

# PREVALENCE AND SOCIO-DEMOGRAPHIC FACTORS ASSOCIATED WITH TOBACCO SMOKING AMONG ADULT MALES IN RURAL SINDH, PAKISTAN

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**Abstract.** This cross-sectional study was undertaken to determine the prevalence of tobacco smoking and to obtain information on socio-demographic factors associated with tobacco smoking among adult males in a rural district of Sindh Province, Pakistan. We used a one-stage cluster sampling frame to identify 411 adult males from the study site. We found a high prevalence, 55% of current smokers among this rural population. The median age of initiation of smoking was 20 years. Awareness of the adverse effects of smoking on lung and heart diseases was 86% and 77%, respectively. Smoking prevalence increased with age and income, and was highest among subjects aged 44 years and above (76%) and with incomes of more than PKR 4000 (72%). The high prevalence of smoking suggests that there is an urgent need for developing intervention plans to address this major public health problem in this region.

## INTRODUCTION

It is estimated that each year tobacco smoking accounts for about 3 million deaths worldwide, which amounts to one death every 10 seconds (WHO, 1999). Unless the current trends are reversed, by the year 2030, this figure will have increased to 10 million deaths each year. Seventy percent of these deaths are predicted to be in developing countries. Despite thousands of scientific studies that have established the carcinogenic and other health effects of tobacco, the number of smokers is increasing. There are currently 1.1 billion smokers worldwide. Approximately 80,000 to 100,000 young people around the world become addicted to tobacco each day

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(Jha, 1999). Pakistan, the sixth most populous country in the world, has a high prevalence of smoking among adult males (Alam, 1998), but there is a lack of available data on factors associated with smoking in rural areas of Pakistan, which contain nearly 68% of the population (Pakistan Census Organization, 2000). In Pakistan, studies that have assessed the smoking habits of different population groups, mostly concentrated on urban populations. One study, conducted in Karachi, described a smoking prevalence of 21% among male medical students, with an average age of initiation at 17 years (Ahmed and Jafarey, 1983). A community-based survey conducted in a Karachi squatter settlement reported a smoking prevalence of 30% among adult males (Merchant *et al*, 1998). Jaleel *et al* (2002) reported a smoking prevalence of 30% among adult males in Abbottabad City, in the North West Frontier Province of Pakistan. Recently, a cross-sectional survey in Karachi found a prevalence of 32% among adult males (Maher

and Devji, 2002). Regarding factors associated with smoking, only one study from the northern areas of Pakistan reported use of wine, snuff, and farming as correlates of tobacco smoking (Shah *et al.*, 2001). The present investigation was carried out to obtain information on smoking habits and on socio-demographic factors associated with tobacco smoking among adult males in a rural area. This research was helpful in terms of filling information gaps and in suggesting possible future studies.

#### MATERIALS AND METHOD

This study was conducted in Taluka Gambat, located in Khairpur District of Sindh Province, a rural settlement located on the south bank of the Indus River. Taluka Gambat is 42 km southwest of the main city of Khairpur District. The area is homogenous in terms of socioeconomic status, language, and culture (Planning and Development Department, 2000). One-stage cluster sampling was used to select the study subjects. Villages were defined as clusters. In each cluster, households were selected systematically, and only one individual from each household was selected. Eligible subjects were adult males aged  $\geq 18$  years and residents of the village. We selected 411 males from the study site.

Interviews were conducted, only after obtaining informed consent, in the local language. We used a modified version of a questionnaire developed by the World Health Organization (WHO, 1997) in this study. The questionnaire elicited information on socio-demographic factors, including age, education, occupation, average monthly income of respondent, marital status, knowledge of health risks associated with tobacco smoking, cigarette consumption, and the reason for initiation of tobacco smoking. Once data were collected, they were coded, edited, and entered using the statistical program Epi Info

6.04<sup>©</sup> software program (Epi Info, CDC, Atlanta, GA, USA).

In the analyses, age was categorized into intervals of 18-24, 25-34, 35-44, and 44 plus years; marital status was categorized as married or unmarried; occupation was categorized as farmer, laborer, shopkeeper, office job, businessman, student, and others, which included males who were jobless or retired. Income was categorized as not reported, none, 1-2,000, 2,001-4,000 and  $> 4,000$  Pakistan rupees (PKR) (US\$ 1 = PKR 59). For 26 subjects who did not report an income, we replaced the missing values with the mean income for the occupation reported by them that was derived from data on subjects with average incomes and occupations.

Descriptive analysis was conducted to determine the distribution of subjects by socio-demographic characteristics using the Statistical Package for Social Sciences (SPSS<sup>®</sup>) 12.0.1 software (SPSS Inc, Chicago, IL, USA). We computed the prevalence of smokers. A subject was defined as a smoker if he had smoked more than 100 cigarettes in his life time (WHO, 1997). Non-smokers were those who did not smoke or smoked less than 100 cigarettes in their lifetime. We used a prevalence ratio (PR) to examine the association between smoking and selected factors. Generalized log binomial modeling was done to adjust for the factors that were significant in the univariate analysis to estimate the adjusted prevalence ratio (PR<sub>ADJ</sub>) with its 95% confidence interval.

#### RESULTS

We interviewed 411 adult males who resided in Taluka Gambat, Khairpur District, Sindh Province. All of the men who were invited to participate in the study consented. Participants had a median age of 30 years; 120 (30%) were illiterate and 271 (66%) were married. Farming and labor were the main

Table 1

Prevalence of smoking and selected characteristics of current smokers in Taluka Gambat, Khairpur District, Sindh Province.

Variables	N	%
Smoking prevalence	(n=411)	
Smokers (> 100 cigarette in lifetime)	225	55
Smokers (< 100 cigarette in lifetime)	49	12
Never smokers	137	33
Characteristics of current smokers age at initiation (years )	(n=225)	
8-15	29	13
16-20	116	52
21-25	52	23
>than 25	28	12
Median age	20	
Reason for initiation <sup>a</sup>		
Peer pressure	152	68
Stress	36	16
Advertisement	14	06
Pleasure	22	10
Number of cigarette per day		
1-10	118	53
11-20	59	26)
> 20	48	21
Ever tried to quit smoking		
No	165	73
Yes	60	27
Do you need some help in quitting		
No	167	74
Yes	58	26

<sup>a</sup>Column total may not equal to 'n' due to missing values

occupations of 22% and 26% of subjects, respectively. The median individual income was PKR 2,000 per month.

The prevalence of smokers among adult males in this rural population was 225 (55%). Non-smokers included 137 males (33%) who had never smoked and 49 (12%) who smoked less than 100 cigarettes in their lifetime (Table 1). Among current smokers, the median age of smoking initiation was 20 years. About two-thirds of smokers (68%) reported that they started smoking due to peer pressure. Fifty-one percent of smokers were consuming an

average of 1-10 cigarettes per day, and 21% consumed more than a pack per day. Sixty (27%) smokers indicated that they had tried to quit smoking in the past, and 26% expressed the need of some assistance in quitting tobacco smoking in the future.

Table 2 displays crude prevalence ratios for the relations between selected factors and smoking. Age was positively associated with smoking. Males who were 25 years and older had a smoking prevalence of 2.0 to 2.5 times higher than that of males aged 18-24 years. Education was inversely related with smoking.

Males who had 1-5 years of schooling or who were illiterate were more likely to be smokers, as compared to males with six or more years of education. Married men smoked more than unmarried men ( $PR = 1.4$ ,  $CI = 1.1-1.9$ ). Males who were laborers ( $PR = 1.4$ ,  $CI = 1.1-1.9$ ) and shopkeepers ( $PR = 1.3$ ,  $CI = 1.0-1.8$ ) were more likely to be smokers as compared to farmers.

Regarding knowledge, among all subjects, the proportion who reported awareness that smoking has an influence on health was 86% for lung cancer, 77% for heart diseases, 36% for impotency, and 28% for other diseases, including respiratory diseases 23% and malnutrition 4.6% (data not presented in table). Subjects who were aware that smoking had an influence on lung cancer were less likely to be smokers as compared to males who indicated no such awareness ( $PR = 0.7$ ,  $CI = 0.6-0.9$ ) (Table 2).

The development of a multivariable model was constrained by the high correlation among variables related to socioeconomic status (education, income, and occupation). Models that included occupation did not converge, so this variable was omitted from the final model. The association of smoking increases with age; the adjusted prevalence ratios ( $PR_{ADJ}$ ) were 2.0, 2.2, and 2.5 for age groups 18-24, 25-34 and  $> 44$ , respectively. These results were statistically significant. Males who earned more than PKR 4,000 per month had a smoking prevalence 70% higher than that of males with no income ( $PR_{ADJ} = 1.7$ ,  $CI = 1.2-2.6$ ) when adjusted for other variables. Associations with years of education and marital status were weak and were not statistically significant after adjusting other variables.

## DISCUSSION

We found a prevalence of 55% of current tobacco smoking among adult males in this rural population, which is about two fold higher than the national estimates in 1998 of 29%

for adult males in rural Sindh (Nasir and Rehan, 2001). This might be evidence that the country could be heading towards a tobacco epidemic (White, 2000).

The present study provides information on factors associated with smoking in this rural area, which has never been investigated in detail in Pakistan. The main factors positively associated with tobacco smoking are age and income after adjusting for other factors. The prevalence of smoking increased with age and income, and was highest for age  $\geq 44$  years and for an income of more than PKR 4,000 per month. A positive association with age was also reported for rural areas of Pakistan (Nasir and Rehan, 1998). Another cross-sectional study, conducted in India, also reported a similar pattern of an increasing prevalence of tobacco smoking with increasing age (Rani et al, 2003). The median age at initiation of tobacco smoking in this rural setting was 20 years, which was similar to the findings of studies among medical students (Hussain et al, 1995), and in an urban area of Karachi (Maher and Devji, 2002). The same pattern was also found in northern areas of Pakistan (Shah et al, 2001) and in Riyadh, Saudi Arabia (Saeed et al, 1996). The role of peer pressure found in the present study is also consistent with previously published data on reasons for initiation of smoking in an urban area of Sindh, Pakistan (Hussain et al, 1995; Maher and Devji, 2002). Another study undertaken in Calcutta, India, showed a similar pattern among adolescents (Sen and Basu, 2000).

Regarding education, Pakistan has a low proportion of literacy when compared to other countries of the region. According to the most recent economic report (Ministry of Finance, 2001), 43% of males and 70% of females in Pakistan are illiterate. In our study, we found that illiterate males were more likely to be smokers compared to males with more than 10 years of education, but the association was not significant after adjusting for other factors.

Table 2  
Crude prevalence ratio (PR) for smoking and corresponding 95% confidence interval in relation to factors among smokers.

Factors	N/T <sup>a</sup>	Pr <sup>b</sup> (%)	PR	95% CI
Age in years				
18-24	36/121	(30)	1.0	-
25-34	81/137	(59)	2.0	(1.5 - 2.7)
35-44	57/86	(66)	2.2	(1.6 - 3.0)
> 44	51/67	(76)	2.5	(1.4 - 2.9)
Education status				
>10	45/104	(43)	1.0	-
6-10	45/95	(47)	1.1	(0.8 - 1.5)
1-5	60/92	(65)	1.5	(1.2 - 2.0)
Illiterate	75/120	(63)	1.4	(1.1 - 1.9)
Occupation				
Farmer	43/90	(48)	1.0	-
勞動者	71/105	(68)	1.4	(1.1 - 1.9)
Shopkeeper	37/59	(63)	1.3	(1.0 - 1.8)
Office job	33/46	(72)	1.5	(1.1 - 2.0)
Business	10/11	(91)	1.9	(1.4 - 2.5)
Student	15/62	(24)	0.5	(0.3 - 0.8)
Others	16/38	(42)	0.9	(0.6 - 1.4)
Marital status				
Unmarried	47/140	(34)	1.0	-
Married	178/271	(66)	1.4	(1.1 - 1.9)
Average individual income per month				
0, no income	29/98	(30)	1.0	-
1-2,000	67/114	(59)	2.0	(1.4 - 2.8)
2001-4,000	94/151	(65)	2.1	(1.5 - 2.9)
> 4,000	35/48	(72)	2.5	(1.7 - 3.5)
Awareness of the influence of smoking on lung cancer				
No	41/58	(71)	1.0	-
Yes	184/353	(52)	0.7	(0.6 - 0.9)
Awareness of the influence of smoking on heart disease				
No	59/95	(62)	1.0	-
Yes	166/316	(53)	0.8	(0.7 - 1.0)
Awareness of the influence of smoking on impotency				
No	154/262	(59)	1.0	-
Yes	71/149	(48)	0.8	(0.7 - 1.0)
Awareness of the influence of smoking on other diseases				
No	160/297	(53)	1.0	-
Yes	65/114	(57)	1.1	(0.9 - 1.3)

<sup>a</sup>N=number of smokers; T=Total number of participants.

<sup>b</sup>Pr=Prevalence.

Table 3  
Prevalence ratio ( $PR_{ADJ}$ ) and 95% confidence interval for smoking status and potential risk factors, multivariate log binomial model.

Factors	$PR_{ADJ}$ <sup>a</sup>	95% CI
Age (years)		
18-24	1.0	-
25-34	1.7	(1.2 - 2.4)
35-44	1.6	(1.1 - 2.4)
> 44	1.9	(1.3 - 2.8)
Education (years)		
>10	1.0	-
6-10	1.1	(0.9 - 1.6)
1-5	1.1	(0.9- 1.4)
Illiterate	1.1	(0.9- 1.5)
Marital status		
Unmarried	1.0	-
Married	1.2	(0.9 - 1.6)
Average individual income per month		
0, no income	1.0	-
1-2,000	1.4	(1.0 - 2.1)
2,001-4,000	1.4	(1.0 - 2.1)
> 4,000	1.7	(1.2 - 2.6)

<sup>a</sup>Adjusted for other variables in the model (model included indicator terms for categories of age, education, income and marital status).

A similar pattern was reported from Dhaka, Bangladesh and in Kuwait, a high prevalence of smoking among low education group (Ahsan *et al*, 1998; Memon *et al*, 2000). In this study, we found occupational categories such as business and labor were positively associated with smoking, a result similar to findings reported from rural China (Hu and Tsa, 2000). Limited data regarding awareness are available for Pakistan. Recently, a study among medical students found low levels of knowledge about smoking as the cause of diseases (Omair *et al*, 2002).

This study had several limitations. First, the cross-sectional nature of the study did not

allow us to judge causality. Second, recall bias may have occurred due to the self-reported nature of the information on tobacco smoking. We were not able to obtain complete data on income, as the survey asked about individual income and not household income.

In conclusion, This study indicated a high prevalence of smoking cigarettes among adult males, which can constitute a major public health problem in the future. This study also observed that smoking was not as prevalent among young adult men, an important finding that suggests the need for addressing this age group in designing future smoking prevention programs.

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