

Patterns of Cigarette and Waterpipe Smoking in Erbil City, Iraq. A Household Survey

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Abstract

Background and objective: Globally, tobacco use is one of the most serious public health concerns and preventable causes of morbidity and mortality, expected to reach annually more than 8 million deaths by the year 2030. In light of this estimation and limited surveillance of smoking, this study aimed to identify the tobacco use trends and patterns in various forms in Erbil city.

Methods: A community-based cross-sectional household survey was carried out from September 2021 through June 2022, on a sample of 2601 respondents selected through a multi-stage cluster sampling method in Erbil city. A specially designed questionnaire through direct interviews was used to collect socio-demographic and smoking-related data.

Results: The prevalence of current daily smoking was 44.3%, occasional smoking was 14.5%, Ex-smoking was 8.0%, and those who never smoked before 33.2%. The prevalence of cigarette, and waterpipe smoking was 37.2%, and 46.5% respectively. More than half (51.0%) had tried to quit smoking at least once in their life, while 11.9% succeeded to quit. The main reason behind quitting was anticipated health risks (97.3%). The prevalence of smoking was significantly higher among those aged 20-29 years, single, males, college education, those having skilled manual /non-manual occupations, those who have smoker friends, and from a middle socioeconomic level

Conclusion: The prevalence of smoking (current daily and occasional) was more than half and about one-third never smoked before. More than half had tried to quit smoking at least once in their life but (11.9%) succeeded to quit due to anticipate health risks and family pressure.

Keywords: Pattern; Cigarettes; Waterpipe; Smoking; Survey.

Introduction

According to the World Health Organization report on the global tobacco epidemic 2021, tobacco smoking is one of the world's most serious public health concerns responsible for more than 8 million death each year. Although the use of various tobacco products differs from one region to another in the world, the two most prevalent tobacco products used globally are cigarettes and waterpipes.¹ There is increasing evidence showing the popularity and widespread practice of waterpipe tobacco smoking among high school

children, and college and university students.^{2,3} An increase in the prevalence of waterpipe smoking was reported in Iraq,^{4,5} and in the Kurdistan region.^{6,7} Furthermore, passive smoking and exposure to secondhand smoke are reported to be associated with many short-term and long-term health risks among children and adults.⁸ Several socio-demographic, personal, behavioral, psychological, and environmental factors have been identified in several studies that play a significant role in the initiation and maintenance of tobacco use.⁹⁻¹¹

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Smoking is linked to higher medical costs, a shorter lifespan, and violence, in addition to respiratory, cardiovascular, and cancer problems.¹² Monitoring is an important part of the tobacco control process because it offers crucial information to policymakers and public health authorities about the extent of the tobacco epidemic in the community, tobacco-related disease and death, the economic costs of tobacco use, and the implementation of control policies and programs. Effective tobacco surveillance systems require representative national smoking prevalence data, especially for adults and youth, as well as comprehensive data on other aspects of tobacco use.¹³

Few studies have been conducted in Erbil, in the field of smoking, and no comprehensive study has been done to study the pattern of smoking, especially waterpipe smoking. This comprehensive study was conducted to identify the tobacco use trends and patterns in various forms in Erbil city.

Methods

Study design

A Community-based cross-sectional survey based on household visits was done to find out the prevalence of cigarette and water-pipe smoking and associated factors, in addition, to the proportion of ex-smokers, the factors that made ex-smokers quit, and

the method of quitting.

Study Setting

This study was carried out in Erbil city, the capital of Kurdistan Region-Iraq from September 2021 through June 2022.

Study population

The adults aged 18 years or over willing to participate were included in the study.

Sample size

The sample size was calculated using the EPI-info computer program under the assumption that Erbil's smoking prevalence is similar to Iraq's previously reported prevalence (30%),^{14, 15} and a population of 805840 based on Kurdistan Region Statistics Office (KRSO), an acceptable margin of error of 2.5%, design effect of 2, and confidence level of 95%. Accordingly, the estimated sample size was 2578 which was increased to 2600 to accommodate for incomplete, unreliable answers or non-response.

Sampling method

According to the data from the (KRSO), Directorate of Statistics, Erbil city is divided into six municipalities, including 141 quarters (q). A multi-stage sampling method was used, and 25% of quarters in each municipality were chosen randomly based on the administrative map of the city. The number of quarters in each municipality and the number of samples in each quarter is presented in Table 1.

Table 1 Distribution of the required sample according to the Erbil quarters

Municipality	Municipality population	250/100,000	No. of quarters	25% of quarters	No. of sample/ quarter	Required Sample
M1	45576	147.048556	11	3	49	147
M2	96276	310.629405	22	6	52	311
M3	110964	358.019457	26	7	51	358
M4	338100	1090.86170	34	9	121	1091
M5	97884	315.817532	23	6	53	316
M6	117040	377.623349	25	6	63	378
Total	805840	2,599.9999	141	37		2601

A systematic random sampling method was used to select households in each quarter. For each quarter, it was determined a sampling interval k as the ratio of the estimated quarter size to the sample size. The first household in each quarter was selected randomly, and the next households were selected by every (k^{th}) household.

Data collection

Data were collected through direct interviews with the participants using a specially designed questionnaire from nationally standardized questionnaires (National Adult Tobacco Survey, Global Adult Tobacco Survey) in addition to the adoption of questions from relevant literature. The survey questionnaire comprised socio-demographic and economic features including age, gender, marital status, religion, educational level, occupation, car and house ownership, and smoking-related questions like smoking status, type, age and reasons for starting smoking, cost of smoking, trials to quit, way of quitting, and reasons behind trials to quit smoking.

Smoking status was determined using the WHO criteria for smoking as Current Daily Smoker: Someone who smokes any tobacco product at least once a day in their lifetime and currently has smoked in the last 28 days. Occasional smoker: Someone who smokes, but not on a daily basis. Ex-smoker: Someone who has smoked in their lifetime, but had quit smoking at the time of the interview. Never Smoker: Someone who either has never smoked at all or who has smoked less than 100 cigarettes (or the equivalent amount of tobacco) in their lifetime.¹⁶

Statistical data analysis

The statistical package for the social sciences software (SPSS, version 22) was used for data entry and analysis. The socioeconomic level of participants was calculated based on the socioeconomic index for health research in Iraq.¹⁷ Means for summarizing numerical variables and proportions for the categorical variables

were calculated. The Chi-square was used to compare the proportions. A P -value of ≤ 0.05 was considered statistically significant.

Ethical consideration

This study was approved by the Ethics Committee of Hawler Medical University College of Medicine. Participants had been informed about the purpose of the study, and verbal consent was taken from each participant.

Results

The mean age \pm SD was 38.75 ± 13.790 years ranging from 18 to 76 years. A total of 647 (24.9%) of the respondents were in the age group 20-29 years. More than half (58.9%) were males and married (57.1%). Most of the participants (93.8%) were Muslims followed by Christians (4.5%) and Yazidi (1.7%) Table 2.

Concerning educational level, 400 (15.4%) of the respondents were illiterate, 469 (18%) were high school graduates, and only 24 (0.9%) were Ph.D. holders or equivalent. A total of 795 (30.6%) were from semi-skilled manual occupations, and more than one-quarter (26.7%) had skilled manual /non-manual occupations. Most of the sample 2176 (83.7%) had their own car and 1607 (61.8%) were living in their own houses. Concerning socioeconomic level, a total of 1182 (45.4%) people were from the middle socioeconomic level while only 285 (11%) were from the high socioeconomic level Table 3.

Table 2 Basic demographic characteristics of the study population

Variables	No.	%
Age Groups		
< 20	176	6.8
20 - 29	647	24.9
30 - 39	597	23.0
40 - 49	525	20.2
50 - 59	410	15.7
≥ 60	246	9.4
Gender		
Female	1069	41.1
Male	1532	58.9
Marital Status		
Single	984	37.8
Married	1485	57.1
Divorced	21	0.8
Widowed	111	4.3
Religion		
Muslim	2440	93.8
Christian	118	4.5
Yazidi	43	1.7
Total	2601	100.0

Table 3 Distribution of the study population by socio-economic characteristics

Variables	No.	%
Educational level		
Illiterate	400	15.4
Primary (or read and write)	381	14.7
Intermediate	306	11.8
High school or vocational	469	18.0
Institute (2 years)	429	16.5
Bachelor's degree	469	18.0
Master's degree	123	4.7
Ph.D. or equivalent	24	0.9
Occupation		
Unskilled manual occupation	534	20.5
Semi-skilled manual occupation	795	30.6
Skilled manual /non-manual occupation	693	26.7
Associate Professional	433	16.6
Skilled professional/senior manager	124	4.8
Highly skilled professional	22	0.8
Retired/unemployed		
No	1196	46.0
Yes	1405	54.0
Car Ownership		
No	425	16.3
Yes	2176	83.7
House Ownership		
No	994	38.2
Yes	1607	61.8
Socioeconomic Level		
Low	1134	43.6
Middle	1182	45.4
High	285	11.0
Total	2601	100.0

Table 4 shows that about one-third (33.2%) of the sample never smoked before and the rest of them were distributed by smoking status in such a way that 44.3% of them was current daily smoker, 14.5% was occasional smokers and 8.0% was Ex-smokers. Regarding smoking type 302 (19.8%)

smoke cigarettes only, 456 (35.7%) smoke waterpipe only, and 610 (39.9%) smoke both cigarettes and waterpipe in combination. It is revealed that out of 2601 respondents, the prevalence of cigarette, waterpipe, and Ex-smokers was 37.2%, 46.5%, and 8.0% respectively.

Table 4 Distribution of the study population by smoking status and type of smoking

Variable	No.	%
Smoking Status		
Current daily smoker	1153	44.3
Occasional Smoker	376	14.5
Ex-Smoker	207	8.0
Never-Smoker	856	33.2
Total	2601	100.0
Smoking Type		
Cigarettes	302	19.8
Waterpipe	546	35.7
Electronic Cigarette	16	1.0
Cigarettes and Waterpipe	610	39.9
Cigarettes +Waterpipe+ Electronic Cigarette	55	3.6
Total	1529	100.0

A total of 460 (30.1%) of the sample started cigarette smoking during the age of 15-19 years, while the lowest rate 87 (5.7%) indicated less than 15 years. Around half 437 (45.2%) indicated that they used to smoke 11 to 20 cigarettes per day.

Collective years of smoking for nearly one-third 308 (31.3%) of the sample was 20 years or more. Around half (46.6%) of the participants have ever tried waterpipe

smoking, of them, 835 (68.9%) started waterpipe smoking at an age of fewer than 30 years. Regarding the frequency of waterpipe smoking, the highest rate 450 (37.2%) smoked waterpipe every day. The majority (69.6%) of the participants had a smoking friend while 1167 (44.9%) indicated a positive history of smoking among their first-degree relatives (father, mother, partner, brother, or sister) Table 5.

Table 5 Distribution of the study population by smoking-related characteristics

Variables	No.	%
Age of starting cigarette smoking (n=1529)		
< 15	87	5.7
15 – 19	460	30.1
20 – 24	440	28.7
25 – 29	290	19.0
≥ 30	252	16.5
Number of cigarettes smoked per day (n=967)		
1 – 10	374	38.7
11 – 20	437	45.2
21 – 30	104	10.7
≥ 31	52	5.4
Collective years of smoking (n=983)		
< 5	137	13.9
5 – < 10	281	28.6
10 – 14	170	17.3
15 – 19	87	8.9
≥ 20	308	31.3
Ever tried waterpipe smoking? (n=2601)		
No	1390	53.4
Yes	1211	46.6
Age of starting waterpipe smoking (n=1211)		
< 15	21	1.7
15 – 19	241	19.9
20 – 24	333	27.5
25 – 29	240	19.8
≥ 30	376	31.1
Frequency of Waterpipe smoking (n=1211)		
Everyday	450	37.2
Once Weekly	193	15.9
Once every 2-4 days	381	31.5
Sometimes	187	15.4
A smoker friend (n = 2601)		
No	792	30.4
Yes	1809	69.6
Smoker in the family (n = 2601)		
First-degree relative	1167	44.9
Relatives other than first degree	314	12.1
First-degree and other relatives	907	34.8
None of them	213	8.2

More than half 886 (51.0%) of the sample had tried to quit smoking at least once in their life but only 207 (11.9%) succeeded to quit and the rest either were unsuccessful or succeeded temporarily at the rates of 20.6% and 18.5% respectively.

The main reason behind trying to quit smoking was anticipated health risks (97.3%) followed by family pressure (83.0%), and the majority (64.3%) of the sample tried to quit smoking gradually Table 6.

Table 6 Distribution of the smokers by the pattern of quitting smoking

Variables	No.	%
Did you ever try to quit smoking? (n=1736)		
Tried to quit and succeeded	207	11.9
Tried to quit and succeeded temporarily	322	18.5
Tried to quit and been unsuccessful	357	20.6
Never tried to quit	850	49.0
Times trying to quit smoking (n=886)		
1 – 3	429	48.4
4 – 6	429	48.4
7 – 10	28	3.2
$\bar{x} \pm SD$	3.56	± 1.462
The reason behind trying to quit smoking (n=886) *		
Family Pressure	735	83.0
Health Risks	862	97.3
Disease	528	59.6
Ways of trying to quit smoking (n=886)		
Suddenly	276	31.2
Gradually	570	64.3
Nicotine replacement therapy	40	4.5

* Smokers might have more than one reason to quit smoking

Table 7 shows that there was a statistically significant association between the prevalence of smoking and age, gender, marital status, education level, occupation, having a smoker friend, and socioeconomic level of participants.

The prevalence of smoking was significantly higher among the age group 20-29 years (78.4%), males (74.5%), and the single (78.6%). The prevalence of smoking was significantly higher among

participants with high educational levels; 75.6% and 70.4% among Master's and Bachelor's, compared to 33.3% illiterates. It is evident that the prevalence of smoking was significantly higher among those having skilled manual /non-manual occupations (74.5%), those who have smoking friends (77.3%), and participants who were from a middle socioeconomic level (69.3%) ($P < 0.001$).

Table 7 Prevalence of smoking by socio-economic characteristics of the sample

Variables	Smokers		Non-smokers		Total	P value*
	No.	(%)	No.	(%)		
Age Groups						
< 20	114	(64.8)	62	(35.2)	176	< 0.001
20 - 29	507	(78.4)	140	(21.6)	647	
30 - 39	391	(65.5)	206	(34.5)	597	
40 - 49	271	(51.6)	254	(48.4)	525	
50 - 59	159	(38.8)	251	(61.2)	410	
≥ 60	87	(35.4)	159	(64.6)	246	
Gender						
Female	387	(36.2)	682	(63.8)	1069	< 0.001
Male	1142	(74.5)	390	(25.5)	1532	
Marital Status						
Single	773	(78.6)	211	(21.4)	984	< 0.001
Married	719	(48.4)	766	(51.6)	1485	
Divorced	11	(52.4)	10	(47.6)	21	
Widowed	26	(23.4)	85	(76.6)	111	
Education						
Illiterate	133	(33.3)	267	(66.7)	400	< 0.001
Primary (or read and write)	193	(50.7)	188	(49.3)	381	
Intermediate	184	(60.1)	122	(39.9)	306	
High school or vocational	302	(64.4)	167	(35.6)	469	
Institute (2 years)	282	(65.7)	147	(34.3)	429	
College (Bachelor's degree)	330	(70.4)	139	(29.6)	469	
College (Master's degree)	93	(75.6)	30	(24.4)	123	
Ph.D. or equivalent	12	(50.0)	12	(50.0)	24	
Occupation						
Unskilled manual	213	(39.9)	321	(60.1)	534	< 0.001
Semi-skilled manual	431	(54.2)	364	(45.8)	795	
Skilled manual /non-manual	516	(74.5)	177	(25.5)	693	
Associate Professional	270	(62.4)	163	(37.6)	433	
Skilled professional	85	(68.5)	39	(31.5)	124	
Highly skilled professional	14	(63.6)	8	(36.4)	22	
Smoker friends						
No	130	(16.4)	662	(83.6)	792	< 0.001
Yes	1399	(77.3)	410	(22.7)	1809	
Socioeconomic Level						
Low	518	(45.7)	616	(54.3)	1134	< 0.001
Middle	819	(69.3)	363	(30.7)	1182	
High	192	(67.4)	93	(32.6)	285	
Total	1529	(58.8)	1072	(41.2)	2601	

* Chi-square test

Discussion

Monitoring is an important part of the tobacco control process because it offers crucial information to policymakers and public health authorities about the extent of the tobacco epidemic in the community. Accordingly, this study aimed to identify the tobacco use trends and patterns in various forms in Erbil city.

Socio-demographic characteristics of the study participants

In this study, more than half (58.9%) of the participants were male (Table 2). This result was consistent with the result of a study in Pakistan,¹⁸ which found 51.2% male participants. The opposite results were found by other studies,^{12, 19} who reported that 52.58% and 58.5%, of the participants, were female respectively. In agreement with the result of this study, a study conducted among Iraqi adults found that three-fourths (74.9%) of the sample were married.²⁰ In this study, most of the participants (93.8%) were Muslim followed by Christians and Yazidi religion. This result agrees with that of a study in Bangladesh, which revealed that (94.6%) of the sample were Muslim,²¹ and another study among Jordanian adults who found that (83.8%) were from the Muslim religion.²² This is because Islam is the main religion in these countries. These results are inconsistent with those of a study in Brazil which found that more than half (58.2%) of the sample were Catholic.²³ In this study, (15.4%) of respondents were illiterate (Table 3), contradictory results were found by a study among adults in Pakistan who reported (8.0%) illiterate,¹⁸ and another study in Andkhoy city of Afghanistan which found that (51.2%) of the study participants were illiterate.²⁴ Results from this study reported that more than half (57.3%) of the study sample were employed in skilled or semi-skilled manual occupations. A study in Erbil city reported unskilled manual workers, skilled manual workers, and non-manual workers at the rates of 8.4%, 21.8%, and 65.0% respectively.²⁵ It is evident from the results

of this study that below half (45.4%) of the participants were from the middle socioeconomic level. This result is consistent with the findings of a study on a group of men in Mosul, Iraq.²⁶

The pattern of cigarettes and waterpipe smoking among the study participants

Around half (44.3%) were current daily smokers, 14.5% were occasional smokers, 8.0% were Ex-smokers, and 33.2% had never smoked before (Table 4). Several studies show clear variability in the reported prevalence of current smoking as 40.08% in Saudi Arabia,²⁷ 34.1% in China,²⁸ and 26.4% in Libya,²⁹ which is far less than this study's findings, however, the prevalence of never smokers was quite similar (33.3%) and the prevalence of Ex-smokers (40.3%), was far greater than this study. These variations in the reported prevalence of smoking may be attributed to the different study locations, sampling frames and demographic characteristics of the populations enrolled, and cultural and religious factors. In this study, the prevalence of smoking cigarettes was (37.2%), and for waterpipes (46.5%). Almost similarly, the prevalence of cigarette smoking was (34.88%) in a study in India,³⁰ and 31.0% in a study in Hossana Town, Southern Ethiopia.³¹ Compared to this study, the prevalence of cigarette smoking was reported much higher (79.17%) in a study about socio-economic determinants of smoking among Iraqi adults.²⁰ A study in Mosul, Iraq revealed a higher cigarette smoking prevalence (77.4%).²⁶

In this study, the most common age for starting cigarette smoking was 15-19 years (30.1%). Nearly half (45.2%) of the sample used to smoke 11 to 20 cigarettes per day (Table 5). This result is supported by a study among adolescents in Eastern Ethiopia who reported that the majority (54.2%) of adolescents began smoking between the ages of 13-16, and (45.8%) of smokers smoked more than 10 cigarettes per day.³² Nearly half (46.6%) of the participants have ever tried waterpipe

smoking. Waterpipe smoking initiation for the majority (68.9%) of them was at an age of less than 30 years. More than one-third (37.2%) of the sample used to smoke waterpipe every day (Table 5). These results are consistent with those of a study that documented that 49% of the sample had ever tried waterpipe smoking and starting age of waterpipe smoking for 42.9% of the respondents was 19-21 years.³³ The same result was also found in Uganda revealing that 36.4% of the study participants smoked waterpipe, the waterpipe smoking initiation age was 22.8 years, and (31.2%) used to smoke waterpipe every day.³⁴ A study in Turkey, reported a much higher prevalence of waterpipe smoking (70.6%).³⁵ More than half (51.0%) of the studied sample had tried to quit smoking at least once in their life, and almost the entire studied sample (97.3%) tried to quit smoking because of fear of health risks in addition to family pressure (Table 6). Similarly, other studies in Qatar,³⁶ and Malaysia,³⁷ revealed that nearly half of respondents attempted to quit at least once. In contrast, the quit attempt was higher in Saudi Arabia (65.7% quit trials 36% succeeded),³⁸ in Brazil (65.6% quit trials 23.4% succeeded),³⁹ while a lower quit trial was reported in Indonesia (12.3%).⁴⁰ In agreement with the present study, medical concerns, medical risks, and social factors were the most common reasons for quitting attempts in the United States.⁴¹

Association between smoking and basic socioeconomic characteristics

In this study (Table 7), the prevalence of smoking was significantly higher among males (74.5%), participants of the age group 20-29 years (78.4%), and those who were single (78.6%). Numerous studies reached similar conclusions.⁴²⁻⁴⁴

The significantly higher prevalence of smoking among males compared to females in this study may be attributed to the limited access of female participants to smoking products and sociocultural undesirability tied to smoking behavior

among females. Regarding marital status, research from Yemen confirmed this study's findings and showed that smoking prevalence was much higher among singles.¹⁶ In this study, smoking was more prevalent among people who had smoker friends. These findings are supported by studies in Malaysia,⁴⁵ and another study among adolescents in Eastern Ethiopia.³² There was a statistically significant association between the prevalence of smoking and high educational level, and except for those who had a Ph.D. or equivalent the prevalence of smoking increased with increasing educational levels. An Indonesian study supported this result and revealed that the higher the education level the higher prevalence of smoking among respondents,⁴⁶ however, contrary to this was reported in Greece.⁴⁷ This study found that the prevalence of smoking was substantially higher among participants who had skilled manual/non-manual occupations (74.5%), similar findings were reported by other studies.^{47, 48} This study found that smoking was significantly more among participants from the middle socioeconomic level (69.3%). A higher prevalence of smoking was reported among those with lower socioeconomic status in an Indonesian study,⁴⁶ whereas contrary to these results, findings from a national health survey for the population of the Republic of Serbia showed that smokers are more likely to come from higher socioeconomic levels than from lower classes.⁴⁹ The disparity in the association between smoking prevalence and socioeconomic factors in previous studies may be attributed to different socioeconomic indexes, environmental factors, resources, participant awareness, and psychological states which are just a few possible causes and explanations for the founded discrepancy.

Conclusion

It can be concluded that the prevalence of cigarette, waterpipe, and Ex-smokers was

37.2%, 46.5%, and 8.0% respectively. Smoking initiation for cigarettes and waterpipe is at young ages under the influence of personal and peer pressure. About half of smokers tried to quit smoking but few proportions succeeded mainly due to anticipating health risks and family pressure. Prevalence of smoking was significantly higher among participants aged 20-29 years, male, single, higher education level, skilled manual/non-manual occupations, those having a smoker friend, and from a middle socioeconomic level.

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Competing interests

The author declares that she has no competing interests.

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