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False Beliefs About Shisha Use Among Young People: An Updated Systematic Review

Jesús Torres-Medina[1], Jorge Min Hui Zhou-Zhou[1]
[1] Faculty of Medicine, University of Granada (UGR)

Abstract

Introduction

The use of shisha is widespread worldwide. We found systematic reviews on its use (1), on its health effects (2-4), and on the toxic content of inhaled smoke (5). However, no systematic reviews were found that collected and analyzed false beliefs about its use. Therefore, it is an under-researched topic and these false beliefs need to be described in order to provide more evidence in this field and increase knowledge about shisha use.

Objective

The primary objective of this study is to conduct a systematic review on the existence of false beliefs and perceptions of shisha use among young people.

Methods

In March 2020, a systematic literature search was conducted in three databases (MEDLINE, SCOPUS, and Web of Science Core Collection). The elements of the PICOS acronym in our research question were: the studied population (P) were young people aged 12 to 35, the intervention (I) was to ask about false beliefs about shisha use, comparison (C) was not described, the outcome (O) was to describe these false beliefs, and the design of the studies included (S) was descriptive.

With these elements, a search string was developed and the selection criteria were established: 1) population aged 12 to 35 years, 2) questions about false beliefs about shisha use, 3) descriptive studies, and 4) studies written in English, French, Spanish or Chinese. Using the search string, a total of 105 studies were obtained from the three databases. After an initial analysis of titles and abstracts, 15 articles were selected and read thoroughly, after which 6 of them were excluded for not meeting the selection criteria.

Results

After evaluating 105 articles, 9 studies were included in this review. More than twenty false beliefs were identified and grouped into five categories: health harm, levels of nicotine and addictiveness, smoke content, fruit flavor or aroma and other beliefs. Most of these beliefs relate to the perception of risk to health. It is common to think that shisha is harmless or less harmful than tobacco, or that its negative health effects are over-estimated. There is also considerable confusion regarding sharing the mouthpiece, as it is thought that diseases cannot be transmitted this way. Many young people also believe that shisha is not addictive or that it is less so than tobacco, and that it does not contain nicotine or contains a lesser amount of it. In addition, some think that water filters out tobacco toxins and, therefore, the smoke does not contain any hazardous chemicals. Moreover, some believe that smoking fruit-flavored tobacco makes it healthier and less addictive, or even that smoking shisha helps to relax and stay slim. It is also emphasized that women smoking shisha in public is no longer taboo. Finally, we identified the most frequently asked beliefs in the questionnaires and those statistically significant related to shisha use.

Discussion

This systematic review identified a large number of false beliefs about shisha use among young people, making evident the existing misinformation in this age group i regarding its health effects. Furthermore, despite the social and cultural differences, as well as those concerning the use of shisha in the populations studied in this review, all of them showed similar misconceptions. In Spain, shisha use is permitted in cafés and pubs, and it is even included for free with the purchase of a certain number of drinks. This shows that the applied health policy is very permissive and must change for the good of the youth. Therefore, it is necessary to implement the existing legal measures and educate adolescents at an early stage so that they can understand the harmful effects of shisha, and avoid the risk of smoking initiation through new fashionable forms of use. Further research should assess these false beliefs in a larger number of countries

to homogenize the population studied. This would increase the evidence provided in similar reviews. To conclude, the limitations of this systematic review include that the search string is restrictive, no backward reference searching was conducted, and the study population of the articles included is heterogeneous.

Keywords: youth, false beliefs, shisha, survey.

1. Introducción

Smoking is the leading preventable cause of death worldwide (6). According to 2015 data, the prevalence for daily tobacco smoking was 15.2%. It was estimated that smoking-attributable mortality was 110.7 out of 100,000 deaths and 170 million disability-adjusted life-years globally (7). These figures reveal alarming results about detrimental effects of smoking at a population level. In fact, 85-90% of lung cancer cases in the United States are associated with tobacco use (8). Through different mechanisms, smoking is also associated with diseases such as chronic obstructive pulmonary disease (COPD) (9) coronary heart diseases (10), or Alzheimer (11), and in the increase of spontaneous abortions (3). Fortunately, tobacco use in Spain is decreasing, dropping to 22.08% in 2017 (12), although this is progressively slowing down. Nonetheless, there are certain alarming trends that are becoming popular, especially among young adults, which may have harmful health effects. One such trend is the use of shisha, the second most widely used alternative to tobacco (2). In the United States, the use of shisha in adults was around 1.5% in 2014-2015 (13), while there were 100 million shisha users worldwide (14). Furthermore, shisha smoking is known for its harmful health effects and, like tobacco, it can cause addiction, although its nicotine content may vary depending on the coal brand used (which contains a mix of tobacco and herbs) around 1.68-11.87 mg/g, in contrast to 0.5-19.5 mg/g present in cigarettes (15). Shisha smoke does not only contain nicotine; chemical analysis of the coal used reveals that it contains similar concentrations of lead and nitrogen and a higher concentration of heavy metals. It also includes 7 carcinogenic substances, 39 central nervous system depressors, and 31 respiratory irritants (16), in addition to the carbon monoxide of inhaled smoke derived from combustion. Therefore, effects similar to those of tobacco have been found in cardiovascular and respiratory health (4), including an increased risk of coronary heart disease, heart failure, recurrent ischemia, and increased heart rate, blood pressure and mortality related to these diseases. It may also cause COPD, lung cancer, adult and childhood asthma, as well as other diseases (2). Among its conditioning factors, it has been found that the amount of inhaled smoke is hundreds of times greater than in a cigarette (17), requiring greater inhalation effort and reaching deeper levels than with a cigarette puff. Moreover, one shisha session is equivalent to 2.5 times higher nicotine levels and 10 times higher carbon monoxide levels than a single cigarette, which may warn about its potential addiction and health effects (5). It has been proven that sharing a shisha mouthpiece can be a risk for transmitting not only a cold, but severe diseases such as hepatitis A or tuberculosis (18).

Part of the popularity of the product resides in its social nature (4) and there is ample evidence that shisha use is more frequent during the first decades of life (19, 20). In addition, young adults are willing to try alternative tobacco products advertised as healthier options (21). Therefore, the false belief that shisha does not promote other forms of smoking or is not an initiation window to using other forms of tobacco should be rejected, since shisha use is associated with cigarette smoking (22). A study conducted in Iranian adolescents indicated that the initiation window for shisha use was between 12 and 24 years (19). Consequently, the lack of reviews regarding false beliefs about shisha use proves the validity of this study. For this purpose, we selected descriptive studies conducted in young people between 12 and 35 years of age, who were asked about their beliefs about shisha use, in order to describe these beliefs with the use of the PICOS acronym.

2. Materials and Methods

2.1. Protocol and registration

Firstly, we decided the subject in question and, according to PRISMA guidelines (23), the research question was stated following the elements of the PICOS acronym. Secondly, the aim of the study was described, and the selection and exclusion criteria were established. Then, according to these aspects, we created the search string and decided which databases would be used, with the aim of collecting

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Gudrun Palomino-Tirado[2], Laura Copado-Jiménez[2], Elena Company-Campos[2], Amelia Perdigón-Hernández[2], Claudia Conde-Sánchez[2]

[2] Faculty of Translation and Interpreting, University of Granada (UGR)

the references in a scientific research assistant (Zotero). The next step was to read the title and abstract of each article by both authors independently; those that could meet the selection criteria were selected and, after deleting duplicates, the selected articles were read thoroughly. Studies that did not meet the selection criteria were excluded from this review. A flow diagram was designed to clarify the selection process. The articles were then reviewed in detail for data extraction by both authors independently, after which and afterwards, the findings were pooled to obtain data that could be included in this review and to create a summary table. Whenever there was a conflict between the authors, it was solved by asking to a third researcher from the Teaching Innovation Project.

On March 4, 2020 all required data for the registration and subsequent development of this review were introduced in PROSPERO (International Prospective Register of Systematic Reviews).

2.2. Eligibility criteria

This review was performed using the PICOS acronym: the population (P) were young adults aged between 12 and 35, the intervention (I) was to ask about false beliefs about shisha use, the comparison (C) was not described, the outcome (O) was to describe these false beliefs, and the study design (S) was descriptive.

Initially, we thought about limiting the search by date to include only articles that had been published in the last 5-10 years, since shisha use has become increasingly popular in recent years. Nonetheless, before carrying out the search, we decided not to limit it by date or location with the aim of gathering the largest number of articles.

2.3. Information sources

Three databases were used for this study: MEDLINE, Web of Science Core Collection and SCOPUS. The search started on March 4, 2020 and finished on March 9, 2020.

2.4. Search

The search string used in the databases named above included the following terms and boolean operators: (young* OR adolescent OR teenag* OR infant OR youth*) AND (belie* OR impression OR perception OR opinion OR view* OR judg* OR understand* OR assumption OR knowledg* OR notion OR expectation OR supposition) AND (false OR incorrect OR untrue OR wrong OR erroneous OR unfounded OR fake) AND (hookah OR "water pipe" OR narguile OR shisha) AND (questionnaire OR survey). As mentioned before, the search string was designed using the PICOS acronym. In addition, an alert was created in each database, so the authors would be notified if any new article that met the search criteria was published during the course of the study.

2.5. Study selection

The selection criteria established were: population aged between 12 and 35, discussing false beliefs about shisha use, being descriptive and being written in Spanish, English, French or Chinese.

After applying these criteria, the resulting papers from each database were analyzed by reading only their titles and abstracts. Duplicates were deleted and selected articles were read thoroughly. Only studies that met all the selection criteria were included. The authors carried out this process independently and then pooled their findings.

2.6. Data collection process

The articles included in this review were fully read by both authors independently and data was extracted following the PRISMA guidelines (23). The data was subsequently shared in order to write this review and design a summary table. Any conflict between the authors was solved by asking a third researcher from the Teaching Innovation Project.

2.7. Risk of bias across studies

The studies analyzed may be subject to selection bias. Some studies only interviewed regular smokers and thus the findings cannot be extrapolated to young population in general. Additionally, most of the interviews were conducted in venues such as cafeterias or pubs and, therefore, the young adults interviewed do not represent the overall young population. These participants may have a greater understanding of shisha due to being frequently exposed to it in establishments where its use is common place. In turn, studies analyzed very different contexts as they were conducted in countries that differ greatly, where the prevalence of shisha use is higher than in Western countries. Voluntary response bias can be also recognized considering that data collection methods were voluntary surveys in many studies. The degree of information and motivation of these participants may differ substantially from the rest of young adults.

2.8. Summary measures and synthesis of results

The main summary measure used in this review was the response rate to false beliefs in the questionnaires of the selected articles. Odds ratio and its associated confidence interval have been used to describe false beliefs significantly associated with shisha use.

A table summarizing the content of each article was drawn. Tables of studies containing information from questionnaire responses were also helpful.

3. Results

Figure 1 describes the literature selection process. After entering the search string in the three databases, a total of 105 articles were obtained (4 in MEDLINE, 5 in Web of Science Core Collection and 96 in SCOPUS). Then, a number of studies were excluded: 7 duplicates and the title and abstract of another 83 that did not meet the selection criteria. The full text of the remaining 15 articles was read, after which 6 others were excluded for not meeting the selection criteria. Therefore, 9 studies were included in this systematic review.

Table 1 presents a brief description of the sample, the place where the studies were conducted, false beliefs observed, and the data collection process.

More than twenty false beliefs were detected among young people in the 9 articles included in this systematic review. They were then grouped into 5 different categories (Figure 2): harm on health, amount of nicotine and addictiveness, smoke content, fruit flavor and other beliefs.

3.1. Health harm

This is the most discussed topic in the selected articles studied for this systematic review. Most false beliefs are identified in this section.

In four of the reviewed studies, the false belief that smoking shisha is not harmful to health can be observed (20, 24–26). A 6.3% of university students surveyed in Turkey answered that they agreed with the statement that shisha is not harmful because it does not burn the lungs (25). It is also believed that shisha is less harmful than tobacco (24, 27), that occasionally smoking a cigarette is more harmful than smoking shisha (28), and that, compared to tobacco, it cannot cause cancer, cardiovascular disease (22), or increase cardiovascular disease risk (26). The majority of shisha-smoking participants from the survey conducted in San Diego believed that it is less harmful than tobacco (27). 34.8% of respondents in South East London believed that shisha is less harmful than cigarettes because it does not cause cancer (22). It is also thought that not all forms of shisha are harmful to health (22), that the danger of smoking shisha is over-estimated (up to 48% of smokers surveyed in South Africa said this) (28), and that quitting shisha does not improve health (26).

With regards to the mouthpiece, some young people believe it should be shared (26), that sharing it is not harmful (28), or that colds and other diseases cannot be transmitted this way (26). Other misconceptions include thinking that shisha use cannot cause eczema or oral infections (26).

3.2. Amount of nicotine and addictiveness

In this aspect, several false beliefs can be identified.

With regard to the amount of nicotine, shisha is thought to be nicotine-free (25, 26) or to contain less nicotine than tobacco (26, 28).

With respect to addiction, there are false beliefs such as that smoking shisha is not addictive (17, 20, 25, 26) or that it is less addictive than tobacco (24, 28). Up to 21.99% of students surveyed in Turkey in 2014 agreed with the statement that addiction to nicotine does not exist (25), up to 58% of smokers surveyed in South Africa said that it is not as addictive as tobacco (28), and up to 31.5% of teenagers surveyed in Turkey in 2015 thought that it is not addictive, while 16% had no information in that respect (26). It is even believed that smokers do not become more addicted the more they smoke or that they can easily quit smoking (as stated by 53% of respondents in South Africa) (28).

3.3. Smoke content

It is thought that shisha smoke does not contain any hazardous chemicals (20, 28), that the exposure of non-smokers to shisha smoke does not cause respiratory tract diseases (26), and that water filters out tobacco toxins (22, 25, 26, 28). This last aspect is particularly remarkable as 25.33% of university students surveyed in Turkey in 2014 (25) and 33.2% of those surveyed in South-East London (22) believed it to be true.

3.4. Fruity flavor or aroma

Several studies identified the false belief that smoking shisha with a fruity flavor or aroma is healthier than smoking simple shisha (22, 25, 26) or even that this way of smoking is not addictive (26). 29.5% of participants in South East London said that smoking shisha is healthier than smoking cigarettes because it contains fruit (22).

3.5. Other beliefs

Other misconceptions can be identified, such as that smoking shisha helps to relax (up to 53% of smokers surveyed in South Africa claimed this) or stay slim (28). With regard to women, in the study conducted in Iran it is emphasized that it is nowadays less taboo for women to smoke shisha in public, but that does not mean that the taboo no longer exists (29).

As previously discussed in the Material and Methods section, the selected studies may be affected by a selection bias and a voluntary response bias.

Some studies do not specify whether participants are smokers or not and are conducted only in places where shisha is used. In addition, the study populations of the different studies vary considerably regarding the prevalence of shisha use as well as socially and culturally. Consequently, it is difficult to extrapolate these beliefs to young people more generally.

4. Discussion

4.1. Main findings

The literature review of this topic yields results of great interest. It should be noted that there exist a large number of false beliefs (more than 20) about shisha use among young adults, which may be grouped into specific categories (Figure 2): health harm, amount of nicotine and addictiveness, smoke content, fruity flavor or aroma, and other beliefs.

In addition, this review has identified a series of false beliefs that are frequently asked in questionnaires. Five of them could be highlighted: smoking shisha is not harmful to health, smoking shisha is less harmful than smoking cigarettes, smoking shisha is less addictive than smoking cigarettes, fruit-flavored shisha is healthier than simple shisha, and water filters out tobacco toxins. It is also important to stress that the issues identified as more confusing for young adults are (according to rates previously analyzed in the study samples): smoking helps people relax, the harmful effects of shisha use are over-estimated, , shisha use is less harmful than smoking cigarettes because it does not cause cancer, shisha use cannot cause addiction or is less addictive than smoking cigarettes, it is easy to stop smoking shisha, and water filters out tobacco toxins. Certain false beliefs were even proven to be statistically associated with shisha use: traditional shisha does not contain tobacco (Odds ratio [OR]: 0.73), it is not addictive (OR:1.63), its harmful effects have not been proven (OR: 0.59), water filters out tobacco toxins (OR: 2.24), and it is unknown whether shisha use can cause cancer (OR: 1.15) (22). Finally, further studies which include false beliefs about shisha use in different populations are required to increase the external validity of similar reviews.

4.2. Limitations

This review has some limitations. The most significant limitation was the use of a very restrictive search string to avoid the inclusion of a wide range of articles which did not meet the selection criteria. The inclusion of terms such as "false" reduced the number of articles initially included. Another limitation was that authors did not carry out a backward reference search of selected results.

The fact that articles included samples of considerably heterogeneous populations further hindered our work. The review includes articles with samples from Saudi Arabia, USA, and Turkey (among others), with quite diverse social and cultural backgrounds. Shisha use is more common in certain cultures, such as Middle East countries, and thus patterns of use are different. Nonetheless, the false beliefs identified in the studies were homogeneous. Therefore, it should be noted that these beliefs are shared in different social and cultural contexts.

4.3. Implications for future research, policy, and practice

The findings of this review suggest that the general public does not have accurate information about shisha use and its health implications, since there is a casual use of it.

This casual use could be explained by the social nature of shisha use. In Spain, shisha is mostly use in a fun environment among young adults, who are most frequently friends. Shisha use is thus seen as a communal activity which makes it difficult for individuals to stop, as they could be excluded or stigmatized. This can be seen in one of the selected studies (29) in which a young smoker claimed that in order to stop smoking shisha, he would first have to stop seeing his friends. In countries like Iran, where shisha use is a deep-rooted tradition and where its use is more homogeneous among certain age groups, it can be seen that culture is a very influential factor. In one study (29) a citizen of this country claimed that the use of shisha does not have any negative health effects as it has been smoked for generations and nothing has happened to smokers.

One of the most influential factors in the casual use of shisha is the low perception of risk. In most studies a large number of the respondents believed that smoking shisha is less harmful than smoking cigarettes or that shisha use does pose aa risk of suffering from cardiovascular diseases.

The use of fruit-flavored tobacco promotes this perception, being a very common statement in the studies analyzed. However, there is ample evidence that contradicts these data, equating shisha use to that of tobacco (4), but that scientific information is not available for the general public. Therefore, another possible reason for this casual use and for these widespread false beliefs may be the lack of accurate information that can be accessed by young people, either in educational institutions or in society. It is therefore necessary to provide information on new products and forms of tobacco use as these are constantly evolving, the trends changing rapidly. Health promotion actions are needed to provide the

population with this information and to lower the risk of future cardiorespiratory problems derived from the use of these products.

Although part of the study population knew about the harmful effects of shisha use, they did not know how to successfully quit. One of the solutions that could be proposed are 'peer education' (in which people who teach the young adults typically share with them certain characteristics, such as being of a similar age or having smoked in the past). This educational method has been proven to be more effective in reducing tobacco consumption than the normative education. Another alternative solution could be to practice sports (30).

It would also be useful to include some actions in medical practice to collect data and educate on this matter, since even some health professionals hold false beliefs about shisha use (31). A useful example of these actions could be collecting data about certain products, i.e. smokeless tobacco or shisha, as people usually think their health implications are different or are not particularly concerning. Tobacco smokers, who are more likely to smoke shisha, could be given information about the deleterious effects of shisha, in order to prevent its recreational use.

Finally, governments should take a more belligerent stance to tackle this public health problem, for example, approving legislation that protects the population from these alternative tobacco products. In Spain, there is an anti-smoking law which dictates that citizens under 18 years old are not allowed to smoke, including shisha tobacco (33). Nonetheless, as proved in the analyzed surveys, there is a lack of awareness and information among young people about the risks posed by alternatives to tobacco. Hence, anti-smoking campaigns aimed at young people need to include information about these other products since their use may subsequently initiate in the use of tobacco. This is essential since young people are especially vulnerable (33), being the initiation window for shisha uses between 12 and 24 years old (19).

5. Conclusions

This systematic review identified a large number of misconceptions among young people about shisha use. This evinces the lack of information regarding its use and health effects in this age group. Despite social and cultural differences, and differences in use in the populations studied in this review, similar misconceptions exist in all of them. In Spain, it is very common to use shisha in cafeterias or pubs and shisha is even included for free sometimes with the purchase of a certain number of drinks. This proves how the permissiveness of the health policy applied, which should change for the good of young people. The already existing legal measures should be applied and educational measures should be taken in order to provide young people with truthful information on the harmful effects of shisha use. The main objective should be preventing them from taking a smoking habit through new, fashionable forms of consumption. Nonetheless, further studies are necessary in order to assess these false beliefs in a greater number of countries, and to make the population studied more homogeneous. This would also provide more evidence for similar reviews.

To conclude, among the limitations of this systematic review are the restrictive character of the search string, the fact that no backward reference searching was performed, and heterogeneous character of the study population of the selected articles.

Statements

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Ethical concerns

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Conflicts of interest

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Annex I: Tables

First author and year	Sample	Place	False beliefs	Method
Roman, 2013 (28)	389 university students. 250 (64%) women and 139 (36%) men. Average of 22.2 years (Standard deviation [SD] 5.04)	Western Cape, South Africa	- Shisha smoking helps you relax - Smoking shisha helps you stay thin - Smoking shisha provides less nicotine than cigarettes. - Smoking shisha is less addictive than smoking cigarettes. - An occasional cigarette is more harmful than smoking shisha -The danger of smoking shisha is exaggerated - Sharing the shisha is not harmful to the individual's health - Shisha smokers don't get more addicted the more they smoke - Each shisha inhalation has no effect on the body - Shisha smokers can easily quit - The inhaled shisha smoke does not contain harmful chemicals - Toxins from tobacco are filtered out of the shisha water	Survey
Sutfin, 2019 (20)	16-25 years old. -Phone survey: 896 -Focal group: 38 -Online survey: 1636	North Carolina, USA	- No harmful chemicals are inhaled - Smoking shisha is not harmful to health - It is not addictive	Phone survey, focus group and online survey
Abdulrashid, 2018 (24)	332 women. Average of 32.5 years (SD 11.9)	10 cafeterias in Jeddah, Saudi Arabia	Shisha is less harmful and less addictive than tobacco.	Survey, focus group and qualitative interview
Alvur, 2014 (25)	1255 university students. 864 women (68.8%) and 391 men (31.2%). Average of 20.8 years (SD 2.29)	Sakarya University, Turkey	- Shisha is not harmful because its smoke does not burn the lungs. - Carcinogenic chemicals in the smoke are filtered out of the water. - Shisha does not contain nicotine. - Fruit-flavored shisha is healthier than simple shisha. - Shisha smoking is not addictive.	Survey

Aljarrah, 2009 (27)	235 participants. 57% men and 43% women	Restaurants, pubs and cafeterias in San Diego, California, USA	Most shisha smokers (58.3%) think shisha is less harmful than tobacco. There are no gender differences. Asians often do not share this belief. .	Survey
Cinar, 2015 (26)	877 students. 467 women and 410 men. All under 30 years	Ankara University, Turkey	- Significant gender differences - Shisha smoking does not seriously harm the lungs. - Carcinogenic substances are filtered out of the water - Shisha smoking cannot cause eczema - Shisha smoking does not increase cardiovascular risk - Non-smoking exposure to shisha smoke does not cause respiratory tract diseases - Oral infections cannot develop in shisha smokers - Fruit-flavored shisha is not addictive - Quitting shisha does not improve health - Shisha tobacco does not contain nicotine - Shisha smoking is not addictive - Diseases such as colds cannot not be transmitted through the sharing of the mouthpiece - Fruity flavor or aroma shisha with is healthier - Shisha is less harmful than cigarettes in terms of nicotine content - The mouthpiece should be shared	Survey
Azodi, 2017 (29)	12 young people between 11 and 35 years old	Bushehr, Irán	- Shisha smoking is less harmful than cigarette smoking -It is a taboo for women to smoke shisha in public	Open and semi-structured interview
Jawad, 2016 (22)	1176 participants. 658 (56.0%) men and 518 (44.1%) women. 490 (41.6%) aged between 18 and 35	South East London	- Traditional shisha does not contain tobacco - All forms of shisha contain tobacco - Shisha is not addictive - Not all forms of shisha are harmful to health - It is legal to smoke shisha inside cafeterias or in public places - It is legal to sell shisha containing tobacco to minors under 18 - Shisha smoke is filtered out of the water - Shisha is safer than cigarettes because it contains fruit	Survey

			- Shisha is healthier than cigarettes because it does not cause cardiovascular disease - Shisha is healthier than cigarettes because it does not cause cancer.	
Mays, 2017 (17)	44 young people. 23 women and 21 men. 25.3 average age (SD 2.7)	USA	Shisha smoking is not addictive	Survey

Table 1. Summary table with a brief description of sample characteristics, place where the study was carried out, false beliefs observed and type of study carried out.

Annex II: Figures

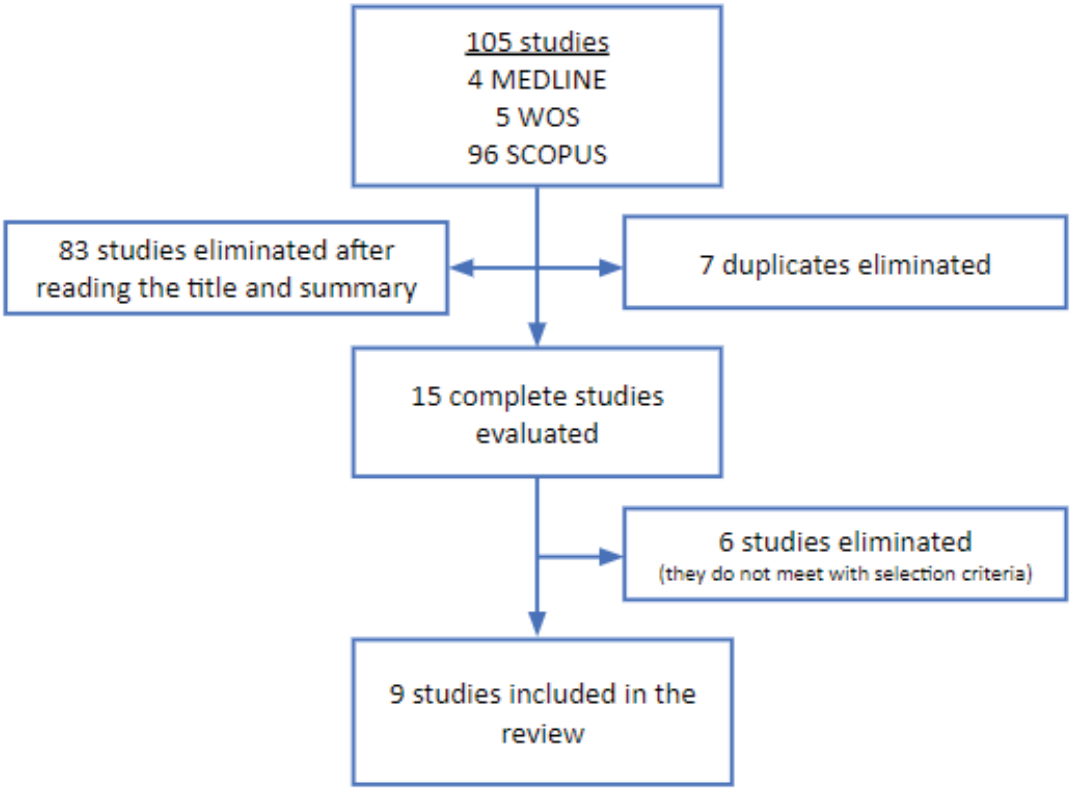

Figure 1. Flow diagram describing the process of searching and selecting the articles included in the systematic review.

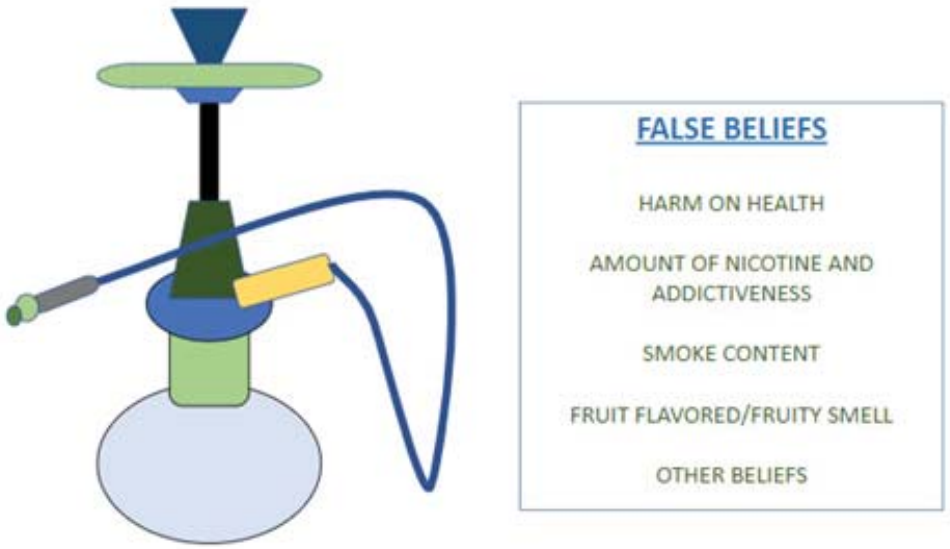

Figure 2. Diagram of the five categories in which the false beliefs described in the review are grouped.