





Use of Tobacco Products in Turkish Children and Young People: Is there an Alarm for Hookah Use?

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Abstract

OBJECTIVES: In the recent years, it has been observed that the use of hookah, a tobacco product, has increased in children and young people in Turkey. This study was conducted to determine the prevalence of cigarette and hookah use in children and young people specific to age and gender and to define the factors relevant to the use of hookah.

MATERIALS AND METHODS: The study was conducted with secondary/high school students between 11 and 17 years of age (Survey 1, n=4718) and with university students between 18 and 23 years of age (Survey 2, n=1588) as two groups, which made a total of 6306 students. The students were asked to fill in a questionnaire which consisted of questions about socio-demographic data and the use of tobacco and tobacco products.

RESULTS: It was determined that the use of cigarette and hookah was high in males, and it increased as the age increased in both genders ($p<0.05$). It was also determined that parents and friends using cigarette and hookah affected the use of cigarette and hookah in the study groups in both surveys ($p<0.05$). Additionally, it was determined that the educational level of the parents and being of a high social class were the social determiners of hookah use ($p<0.05$).

CONCLUSION: It is important that we fight against the use of all tobacco products, especially in young people. Education about the damages of tobacco and applying tobacco products should start at an early age, and accurate tobacco control models may provide support in this field.

KEYWORDS: Youth, hookah use, tobacco products

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INTRODUCTION

Tobacco use is an important public health problem. Approximately 7 million people lose their lives to tobacco use annually, and about 884,000 people lost their lives due to passive exposure to tobacco smoke despite not using tobacco products themselves in 2016 [1, 2].

The usage of tobacco and tobacco products starts usually at an early age, in childhood/adolescence. According to the data from Turkey Statistical Institute (TUIK), Turkey Health Survey 2014, 47.8% of tobacco users started using tobacco at the age of 15-19; and 4.5% of tobacco users are under 10 years of age [3]. In the National Tobacco Control programs, information about age-specific smoking prevalence in children and adolescents, the trends over time are important. To plan tobacco control studies, information on tobacco epidemiology needs to be evaluated. In Global Youth Tobacco Survey (GYTS) 2017 of Turkey, percentage of smoking was found as 7.7% (female: 5.3% male: 9.9%) [4].

According to the Global Adult Tobacco Survey 2012, cigarette is the most common tobacco product among adults aged 15 years and above. It has been reported that the rate of use of cigarettes is 25.7%, hand-rolled cigarettes 2.6%, hookahs 0.8%, and other tobacco products 0.4%. A total of 16.1% of the participants in the survey started smoking before the age of 15, and 53.1% of them are still using the hookah starting before the age of 19 [5]. In GYTS 2017, percentage of ever use of hookah and current use of hookah were 24.6% and 11.2% among children aged 13-15, respectively [4]. The data support the fact that the use of hookahs is increasing in young people.

In most of the research done in Turkey in children and young people about smoking, there are limited data on hookah, cigar, pipe use, the age of starting these, rates, gender, and age. This study was carried out with the aim of determining the factors related to age and sex-specific prevalence and use of hookah, which is a product of tobacco, among Turkish children and young people in Manisa city center.

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MATERIALS AND METHODS

Study Group

The data were obtained from two population-based surveys: Survey 1 and Survey 2. The local ethics committee approved (18.05.2011-164) the study, and informed consent was obtained from the parents of the students.

Survey 1

The data of Survey 1 come from the baseline survey of an interventional study among adolescents between 11–17 years old which aimed to evaluate the effectiveness of peer education on healthy lifestyle behaviors in Manisa, Turkey, in 2011. There were 41 secondary schools and 20 high schools in Manisa City Center in 2011. Of these schools, the managers/teachers of 24 secondary schools and 12 high schools volunteered for the interventional study. The sample size was calculated as 2000 for each of the study group to obtain smoking risk reduction from 3.5% to 2.0% with type 1 error of 5%, power of 80%, ICC: 0.002, and a cluster size of 30. In this cross-sectional data, the sample size provided an estimation of smoking prevalence of hookah with a 10% prevalence and 1.2% precision (type 1 error: with a 95% confidence level, design effect: 2). The number of students to be selected from each school was determined by probability proportional to size sampling method. Classes were selected from schools with the intent of providing an overall age distribution comparable to the population's age distribution. All the students from randomly chosen classes were interviewed. The students who were not in the school during the data collection days were not included in the study. We collected the data from 5193 of the 6208 students who attended the selected classes by a self-reported questionnaire. Smoking status or use of hookah data were not completed for 475 students. The data analyses were carried out for students whose tobacco or hookah use data were complete (n=4718, 75.9%).

Survey 2

The survey was conducted on university students aged between 18 and 23 (n=2612) in Manisa, Turkey, in 2011. All the students who attended Medical Faculty (n=556), School of Health (n = 627), Vocational School of Health Services (n=313), and School of Physical Education and Sports (n=1116) in Manisa Celal Bayar University in 2011 were included in the study. Of those students, 1588 filled a self-reported questionnaire (response rate 60.7%).

Data Collection

The questionnaires used in both surveys consisted of sociodemographic variables such as age, sex, parents' educational level, social class, questions about smoking status of the parents/friends, as well as use of different tobacco prod-

ucts (cigarette, cigar, hookah, etc.). Social class was defined based on the father's job using Boratav's classification in Socioeconomic Characteristics of Classes and Groups in Turkey [6]. Per this classification, upper social class is self-employed people with high education level, middle class is salaried employed people with high education level, low social class is unqualified service workers, and unemployed is unemployed people.

Table 1 shows the definition of smoking and use of hookah (7).

Statistical Analysis

Comparisons were done using logistic regression analysis (enter model) in the Statistical Package for Social Sciences for Windows version 15.0 (SPSS Inc.; Chicago, IL, USA). The comparisons for age were adjusted by sex while the comparisons for sex were adjusted by age. The comparisons except for age and sex were adjusted by both age and sex. $p < 0.05$ was accepted as the level of statistical significance.

RESULTS

A total of 53.4% of the secondary/high school students were male, 64.4% were in the age group of 10–14; and 35.6% were in the age group of 15–17; and 39.7% of the university students were male, 64.6% were under 20 years of age; and 35.4% were over 21 years of age. In survey 1 and survey 2, it was determined that regular smoking was 11.9% and 32.6% in males, respectively, and 3.8% and 15.6% in females, respectively; while the use of hookah was 11.7% and 41.7% in males, respectively; and 6.0% and 24.1% in females, respectively (Table 2). We found most of the hookah users were seldom users. Of the users of hookah in secondary/high school and university, 4.6% and 1.1%, respectively, were daily users while 17.8% and 11.5%, respectively, used it 1–6 times a week; 77.6% and 87.4%, respectively, used it less than once a week.

Age-adjusted Odds Ratio (OR) (95% CIs) of smoking in males were 2.85 (95%, 2.19–3.70) times higher compared to females in survey 1, while it was 2.28 (95%, 1.79–2.91) in survey 2. Similarly, males had a higher risk of use of hookah in survey 1 and survey 2, respectively 1.77 and 2.13 times higher compared to females. As the age increased in the study group, the rate of smoking cigarettes and hookah increased in both sexes (Tables 3 and 4; Figure 1–4). Sex-ad-

Table 1. Definitions of smoking and use of hookah

	Secondary and high school Students	University students
Smoking		
Ever user	Have smoked at least once in a lifetime	
Occasional smokers	Smoking less than 1 per week.	Smoking less than 1 per day.
Regular smokers	Smoking at least 1 per week.	Smoking at least 1 per day.
Use of hookah		
Ever user	Have used at least once in a lifetime	
Current hookah smokers	Using hookah	

MAIN POINTS

- Hookah use is gradually increasing in teenagers and young adults.
- Our approach against tobacco should not only include cigarettes but also other forms of tobacco such as hookah.
- Education about the damages of tobacco and applying tobacco products should start at an early age.

Table 2. Prevalence of current use of cigarettes and hookahs in male and female in two surveys

	Survey 1 (Secondary and high schools)			Survey 2 (University)		
	Male % (95% CI)	Female % (95% CI)	Age-adjusted OR (95%CI)*,**	Male % (95% CI)	Female % (95% CI)	Age-adjusted OR (95%CI)*,**
Current use of cigarette	11.9 (10.6-13.1)	3.8 (3.0-4.6)	2.85 (2.19-3.70)	32.6 (29.0-36.1)	15.6 (13.3-17.8)	2.28 (1.79-2.91)
Current use of hookah	11.7 (10.4-12.9)	6.0 (5.0-7.0)	1.77 (1.40-2.23)	41.7 (37.9-45.4)	24.1 (21.4-26.7)	2.13 (1.71-2.66)

* Reference group is male
 **p<0.001 for all comparisons

Table 3. Use of cigarettes and hookahs by age in male and female secondary and high school students

Age	Smoking (%)			Use of hookah (%)	
	Ever users	Occasionally smokers	Regular smokers	Ever users	Current hookah smokers
Male					
≤11	9.9	2.1	0.8	6.4	2.5
12	15.3	1	2.4	7.2	2.5
13	17.2	1.4	2.9	11.4	3.7
14	22.7	3.9	5.5	14.0	8.8
15	24.2	3.9	15.9	33.7	20.1
16	25.7	5.6	18.7	39.3	27.2
≥17	28.1	6.8	24.5	47.6	31.4
Female					
≤11	3.1	0	0.8	1.6	0.0
12	5.5	0.4	0.4	4.7	1.7
13	12.9	0.2	1.8	9.0	4.3
14	14.8	0.9	2.6	18.7	8.1
15	24.4	0.9	5.4	22.1	11.6
16	24	2.4	9.1	29.6	13.6
≥17	22.8	3	11.9	30.0	13.0

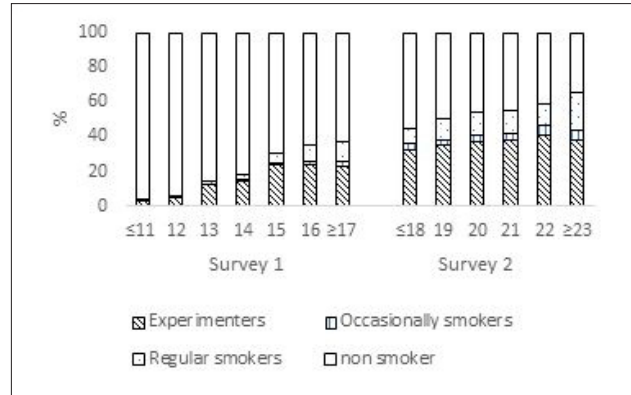


Figure 2. Use of cigarettes by age in females in survey 1 and survey 2

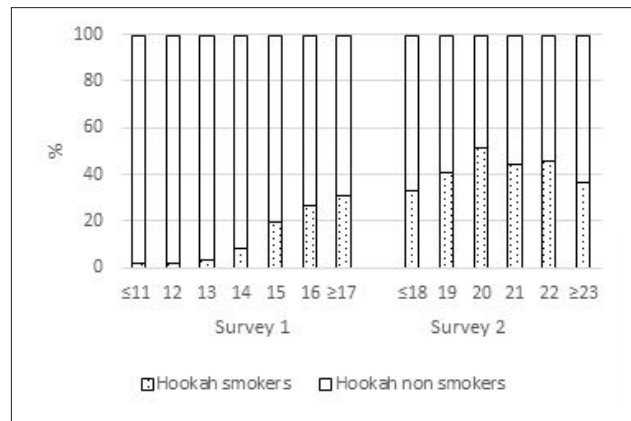


Figure 3. Use of hookah by age in males in survey 1 and survey 2

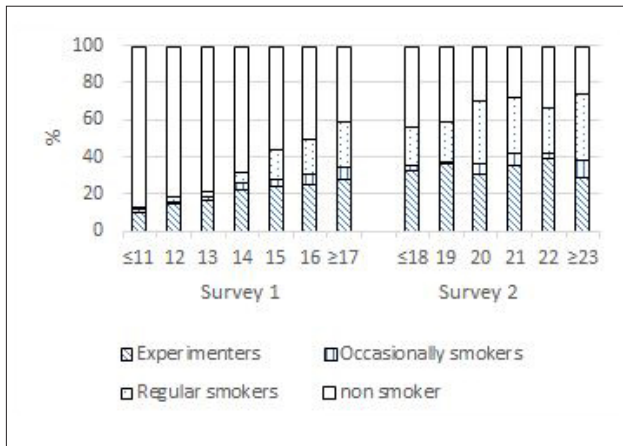


Figure 1. Use of cigarettes by age in males in survey 1 and survey 2

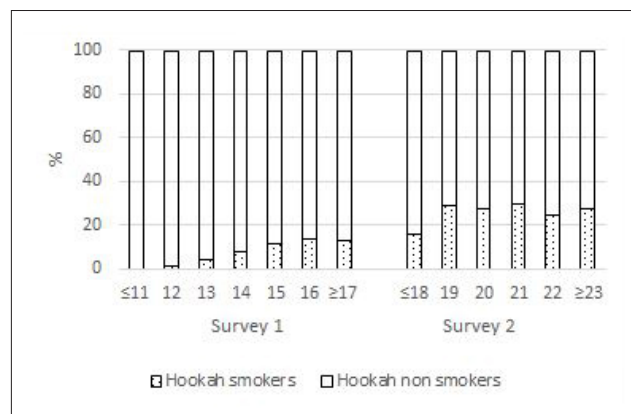


Figure 4. Use of hookah by age in females in survey 1 and survey 2

We found that the smoking status of parents and close friends are the most important risk factors for smoking in both surveys (p<0.05 for all comparisons). Age- and sex-adjusted

ORs for smoking status of friends were between 17.33 (95%, 9.51-31.57) and 70.15 (95%, 40.78–120.68). The statistically significant risk factors were also smoking status of parents and close friends. We also found ORs were lower in students who have lower social class (e.g. low education level of parents and low social class) compared to others ($p < 0.05$, for all comparisons) (Table 6).

DISCUSSION

In this study, we found smoking and the use of hookah are quite common in children and young people in the Manisa

city center. Smoking and hookah use increased as the age increased, and the smoking percentages are quite high among the final year students in high school and university. Approximately 1 in 3 males smoke and use hookah, while 1 in 6 females are users among the final year students of high school. The proportions of smoking and use of hookah are as high as 4 in 10 in males and 1 in 3 females among the final year students of the university. At the same time, it was determined that the use of cigarettes by parents and friends was a determining factor affecting cigarette and hookah use among adolescents. Besides these, it has been found that belonging to the upper social class increased hookah use.

Current smoking and current use of hookah were more common among males. At the same time, as the age of secondary/high school students and university students increased, the rate of ever using/smoking cigarette and hookah increased. It was observed that the rate of ever users of cigarette and hookah was high in males especially at age 15 and over (respectively min 24.4%, min 33.7%) in secondary/high school students. Girls also had lower rates but the trend was not different (min 22.8%, min 22.1%, respectively). The percentages of ever use of hookah were quite high among university students (males 77.8%, females 58.2%). According to 2016 national data, among adults older than 15 years who started smoking for the first time, 47.8% ranged between 15 and 19 years, 32.1% ranged between 10 and 14 years, and 4.5% were under 10 years of age [8]. It is stated that 53.1% of those who still use hookahs started using it before they were 19 years old [5]. Günay and his colleagues conducted a survey on 1682 secondary school students with an average age of 11.5 ± 0.7 . They found that 5.9% of the students were smokers and the mean age of the first experience was 8.9 ± 2.7 years. [9].

Çavdar and his colleagues reported the rate of trying a cigarette as 33.8% (male 36.3%, female 31.6%) in the research conducted on 2296 high school students in 2013/2014 [10]. The high rate of age-specific trying a cigarette or hookah

Table 4. Use of cigarettes and hookahs by age in male and female university students

Age	Smoking (%)			Use of hookah (%)	
	Ever users	Occasionally smokers	Regular smokers	Ever users	Current hookah smokers
Male					
≤18	32.8	3.2	20	57.9	33.3
19	36.9	0.9	21.6	66.1	40.9
20	30.8	5.6	33.6	76.6	51.9
21	35.7	6.1	30.6	73.2	44.3
22	39.5	2.5	24.7	77.8	45.7
≥23	29.4	9.5	34.9	71.1	37.0
Female					
≤18	33	3	8.8	39.4	16.4
19	35.6	2.5	12.4	55.4	29.4
20	37.4	3.7	13.4	54.3	27.7
21	37.9	4	13.7	58.2	29.8
22	41.3	5	12.5	53.1	24.7
≥23	38.7	5.3	21.3	51.3	27.6

Table 5. Sex-adjusted ORs and 95% confidence intervals of age groups for the current use of cigarettes and hookahs in secondary/high school and university students†

Age (n) ††	Survey 1 Secondary and high schools		Age (n) ††	Survey 2 University	
	Current use of smoking OR (95%CI) ^a	Current use of hookah OR (95%CI) ^a		Current use of smoking OR (95%CI) ^a	Current use of hookah OR (95%CI) ^a
≤11(490)	Ref	Ref	≤18 (450)	Ref	Ref
12 (876)	1.15 (0.51-2.58)	1.71 (0.67-4.35)	19 (319)	1.13 (0.76-1.68)	1.79 (1.29-2.49)***
13 (1002)	1.73 (0.82-3.66)	3.31 (1.39-7.86)**	20 (294)	1.79 (1.23-2.61)**	2.04 (1.46- 2.85)***
14 (725)	3.70 (1.79-7.63)***	7.29 (3.12-17.02)***	21 (218)	1.77 (1.18 -2.64)**	1.90 (1.32-2.73)***
15 (590)	8.48 (4.21-17.05)***	15.30 (6.64- 35.25)***	22 (162)	1.36 (0.85-2.15)	1.73 (1.16-2.59)**
16 (485)	12.05 (5.98-4.25)***	21.16 (9.18-48.74)***	≥23 (203)	2.65 (1.78-3.95)***	1.46 (0.99-2.13)
≥17 (288)	16.72 (8.20-4.12)***	24.81 (10.61-58.02)***			

†Dependent variables, current smoking/current use of hookah Yes:1, No:0
Independent variables. Sex (Male:1, Female:0), Age (primary, secondary or high (≤11:0, 12:1, 13:2, 14:3, 15:4, 16:5, ≥17:6), Age (University (≤18:0, 19:1, 20:2, 21:3, 22:4, ≥23:5).

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

††some of the data are missing for some students

Table 6. Age- and sex-adjusted ORs and 95% confidence intervals of social determinants of the current use of cigarettes and hookahs in secondary/high school and university students†

Variables (n) ††	Current use of smoking		Current use of hookah	
	Secondary and high schools	University	Secondary and high schools	University
	OR (95%CI) ^a	OR (95%CI) ^a	OR (95%CI) ^a	OR (95%CI) ^a
Mother's Educational level				
Illiterate/literate (638)	0.97 (0.53-1.76)	0.72 (0.43-1.19)	0.16 (0.09-0.30)***	0.44 (0.27-0.72)
Primary school (2082)	0.74 (0.42-1.28)	0.85 (0.60-1.21)	0.51 (0.34-0.77)**	0.73 (0.53-1.00)
Secondary school (799)	1.12 (0.62-2.01)	0.98 (0.64-1.49)	0.81 (0.52-1.26)	0.90 (0.62-1.31)
High school (865)	0.90 (0.49-1.64)	0.86 (0.59-1.27)	0.82 (0.53-1.29)	0.94 (0.67-1.33)
University (311)	(ref)	(ref)	(ref)	(ref)
Father's Educational level				
Illiterate/literate (182)	1.25 (0.60-2.60)	1.14 (0.46-2.79)	0.19 (0.07-0.49)***	0.68 (0.28-1.65)
Primary school (1693)	1.32 (0.84-2.07)	0.94 (0.68-1.29)	0.73 (0.52-1.01)	0.62 (0.47-0.83)***
Secondary school (1024)	1.63 (1.02- 2.61)*	0.86 (0.58-1.27)	0.94 (0.66-1.34)	0.89 (0.63-1.24)
High school (1056)	1.51-(0.93-2.42)	1.01 (0.73-1.39)	1.05 (0.74- 1.50)	0.86 (0.65-1.15)
University (695)	(ref)	(ref)	(ref)	(ref)
Social class				
Unemployed (431)	1.53 (0.90-2.59)	0.82 (0.51-1.33)	0.65 (0.41-1.03)	0.59 (0.38-0.93)*
Low (2080)	1.19 (0.79-1.79)	0.95 (0.68-1.32)	0.67 (0.49-0.92)*	0.70 (0.52-0.95)*
Middle (951)	1.15 (0.72-1.82)	0.85 (0.60- 1.19)	1.07 (0.77-1.50)	0.85 (0.63-1.15)
Upper (689)	(ref)	(ref)	(ref)	(ref)
Mother's smoking status				
No (3473)	(ref)	(ref)	(ref)	(ref)
Daily (634)	1.98 (1.42-2.76)***	1.68 (1.22-2.32)**	3.06 (2.34-3.99)***	1.79 (1.32-2.41)***
Occasionally(568)	1.90 (1.32-2.73)***	1.21 (0.77-1.91)	1.94 (1.41-2.67)***	1.36 (0.91-2.05)
Father's smoking status				
No (2076)	(ref)	(ref)	(ref)	(ref)
Daily (1813)	1.83 (1.38-2.42)***	1.58 (1.22-2.05)***	1.72 (1.36-2.18)***	1.20 (0.96-1.52)
Occasionally (743)	1.24 (0.79-1.95)	1.12 (0.69-1.82)	1.47 (1.03-2.11)*	0.94 (0.61-1.45)
Smoking status of close friends				
None (3161)	(ref)	(ref)	(ref)	(ref)
A small part (987)	5.73 (3.47-9.46)***	4.15 (2.27-7.60)***	4.43 (3.22-6.11)***	2.39 (1.70-3.36)***
Half (378)	27.64 (16.67- 45.82)***	17.33 (9.51-31.57)***	10.31 (7.19-14.78)***	4.54 (3.14-6.55)***
Almost all (181)	70.15 (40.78-120.68)***	35.59 (18.96-66.78)***	27.03 (17.78-41.09)***	6.62 (4.38-10.00)***

^aORs (95% CIs) for each social determinants were adjusted for age and sex.

[†]Dependent variables, current smoking /current use of hookah Yes:1, No:0

Independent variables. Sex (Male:1, Female:0), Age (primary, secondary or high (≤11:0, 12:1, 13:2, 14:3, 15:4, 16:5, ≥17:6), Age (University (≤18:0, 19:1, 20:2, 21:3, 22:4, ≥23:5), Mother's or father's Education level (Illiterate/Literate:1, Primary:2,Secondary:3, High school:4, University:5), Income level (Unemployed:1, low:2, Moderate:2, upper:3), Mother's or father's smoking status (non-smoker:1, daily:2, occasionally:3), Smoking status of closed friends (none:1, a small part:2, half:3, Almost all:4).

*p<0.05, **p<0.01, ***p<0.001

††some of the data are missing for some students

for the first time in our research supports national data. It is suggested that education on negative effects of tobacco use should be started in childhood and adolescence, and secondary/high school children should be educated about the ill effects of tobacco products, especially smoking and hookah.

gions in secondary/high school and university students, there are data supporting the increase of regular smoking as age increases [10-16]. At the same time, the use of hookahs also increases with age [10, 17, 18].

In our study, the use of cigarette and hookah was high in university students of both sexes but higher in males. While the rate of regular smoking among secondary/high school stu-

dents was 11.9% for males and 3.8% for females, these rates were 32.6% and 15.6% for university students, respectively. According to the Global Youth Tobacco Survey conducted in 2009, it was reported that the number of male smokers in the age group of 13–15 was almost twice that of female smokers (10.2% for male, 5.3% for female) [4]. GYTS 2012 of Turkey shows an increase in smoking prevalence (12.1% for male, 8.3% for female). The results of GYTS 2017 of Turkey revealed a decrease in smoking prevalence among 13-15-years old (9.9% for male, 5.3% for female) [4]. Surveys conducted in different years have shown that smokers are more likely to be male in secondary/high school students and university students [10-15, 17, 19-21]. The data from the Ministry of Health supports this [8]. Early application of models such as peer education as well as training this target group may help reduce the use of tobacco and its products in young people.

There is little data on the use of hookah in young people. It is known that the consumption of this tobacco product increased after the use of aromatic hookah started. According to the 2012 Global Youth Tobacco Survey data, it was reported that hookah use was 0.8% and other tobacco products use was 0.4%, with cigarettes being the most used tobacco product in adults over 15 years old. It was stated that the use of hookah in the youth between 15 and 24 years was 4.3% and the rate of using narghile in the educated people such as high school and university graduates was higher [5]. The percentage of ever use of hookah and current use of hookah were obtained as 24.6% and 11.6% (16.2% for male, 6.0% for female) among 13-15-years old in in 2017 GYTS of Turkey [4]. Günay et al. [9] found that the rate of ever use of hookah in secondary/high school students was 3.6% and the mean age of first experience was 10.3 ± 1.7 . Çavdar et al. [10] found that the rate of ever use of hookah was 41.8% in males and 30.7% in females; and reported that the ever use rate increased with social class. Jawad et al. [18], found that, in the age group of 11-16 in the UK, the rate of hookah use was 13.7% in 2013 and 14.6% in 2015, and that the use of hookah increased by 45% each year with age. In a study conducted in 2097 young people (11th-12th graders) in the USA in 2014, the prevalence of hookah use was found to be 10.7% [22]. In 2014, it was found that the use of hookah among university students was 28.6% in the US [23]. As in our study, as the age increased, the use of hookah increased and the use was more in men. Results also support the need for approaches to reduce the use of other tobacco products such as hookah and not just cigarettes.

Our study results showed that hookah use is quite common among young males over 17. In our study, the use of hookah in secondary/high school was 11.7% for males and 6.0% for females, while it was 41.7% for males and 24.1% for females among university students. Among secondary/high school students, we found that gender (OR: 6.0 [95% CI 5.0-7.0]) and older age (OR for ≥ 17 : 24.81 [95% CI, 10.61-58.02]) are closely related with current use of hookah. The male sex and older age were also statistically significant risk factors for current use of hookah among university students, but ORs were approximately 2. We also found smoking status of parents and close friends are the most important risk factors for smoking and use of hookah in both surveys. Smoking status

of close friends is the most determining factor on smoking or use of hookah of young people. Erbaydar et al. [24] in 2010 found that the peer effect was high in a study of 460 people who were smoking in hookah cafés. Kelishadi et al. [17], in a study that included elementary school students, found that father's and siblings' smoking status were related to the rate of smoking. In 2013, Habibullah et al. [25] found that in Pakistani college students, curiosity and peer influence were the main reasons to starting smoking. In 2014, Haroon et al. [26] conducted a study with Pakistani medical students and found curiosity, peer influence, and social trends were the main reasons to starting smoking. In the USA, Smith et al. [27] found that in high school students, the primary reason to starting smoking was peer influence. These findings support that peers and friends affect the smoking status of a teenager/young adult. Therefore, like in cigarette smoking, development of peer education programs in hookah smoking could be effective.

We found smoking was quite common, independent from socioeconomical status, in children and young people; but the use of hookah is statistically higher in upper social class. The results of our study show that young people can access cigarettes easily while they cannot afford the use of hookah. We did not ask the place of using hookah in our survey, but the higher use of hookah among students in the upper social class implies that they use hookah in cafés and not in their homes. The measures to prevent accessibility of cigarettes such as increasing the tax on cigarettes or preventing the sales of tobacco in bazaars may be effective to decrease smoking among young people.

Both in Turkey and around the world, legislative action and MPOWER approach seem to be effective at lowering the consumption of tobacco products. However, it is known that since 1990s, the increasing popularity of aromatic hookah smoking in Turkey and the rest of the Middle East has turned into an epidemic [28]. The studies on the reasons for use of hookah showed that young people prefer to use hookah because of aroma and peer effect [24, 29]. We did not gather information on why young people use hookah. We also did not collect information on the place of hookah use and the perceptions on the safety of hookah compared to other tobacco products. Studies conducted to garner information on this topic will be helpful for interventions to control tobacco use among young people. Increase in the number of hookah cafés may be another factor in increasing hookah use. Therefore, it is important to emphasize that our approach against tobacco should not only include cigarettes but also other forms of tobacco such as hookah. Informing teenagers and young adults about the dangers of tobacco products as soon as possible, using peer education models and tobacco control programs should support this cause.

Study Limitations

There are some strengths and limitations of this study. The sample size of the survey is quite large. The information on use of tobacco products has been collected from the students of secondary/high schools and university in the same year using the same method. Thus the study provides the differences in the use of tobacco products according to age and sex.

However, the response rate was lower than expected (75.9% for survey 1 and 60.7% for survey 2). The participation rates in these studies in developed countries have been gradually decreasing. The median participation rate for a similar study, BRFSS, in the USA, was 71% in 1993, 49% in 2000, and 51% in 2005 [30].

We think that the sampling bias due to low response rate might be random since we aimed to collect data in the class on school days.

HAYAT Project Team

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