

Waterpipe Tobacco Smoking Prevalence and Associated Factors in the Southeast of Iran

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Original Article

Abstract

Background: Waterpipe smoking is a growing public health threat worldwide. The aim of this study was to assess waterpipe smoking prevalence and its associated factors among Iranian adults.

Methods: This cross-sectional study was conducted in Kerman, Iran, recruiting 1090 adult participants using multistage sampling in 2016. A self-reported researcher-designed questionnaire was used. The socio-demographic characteristics and waterpipe smoking behaviors such as pattern, duration, and the most common place of waterpipe use, the type of tobacco, and the concurrent use of alcohol and substances were assessed. Data analyses were performed using chi-square, independent t-test, and multiple logistic regression.

Findings: The prevalence of ever, current and daily waterpipe smoking were 43.8%, 28.8%, and 7.2%, respectively. Men initiated to use waterpipe in more early ages than women ($P < 0.001$). Café or restaurant (34.4%) and friends' house (36.8%) were the most frequent places for waterpipe using by men and women, respectively. Men used waterpipe 2.8 times more frequently than women. Waterpipe smoking was 4.9 times more likely in the 18-24 years age range compared to the 45 years or older. Waterpipe use was 2.4 times greater in the unemployed than in housewives. People with a university education were 1.4 and 1.7 times more likely to use waterpipe compared to people with high school diploma and illiterates, respectively.

Conclusion: The present study revealed that men, high level of education, younger age and unemployment were associated with waterpipe smoking. Therefore, we need to design and implement more effective interventions, especially for vulnerable target groups.

Keywords: Waterpipe smoking; Prevalence; Risk factors; Behavior

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Introduction

Tobacco smoking is the greatest preventable cause of death and the most important health problem in the world. According to the World Health Organization (WHO) report, in 2005, more than 5 million death of tobacco-related complications occurred worldwide. It is estimated that this figure will reach about 8 million in 2030 more than 80% of which will occur in low and middle-income countries.¹

The waterpipe, also known as hookah, shisha, arghile, narghile, hubble-bubble, qalyan is a traditional method of tobacco smoking which is common in the Middle East and Arabic countries that have recently spread in North America and other western countries. In this method of tobacco use, the tobacco smoke passes through water before inhalation.^{2,3}

A typical session of waterpipe smoking for 45 minutes, the peak plasma nicotine concentration is equal to 6 minutes of cigarette smoking and the peak carboxyhemoglobin (COHb) concentration in waterpipe smokers is significantly more than cigarette smokers.⁴ A session of waterpipe smoking for 1 hour is equal to 2-10 cigarettes from the aspect of toxic and carcinogenic emitting particles in the ambient.⁵ Also, waterpipe tobacco (known as Moassel) contains high amounts of carcinogen heavy metals that only 35% of them remain in the ash and around 65% of them enter the human body through the smoke.⁶

Recent evidence indicates that waterpipe smoking is associated with a significantly increased risk of lung cancer, chronic respiratory disease, low birth-weight, periodontal disease, and cardiovascular diseases.⁷⁻⁹ In addition, there is the potential risk of transmission of infectious diseases especially tuberculosis and bacterial infections due to the common use of the waterpipe mouthpiece.¹⁰

Despite harmful effects and high potential of addiction, the waterpipe smoking prevalence has recently increased worldwide, especially in the Middle East. One of the main reasons for this matter is the belief that waterpipe smoking is less harmful than cigarette smoking.¹¹ The global pattern of tobacco use has changed in recent years so that cigarette smoking has decreased but other forms of tobacco use especially waterpipe use has

increased as an alternative.^{12,13} Today, there is a global epidemic of waterpipe smoking especially, among adolescents and young adults.¹⁴

In recent years, the trend of waterpipe use is growing in Iran and has become a common entertainment especially among Iranian adolescents.¹⁵⁻¹⁷ Results of a national survey showed that the prevalence of daily waterpipe smoking in Iranian population was 2.7% (3.5% in men and 1.9% women) and Iranian daily waterpipe smokers used waterpipe on average 3.5 times a day (2.8 in men and 4.5 in women). Also, more than 50% of Iranian women using tobacco smoke tobacco by waterpipe.¹⁷ Other studies suggested that gender, age, socioeconomic status, having family members and friends who smoke cigarette, stress levels, sleep duration, job, and going to the restaurants or café were associated with waterpipe use in Iranian adults.^{15,18}

To implement effective prevention strategies of waterpipe use in Iranian population, it is necessary to review the current status of waterpipe smoking. Therefore, the aim of this study was to determine the prevalence, pattern of use and related factors with waterpipe use among adults.

Methods

This population-based cross-sectional study was conducted in Kerman, Iran, from January to April 2016. Kerman province is located in the southeast of Iran with about two million residents which cover about 3% of Iran population.

Participants included individuals 18 years of age and older residing in Kerman (living in the city at least in recent five years). Verbal informed consent was obtained. The sample size was calculated as 1100 subjects (550 men, 550 women) on a prevalence of 50%, design effect = 2.5, $d = 0.05$. The multi-stage sampling method was used; the city was divided into four regions based on municipality regions, and then we randomly selected some blocks among these regions. Finally, dwellings on the blocks were randomly selected for participation. Gender balance was considered in this sampling according to the man to woman ratio in the reference population of Kerman.

A self-reported questionnaire was completed by participants. This researcher-designed questionnaire included questions on socio-demographic and waterpipe smoking behaviors.

The demographic questions included age, gender, education level, income, employment and marital status. The waterpipe smoking behaviors questions included frequency of use, duration of use, age of initiation of use, the most common time and place of use, type of tobacco used, concurrent use of alcohol and substance, and main motives for waterpipe smoking and quit. The validity of the questionnaire was assessed by experts' opinion and the reliability was checked using Cronbach's alpha test ($r = 0.77$).

We defined ever waterpipe smoker as anyone who had waterpipe use experience during lifetime even one puff, current waterpipe smoker as anyone who had waterpipe use experience during last month, and daily waterpipe smoker as anyone that smokes at least once a day.

We applied independent t-test and chi-square to assess the correlation between independent variables and waterpipe smoking. Then, multivariable logistic regression was used to determine the predictors of waterpipe use. The level of significance was set to 0.05.

The study was registered by the ethical committee of the Kerman University of Medical Sciences (Ethical code: IR.KMU.REC.1394.262).

Results

A total of 1090 questionnaire were completed (Response Rate: 99%) and the age range of participants was from 18 to 76 years [mean \pm standard deviation (SD) 31.88 \pm 10.35 years]. About half of participants were women (49.5%). The majority of participants were married (57.3%), employed (60.6%), university educated (50.5%), and they earned less than US\$450 per month (87.0%) (Table 1).

The prevalence of ever, current and daily waterpipe smoking were 43.8% (men: 56.9%, women: 30.4%) ($P < 0.001$), 28.8% (men: 36.9%, women: 20.6%) ($P < 0.001$), and 7.2% (men: 10.5%, women: 3.7%) ($P < 0.001$), respectively (Figure 1).

The mean \pm SD age of initiation of waterpipe use was 19.18 \pm 5.94 years (men: 17.42 years, women: 22.38 years; $P = 0.004$). The women and men smoked waterpipe more frequently in friend's house (36.8%) and café/restaurant (34.4%), respectively ($P < 0.001$). The majority of men intended to quit waterpipe smoking but most of women did not intend to quit ($P = 0.019$).

Table 1. Sociodemographic characteristics of the study participants (n = 1090)

Characteristic	n (%)
Gender	
Women	540 (49.5)
Men	550 (50.5)
Age (year)	
18-24	279 (25.7)
25-34	454 (41.8)
35-44	201 (18.5)
≥ 45	151 (13.9)
Marital status	
Married	623 (57.3)
Single	441 (40.5)
Divorced/widowed	24 (2.2)
Education level	
Illiterate	11 (1.0)
< High school	165 (15.2)
High school diploma	362 (33.3)
University	549 (50.5)
Employment status	
Housewife	169 (15.6)
Retired	29 (2.7)
Employed	658 (60.6)
Student	165 (15.2)
Unemployed	65 (6.0)
Income	
Less than US\$150 per month	421 (44.5)
US\$150 to US\$450 per month	400 (42.2)
More than US\$450 per month	126 (13.3)

There were significant differences between men and women about companion of first use ($P < 0.001$), duration of waterpipe smoking session ($P = 0.011$), concurrent use of alcohol ($P = 0.040$), concurrent use of substance ($P = 0.014$), using shared waterpipe ($P < 0.001$) and the main motives for waterpipe use ($P = 0.038$). The pattern of current waterpipe use ($P = 0.111$), the frequency of waterpipe use during a day ($P = 0.082$), the main motivation for quitting waterpipe smoking ($P = 0.521$) and use of flavored tobacco ($P = 0.692$) were not significantly associated with gender.

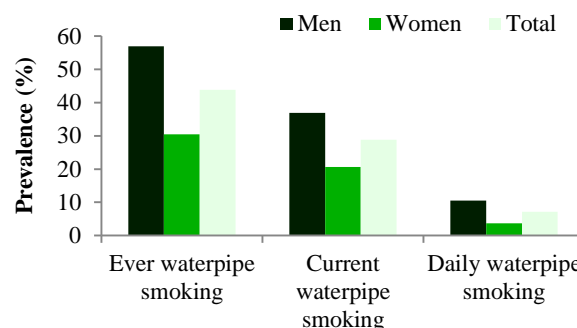


Figure 1. Prevalence of waterpipe smoking in men and women

About 70.0% of ever waterpipe smokers reported friends as the companion of first use and the majority of waterpipe users shared waterpipe with friends (78.5%). The main pattern of current waterpipe use was occasionally (1-3 times in a month) (42.4%) and most daily waterpipe smokers reported one-time use in a day (44.9%). The usual duration of waterpipe smoking session was less than half hour (57.5%).

About 25.6% and 7.8% of waterpipe smokers reported the concurrent use of alcohol and substance, respectively, and the most used substance was opium (84.9%). The main reason for waterpipe use was entertainment and pleasure (55.4%). About 52.0% of waterpipe smokers wanted to quit waterpipe smoking and the main motivation a concern of disease (81.3%). Most waterpipe smokers used flavored tobacco (93.9%) (Table 2).

Table 2. Gender differences of waterpipe smoking behaviors

Study item	Women	Men	P	Total
Age of first use (year) [n (%)]			< 0.001	
≤ 15	11 (6.7)	103 (34.7)		114 (24.8)
16-18	33 (20.2)	104 (35.0)		137 (29.8)
≥ 19	119 (73.0)	90 (30.3)		209 (45.4)
Companion of first use [n (%)]			< 0.001	
Alone	0 (0)	31 (9.9)		31 (6.5)
Family members	75 (46.0)	40 (12.7)		115 (24.1)
Friends	88 (54.0)	243 (77.4)		331 (69.4)
Pattern of current waterpipe smoking [n (%)]			0.111	
Daily	20 (18.0)	58 (28.6)		78 (24.8)
Weekly (1-6 times in a week)	41 (37.0)	62 (30.5)		103 (32.8)
Occasionally (1-3 times in a month)	50 (45.0)	83 (40.9)		133 (42.4)
Frequency of waterpipe smoking during a day [n (%)]			0.082	
Once	9 (45.0)	26 (44.8)		35 (44.9)
Twice	1 (5.0)	15 (25.9)		16 (20.5)
Three times or more	10 (50.0)	17 (29.3)		27 (34.6)
Usual duration of waterpipe smoking session (hour) [n (%)]			0.011	
Less than 0.5	109 (66.1)	159 (52.8)		268 (57.5)
0.5 to 1	47 (28.5)	108 (35.9)		155 (33.3)
More than 1	9 (5.5)	34 (11.3)		43 (9.2)
Use of flavored tobacco [n (%)]			0.692	
Yes	154 (93.3)	293 (94.2)		447 (93.9)
No	11 (6.7)	18 (5.8)		29 (6.1)
Concurrent use of alcohol [n (%)]			0.040	
Yes	33 (20.0)	89 (28.6)		122 (25.6)
No	132 (80.0)	222 (71.4)		354 (74.4)
Concurrent use of substance [n (%)]			0.014	
Yes	6 (3.6)	31 (10.0)		37 (7.8)
No	159 (96.4)	279 (90.0)		438 (92.2)
Individual most commonly waterpipe is shared with [n (%)]			< 0.001	
Alone	4 (2.5)	21 (6.9)		25 (5.4)
Family members	51 (32.1)	24 (7.8)		75 (16.1)
Friends	104 (65.4)	261 (85.3)		365 (78.5)
Usual Place of waterpipe smoking [n (%)]			< 0.001	
Own house	54 (33.1)	46 (14.6)		100 (21.0)
Friend's house	60 (36.8)	94 (29.9)		154 (32.3)
Cafe or restaurant	36 (22.1)	108 (34.4)		144 (30.2)
Other places such as park	13 (8.0)	66 (21.0)		79 (16.5)
The main motives for waterpipe smoking [n (%)]			0.038	
Entertainment and pleasure	85 (53.5)	175 (56.5)		260 (55.4)
Reducing stress and fatigue	35 (22.0)	81 (26.1)		116 (24.7)
The curiosity	23 (14.5)	18 (5.8)		41 (8.7)
Enjoy the taste and smell	9 (5.7)	20 (6.5)		29 (6.2)
The insistence of friends and family members	7 (4.4)	16 (5.2)		23 (4.9)
Intention to quit waterpipe smoking [n (%)]			0.019	
Yes	73 (44.5)	158 (56.0)		231 (51.8)
No	91 (55.5)	124 (44.0)		215 (48.2)
The main motives for waterpipe smoking quit [n (%)]			0.521	
Concern of disease	88 (84.6)	116 (78.9)		204 (81.3)
High cost	2 (1.9)	4 (2.7)		6 (2.4)
The insistence of friends and family members	14 (13.5)	27 (18.4)		41 (16.3)

Table 3. Waterpipe smoking status by sociodemographic characteristics

Sociodemographic characteristics	Ever smoked waterpipe	Never smoked waterpipe	P
Gender [n (%)]			< 0.001
Women	164 (30.4)	376 (69.6)	
Men	313 (56.9)	237 (43.1)	
Age (year) [n (%)]			< 0.001
18-24	163 (58.4)	116 (41.6)	
25-34	203 (44.7)	251 (55.3)	
35-44	63 (31.3)	138 (68.7)	
≥ 45	46 (30.5)	105 (69.5)	
Marital status [n (%)]			< 0.001
Married	233 (37.4)	390 (62.6)	
Single	235 (53.3)	206 (46.7)	
Divorced/widowed	7 (29.2)	17 (70.8)	
Education level [n (%)]			0.014
Illiterate	2 (18.2)	9 (81.8)	
< High school	82 (49.7)	83 (50.3)	
High school diploma	139 (38.4)	223 (61.6)	
University	252 (45.9)	297 (54.1)	
Employment status [n (%)]			< 0.001
Housewife	37 (21.9)	132 (78.1)	
Retired	11 (37.9)	18 (62.1)	
Employed	309 (47.0)	349 (53.0)	
Student	79 (47.9)	86 (52.1)	
Unemployed	39 (60.0)	26 (40.0)	
Income [n (%)]			0.687
Less than US\$150 per month	179 (42.5)	242 (57.5)	
US\$150 to US\$450 per month	182 (45.5)	218 (54.5)	
More than US\$450 per month	56 (44.4)	70 (55.6)	

The median and interquartile range of monthly cost of waterpipe smoking were US\$3 and US\$15, respectively.

The univariable analysis indicated that waterpipe use was significantly related to gender, age, education, marital and employment status but income level was not significant (Table 3).

Logistic regression analysis showed that gender, age, education and employment status were significantly related to waterpipe smoking while it was not associated with marital status. According to this model, men used waterpipe 2.8 times more frequently than women and waterpipe smoking was 4.9 times more likely in the 18-24 years age range compared to the age range of 45 years or older. Waterpipe use was 2.4 times greater in the unemployed than in housewives. People with a university education were 1.4 and 1.7 times more likely to use waterpipe compared to people with high school diploma education and illiterates, respectively (Table 4).

Table 4. Predictors of waterpipe smoking

Variable	P	OR (95% CI)
Gender		
Women	< 0.001	1
Men	< 0.001	2.82 (2.11-3.77)
Age (year)		
18-24	< 0.001	4.92 (2.88-8.38)
25-34	< 0.001	2.28 (1.41-3.68)
35-44	0.001	1.30 (0.77-2.20)
≥ 45	0.323	1
Employment status		
Housewife	0.007	1
Retired	0.276	1.70 (0.65-4.43)
Employed	0.142	1.40 (0.89-2.21)
Student	0.551	0.84 (0.47-1.48)
Unemployed	0.009	2.40 (1.24-4.63)
Education level		
Illiterate	0.013	0.60 (0.10-3.44)
< High school	0.566	1.36 (0.91-2.02)
High school diploma	0.127	0.70 (0.52-0.95)
University	0.024	1

OR: Odds ratio; CI: Confidence interval

Discussion

The prevalence of ever waterpipe smoking among

adults was 43.8% in this study which was higher than most studies in Iran (8.6%-11.9%) but similar to the results of a study from Tehran, Iran (46.0%).^{15,19,20} The reported prevalence in many countries was lower than our study (37.8% in Arabic-speaking adults in Australia and 11.2% in the USA) but in Kuwait it was higher than the present study (63%).^{11,21,22} The prevalence of current waterpipe smoking in the present study was 28.8% and higher than many Middle East countries [Bahrain 5%, Pakistan 6%, Persian Gulf region 4%-12%, Syria 12%, and Lebanon (15%)] and other countries (6.4% in Vietnam and 11.0% in Arabic-speaking adults in Australia).^{11,23} A total of seven percent of participants smoked waterpipe daily in our study that was higher than the results of a study in Tehran (3.5%) and the national survey of Iranian adults in 2007 (2.7%),^{17,20} but lower than the prevalence of daily waterpipe smoking in Lebanon (9.0%).¹¹

In the present study, the prevalence of waterpipe smoking was higher than most of the previous studies. Lack of knowledge about the hazardous effects of waterpipe, having positive attitude toward the waterpipe smoking compared to cigarette smoking, social acceptance of waterpipe smoking rather than cigarette smoking, the traditional role of waterpipe in Iranian society as an instrument for recreation in family and friendly gatherings and inappropriate implementation of laws limiting waterpipe use in public places in recent years are the main reasons for this tragedy.

The results of our study revealed that the prevalence of waterpipe smoking among men was significantly more than women. Most national and local studies confirm this^{11,17,20,24} but the results of three studies conducted in Hormozgan and Bushehr, Iran, and Kuwait showed that the prevalence of waterpipe smoking among women was more than men.^{13,25-27} In these areas, waterpipe use among women is traditional and it is part of their culture, so this difference is logical.

The age of initiation of waterpipe smoking in this survey was lower than the most studies conducted in Iran and other countries.^{17,21,28,29} Therefore, policymakers should focus on school-based waterpipe smoking prevention programs and minors' access restrictions.

About 8% of waterpipe smokers confessed

concurrent substance use. This prevalence was nearly similar to another study (6%),³⁰ but the type of substance used was different among countries. The most common substance used concurrently was opium in this survey while marijuana was more common in the USA.^{28,29} Also, about 25% of waterpipe users reported the concurrent use of alcohol whereas it was lower than the USA (35%).²⁹ These findings suggest that waterpipe use is associated with other high-risk health behaviors, especially substance use and alcohol drinking.

The most common place of waterpipe use was friend's house while café or restaurant was more common in Syria.²⁸

The main reasons for waterpipe smoking were entertainment and pleasure among our participants and it was similar to other studies.^{29,31-33} Therefore, policymakers should promote healthy entertaining activities instead of waterpipe smoking. In this study the main motive for quitting waterpipe was a concern of disease and it was similar to the study conducted in Syria.²⁸

Most waterpipe smokers reported their waterpipe session lasted less than 30 minutes. This finding was similar to Vietnam and Egypt but the most waterpipe smokers in Turkey and the USA reported their waterpipe session lasted 60 minutes or more.²⁴

Our study suggested that male gender is associated with waterpipe use. Similarly, the most studies have confirmed this finding.^{17,22,23} Also, age range of 18-24 years and university education were significantly associated with waterpipe smoking. This finding is supported by two studies done in Tehran,¹⁶ and California, USA.²² We revealed that unemployment was significantly associated with waterpipe use. Baheiraei et al. showed waterpipe smoking was more prevalent in unemployed.¹⁶ Younger age [odds ratio (OR) = 4.92] and the male gender (OR = 2.82) were the strongest predictors of waterpipe smoking. It was similar to other studies conducted in Iran and other countries.^{16,17,22,23} The main reasons for this issue are inadequate healthy entertainment for the young age group and waterpipe smoking stigma for women in Iran.

Despite more frequent waterpipe use among singles than married individuals, marital status was not significant in the regression model which was similar to some studies.^{15,18,23} Our

findings suggested that income did not have significant effect on waterpipe use that is verified by the another study in Iranian adults.¹⁸ We found that the cost of waterpipe smoking was very low in our population, so increasing the price of tobacco could be an effective preventive intervention.

To the best of our knowledge, no study has been conducted about prevalence, related factors and pattern of waterpipe smoking based on large sample size in adults in southern of Iran. Due to the cross-sectional nature of this study, we could not examine the causal relationship. Other limitations of this survey are social desirability and recall biases. These biases may have underestimated the prevalence of waterpipe smoking, especially in women. The authors suggest further study on the knowledge and attitude of general population towards waterpipe smoking.

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Conclusion

The findings of this study showed that waterpipe smoking is a prevalent health risk behavior among Iranians. In the present study, men with university education, 18-24 years age group and unemployed were at the highest risk of waterpipe use. Therefore, Iranian society needs a comprehensive approach to limit the use of waterpipe and policymakers should focus on community interventions to reduce waterpipe use.

Conflict of Interests

The Authors have no conflict of interest.

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شیوع و عوامل مرتبط با مصرف قلیان در جنوب شرق ایران

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مقاله پژوهشی

چکیده

مقدمه: مصرف قلیان یک تهدید در حال رشد برای بهداشت عمومی در سراسر جهان است. هدف از انجام مطالعه حاضر، بررسی شیوع و عوامل مرتبط با مصرف قلیان در افراد بالغ شهر کرمان بود.

روش‌ها: این مطالعه به صورت مقطعی بر روی ۱۰۹۰ شرکت کننده و با استفاده از روش نمونه‌گیری چند مرحله‌ای در سال ۱۳۹۵ انجام شد. جهت جمع‌آوری داده‌ها، از پرسش‌نامه محقق ساخته خودایفا استفاده گردید. متغیرهای جمعیت‌شناختی، اجتماعی و رفتارهای مرتبط با قلیان کشیدن مانند الگو، طول مدت، شایع‌ترین مکان مصرف، نوع تنباکو و مصرف هم‌زمان الکل و مواد مخدر نیز مورد بررسی قرار گرفت. داده‌ها با استفاده از آزمون‌های χ^2 و Independent t و رگرسیون لجستیک چندگانه تجزیه و تحلیل گردید.

یافته‌ها: شیوع تا به حال، در حال حاضر و روزانه مصرف قلیان به ترتیب ۴۳/۸، ۲۸/۸ و ۷/۲ درصد به دست آمد. سن شروع مصرف قلیان در مردان نسبت به زنان پایین‌تر ($P < 0/001$) و کافه یا رستوران (۳۴/۴ درصد) و خانه دوستان (۳۶/۸ درصد) به ترتیب شایع‌ترین مکان‌های مصرف قلیان توسط مردان و زنان بود. مردان ۲/۸ برابر بیشتر از زنان و افراد با طیف سنی ۱۸-۲۴ سال، ۴/۹ برابر بیشتر نسبت به افراد در بازه سنی ۴۵ سال یا بالاتر قلیان مصرف کردند. استفاده از قلیان در افراد بیکار ۲/۴ برابر بیشتر از افراد خانه‌دار بود و افراد دارای تحصیلات دانشگاهی به ترتیب ۱/۴ و ۱/۷ برابر بیشتر از افراد با سطح تحصیلات دیپلم و بی‌سواد از قلیان استفاده نمودند.

نتیجه‌گیری: جنسیت مرد، سطح تحصیلات بالاتر، سن پایین‌تر و بیکاری، از جمله عوامل مرتبط با مصرف قلیان به شمار می‌رود. بنابراین، طراحی و اجرای مداخلات مؤثرتر به ویژه برای گروه‌های هدف آسیب‌پذیر، نیاز است.

واژگان کلیدی: قلیان کشیدن؛ شیوع؛ عوامل خطر؛ رفتار

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