January 2007

Prevalence and predictors of smokeless tobacco use among high-school males in Karachi, Pakistan

S Rozi
Aga Khan University, shafquat.rozi@aku.edu

S Akhtar
Aga Khan University

Recommended Citation

Rozi, S., Akhtar, S. (2007). Prevalence and predictors of smokeless tobacco use among high-school males in Karachi, Pakistan. *Eastern Mediterranean Health Journal = La Revue De Sante De La Mediterranee Orientale = Al-Majallah Al-Sihhiyah Li-Sharq Al-Mutawassit, 13*(4), 916-924.
Available at: https://ecommons.aku.edu/pakistan_fhs_mc_chs_chs/632

Prevalence and predictors of smokeless tobacco use among high-school males in Karachi, Pakistan

S. Rozi[1] and S. Akhtar[1,2]

معدل انتشار تعاطي التبغ اللاتدخيني وما ينبئ به بين المراهقين الذكور في المدارس العليا في كراتشي، باكستان

شفقت روزي، سعيد أختـر

الخلاصـة: أجرى الباحثان دراسة مستعرضة في ثلاث مدن في كراتشي، باكستان، لدراسـة معـدل انتـشار تعـاطي التبغ اللاتدخيني والعوامل التي ترافقه بين 772 مـن المراهقين الـذكور في المـدارس العليـا. وقـد تـضمَّنت المعطيـات المجموعة من الاستبيان العوامل الاجتماعية والديموغرافية وسوابق تدخين السجائر وتعاطي التبغ اللاتدخيني. وقد بلغ معدل انتشار تعـاطي التبغ اللاتـدخيني (الغوتكـا، والـنشوق، والنيـسوار) 16.1٪ (13.5٪ – 18.9٪) بفاصـلة ثقـة مقدارها 95٪ CI). وعند إجراء التحليل بالتحوُّف اللوجسـتي المتعدِّد، اتَّضح أن العوامل الـتي تـتعلَّق بتعـاطي التبـغ اللاتدخيني بين المراهقين الذكور، تعلُّقاً يُعْتَدُّ به إحصائياً، هي الانتساب إلى مدارس حكومية (معـدل أرجحيـة OR مصحَّح 6.3)، وتدخين السجائر (معدل أرجحية 3.2)، وعـدم مـشاهدة إعلانـات حـول مكافحـة التبـغ (معـدل أرجحية 1.5)، والسوابق العائلية لتعاطي التبـغ (معـدل أرجحيـة 3.9)، ومـضغ جـوزة التنبـول (معـدل أرجحيـة مصحَّح 2.9)، وتعاطي جوزة الأريكا (معدل أرجحية مصحَّح 3.2).

ABSTRACT A cross-sectional study was conducted in 3 towns in Karachi, Pakistan to investigate the prevalence of and factors associated with the use of smokeless tobacco among 772 high-school adolescent males. A structured questionnaire collected data on sociodemographic factors and history of cigarette and smokeless tobacco use. Prevalence of smokeless tobacco use (*gutka*, snuff, *niswar*) was 16.1% (95% CI: 13.5%–18.9%). On multiple logistic regression analysis, the factors significantly related to smokeless tobacco use among the sample were: attending government school [adjusted odds ratio (OR) 6.3], smoking cigarettes (OR 3.2), not seeing anti-tobacco advertisements (OR 1.5), family history of tobacco use (OR 3.9), use of betel quid (OR 2.9) and use of areca nut (OR 3.2).

Prévalence et prédicteurs de la consommation de tabac sans fumée chez les lycéens de sexe masculin à Karachi au Pakistan
RÉSUMÉ Au Pakistan, une étude transversale a été menée dans 3 districs de Karachi chez 772 lycéens de sexe masculin afin de déterminer la prévalence de la consommation de tabac sans fumée et les différents facteurs qui lui sont associés. Un questionnaire structuré a permis la collecte des données relatives aux facteurs sociodémographiques, ainsi qu'à l'histoire de la consommation de cigarettes et de tabac sans fumée. La prévalence de l'usage du tabac sans fumée (*gutka*, tabac à priser, *niswar*) était de 16,1 % (IC 95% : 13,5 - 18,9 %). L'analyse de régression logistique multiple a révélé que chez les adolescents de sexe masculin, les facteurs significativement liés à la consommation de tabac sans fumée étaient la fréquentation des lycées publics [odds ratio (OR) ajusté : 6,3], l'usage de cigarettes (OR : 3,2), l'absence de visibilité des messages antitabac (OR : 1,5), une histoire familiale de tabagisme (OR : 3,9) et l'usage de la chique de bétel (OR : 2,9) et de noix d'arec (OR : 3,2).

[1]*Division of Epidemiology and Biostatistics, Department of Community Health Sciences, Aga Khan University, Karachi, Pakistan (Correspondence to S. Rozi: shafquat.rozi@aku.edu).*
[2]*Department of Community Medicine and Behavioural Sciences, Faculty of Medicine, Kuwait University, Safat, Kuwait.*

Introduction

About 5 million people worldwide die annually from tobacco-related disease [1]. Tobacco kills more people each year around the world than AIDS, drug abuse, road traffic accidents, murders and suicide combined [2].

In Pakistan, about 34% of males and 13% of females use tobacco in different forms [3]. Currently, the major forms of tobacco that are in use in South Asian countries including Pakistan are betel quid (*pan*) with tobacco, *gutka* (special tobacco formulation), packaged chewing tobacco products and *bidis*. *Gutka* is a new, sweetened form of smokeless tobacco, legally sold packaged in bright foil that is raising major health concerns. Betel quid with tobacco consists of 4 main ingredients: tobacco, areca nuts and slaked lime wrapped in betel leaf. Snuff is powder tobacco that is inhaled through the nasal passages or taken orally.

People share the common belief that smokeless tobacco (chewable tobacco or snuff) is not harmful to health [4]. However, scientific evidence shows that use of smokeless tobacco is just as addictive and harmful as smoked tobacco [5]. Chewed tobacco is a well-established risk factor for oral cancer [6,7].

The pattern of tobacco use varies according to social status and age. Tobacco use primarily begins in early adolescence, typically by age 16 years; first use mostly occurs before the time of high-school graduation [8,9]. Recent research indicates that smoking among adolescents is rising and age of initiation is becoming younger [10]. The use of chewable tobacco and snuff has been increasing among adolescents [11].

Smokeless tobacco is easier to hide and use than smoke products, especially in the restricted environment of schools. Tobacco use among peer groups, friends, siblings and parents is a powerful influence for initiation of various forms of tobacco use in adolescence [12–14]. Furthermore, daily smokeless tobacco users were more likely to start using cigarettes, marijuana and alcohol than were others [15,16]. Therefore, it is imperative to assess the magnitude of smokeless tobacco use and characterize this population so as to design necessary interventions to control the problem. The objectives of this study were to estimate the use of and identify the factors associated with smokeless tobacco among high-school adolescent boys in Karachi, Pakistan.

Methods

A cross-sectional study was conducted from January 2003 to May 2003 in schools of 3 areas of Karachi, the largest city of Pakistan, with representation of people from all ethnic, social and economic groups [17]. There are 79 registered public and private schools [18]. The study only covered male adolescents as tobacco use among adolescent females in our culture is not common or socially acceptable; it is mostly used by older women, particularly those in the labour force.

Two-stage cluster sampling stratified on school type was employed to select schools and students. Each school was treated as a cluster: 33 out of 79 schools were selected randomly proportionate to the number of each school type (17 public and 16 private) [10]. Of the students present on the day of our visit, an average of 25 students from each public school and 20 students from each private school were selected systematically on the basis of their seating arrangement.

We interviewed 772 male secondary school (6th–10th grade) students aged 10–16 years. We used a structured questionnaire

which was initially designed in English and translated into Urdu and pre-tested. Field staff were trained in interview techniques and the purpose of the study.

Data were collected about sociodemographic characteristics (age, sex, education and employment status), cigarette smoking, use of smokeless tobacco (*gutka*, snuff, *niswar*) and use of other chewed products (*pan* without tobacco, areca nut) by the student and his family members. Students were also asked if during the past 30 days or 6 months they had seen/heard tobacco promotion or anti-tobacco advertisements on television, radio or in magazines. To preserve respondents' privacy, the questionnaire was administered by trained data collectors in a separate room from the classroom.

Permission was taken from Nazim district education officer and appropriate school authorities to conduct a research study in the schools of their region. Verbal consent was taken from the participants and they were assured about the confidentiality of the data.

Statistical analysis

To assess the prevalence of cigarette smoking and smokeless tobacco, *pan* and areca nut use, means and standard error (SE) for continuous variables and proportions for categorical variables were calculated. Crude odds ratios (OR) and their 95% confidence interval (CI) were calculated by univariate logistic regression. Those variables with $P \leq 0.25$ or those of biological and/or social importance were selected for multiple logistic regression analysis [19]. All plausible interactions were evaluated for inclusion in the multivariate model. Adjusted OR and their 95% CI were obtained from the final multiple logistic regression model. All the analysis was performed with *SPSS*, version 11.5.

Results

A total of 772 male students were interviewed: 427 (55.3%) from government and 345 (44.7%) from private schools. The mean age of students was 14.8 (SE 0.1) years. In all public and private schools of the 3 selected towns, the main languages spoken by students were Sindhi (39.6%) and Urdu (20.6%). Table 1 shows the sociodemographic characteristics of the respondents. The majority of mothers of the adolescents (65.2%) had no formal education and only 6.5% were in paid employment.

The prevalence of smokeless tobacco use was 16.1% (95% CI: 13.5%–18.9%) and cigarette smoking was 13.7% (95% CI: 11.3%–16.2%). The mean age of starting cigarette smoking was 13.1 years (SE 0.2) and smokeless tobacco was 11.5 years (SE 0.1) (Table 1). Some of the students (18.0%) reported spending 500 rupees or more per month on buying areca nut and *gutka*. In addition 12.6% and 47.2% of students were using pan and areca nut respectively.

The mean age of smokeless tobacco users was 15.2 years (SE 1.2) compared with 14.8 years (SE 1.3) for non-users. Univariate analysis showed that smokeless tobacco use among the adolescents was significantly associated with age, type of school, area of residence, parents' education and father's occupation, with users more likely to be younger, attending government schools, living in Gadap, with less well-educated parents ($P \leq 0.025$) (Table 2).

Smokeless tobacco use was also associated with spending leisure time outside the home, use of *pan* without tobacco, use of areca nut, smoking cigarettes, seeing tobacco promotion advertisements, not seeing anti-tobacco promotion advertisements and

Table 1 **Sociodemographic characteristics of respondents and history of cigarette and smokeless tobacco use among high-school adolescents in Karachi, Pakistan**

Characteristic	No. (n = 772)	%	Characteristic	No. (n = 772)	%
Father's education			*Spend leisure time[b]*		
Intermediate or above	222	28.8	Reading books	480	62.2
Metric[a]	149	19.3	Playing games	410	53.1
Middle	56	7.3	Watching television	451	58.4
Primary	120	15.5	Working	97	12.6
No schooling	225	29.1	Studying	34	4.4
Father's occupation			Outside home	15	1.9
Professional	61	7.9	*Ever smokers: age at starting smoking (years)*		
Service	144	18.7			
Business	141	18.3	8–10	35	21.1
Agriculture and forestry work	79	10.2	11–13	44	26.5
Production and related work	190	24.6	14–16	87	52.4
Other	157	20.3	Mean (SE)	13.1 (0.2)	
Mother's education			*Ever users: age at starting smokeless tobacco (years)*		
Intermediate or above	68	8.8			
Metric[a]	76	9.8	5–8	82	15.0
Middle	41	5.3	9–12	242	44.4
Primary	84	10.9	13+	221	40.6
No schooling	503	65.2	Mean (SE)	11.5 (0.1)	
Residential area			*Family history of tobacco use*		
Malir	203	26.3	Yes	391	50.6
Bin-Qasim	366	47.4	No	381	49.4
Gadap	203	26.3			

[a]*Metric means completion of 10 years of schooling.*
[b]*Multiple responses.*
n = *total number of respondents.*
SE = *standard error.*

tobacco use by one or more family member ($P \leq 0.025$) (Table 2).

The final multiple logistic regression model showed that school type (adjusted OR = 6.3; 95% CI: 3.2–12.6), smoking (adjusted OR = 3.2; 95% CI: 1.9–5.4), not seeing anti-tobacco advertisements on television and radio (adjusted OR = 1.5; 95% CI: 1.0–2.4), family history of tobacco use (adjusted OR = 3.9; 95% CI: 2.2–6.8), use of betel quid (adjusted OR = 2.9; 95% CI: 1.7–5.0) and use of areca nut (adjusted OR = 3.2; 95% CI: 1.9–5.1) were significantly associated with smokeless tobacco

use among high school adolescents (Table 3).

Discussion

The prevalence of use of smokeless tobacco products was higher than cigarettes among high-school students (16.1% versus 13.7%) and the age at starting smokeless tobacco was also lower than for cigarettes (mean 11.5 years versus 13.1 years). Several factors may contribute to the use of smokeless tobacco: it is easy to obtain, is more socially

Table 2 **Univariate analysis of factors associated with smokeless tobacco use among male high-school adolescents in Karachi, Pakistan**

Characteristic	Non-user (n = 648)		User (n = 124)		Crude OR	95% CI
	No.	%	No.	%		
Mean (SE) age (years)	14.8 (1.3)		15.2 (1.2)		1.3	1.1–1.5
Type of school						
Private	334	96.8	11	3.2	1.0	–
Government	314	73.5	113	26.5	10.9	5.7–20.6
Father's education						
Intermediate or above	210	94.6	12	5.4	1.0	–
Metric[a]	130	87.5	19	12.8	2.5	1.2–5.4
Middle	47	83.9	9	16.1	3.3	1.3–8.4
Primary	88	73.3	32	26.7	6.3	3.1–12.9
No schooling	173	76.9	52	23.1	5.2	2.7–10.1
Father's occupation						
Professional	53	86.9	8	13.1	0.8	0.3–1.9
Service	134	93.1	10	6.9	0.4	0.2–0.8
Business	111	78.7	30	21.3	1.5	0.8–2.7
Agriculture/forestry work	62	78.5	17	21.5	1.5	0.7–3.0
Production/related work	155	81.6	35	18.4	1.2	0.7–2.2
Other	133	84.7	24	15.3	1.0	–
Mother's education						
Schooling	397	78.9	106	21.1	1.0	–
No schooling	251	93.3	18	6.7	3.7	2.2–6.2
Residential area						
Malir	180	88.7	23	11.3	1.0	–
Bin-Qasim	319	87.2	47	12.8	1.2	0.6–1.9
Gadap	149	73.4	54	26.6	2.8	1.6–4.8
Cigarette smoking						
Non-smoker	581	87.2	85	12.8	1.0	–
Smoker	67	63.2	39	36.8	3.9	2.5–6.2
Seen tobacco promotion advertisements						
No	430	85.1	75	14.9	1.0	–
Yes	218	81.6	49	18.4	1.3	0.8–1.9
Seen anti-tobacco advertisements						
Yes	224	87.2	33	12.8	1.0	–
No	424	82.3	91	17.7	1.4	0.9–2.2
Family history of tobacco use						
No	361	94.8	20	5.2	1.0	–
Yes	287	73.4	104	26.6	6.5	3.9–10.8
Pan (betel quid) without tobacco user						
No	598	88.6	77	11.4	1.0	–
Yes	50	51.5	47	48.5	7.3	4.5–11.6

Table 2 **Univariate analysis of factors associated with smokeless tobacco use among male high-school adolescents in Karachi, Pakistan** (concluded)

Characteristic	Non-user (n = 648)		User (n = 124)		Crude OR	95% CI
	No.	%	No.	%		
Areca nut user						
No	353	86.5	55	13.5	1.0	–
Yes	295	81.0	69	19.0	1.5	1.0–2.2
Spend leisure time outside home						
No	638	84.3	119	15.7	1.0	–
Yes	10	66.7	5	33.3	2.7	0.9–7.9

[a]Metric means completion of 10 years of schooling.
n = number of respondents.
SE = standard error; OR = odds ratio; CI = confidence interval.

Table 3 **Multivariate analysis of factors associated with smokeless tobacco use among male high-school adolescents in Karachi, Pakistan**

Characteristic	Adjusted OR	95% CI
Type of school		
Private	1	–
Government	6.3	3.2–12.6
Cigarette smoking		
Non-smoker	1	–
Smoker	3.2	1.9–5.4
Seen anti-tobacco advertisements		
Yes	1	–
No	1.5	1.0–2.4
Family history of tobacco use		
No	1	–
Yes	3.9	2.2–6.8
Pan (betel quid) without tobacco user		
No	1	–
Yes	2.9	1.7–5.0
Areca nut user		
No	1	–
Yes	3.2	1.9–5.1

OR = odds ratio; CI = confidence interval.

and culturally acceptable than cigarettes and easier to use than smoked products, especially in the school environment where smoking restrictions are enforced. Parental sanctions are also not very high for the use of smokeless tobacco because of the conviction of many people that smokeless tobacco, betel quid and areca nut pose a lower health risk than cigarettes [4].

This study is based on the self-reported status of the respondents' smokeless tobacco use. To maintain confidentiality students were not asked about their class or name. Another limitation of the study was that we could not make any biomedical validations of self-reported tobacco use.

Use of smokeless tobacco was higher among government school students compared to private school students (OR = 6.3); this may have been due to better educational activities and more stringent measures to restrict tobacco use in private schools.

Those adolescents who reported that at least one family member (parent, siblings and other members) use any tobacco products were also more likely to use smokeless tobacco (OR = 3.9), presumably because they have easy access to these products.

A strong association between cigarette smoking and use of smokeless tobacco was observed in this study (OR = 3.2). Also, a strong association between adolescents' smokeless tobacco use and use of *pan* without tobacco and areca nut (OR = 2.9 and 3.2) confirms those of other studies conducted elsewhere [15,16]. One reason is the availability of all these products from the same sources. Furthermore, once a person starts using tobacco in any form he/she is likely to become nicotine-addicted.

Smokeless tobacco, such as *gutka*, contains nicotine and therefore the health consequences may be similar to those of cigarette smoking, including coronary artery and peripheral vascular disease, hypertension, fatal morbidity and mortality [20]. There is a need to provide community-based educational programmes in which the adverse health consequences of tobacco are addressed. However, even chewing products without tobacco has risks; traditional *pan* has been implicated as a major etiological factor for oral submucous fibrosis [7]. As 12.6% of the students were using pan and 47.2% areca nut, it suggests that adolescents are putting themselves at risk of associated diseases. There is a need for awareness programmes about the deleterious effects of betel quid and areca nut, even without tobacco.

In the absence of any restriction by school authorities or parents and because of easy and widespread availability of tobacco products to all ages, adolescents are spending substantial amounts on purchasing these products even when they need stationery or books for school. The average amount spent on areca nut and *gutka* was 500 rupees or more per month (about US$ 8). Tobacco use usually starts in early adolescence [8]. Informal discussion during our interviews suggested that many of the youth who smoked reported that they want to stop but were unable to do so.

We also found a significant association with adolescent tobacco use and not seeing anti-tobacco promotional advertisements on television and radio (OR = 1.5). Tobacco advertisements are designed to encourage young people to take up smoking [21] since advertisements have been shown to have a strong influence on teenagers [22].

Based on the results of this study, we recommend that tobacco promotional advertisements be banned in Pakistan. More efforts are needed to reduce easy access to any form of tobacco, betel quid and areca nut by young people. There is also a need to increase taxation of tobacco products because price is recognized as a major determinant of cigarette consumption [23,24]. Monitoring is necessary to assess the effectiveness of intervention programmes to control the increasing use of smoked and smokeless tobacco, betel quid and areca nut or any form of chewable tobacco among adolescents.

Acknowledgements

References

1. *Why is tobacco public health priority?* World Health Organization [web page] (http://www.who.int/tobacco/health_priority/en/index.html, accessed 7 February 2007).

2. Mackay J, Eriksen M. *The tobacco atlas*. Geneva, World Health Organization. 2002.

3. *National Health Survey of Pakistan 1990–94.* Islamabad, Pakistan Medical Research Council, Network Publication Service, 1998.

4. *The Surgeon General's report for kids about smoking. Is smokeless tobacco safe?* Centers for Disease Control and Prevention [web page] (http:// http://www.cdc.gov/tobacco/sgr/sgr4kids/smokless.htm, accessed 7 February 2007).

5. JAMA patient page. Preventing tobacco use in children and adolescents. *Journal of the American Medical Association*, 2000, 284:794.

6. Khadim MI. The effects of Pan and its ingredients on oral mucosa. *Journal of the Pakistan Medical Association*, 1977, 27:353–6.

7. Merchant A et al. Paan without tobacco: an independent risk factor for oral cancer. *International journal of cancer*, 2000, 86:128–31.

8. Sinha DN et al. Tobacco use among school personnel in Bihar, India. *Tobacco control*, 2002, 11:82–3.

9. *Smoking and teens fact sheet.* American Lung Association [online factsheet] (http://www.lungusa.org/site/pp.asp?c=dvLUK9O0E&b=39871, accessed 22 February 2007).

10. Rozi S, Akhtar S. Smoking among high school adolescents in Karachi, Pakistan. *International journal of epidemiology*, 2004, 33:613–4.

11. *Prevention of tobacco use among adolescents in public schools in San Diego Country, USA.* San Diego, California, Center for Behavioral Epidemiology and Community Health, 1989.

12. Creath CJ, Wright JT, Wisniewski JF. Characteristics of smokeless tobacco use among high school football players as related to type of smokeless tobacco and period of use. *Journal of drug education*, 1992, 22:69–85.

13. Boyle RG, Claxton AJ, Forster JL. The role of social influences and tobacco availability on adolescent smokeless tobacco use. *Journal of adolescent health*, 1997, 20:279–85.

14. Lisnerski DD et al. Demographic and predictive correlates of smokeless tobacco use in elementary school children. *American journal of health promotion*, 1991, 5:426–31.

15. Haddock CK et al. Evidence that smokeless tobacco use is a gateway for smoking initiation in young adult males. *Preventive medicine*, 2001, 32:262–7.

16. Tomar SL. Is use of smokeless tobacco a risk factor for cigarette smoking? The US experience. *Nicotine & tobacco research*, 2003, 5:561–9.

17. Forbes D, Cutler C. Karachi. In: Beckel L, ed. *Atlas of the megacities. The European Space Agency's contribution to a better understanding of a global challenge.* Salzburg, Geospace, 2001.

18. *Kolachi to Karachi*. Karachi, City District Government (http://www.karachicity.gov.pk/hist.asp, accessed 22 February 2007).

19. Hosmer D, Lemeshow S. *Applied logistic regression*. New York, John Wiley, 1996.

20. *The health consequences of using smokeless tobacco: a report of the Advi-*

sory Committee to the Surgeon General. Bethesda, Maryland, US Department of Hearth and Human Services, 1988 (NIH Publication No.86–2874).

21. *Teenage girls as the target of the tobacco industry.* American Lung Association [online factsheet] (http://www.ritobaccocontrolnet.com/teengirl.htm, accessed 22 February 2007).

22. Lopez ML et al. Impact of cigarette advertising on smoking behaviour in Spanish adolescents as measured using recognition of billboard advertising. *European journal of public health*, 2004, 14:428–32.

23. Townsend J, Roderick P, Cooper J. Cigarette smoking by socioeconomic group, sex, and age: effects of price, income, and health publicity. *British medical journal*, 1994, 309:923–7.

24. Bosanquet N. Europe and tobacco. *British medical journal*, 1992, 304:370–2.

Tobacco-free Mecca and Medina (WHO-EM/TFI/029/E)

In 2002, the Ministry of Health of Saudi Arabia adopted a new and radical policy approach to strengthening tobacco control through religion. It launched an initiative to make the two holiest cities in Islam, Mecca and Medina, not just smoke-free but literally tobacco-free. The rationale and experiences of the Saudi government in regulating tobacco use in Mecca and Medina are examined in this report.

This document can be obtained from Distribution and Sales, World Health Organization, Regional Office for the Eastern Mediterranean, PO Box 7608, Nasr City, Cairo 11371, Egypt (email: DSA@emro.who.int). It can also be accessed at: http://www.emro.who.int/tfi/wntd2007/pdf/tobacco_free_mecca_medina.pdf