

# Smokeless Tobacco Use in Iran: A Systematic Review

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## Review Article

### Abstract

**Background:** Smokeless tobacco (ST) use is one of the most important public health problems in Southeast Asia. The use of these substances increases the incidence of some cancers and other diseases. The purpose of this review study was to investigate on ST use in Iran.

**Methods:** A literature search was conducted on PubMed, Google Scholar, and three national databases [Scientific Information Database (SID), IranMedex, and IranDoc] based on the standard search strategy.

**Findings:** Most consumer people lived in Sistan and Baluchestan Province (Zahedan and Chabahar Cities) and Golestan Province, Iran. ST use rates ranged from 11.0% to 45.7% among college students in Sistan and Baluchestan (Zahedan and Chabahar) and Golestan. There are various types of ST consumed in Iran that have been mentioned in various articles, including Pan, Gutka, Nass, Naswar, Biti, and Supari.

**Conclusion:** Most studies on ST have been conducted in Sistan and Baluchestan and Golestan Provinces and we need more research for other provinces. Consumption by women is a warning and a threat to women's health in the future. Further studies will be needed to find out more precisely the prevalence of consumption in Iran.

**Keywords:** Tobacco use cessation; Systematic review; Iran

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## Introduction

Smokeless tobacco (ST) is consumed in various types and forms of industrial and traditional use in most South-East Asia Region (SEAR) countries. South-East Asia has 90 percent of global consumers, with more than 250 million users living in the area.<sup>1</sup> Various forms of ST products are used in different parts of the region.<sup>2</sup> According to the literature, the prevalence of ST use varied from 1.1% to 51.4% in men in SEAR, while it varied from 1.9% to 27.9% among women in SEAR. The Global Adult Tobacco Survey (GATS) in India revealed that more than one third (35.0%) of adults in India used a type of tobacco. Among them, 21.0% of adults used ST only. The rate of ST use among Indian men was 33.0% and in Indian women was 18.0%.<sup>1</sup> ST is more prevalent in less educated groups and low socio-economic groups in Bangladesh<sup>3</sup> and Thailand,<sup>4</sup> as well as in Nepal<sup>5</sup> and India.<sup>6</sup> Nearly ST is high in most countries in the Southeast Asia, such as Bangladesh, India, Myanmar, Nepal, and Sri Lanka.<sup>7</sup> Although smokeless products are used throughout the world and in 121 countries, more than 80.0% of users are living in SEAR countries.<sup>8</sup>

Southeast Asian immigrants in the United Kingdom (UK), South and East Africa, and the Malay Peninsula use Pan and Gutka products. It has also been seen among immigrants from Southeast Asia in parts of Europe and Australia.<sup>8,9</sup> On the other hand, the population of immigrants in Southeast Asia is growing rapidly in the United States (US). Since Pan and Gutka are not forbidden in the US, in the past two decades, the tobacco industry in India has introduced new markets for Gutka and Pan in the US.<sup>8,10</sup> In Bombay, India, from 99595 adults over 35 years old, 32.0% reported using ST (chewable).<sup>8,11</sup> Scientific evidence suggests that the use of ST products is associated with oral cancer, nicotine addiction, oral pain, cardiovascular disease (CVD), high blood pressure, diabetes, decreased bone density, and problems during pregnancy, delivery, and after delivery.<sup>1,12,13</sup> Also, in some studies, other chemical elements in Pan and Gutka have been analyzed and the presence of excessive arsenic in the non-smoked tobacco has been confirmed. Increasing the number of exposure times to these substances will be more harmful. On the other hand, the mean arsenic concentration available was observed at a

concentration of 0.25 mg/g, which is much higher than the permitted standard level of 0.01 mg/g.<sup>10</sup> Other studies have also shown that the copper element in Pan and Gutka is excessive, harmful, and non-standard.<sup>14,15</sup>

A study in India showed that the presence of nicotine was confirmed by the famous Pan Masala brands that claimed to be 100% non-tobacco. Even the Central Tobacco Research Institute in India gained a brand called "Pan masala with a no-tobacco claim" with the highest levels of nicotine.<sup>16,17</sup> ST as one of the main factors for the increase in oral cancer in the SEAR contains about 90.0% of the global burden of tobacco smoke, in Southeast Asia, with around 100 million users in India and Pakistan.<sup>18,19</sup>

Because one of the most important risk factors for oral and lip cancer and oral cavities<sup>8</sup> also main risk factors for head and neck cancer is in Pakistan<sup>20,21</sup> and the presence of fascinating and flavoring packaging for these products which seduces young people to use them.<sup>22</sup> On the other hand, epidemiological studies have reported a high prevalence of neck and head cancer in south-eastern Iran.<sup>21</sup> Since access to information on all aspects of ST in Iran is not available due to the lack of specific statistics in this context and also since there is a lack of qualitative research and monographic or ethnographic studies in this field,<sup>23,24</sup> our research question in this review is to understand the status of ST, type of consumption, and any epidemiological information about it in Iran. The purpose of our review was to determine the situation of ST use in Iran.

## Methods

**Search strategy:** This study was a systematic review that extracted the findings of studies on the ST use in Iran, including articles published in domestic and international journals and searching in PubMed, Google Scholar, and three national databases [Scientific Information Database (SID), IranMedex, and IranDoc] on 12 December 2019.

These databases were searched using the following keywords: Smokeless Tobacco OR Oral Tobacco OR Snus OR Gutkha OR Naswar OR Chew\* Tobacco OR Tobacco Powder OR Tobacco Tooth Powder OR Gutkha OR Mawa OR Khaini OR Snuff OR Pan Masala OR Pan Masala with Tobacco OR Pan OR Pan with Tobacco OR Zarda OR Tambaku OR Betel Quid Tobacco OR Betel

Tobacco OR Tobacco Leaf OR Gnudi OR Kadapa OR Mainpuri Tobacco OR Qiwam OR Kimam OR Dohra OR Raw Tobacco AND Oral Cancer OR Oral Carcinoma\* OR Oral Malignant\* OR Oral Tumour OR Oral Growth AND Iran[tiab] AND "last 10 years"[PDat]. Search on Google Scholar was done based on the following keywords: "Smokeless Tobacco", "Oral Tobacco", "Pan and Gutkha", and "Naswar".

**Evaluation of articles:** First, all the articles were collected using the selected keywords and a list of abstracts was prepared after completion of the search. After hiding the profile of the articles, including the name of the journal and the author's name, the full text of the articles was available to the reviewers. Each article was read by two reviewers independently. If the article had been excluded, the reason for the exclusion would have been mentioned, and in case of disagreement between the two reviewers, the article was judged by the third reviewer and his opinion was considered. Persian and English articles derived from descriptive and cross-sectional articles, interventional articles, and prospective studies had inclusion criteria.

## Results

**Search output:** Collected papers by two researchers were examined and isolated finally on the base of the PRISMA flow chart (Figure 1) for finding qualification articles, and the final 12 papers found were deserving of our review work.

After the final review, we were able to isolate 12 final papers for this review (Table 1). Of these,

five were articles of the cross-sectional study, two articles of intervention before and after, one article comparing consumption and non-use of samples, three prospective study papers, and one was World Health Organization (WHO) report.

## Discussion

The purpose of this review study was to investigate on ST use in Iran. Most studies on ST have only been carried out in a small number of areas.

The results of our review showed that ST was used in Sistan and Baluchestan Province (Zahedan and Chabahar Cities) and Golestan Province, Iran, and most studies conducted in Iran about ST were done on students at the age of secondary school<sup>25</sup> and high school.

Some studies found that women were also part of the consumers. Consumption is hidden among most women. We still do not know how many female consumers there are. This is an alarm for women's health.<sup>23,24</sup> In this context, our study is consistent with a large number of studies from other countries such as Nepal, Bangladesh, Maldives, Myanmar, Sri Lanka, and Thailand.<sup>27-30</sup> ST use rates range from 11.0% to 45.7% among college students in Sistan and Baluchestan Province (Zahedan and Chabahar Cities) and Golestan Province.<sup>24-26,30-33</sup> The findings from this study make several contributions to the current literature. First, in this article, we reported for the first time the types of ST. They include Pan, Gutka, Nass, Naswar, Biti, and Supari. There are different types of smokeless products available in the country.

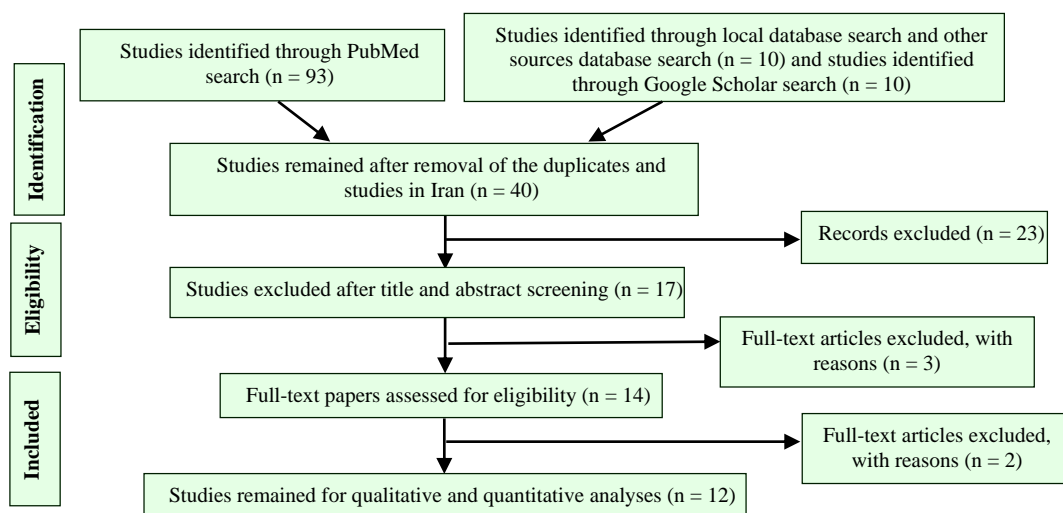


Figure 1. Study selection based on PRISMA flow chart

**Table 1.** Articles and specifications (n = 12)

Author	Type of publication	Language	Location	Type of intervention	Type of outcome	Type of study	Population of study
Pourshams et al. <sup>34</sup>	Original article	English	Iran	-	About 50.0% of men and 85.0% of women had no formal education. The highest attained educational level was lower in older subjects and among women, compared with younger subjects and men, respectively. The GCS confirms previous findings of a low prevalence of tobacco smoking, Nass (a kind of ST) chewing, and alcohol drinking in this population, particularly among women. <sup>4,11</sup> Among men, 60.0% had never smoked tobacco, and 83.0% and 92.0% had never used Nass or alcohol, respectively. Among women, the rates of tobacco smoking and consumption of Nass and alcohol were negligible. 22.0% of men and 7.0% of women were current opium users.	GCS	The study population is a sample of the Golestan population, aged 40-75 years. The primary goal was to establish a cohort of 50000 healthy individuals.
WHO report <sup>35</sup>	Report	English	Iran	-	Youth: Global Youth Tobacco Survey, 2007, national, age: 13-15 years Adults: No known data on smokeless use among adults	-	Youth: Global Youth Tobacco Survey, 2007, national, age: 13-15 years
Jalilvand et al. <sup>36</sup>	Original article	English	Iran	-	Thirty-nine (11.0%) students were lifetime users of ST among which, nineteen (5.4%) were occasional users, seven (2.0%) were current users, and thirteen (3.6%) fulfilled the criterion for established users. Pan was the most commonly used form of ST followed by Nass. On univariate analysis, lifetime use of ST showed significant associations with the use of cigarettes, student gender (male > female), individual condition (native > guest), and kind of the college (engineering > psychology).	Cross-sectional	A total of 354 students (15-30-year old) in five colleges
Farhadmollahahi <sup>26</sup>	Original article	English	Iran	-	The mean activity of SOD was significantly higher in the Pan consumer group ( $4.40 \pm 1.60$ u/mg) compared to non-consumers ( $3.59 \pm 1.80$ u/mg, $P = 0.027$ ).	Compared in the saliva of Pan consumers and non-consumers	Unstimulated saliva of 87 subjects (47 Pan consumers and 40 non-consumers)
Honarmand et al. <sup>31</sup>	Original article	English	Iran	-	At the time of conducting this study, 102 students (23.7%) had already consumed ST and 49 students (11.4%) were current users (consuming at least once in 30 days before the study). There was a significant relationship between history of ST consumption, university/college, place of living, mean GPA, and mother's education level ( $P < 0.050$ ). Also, there was a significant association between knowledge and prevalence of ST use ( $P < 0.001$ )	Cross-sectional	431 students

**Table 1.** Articles and specifications (n = 12) (continue)

Author	Type of publication	Language	Location	Type of intervention	Type of outcome	Type of study	Population of study
Etemadi et al. <sup>32</sup>	Original article	English	Iran	-	7.5% of participants reported chewing tobacco (Nass) and 1.1% reported smoking waterpipe, and these figures declined in the later birth cohorts. During a median follow-up of 8 years, 4524 deaths occurred (mean age: 64.8 ± 9.9 years). Current (HR = 1.44, 95% CI: 1.28-1.61) and former (HR = 1.35, 95% CI: 1.16-1.56) cigarette smokers had higher overall mortality relative to never tobacco users. The highest cigarette-associated risk was for cancer death among current heavy smokers (HR = 2.32, 95% CI: 1.66-3.24). Current Nass chewing was associated with overall mortality (HR = 1.16, 95% CI: 1.01-1.34), and there was a 61% higher risk of cancer death in people chewing Nass more than five times a day. We observed an association between the cumulative lifetime waterpipe use (waterpipe use ≥ 28 years) and both overall (HR = 1.66, 95% CI: 1.11-2.47) and cancer mortality (HR = 2.82, 95% CI: 1.30-6.11).	GCS	The study includes 50045 adults (aged 40-75 years) from north eastern Iran
Islami et al. <sup>37</sup>	Original article	English	Iran	-	A total of 3051 (6.1%) participants reported a history of HD, and 525 (1.1%) and 3726 (7.5%) reported ever waterpipe or Nass use, respectively. Heavy waterpipe smoking was significantly associated with HD prevalence (highest level of cumulative use vs. never use: OR = 3.75, 95% CI: 1.52-9.22, P for trend = 0.040). This association persisted when using different cut-off points and when restricting HD to those taking nitrate compound medications, and among never cigarette smokers. There was no significant association between Nass use and HD prevalence (highest category of use vs. never use: OR = 0.91, 95% CI: 0.69-1.20).	GCS	50045 residents of Golestan Province (40-75 years old, 42.4% men)
Rakhshani et al. <sup>38</sup>	Original article	English	Iran	-	The mean age of participants was 16.2 ± 1.1 years. While 10.4% of the students were current users of Pan, 17.9% were ex-users. Mean duration of using Pan was 2.5 ± 1.6 years. Number of daily Pan consumption was 4.2 ± 3.6 per day. Cigar was the most common substance used at least once by pupils (18.6%) followed by Pan (17.9%), Naas (11.5%), and other illicit drugs. Only 64.7% of our pupils did not use any illicit drug at the time of study. Risk of Pan use among students who had a history of taking any other substances was 18-fold more than others. In the case of each attitude, score accretion and risk of Pan consumption declined up to 16.0%.	Cross-sectional	This study was done on 504 high school pupils of Zahedan City, Capital of Sistan and Baluchestan Province, southeastern Iran

**Table 1.** Articles and specifications (n = 12) (continue)

Author	Type of publication	Language	Location	Type of intervention	Type of outcome	Type of study	Population of study
Bakhshani et al. <sup>39</sup>	Original article	Persian	Iran	-	The incidences of first experience of waterpipe smoking (hookah), chewing tobacco (Nass), tramadol, drugs, and alcohol were 21.5%, 6.1%, 4.7%, 4.2%, and 7.2%, respectively. The results of the incidence in total also showed that 3.5% of the students started smoking in 2010. In addition, lifetime experience and annual incidence of these behaviors was 2-5 times more likely among adolescents with a family member or a friend who uses substances, compared with those without a history of substance use. Furthermore, such behaviors were 2-3 times higher in adolescents with abnormal general health compared with the normal ones.	Cross-sectional	A total of 1000 randomly-selected male and female high school students
Farhad Molasha hi et al. <sup>33</sup>	Original article	Persian	Iran		In whole, 58 students (19.9%) were current users and 29.9% had used Pan during their life time. Pan consumption showed significant relationship with parents' educational level, educational statue of students, family size, the number of cigarette smokers in the family, and ethnicity ( $P < 0.050$ ), while it had no significant relationship with age.	Cross-sectional	292 high school boys
Fattahi et al. <sup>40</sup>	Original article	Persian	Iran	Before and after intervention	After educational intervention, mean scores of knowledge, attitude, affective belief, and behavior in reducing Pan consumption increased significantly in experimental group but not in control group.		In this study, 105 young adolescents were selected through random selection and divided in two groups.
Mirbaloc hzehi et al. <sup>41</sup>	Original article	Persian	Iran	Before and after intervention	Results showed that the educations based on Precede-Proceed model significantly increased mean scores of model structures in intervention compared to control group. Additionally self-efficacy, knowledge, and attitudes were shown as predictive factors of behavior.	Quasi-experimental study	This study was conducted on 200 randomly selected junior high school students in the suburb of Zahedan

ST: Smokeless tobacco; SOD: Superoxide dismutase; GPA: Grade point average; HR: Hazard ratio; CI: Confidence interval; GCS: Golestan Cohort Study; OR: Odds ratio; HD: Heart disease



These findings enhance our understanding of a variety of ST such as Nass, Pan, Supari, etc.<sup>25,26</sup> Also in a number of studies, there is a mention of the disadvantages of ST.<sup>26,42</sup> In some studies, consumer opinions have also been said that they believed that it was harmless for them.<sup>32,43</sup> Some consumers used it to eliminate bad smells and parasitic infections as anti-parasite to teeth and catarctic.<sup>25</sup>

Most studies have indicated that the use of ST types is part of the native culture of any region. Easy access to ST in some markets in Sistan and Baluchestan Province and Chabahar City can be a major cause of increased consumption for teens and people.<sup>25,26</sup> On the other hand, most studies have suggested further studies and educational and behavioural interventions.<sup>22,40,41,44</sup> The results of other studies in Iran have shown that oral tissue damage is due to the use of this substance.<sup>42,43</sup>

In 2017, WHO reported that the rate of ST use in Iran was 5.4% in young men, 4.8% in young women, and 5.1% in total. The report does not provide information on the use of ST in adults.<sup>35</sup> On the other hand, in some other studies, the necessity of conducting qualitative research such as monography and ethnography has been emphasized for proper research and appropriate interventions.<sup>23,40</sup> Another study conducted at the University of Zahedan highlighted the high prevalence of consumption among female students and the need for prevention programs in this area has been approved.<sup>44</sup> Also, there was a significant relationship between knowledge and attitude of female students about smoking and ST use. In other words, students with poor awareness and attitude reported more consumption. Media education and formal and informal educational interventions are necessary in this regard.<sup>31,45</sup>

In a prospective study conducted among 50000 Iranians aged 40-75 years in Golestan Province, in the period between 2004 and 2008, a questionnaire on the use of cigarettes, chewable Nass, and waterpipe was used for the follow-up of 8 years; 4524 deaths occurred at an average age of  $64.8 \pm 9.9$  years.<sup>32</sup> A case study on a 15-year-old teenager in Chabahar showed that he had oral submucous fibrosis due to regular use of Supari.<sup>43</sup>

On the other hand, due to the proximity of Iran to countries producing ST, illegal entry of these products into luxury packages and presentation at the market level and some food stores, as well as lack of awareness of many students about the

nature of the complications of these materials, still we see an increase in their use.<sup>33</sup> In a study conducted among 292 high school students in Zahedan with an average age of 16.75 years and a total of 19.9% history of use, thirty days before the current user, 58% and 29% had a lifetime user experience, used Paan to freshen the mouth, 4.3% used it to invigorate, and 3.1% used it to relieve pain. 3.1% used it to relieve toothache.<sup>33</sup> In another study in the city of Chabahar, 105 12-14-year-old students underwent secondary education; 24.8% (26 people) reported at least one or two times use in the past three months; also knowledge, attitude, and emotional beliefs of the students were very low before the intervention.<sup>40</sup> In addition, in another study, 200 high school students aged 14 to 17 years in Zahedan suburbs were studied. In this study, after the educational intervention, knowledge, attitude, and self-efficacy of students were increased.<sup>41</sup> Focus group discussion (FGD) on 78 students showed the causes of panic use: feelings of agility, poor peers, feeling of magnanimity, relaxation and fun, family problems, addiction of parents, pleasure, low price of these materials, and lack of family control.<sup>46</sup> In another study on 1000 male and female high school students in Zahedan, the percentage of use of chewing tobacco (Nass) was 6.1%. In this study, consumption of waterpipe smoking (hookah) was reported to be 21.5%.<sup>39</sup> According to the WHO, the use of ST among Iranian youth was 5.1%, of which 5.4% were men and 4.8% were women, and there was no adult reporting.<sup>35</sup>

## Conclusion

Most studies on ST in Iran have been conducted in Sistan and Baluchestan and Golestan Provinces and we need more research for other provinces. Consumption by women is a warning and a threat to women's health in the future. Further studies will be needed to find out more precisely the prevalence of consumption in Iran. Non-homogeneity in the type of article was a limitation of this work. In this review, we conducted a comprehensive review and thus, the homogeneity of the study is low. There are various types of ST consumed in Iran that have been mentioned in various articles, including Pan, Gutka, Nass, Naswar, Biti, and Supari. There are also various brands of ST produced in India and found in markets of Chabahar and Zahedan. Considering

that many of the studies we have reviewed were conducted in places like educational centres such as schools and universities, we suggest that similar studies be conducted between people and adults in non-educational places. The interpretation of the findings showed that education and prevention could reduce the likelihood of the incidence in other provinces in the country. Further studies will be needed to find out more precisely the prevalence of consumption in these provinces.

### Conflict of Interests

The Authors have no conflict of interest.

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### Authors' Contribution

Contributed to the design: EF and MS; Statistical analysis, participated in most of the study steps: HB and PK; Prepared the manuscript: EF and MM and HB; Assisted in designing the study, and helped in the, interpretation of the study: SR and MM. All authors have read and approved the content of the manuscript.



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## مصرف تنباکوی بدون دود در ایران: یک مرور سیستماتیک

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### مقاله مروری

### چکیده

**مقدمه:** مصرف تنباکوی بدون دود، یکی از مهم‌ترین مشکلات سلامت عمومی در جنوب شرقی آسیا محسوب می‌شود. مصرف این مواد، میزان شیوع سرطان‌ها و بیماری‌های دیگر را افزایش داده است. هدف از انجام پژوهش حاضر، بررسی مطالعات صورت گرفته در زمینه مصرف تنباکوی بدون دود در ایران بود.

**روش‌ها:** بررسی مروری در پایگاه‌های علمی Google Scholar و PubMed و سه پایگاه داده ملی Scientific Information Database (SID)، IranMedex و IranDoc بر اساس استراتژی جستجوی استاندارد انجام گرفت.

**یافته‌ها:** بیشتر افراد مصرف‌کننده در سیستان و بلوچستان (زاهدان)، چابهار و گلستان (شمال ایران) زندگی می‌کردند. میزان مصرف تنباکوی بدون دود در بین دانش‌آموزان مدارس سیستان و بلوچستان (زاهدان)، چابهار و گلستان (شمال ایران) از تا ۴۵/۷ درصد متغیر بود. انواع مختلفی از تنباکوی بدون دود در ایران مصرف می‌شود که در تحقیقات گوناگون به آن اشاره شده است که شامل پان، گوتکا، ناس، نسوار، بی تی و سوپاری می‌باشد.

**نتیجه‌گیری:** بیشتر مطالعات مربوط به تنباکوی بدون دود در ایران در استان‌های سیستان و بلوچستان و گلستان انجام شده است و تحقیقات بیشتری در دیگر استان‌ها مورد نیاز می‌باشد. مصرف توسط زنان یک هشدار قلمداد می‌گردد که تهدیدی برای سلامت زنان در آینده است. به منظور پی بردن دقیق‌تر به شیوع مصرف تنباکوی بدون دود در ایران، انجام پژوهش‌های بیشتری لازم خواهد بود.

**واژگان کلیدی:** ترک مصرف تنباکو؛ مرور سیستماتیک؛ ایران

**ارجاع:** صلحی مهناز، فتاحی اسماعیل، براتی حدیث، محمدی مسعود، کسمایی پریسا، رستاقی صدیقه. مصرف تنباکوی بدون دود در ایران: یک مرور سیستماتیک. مجله اعتیاد و سلامت ۱۳۹۹؛ ۱۲ (۳): ۲۲۵-۳۴.

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