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Factors associated with hookah use initiation among adolescents☆,☆☆

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Abstract

Objective: to determine the prevalence and to analyze factors associated with hookah use initiation among adolescents.

Methods: This was a cross-sectional study, in which questionnaires were collected from 495 students attending public and private schools of the urban area of the city of Várzea Grande, in the state of Mato Grosso, Brazil. Data were analyzed through descriptive, bivariate, and multiple Poisson regression analyses.

Results: A total of 19.7% students had tried a hookah. The use of hookah was associated with the final period of adolescence [PR = 6.54 (2.79, 15.32)]; enrollment in private schools [PR = 2.23 (1.73, 2.88)]; and presence of work activities [PR = 1.80 (1.17, 2.78)].

Conclusion: The proportion of adolescents that had tried a hookah was high. The influence of age, work activities, and class period on smoking initiation using the hookah was observed. Preventive measures encompassing all forms of tobacco smoking should be targeted at adolescents in the school environment, aiming at tobacco use control.

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Fatores associados à experimentação do narguilé entre adolescentes

Resumo

Objetivo: determinar a prevalência e analisar os fatores associados à iniciação do uso do narguilé entre adolescentes.

Métodos: trata-se de um estudo epidemiológico transversal. Foram coletados 495 questionários dos estudantes das escolas da rede de ensino público e privado da área urbana do município de

Várzea Grande/MT. Para análise dos dados foram realizadas análises descritiva, bivariada e regressão múltipla de Poisson.

Resultados: experimentaram o narguilé 19,7% dos estudantes. O uso do narguilé está associado com o período final da adolescência [RP = 6,54 (2,79; 15,32)], estarem matriculados nas escolas particulares [RP = 2,23 (1,73; 2,88)] e exercerem atividades laborativas [RP = 1,80 (1,17; 2,78)].

Conclusão: a proporção de adolescentes que experimentaram o narguilé foi elevada. Observou-se influência da idade do escolar, de atividades laborativas e do período das aulas para iniciação do tabagismo por esta forma. Medidas preventivas que abrangem as formas do tabaco devem ser direcionadas aos adolescentes, no ambiente escolar, como forma de controle do tabagismo.

Introduction

Smoking is considered an important public health problem due to the high prevalence of smokers and to the morbidity and mortality of diseases related to tobacco use.[1] Despite the decline in smoking prevalence, especially considering public policies implemented in recent years,[2,3] many young people still experience different forms of tobacco use, becoming vulnerable to initiation, and consequently, to tobacco dependence.[4,5] As smoking can also be considered a pediatric disease, teenagers are the main target for preventive and educational interventions aimed at interrupting the smoking initiation process. In this sense, the school is a privileged space for the study of this disease, as it identifies trends in smoking prevalence, producing data that help to understand this universe and, thus, to foster more effective preventive health policies for smoking control.[4]

Between 2002 and 2008, in the United States, cigarette use by adolescents decreased from 13.0% to 9.1%. In 2008, an estimated 1.4 million people aged 11 to 17 started smoking cigarettes.[6] In Brazil, tobacco use among adolescents has reached alarming rates in several locations.[7] In Cuiabá, state of Mato Grosso (MT), Brazil, the prevalence of smoking experimentation among the studied population was 30.2%; the most often associated factors were low maternal educational level, attending night school, having failed school, and having friends and siblings who smoke.[8] There are no local studies describing the prevalence of experimentation of other forms of tobacco, such as hookahs.

The consumption of tobacco through a hookah is accompanied by a widespread belief in the population that this is less harmful than smoking cigarettes; moreover, smokers believe that this form of tobacco consumption is less addictive.[9–12] As tobacco experimentation among young individuals remains a major impediment for the control of this endemic disease, and considering the harmful effects and addictive potential that the use of hookah promotes, this study was designed, aiming to establish the prevalence of hookah use and to analyze the factors associated with its use among adolescents in the city of Várzea Grande/MT, in order to support future public health interventions for prevention and control.

Methods

A cross-sectional epidemiological study was performed in public and private schools in 2011. The sample size was calculated by using the prevalence of tobacco experimentation among adolescents found in the study performed in Cuiabá, the capital of the state of MT, of 30.2%,[8] with a sampling error of 0.05. The following result was considered in order to establish the predicted sample: minimum sample of 322 × 1.5 design effect = 483 + 20% for losses = 547.

Data from the Educacenso 2010, which were provided by the State Department of Education, were used for random sampling. Initially, a spreadsheet was created in Microsoft Office Excel 2003, and the sixth to ninth years of Elementary School and the first, second and third years of High School from public and private schools in the urban area were included. A total of 687 classes were listed in alphabetical and increasing order of education, with a mean of 19 students enrolled in each. Were included in this study 495 adolescents in the age group between 10 and 19 years who agreed to participate. A total of 21 questionnaires were excluded, as the date of birth was not provided.

Data collection was performed in school, at pre-established dates and times, scheduled with the school principals by the main investigator and a research assistant. Students were informed about the research in the classroom by the interviewers, who provided instructions for completing the questionnaire, which was answered by all students present in the classroom at the time of the visit and without the teacher's presence. An adapted, closed, self-report questionnaire,[8] with no identification of the student was used for data collection.

Data were entered twice using an input mask, through Epi-Info 2000. Stata 1.0 was used for the statistical analysis. The chi-squared test was used to assess statistical differences between proportions and possible associations. In the univariate analysis, prevalence ratios and their corresponding 95% CIs were used as a measure of association between the dependent variable ''use of hookah'' and the other explanatory variables. To design the Poisson multiple regression model, all independent variables that had a p-value < 0.20 in the univariate analysis were included in the model, considering as significant those with a p-value < 0.05. The project was approved by the Research Ethics Committee of the University Hospital.

Table 1 Distribution of adolescents by type of school and socio-demographic variables, 2011.

Variables and categories	Public school (n)		Private school (n)		Total		p-value[a]
	n	%	n	%	n	%	
Age range (years)							
10-12	108	22.4	23	22.7	131	22.5	
13-15	230	51.0	20	32.1	250	49.1	
16-19	99	26.4	15	45.1	114	28.3	0.5471
Gender							
Male	202	46.1	31	53.0	233	46.8	
Female	222	53.8	25	46.9	247	53.1	0.1188
Father's level of schooling							
Illiterate + Incomplete Elementary school (4 years)	56	11.4	04	5.6	60	10.8	
Complete Elementary School (8 years)	60	12.9	07	13.0	67	12.9	
Complete High School	117	28.4	10	26.0	127	28.3	
Complete College/University	29	7.12	18	33.5	47	9.8	
Did not know	165	40.0	19	21.7	184	38.1	0.0032
Mother's level of schooling							
Illiterate + Incomplete Elementary School (4 years)	58	12.6	01	0.9	59	11.4	
Complete Elementary School (8 years)	73	16.9	08	18.3	81	17.0	
Complete High School	120	29.6	09	17.3	129	28.4	
Complete College/University	40	10.0	24	43.9	64	13.5	
Did not know	132	30.6	14	19.4	146	29.5	< 0.0001
Socioeconomic level							
A + B	128	48.2	34	80.4	162	52.1	
C + D + E	138	51.8	07	19.6	145	47.9	< 0.0001

Weighted percentages.
[a] Significance of the association chi-squared test.

Results

The sample comprised a total of 495 students; 89.7% attended public schools and 10.3%, private schools. During the day, 86.2% of the students attended classes (Table 1).

The prevalence of hookah experimentation was 19.7%; most students reported that they preferred to use it with friends (90.7%). There was no statistical difference between females (19.0%) and males (20.4%, p = 0.7534). Among those who had experimented with a hookah, the proportion increased progressively and directly with age, with a prevalence of 3.9% in the age group 10-12 years, 17.6% in the age group 13-15 years, and 35.9% in the age group 16-19 years (p < 0.0001) (Table 2).

In the final analysis model, hookah experimentation was associated with the final years of adolescence [PR = 6.54 (2.79, 15.32)], enrollment in private school [PR = 2.23 (1.73, 2.88)], and presence of work activities [PR = 1.80 (1.17, 2.78)]. This model was considered appropriate, with p = 0.476 (Hosmer and Lemeshow's test) (Table 3).

Discussion

The prevalence of hookah experimentation in this study is close to the values described in the cities of Campo Grande (18.3%) and São Paulo (22.1%), based on the secondary data side from Szklo AS *et al* (2011).[13] The higher prevalence

(29.6%) of the hookah use among students in Lebanon can be explained by the fact that hookah use is part of the Lebanese culture.[14]

Despite the lower prevalence when compared with the classical initiation of smoking, i.e., smoking cigarettes, the hookah experimentation rate is a matter of concern, indicating some degree of dissemination and popularization of this form of tobacco use. In addition to the glamour and the novelty of the process, it is also possible that a migration to other forms of tobacco is occurring, due to the success of policies restricting the use of industrialized cigarettes. It is known that the tobacco industry considers adolescents as potential consumers and, until recently, targeted advertisement towards sweet and menthol flavors, together with attractive packaging, for products used in hookahs.[15] Despite this pressure from the industry, a decrease in cigarette smoking has been observed among students in state capitals of Brazil, which can be considered a positive result of anti-smoking campaigns.[2,16]

It is known that the use of hookahs allows socialization, mingling with friends, and relaxation moments, which can support the preference for hookah observed in this study regarding the place and the presence of company when using it. It can be observed that the frequency of use more than once a month is close to that observed among American students, who prefer weekly use (41%).[17] Even if the student tries the hookah, he or she cannot yet be considered a smoker, but the harmful health effects that a hookah

Table 2 Prevalence of hookah use initiation, prevalence ratio (PR), and confidence interval (95% CI) according to the classification of demographic variables, 2011.

Variables and categories	n[a]	Prevalence of hookah use initiation (%)	Crude PR (95% CI)	p-value[b]
School period				
Morning + Afternoon	427	16.6	1.00	
Night	45	40.0	2.41 (1.48; 3.93)	0.0002
Grade				
Elementary School	338	11.7	1.00	
High School	132	33.5	2.85 (1.63; 4.99)	0.0006
Receives salary or has allowance				
Yes	250	25.4	1.93 (1.31; 2.85)	
No	192	13.1	1.00	0.0008
Has a job				
Yes	115	33.9	2.35 (1.42; 3.90)	
No	349	14.4	1.00	0.0012
School type				
Public	417	17.1	1.00	0.0097
Private	55	42.7	2.49 (1.34; 4.63)	
Has failed school				
Yes	123	30.0	1.89 (1.05; 3.39)	
No	342	15.8	1.00	0.0328
Smokers at home				
Siblings	31	38.1	1.96 (1.05; 3.66)	0.1062
Relatives	133	19.6	1.01 (0.65; 1.57)	
Others	37	13.0	0.67 (0.28; 1.62)	
No smokers	238	19.4	1.00	

CI, confidence interval; PR, prevalence ratio.

[a] Weighted sample values were taken into account.

[b] Values in bold have statistical significance (p < 0.05).

smoking session causes should be considered, as this form of tobacco consumption is as harmful as other forms of smoking, especially regarding the cardiovascular and respiratory effects.[18–20] Additionally, hookah experimentation is a gateway to future nicotine dependence.

In the dependent variable association analyses, hookah experimentation and the other variables showed no differences regarding gender among those experimenting with hookahs, suggesting that the similar experimentation in both genders is related to the students' interpretation of hookah effects on health. These results differ from studies that found a higher prevalence of males[21] and others describing a greater number of females,[14,22] with the latter authors explaining the higher prevalence is due to the

Table 3 Poisson's multiple regression model: variables associated with hookah use, 2011.

Variables and categories	Prevalence of hookah use initiation (%)	Crude PR (95% CI)	Adjusted PR (95% CI)[a]
Age (years)			
10-12	3.99	1.00	1.00
13-15	17.64	4.43 (1.63; 12.03)	4.05 (1.61; 10.22)
16-19	35.94	9.02 (3.32; 24.49)	6.54 (2.79; 15.32)
Works			
Yes	33.90	2.35 (1.42; 3.90)	1.80 (1.17; 2.78)
No	14.42	1.00	1.00
School type			
Public	17.13	1.00	1.00
Private	42.71	2.49 (1.34; 4.63)	2.23 (1.73; 2.88)

CI, confidence interval.

[a] Adjusted by the other variables of the table.

country's culture, which represses the use of cigarette smoking by females. Regarding age, the prevalence of hookah use increased with the student's age, which was corroborated by other studies.[17,22]

Multiple analysis showed that the hookah experimentation was more prevalent in students from private schools, in disagreement with another study that described more experimentation among students from public schools.[14] Regarding the socioeconomic class, the present results stands out, as a smaller proportion of smokers among individuals with a better level of schooling would be expected, considering that smoking is a disease associated with a population's low purchasing power.[23] Possibly, the opposite occurred because the greater purchasing power facilitated the purchase of hookah equipment, becoming crucial to these findings. This fact is reinforced by another result found in the present study: a higher proportion of hookah use among adolescents who have their own income (workers), regardless of being from a low- or high-income family. These data are corroborated by the results of studies that found a higher prevalence of hookah use among adolescents who had jobs.[21,22]

Finally, tobacco experimentation and smoking initiation among adolescents is still a matter of concern, both in the traditional and alternative forms. Specially-created public policies should be directed at this population, with emphasis on educational campaigns warning that use of hookah is a form of smoking initiation that is equally or more harmful than smoking cigarettes. Thus, it can be concluded that among the adolescents studied, the use of hookah was associated with better socioeconomic class (private schools), increasing age (higher age range), and presence of work activities (better purchasing power).

Conflicts of interest

The authors declare no conflicts of interest.

References

1. Sociedade Brasileira de Pneumologia e Tisiologia; Sociedade Brasileira de Cardiologia; Associação Brasileira de Psiquiatria; Federação Brasileira das Sociedades de Ginecologia e Obstetrícia; Sociedade Brasileira de Anestesiologia; Associação Brasileira de Medicina Intensiva; et al. Smoking: Part I. Rev Assoc Med Bras. 2010;56:134–7.
2. Levy D, Almeida LM, Szklo A. The Brazil SimSmoke policy simulation model: the effect of strong tobacco control policies on smoking prevalence and smoking-attributable deaths in a middle income nation. PLoS Med. 2012;9:1–12.
3. Godoy I. Prevalência de tabagismo no Brasil: medidas adicionais para o controle da doença devem ser priorizadas no Ano do Pulmão. J Bras Pneumol. 2010;36:4–5.
4. Centers for Disease Control and Prevention (CDC). Preventing tobacco use among youth and young adults. 2012 [cited04 April 2012]. Available from: www.cdc.gov/tobacco
5. Silva MA, Rivera IR, Carvalho AC, Guerra Júnior AH, Moreira TC. The prevalence of end variables associated with smoking in children and adolescents. J Pediatr (Rio J). 2006;82: 365–70.
6. Centers for Disease Control and Prevention (CDC). Cigarette use among high school students - United States, 1991-2009. MMWR Morb Mortal Wkly Rep. 2010;59:797–801.
7. Filho VC, Campos W, Lopes AS. Prevalence of alcohol and tobacco use among Brazilian adolescents: a systematic review. Rev Saude Publica. 2012;46:901–17.
8. Silva MP, Silva RM, Botelho C. Fatores associados à experimentação do cigarro em adolescentes. J Bras Pneumol. 2008;34:927–35.
9. Maziak W. The waterpipe: time for action. Addiction. 2008;103:1763–7.
10. Smith-Simone S, Maziak W, Ward KD, Eissenberg T. Waterpipe tobacco smoking: Knowledge, attitudes, beliefs, and behavior in two U.S. samples. Nicotine Tob Res. 2008;10: 393–8.
11. Chaouachi K. Hookah (Shisha, Narghile) smoking and environmental tobacco smoke (ETS). A critical review of the relevant literature and the public health consequences. Int J Environ Res Public Health. 2009;6:798–843.
12. Primack BA, Sidani J, Agarwal AA, Shadel WG, Donny CE, Eissenberg TE. Prevalence of and associations with waterpipe tobacco smoking among U.S. university students. Ann Behav Med. 2008;36:81–6.
13. Szklo AS, Sampaio MM, Fernandes EM, Almeida LM. Perfil de consumo de outros produtos de tabaco fumado entre estudantes de três cidades brasileiras: há motivo de preocupação? Cad Saude Publica. 2011;27:2271–5.
14. El-Roueiheb Z, Tamim H, Kanj M, Jabbour S, Alayan I, Musharrafieh U. Cigarette and waterpipe smoking among Lebanese adolescents, a cross-sectional study, 2003-2004. Nicotine Tob Res. 2008;10:309–14.
15. Instituto Nacional do Câncer (INCA).Atualidades do tabagismo. [cited 14 May 2012]. Available from: http://www.inca.gov.br/tabagismo/frameset.asp?item=jovem&link=namira.htm
16. Ministério da Saúde. Plano de implantação da abordagem e tratamento do tabagismo na rede SUS Portaria GM/MS 1.035/04Portaria SAS/MS 442/04. [cited 24 June 2010]. Available from: http://www.inca.gov.br/tabagismo/publicacoes/plano_abordagem_sus.pdf
17. Ward KD, Eissenberg T, Gray JN, Srinivas V, Wilson N, Maziak W. Characteristics of U.S. waterpipe users: A preliminary report. Nicotine Tob Res. 2007;12:1339–46.
18. Hakim F, Hellou E, Goldbart A, Katz R, Bentur Y, Bentur L. The Acute Effects of Water-pipe smoking on the cardiorespiratory system. Chest. 2011;139:775–81.
19. Blank MD, Cobb CO, Kilgalen B, Austin J, Weaver MF, Shihadeh A, et al. Acute effects of waterpipe tobacco smoking: a double-blind, placebo-control study. Drug Alcohol Depend. 2011;116:102–9.
20. Raad D, Gaddam S, Schunemann HJ, Irani J, Abou Jaoude P, Honeine R, et al. Effects of water-pipe smoking on lung function - a aystematic review and meta-analysis. Chest. 2011;139:764–74.
21. Al-Lawati JA, Muula AS, Hilmi SA, Rudatsikira E. Prevalence and determinants of waterpipe tobacco use among adolescents in Oman. Sultan Qaboos Univ Med J. 2008;8:37–43.
22. Waked M, Salameh P, Aoun Z. Water-pipe (narguilé) smokers in Lebanon: a pilot study. East Mediterr Health J. 2009;15: 432–42.
23. Instituto Nacional do Câncer (INCA). A situação do tabagismo no Brasil:Dados dos inquéritos do Sistema Internacional de Vigilância do Tabagismo Organização Mundial da Saúde realizados no Brasil entre 2002 e 2009. 2011 [cited 14 May 2012]. Available from: www.inca.gov.br