco consumption.

Searching and extracting research-related data: In this step, the members of the research team independently searched for texts related to the causes of students’ trend to use waterpipe tobacco from 1.1.2004 to 1.1.2022. The reliable Persian databases, including Magiran, Scientific Information Database, Islamic World Science Citation Center, and international databases including PubMed, Scopus, Google, scholar, and Web of Science, were searched to find relevant documents. The searched words extracted from Medical Subject Headings (MeSH) included WTS (hookah), tobacco, students, and risk factors in Farsi and English.

Results
Overall, 210 articles were found in the initial search of which, 20 articles were entered into the research by removing the duplicate and irrelevant articles and inclusion criteria (Figure 1). The information relevant to these research types is presented in Table 1.

The results of the studies represented that several factors affect the students’ trend toward WTS, which was divided into 3 general categories, including background, mental, and social factors.

Background Factors
Gender and Race
The findings of some studies conducted in Iran and other countries revealed that boys had a higher trend to be addicted to WTS than girls (29, 31, 32). According to the results of research performed in Turkey, girls’ understanding of the harms of WTS on human health is more than that of boys, and this issue is mentioned as one of the reasons for the lower trend of girls consuming WTS(34). In addition to gender, race has been mentioned as an effective factor in the WTS trend. Some researchers believed that the chance of WTS addiction was higher among black people(39, 40), and some others considered this chance higher among white people (35). In this research, it was indicated that the consumption of WTS
Figure 1. Screening and Selecting the Included Articles

### Table 1. Specifications of the Included Articles

<table>
<thead>
<tr>
<th>Title</th>
<th>Author</th>
<th>Year/Country</th>
<th>Research Type</th>
<th>Summary of Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>The prevalence of WTS and perception of its addiction among the students of universities in Palestine, Jordan, and Turkey</td>
<td>Hawash et al (19)</td>
<td>2022/Turkey</td>
<td>Sectional</td>
<td>The overall prevalence of smoking was 31.8%. Many people believed that they would become addicted to WTS, and almost half of them smoked waterpipe tobacco daily. WTS was associated with older age, low monthly income, and living in private residences. Since the prevalence of WTS among the students of Palestinian and Jordanian universities was high compared to those of Turkey, it can be mentioned that Turkish laws regarding WTS caused this consumption restriction.</td>
</tr>
<tr>
<td>Investigation of the popularity, awareness, perceptions, and motivation of medical students about WPS</td>
<td>Salehi (18)</td>
<td>2021/Iran</td>
<td>Sectional</td>
<td>The most important reasons for the tendency to WTS among students were the aspect of entertainment in the family and the aspect of happiness, respectively. A statistically significant relationship was observed between age, knowledge, perception, and WTS.</td>
</tr>
<tr>
<td>Prevalence of WTS and related factors among male students in Iraq</td>
<td>Al-Delaimy et al (27)</td>
<td>2020/Iraq</td>
<td>Sectional</td>
<td>The social acceptability of WTS than cigarette smoking, attention to WTS among friends, the media, or the existence of a WTS cafe near the place of residence, as well as the lack of religious prohibition for WTS, are among the causes of the prevalence of WTS among Iraqi students.</td>
</tr>
<tr>
<td>Attitude and awareness of the harmful effects of WTS among Jordanian students</td>
<td>Al-Sawalha et al (28)</td>
<td>2021/Jordan</td>
<td>Sectional</td>
<td>The perception of the low risk of WTS and its non-addictiveness, as well as the pleasantness of using waterpipe tobacco in communities, are among the reasons for the tendency to WTS.</td>
</tr>
<tr>
<td>The predictive factors of waterpipe tobacco consumption among students in Al Qassim region in Saudi Arabia</td>
<td>Almogbel et al (29)</td>
<td>2021/Saudi Arabia</td>
<td>Sectional</td>
<td>The main predictors of WTS included being a male, belonging to an older age group, being married, receiving low financial assistance, and having one or more smoker siblings. In addition, one of the reasons for the tendency to use waterpipe tobacco among students is the perception that WTS is less harmful than cigarettes.</td>
</tr>
<tr>
<td>Title</td>
<td>Author</td>
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<td>Summary of Results</td>
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<tr>
<td>WTS among Herat students: Prevalence, attitudes, and related factors</td>
<td>Nazir et al (30)</td>
<td>2020/</td>
<td>Sectional</td>
<td>The prevalence of WTS is higher in boys. Smoking among friends or family members and having the perception that WTS has low risk are among the most important reasons for the spread of WTS among students.</td>
</tr>
<tr>
<td>WTS among students in Hong Kong: a sectional research</td>
<td>Lee et al (31)</td>
<td>2020/China</td>
<td>Sectional</td>
<td>WTS is related to gender and aging, individual and emotional sensitivities, as well as psycho-social components.</td>
</tr>
<tr>
<td>Higher prevalence of WTS compared to cigarettes among medical students in Southeast Iran</td>
<td>Miri-Moghaddam et al (32)</td>
<td>2019/Iran</td>
<td>Sectional</td>
<td>It seems that the amount of tobacco consumption, especially for WTS, among medical students in Iran is at an alarming rate. The main reasons for waterpipe and smoking were entertainment, followed by curiosity, and factors such as friends the presence of a smoker at home, and male gender were influential as well.</td>
</tr>
<tr>
<td>Consumption of tobacco and waterpipe tobacco among students in Saudi Arabia: The effect of the sales ban tobacco</td>
<td>Daradka et al (33)</td>
<td>2019/Saudi Arabia</td>
<td>Sectional</td>
<td>The highest consumption of waterpipe tobacco was found among young people whose allowance was more than 500 Arab Rials and the number of family members was more than 5 people.</td>
</tr>
<tr>
<td>Investigation of the knowledge, attitudes, and perceptions towards tobacco use among college or university students</td>
<td>Anshad et al (21)</td>
<td>2019/England</td>
<td>Review</td>
<td>Two mental and social elements were effective in dependence on WTS. The general idea of students was that WTS is a less harmful, addictive, and more social alternative to cigarette smoking, which is also more social. A large proportion of students believed that leaving WTS was easy; however, few could successfully do this behavior.</td>
</tr>
<tr>
<td>Reasons for using or stopping WTS among young American students</td>
<td>Kothari and Berg (22)</td>
<td>2018/</td>
<td>Longitudinal cohort</td>
<td>Two factors (flavor and social reasons) are the reasons for the current use of waterpipe tobacco.</td>
</tr>
<tr>
<td>Investigation of the frequency of the consumption and causes of smoking and WTS among male and female physical education students of Kurdistan University</td>
<td>Rahimzadeh et al (17)</td>
<td>2016/Iran</td>
<td>Descriptive-sectioanl</td>
<td>The most important reasons for the high consumption of cigarettes and WTS in this study in the boys' group were intimate relationships with smoking friends, and in the girls' group, the corresponding reasons were fun and entertainment.</td>
</tr>
<tr>
<td>An understanding of Turkish university students about the effects of WTS on health</td>
<td>Sahin and Cinar (34)</td>
<td>2015/Turkey</td>
<td>Sectional</td>
<td>There was a statistically significant relationship between gender, the amount of allowance, students' thoughts, and opinions about the pathogenicity of WTS and inappropriate perceptions of WTS.</td>
</tr>
<tr>
<td>Social context of WTS among students: Scale development and validation</td>
<td>Sharma et al (23)</td>
<td>2013/</td>
<td>Sectional</td>
<td>Social facilitation, family/cultural effect, and alternatives to cigarette smoking and drinking are 3 important factors in WTS among college students.</td>
</tr>
<tr>
<td>WTS among college students in the United States: A review research</td>
<td>Grekin and Ayna (24)</td>
<td>2012/</td>
<td>Review</td>
<td>Despite its harmful health effects, WTS is highly common among students. Nearly 1 out of 5 American college students reported WTS in the past year. Many students believed that WTS is less harmful than cigarette smoking. WTS is related to the male gender, Arab ethnicity, and smoking.</td>
</tr>
<tr>
<td>WTS among the US university students</td>
<td>Primack et al (35)</td>
<td>2012/</td>
<td>Sectional</td>
<td>WTS after cigarette smoking was the most common form of tobacco use among students, and it is most related to younger age, male gender, white race, non-religious people, and membership in non-religious institutions.</td>
</tr>
<tr>
<td>Prevalence and correlates of WTS among college students in North Carolina</td>
<td>Sutin et al (36)</td>
<td>2011/</td>
<td>Sectional</td>
<td>Demographic factors (male gender, and first-year student), alcohol, and other drug use, the perception that WTS is less harmful than cigarette, and having a WTS commercial place near the university campus were among the effective factors in the prevalence of WTS among students.</td>
</tr>
<tr>
<td>WTS (coconut) among medical and non-medical students in Turkey</td>
<td>Poyrazoğlu et al (13)</td>
<td>2010/Turkey</td>
<td>Sectional</td>
<td>Gender, smoking, and the presence of smokers among family members and friends had a significant effect on the prevalence of WTS.</td>
</tr>
<tr>
<td>Knowledge, attitude, and performance of university students about WTS in Pakistan</td>
<td>Jawaid et al (37)</td>
<td>2008/Pakistan</td>
<td>Sectional</td>
<td>Boredom among youth, WTS in leisure activities, and peer pressure were identified as the most common reasons for increasing the popularity of WTS in Pakistan (40).</td>
</tr>
<tr>
<td>The relevant beliefs and attitudes to WTS among Syrian university students</td>
<td>Maziak et al (38)</td>
<td>2004/Syria</td>
<td>Sectional</td>
<td>The existence of pleasant flavors in industrial tobaccos, the perception of low adverse effects on health, WTS as a social habit, and the negligence of family members regarding the use of WTS, especially for girls were reasons for the prevalence of WTS in the younger of Syria (41).</td>
</tr>
</tbody>
</table>

Note: WTS: Waterpipe tobacco smoking.
among Asians was more than among other populations, and Arabs had more chances to smoke and consume WT in this classification (24). In another research, the highest consumption of WTS was reported among students from Palestine (19).

**Background of Cigarette Smoking**

The background of cigarette smoking, alcohol, and marijuana increases the chance of addiction to WTS (5). Cigarette smokers regularly have a higher chance of becoming addicted to WTS than those who have had a history of smoking in the past (5, 8, 11, 41). Furthermore, the results of longitudinal studies in America and Canada have confirmed this relationship (42). Further, some students used WT as a substitute for cigarettes when they quit smoking (23). On the other hand, WTS is also a cause of smoking addiction (43).

**Mental Factors**

**Personality Elements**

Smoking addiction has psychological dimensions, implying that people with certain psychological characteristics such as low self-confidence, negative self-concept, and lack of skills in saying no, and some types of personalities are more vulnerable to WTS addiction (31, 44).

**Bitter Experiences in Childhood**

Another risk factor for the WTS trend is unpleasant childhood experiences which encompass significant stress and types of violence against people under the age of 18, including physical, emotional, and sexual abuse (45).

**Sensual Attractions**

Sensual attractions such as enjoying the smell and flavor of WTS and its relaxing mode play an important role in the consumption trend. Consuming flavored and sweet tobacco (fruity, chocolate, and the like) by factories producing tobacco products has made WTS popular among students (22, 38) to attract more people. These flavorings are sweet and do not have the bitter and unpleasant flavor and smell found in cigarettes, and they encourage young people to experience WTS because they are approved by their peers (35).

**Social Factors**

**Easy and Cheap Access**

Youth is looking for social opportunities with their peers. WTS is cheap, and waterpipe tobacco is widely used in parks, cafes, restaurants, and friendly and family parties (18, 32, 37). Furthermore, the traditional use of WTS and its historical aspects in some places have caused WTS to be an accessible means of entertainment, at home, and in society (27, 46).

**Income**

The amount of allowance or weekly income affects the students’ trend to consume waterpipe tobacco (34). In some studies, the high-income of students, while their low income in some other studies, was related to their use of waterpipe tobacco (19, 29, 33). In a research conducted in Saudi Arabia in 2015, the amount of WTS was significantly higher among those whose allowance was more than 500 Arabian Riyals (33).

**Wrong Knowledge and Attitude**

Having wrong knowledge and a positive attitude towards WTS is one of the important reasons for students’ trend toward WTS. Many waterpipe tobacco smokers mistakenly think that WTS is less harmful than cigarette smoking (21, 29, 30, 34). In some studies, waterpipe tobacco users believed that smoke passing through water reduces the harmful effects of WTS (4, 14, 47), and some considered the chemicals and nicotine contained in WTS to be less than cigarettes (3, 35, 44, 48). In another research, 39.7% of students assumed that WTS did not contain nicotine, and 43.3% thought that it contained no carbon monoxide (14). To consider that flavored tobacco is healthy is another wrong common concept in a society that significantly influences the WTS trend (34). In a study, students believed that the tobacco used in WTS is not harmful to human health because it is an herbal substance. In this research, 65.2% of smokers and 31% of those who had no history of WTS also mistakenly believed that dependence and addiction to WTS are less than cigarette smoking (12).

**Family and Friends**

It was indicated in some studies that waterpipe smoking is abundantly used in family gatherings, parties, and friendly conversations, and this has caused a person to be familiar with WTS since childhood (23, 30). Negligence of the family or even the presence of a person addicted to smoking or WTS among family members is one of the reasons for the prevalence of WTS among youth (13, 38). In several studies, the effect of a group of friends in the initiation of WTS, especially among youth under 24 years of age, has been mentioned as an extremely important factor (34, 37). In America, 90% of students mentioned their first experience with WTS in the company of family or friends (49). In addition, the results of research in New Zealand demonstrated that the prevalence of WTS in people whose family or friends used waterpipe tobacco was more than in their peers (13, 50).

**Religion**

It is a preventive factor in attracting people to abnormal factors. According to some studies, weak religious beliefs, non-adherence to religious principles, and membership in non-religious groups and institutions increase the
chances of WTS addiction (35, 39). Moreover, the non-prohibition of WTS (e.g., the Sharia laws that prohibit the consumption of alcoholic beverages in many Muslim countries) has led to the youth trend toward WTS (27).

Culture of Society
The wrong dominant culture in society is another reason for the popularity and prevalence of WTS among students. WTS has been popular among people for a long time, and it is a collective act used among family members and fun for get-togethers from a sociological point of view. Thus, higher social acceptance of WTS than cigarettes, the influence of the Internet and mass media that show a positive image of WTS (35, 51-53), and the spread of cafe culture make the young, teenagers, and waterpipe tobacco smokers find it a proper way to spend their leisure time (17, 32). On the other hand, smoking is a violent and inappropriate behavior in popular culture, while WTS is not offensive in terms of appearance. In addition, the acceptance of WTS for girls in some countries such as the Eastern Mediterranean or the Middle East has made them more willing to smoke waterpipe tobacco (38, 54).

Health Policies
Despite the growing consumption of waterpipe tobacco in recent years, there are still no specific laws and regulations (e.g., the law prohibiting smoking in public places) in many countries to limit the use of waterpipe tobacco (20). On the other hand, we still see the media focuses on the harms of smoking due to the important role of the media in shaping the culture of society. Hence, many people think that WTS is harmless to health (4, 12). Studies demonstrate that price is an effective factor in the demand for tobacco products. For example, research conducted in Iran indicated that increasing the price of cigarettes can significantly reduce their consumption (3).

Discussion
The high prevalence of many contextual, mental, and social factors can affect the students’ trend toward WTS. One of the prominent reasons for the WTS trend among students is the consumption of WTS in society, especially among youth, which has become a global problem and has made many countries think of finding suitable solutions (5, 13, 36, 55). Thus, first, the root causes of students’ trend to use waterpipe tobacco should be investigated to develop preventive programs. Based on the findings of this research, one of the effective factors in the WTS trend is background factors. In general, smoking and WTS, especially in men, are customary and accepted in eastern societies. The historical and cultural contexts of WTS in some places, especially in the Middle East and Iran, demonstrate that the youth of these regions have more access to WTS than in other places. Furthermore, the results of a study revealed a strong relationship between smoking and WTS (42). Waterpipe tobacco users turn to cigarettes to take deeper nicotine effects. In this regard, the chance of smoking addiction is 8 times higher in people who had a history of WTS than others. Evidence indicates that nicotine is the gateway to addiction, and most drug and stimulant users have a history of smoking and WTS in their history (54). On the other hand, the lower age of smoking and WTS will be a serious threat to the health of the future generation, and it is necessary for those involved in the health of society to pay more attention to this issue.

One of the important reasons for the WTS trend among students is psychological factors. Bitter childhood experiences, rejection, and humiliation of a person in society, a history of suffering from mental disorders such as anxiety, depression, and inability to manage emotions, and fulfillment of the sense of curiosity are important factors for the WTS trend and drugs in youth (44). On the other hand, the sensory attractions of WTS, including enjoying the smell and flavor of WTS and experiencing a state of relaxation and forgetfulness, euphoria, and dizziness, increase the trend to consume it (1, 56). In this regard, it is essential to prevent the relevant problems by health policymakers with screening plans to detect vulnerable people and implement timely psychological interventions. On the other hand, it is suggested that authorities and scholars make changes in the flavor and smell of tobacco and tobacco products to reduce sensory appeals to reduce its consumption trend.

Another important issue in the WTS trend among students is social factors. In many countries such as Iran, WTS has been introduced as a cheap and accessible group entertainment. This behavior is not only condemned by family and friends but also it is encouraged as well (3, 38). In addition, the wrong knowledge and attitude about the harms of WTS play an extremely important role in its consumption. This issue is highly significant in Iran and other countries. The penetration of ancient beliefs, the focus of information on the harms of smoking, widespread advertising on the naturalness of fruit tobaccos, and the lack of a widespread prohibition on the WTS trend in public places have all caused youth to be unaware of the harms of WTS and its trend (35). Replacing WTS instead of cigarettes, with the view that WTS is not harmful to health, plays a role in the WTS trend. Additionally, many people think that WTS does not contain nicotine and is not addictive for their unawareness. Meanwhile, WTS and the body’s desire to receive the maximum amount of nicotine may become the basis of smoking addiction (43). Therefore, many students in England believed that the current public health campaigns for education about the harms of WTS are insufficient (21). As a result, the point that WTS addiction is the first step to smoking addiction seems empty in society.

Religious commitment is known as a strong and stable
factor against negative behaviors. In fact, religion and mental health protect human personality and dignity. Religion provides specific moral guidelines and laws for self-control, chastity, and refusal of error (56). Thus, developing religious programs in schools can play an essential role in preventing risky behaviors in students and then in students. On the other hand, introducing modern society and less control of families and the high impression of youth and teenagers by their friends can provide the grounds for the WTS trend among the students (44). Hence, teaching life skills, including the ability to say “No” while learning about the risks of WTS, can be highly useful.

**Limitations**

This study had some limitations. Only Persian and English studies were used whose full text was available. Although articles meeting the inclusion criteria were identified and reviewed, some unpublished studies may have been missed. Despite these limitations, this study provides a comprehensive review of effective factors on students’ trend toward WTS consumption, and conducting a review study, generally in a field based on the introduced standard framework, can be known as one of the advantages of his research.

**Conclusion**

The results of this research revealed that background, psychological, and social factors influence WTS in students. Therefore, health policies and health education need to be reviewed about the health risks caused by WTS. The findings of this research can be an important guide for health policymakers to reduce WTS by the future makers of the country (i.e., students). Different factors affect the reduction of WTS, including making culture through mass media, advertising billboards, and virtual space as a convenient and accessible platform, preventing the production of flavored tobacco by the Deputy Food and Drug Ministry of the Ministry of Health, and implementing laws prohibiting WTS in public places. The other influential factors are increasing the price of tobacco, preventing the sale of WTS devices to people under the legal age, increasing the recreational and sports facilities for youth, and increasing social counseling for students at risk which should be considered by the responsible institutions.

**Authors’ Contribution**

**Conceptualization:** Azam Sharifi.

**Investigation:** Marzieh Seif, Mohammad Mehdi Daraee.

**Project administration:** Marzieh Seif.

**Supervision:** Marzieh Seif.

**Validation:** Azam Sharifi, Marzieh Seif, Mohammad Mehdi Daraee.

**Writing – original draft:** Azam Sharifi.

**Writing – review & editing:** Marzieh Seif, Mohammad Mehdi Daraee.

**Competing Interests**

The authors declare that they have no conflict of interests.

**Ethical Approval**

Not applicable.

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**References**


43. Ashfar T, Ward KD, Eisenberg T, Maziak W. Comparison of patterns of use, beliefs, and attitudes related to waterpipe between beginning and established smokers. BMC Public


