



Tobacco use among health professionals and their role in tobacco cessation in Nepal

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KEYWORDS

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Summary

Background: Reduction of tobacco use in the general population is preceded by a reduction in tobacco use among health professionals. There are very few data on tobacco use among health professionals in Nepal and no data on their role in cessation.

Methods: We conducted a cross-sectional study among 377 health professionals (men 59%) in two of the 75 districts of Nepal to understand their tobacco use, factors associated with tobacco use and their role in tobacco cessation. Information on tobacco use, alcohol use, friends' use of tobacco, knowledge on harmful effects of tobacco use and health professionals' self-reported tobacco intervention was collected using a pre-tested and structured questionnaire. Multiple logistic regression analysis was conducted to identify the important predictor variables of tobacco use.

Results: Overall prevalence of current tobacco use was 20.4% (95% CI 16.5–24.9); men 32.4%, women 3.2%. Multiple logistic regression analysis showed that men (OR 6.87; 95% CI 2.41–19.53), alcohol users (OR 3.91; CI 2.08–7.36) and those whose friends used tobacco (OR 3.40; CI 1.79–6.45) were more likely to be current tobacco users compared to their counterparts. Current users were less likely to always ask ($p < 0.001$) and advise ($p < 0.001$) on tobacco use compared to nonusers.

Conclusion: More than 20% of health professionals in our study currently used tobacco. Efforts should be made to control tobacco use among health professionals focusing on men and alcohol users. Strategies to resist peer pressure and making health institutions tobacco free are likely to reduce tobacco use among health professionals.

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Introduction

Throughout the world, tobacco use is a major public health problem and a preventable cause of morbidity and mortality. Many studies have

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shown that tobacco is a key risk factor for non-communicable diseases such as cancers, cardiovascular diseases, chronic obstructive pulmonary diseases [1,2] as well as communicable diseases such as tuberculosis [3]. Approximately 500 million people alive today will die from tobacco use within the next 50 years [4]. Around 70% of these deaths are likely to occur in developing countries. These figures are likely underestimates, as most studies have not included smokeless tobacco use, which is very common in some of the developing countries such as India and Nepal. Smokeless tobacco has also been found to be associated with many cancers [5] and more recently, with acute myocardial infarction [6].

Efforts to reduce tobacco use have been somewhat successful in developed countries such as the United States, where use has been declining among men and has been uneven among other segments of the population, such as women and adolescents, over the last few years [7]. In contrast, tobacco use has been increasing in many developing countries. Prevalence of tobacco use in Nepal is reportedly one of the highest in the world. A nationally representative survey in 2001 found that 73.1% of men in the age group of 15–59 years and 28.8% of women in the age group of 15–49 years were current tobacco users [8]. Nepalese women were reported to have the highest rate of tobacco consumption in the World Health Organization (WHO) South East Asia Region [9], even though tobacco use by women is considered a taboo throughout Asia.

It will be extremely difficult to reduce tobacco related deaths in the next 30–50 years unless adult smokers are encouraged to quit [10]. It has been well established that in order for a downward shift in tobacco use to occur in the developed countries, health care providers must be at the forefront of tobacco cessation [11]. Indeed, in many developed countries smoking prevalence among physicians has been declining substantially since 1950, resulting in a reduction of smoking prevalence among the general population. Health professionals are also highly respected in developing countries, where they are generally considered as role models in healthy lifestyle behaviours. They thus have the potential to play a substantial role in influencing patients' lifestyle choices in terms of tobacco use and cessation. Therefore, the involvement of health professionals is one of the main tobacco use reduction strategies in developing countries. Such a strategy must include both abstinence from tobacco use on the part of the health provider and routine inquiry

into patients' tobacco use and assessment and assistance in cessation.

The WHO Framework Convention on Tobacco Control (FCTC), the first international public health treaty on tobacco control offers a unique window of opportunity for all nations to minimize and avert this looming public health disaster and protect their citizens from the devastating health, social, environmental, and economic consequences of tobacco use and exposure to tobacco smoke [12]. According to the FCTC, health care facilities are expected to design and implement effective programmes aimed at promoting tobacco cessation. National health programmes should include diagnosis and treatment of tobacco dependence including counseling services.

There are very few data on tobacco use among health professionals in Nepal and no data on their role in cessation of tobacco use among the public. Therefore, we conducted this study to determine the prevalence and correlates of tobacco use among health professionals and their role in tobacco cessation among the general population.

Materials and methods

Definitions of terms used

Health professional was defined as any health provider who is on the payroll of government or non-government organizations and directly engaged in the provision of health services to patients. *Current tobacco use* was defined as 'having used tobacco at least once in the last 30 days preceding the survey and *ever tobacco use* as 'having used tobacco even once in their life time', but not in the preceding 30 days. *Never use* was defined as 'not having used tobacco even once in their lifetime' [13]. *Current use of alcohol* was defined as consumption of any alcoholic drinks within the last 30 days.

Study overview

Two of the 75 districts of Nepal were selected for the study: Dhading district from the Central Region and Ilam district from the Eastern Region (Fig. 1). The National Planning Commission Secretariat of His Majesty's Government of Nepal recently developed district level indicators for monitoring overall development of the country based on selected socioeconomic indicators [14]. According to this report, Ilam district was ranked



Figure 1 Map of Nepal showing locations of the two study districts.

above the national average (Rank 12) and Dhading district below the national average (Rank 41). Selection of districts for this study from both lower and upper socioeconomic status was aimed to maximize representation of and generalization to all regions of Nepal.

Using a cross-sectional survey, data were collected during the months of June–August, 2005. We used a pre-tested and structured interview schedule which consisted of 51 questions on basic demographic and socioeconomic characteristics of the respondents, current and ever use of tobacco, forms and frequency of tobacco use, details of family and friends' use of tobacco, respondents' knowledge of harmful effects of tobacco both in general and in respect to specific illnesses, awareness on tobacco control measures, and current alcohol use. A few questions in the schedule captured information on the respondents' self-reported intervention targeting tobacco use, in terms of frequency of inquiry into and assessment of their use of tobacco.

All the health care institutions in the two districts were visited by one of the investigators (BRP) and all health professionals available on the day of visit were included in the study. Administrative staff was excluded as they were not directly involved in health service delivery.

Ethical clearance

Ethical clearance for the study was obtained from the institutional review board of the Sree Chitra Tirunal Institute for Medical Sciences and Technology in Trivandrum, India. Written permission from the district administrative officers of the selected districts and written informed consent was obtained from all the participants of the study before conducting the interview, with the freedom to opt out of the study at any time during the interview.

Statistical methods

Data were entered and analyzed using SPSS version 11.5. Bivariate analysis was done to find the association of socio-demographic and behavioural characteristics with current and ever use of tobacco as outcome variables. Multiple logistic regression analysis was done for the entire sample. Since prevalence of tobacco use was much less among women, multiple regression analysis was done separately for men to see changes, if any, in the association between tobacco use and the predictor variables. Analysis was also done to examine any relationship between self-reported

tobacco cessation intervention and tobacco use among the health professionals. A p value of <0.05 was considered statistically significant.

Results

Among the total of 470 health professionals in the two districts, 377 (80.2%), 59% of which were men, participated in the study. The respondents included 13 physicians, 13 nurses, 29 health assistants, 114 auxiliary health workers, 50 auxiliary nurse midwives, 11 technicians, 81 village health workers and 66 mother and child health workers. The socioeconomic and demographic characteristics of the participants are given in Table 1, along with some behavioural characteristics. The mean age of the sample population was 36 years with a range of 18–58 years. Over 96% of the participants were Hindu whereas the proportion of Hindus in the general population is around 85% [8].

Of the 377 participants, 77 (20.4%) were current tobacco users with a significantly higher prevalence among men (32.4%) compared to women (3.2%). The prevalence and forms of tobacco use by sex is given in Table 2.

Among the male professionals, 50% of physicians, 45.5% of technicians, 36.6% of village health workers, 29.4% of auxiliary health workers and 19.2% of health assistants were current tobacco users. Among the female professionals, 20% of health assistants and 4.5% of mother and child health workers were current tobacco users. None of the nurses, auxiliary nurse midwives, health assistants, auxiliary health workers, nor the single female physician in the sample were current tobacco users.

Among the current tobacco users 67.5% used cigarettes, 48.1% used *khaini* (a tobacco and slake lime mixture which is held in the mouth in much the same way as moist snuff) [15], 7.8% *panmasala* (a commercial preparation containing areca nut,

Table 1 Study sample characteristics

Variables	Males (N = 222)	Females (N = 155)	Total (N = 377)
Age group			
<30	59 (26.6)	50 (32.3)	109 (28.9)
30–39	61 (27.5)	68 (43.9)	129 (34.2)
40–49	81 (36.5)	29 (18.7)	110 (29.2)
≥50	21 (9.5)	8 (5.2)	29 (7.7)
Religion			
Hindus	217 (97.7)	146 (94.2)	363 (96.3)
Others	5 (2.3)	9 (5.8)	14 (3.7)
Marital status			
Unmarried	23 (10.4)	26 (16.8)	49 (13.0)
Married	199 (89.6)	129 (83.2)	328 (87.0)
Household monthly income			
Rupees ^a < 5000	80 (36.0)	99 (63.9)	179 (47.5)
Rupees ^a ≥ 5000	142 (64.0)	56 (36.1)	198 (52.5)
Alcohol use			
Yes	101 (45.5)	14 (9.0)	115 (30.5)
No	121 (54.5)	141 (91.0)	262 (69.5)
Friends' use of tobacco			
Yes	114 (51.4)	35 (22.6)	149 (39.5)
No	108 (48.6)	120 (77.4)	228 (60.5)
Family use of tobacco			
Yes	99 (44.6)	70 (45.2)	169 (44.8)
No	123 (55.4)	85 (54.8)	208 (55.2)
Reported beneficial effect of tobacco use			
Yes	6 (2.7)	3 (1.9)	9 (2.4)
No	216 (97.3)	152 (98.1)	368 (97.6)

Figures in parentheses are percentages.

^a One US dollar = 73 Nepalese rupees.

Table 2 Prevalence of tobacco use by type of tobacco and sex ($N = 377$)

Type of tobacco use	Ever		Current	
	Males	Females	Males	Females
Users	114 (51.4)	11 (7.1)	72 (32.4)	5 (3.2)
Only smoking	62 (27.9)	7 (4.5)	29 (13.1)	2 (1.3)
Only smokeless	27 (12.2)	1 (0.6)	24 (10.8)	1 (0.6)
Both smoking and smokeless	25 (11.3)	3 (1.9)	19 (8.6)	2 (1.3)
Non-users	108 (48.6)	144 (92.9)	150 (67.6)	150 (96.8)
Total	222	155	222	155

Figures in parentheses are percentages.

slake lime and catechu and condiments, with or without powdered tobacco) [16], 3.9% *Bidi* (0.2–0.3 g of tobacco wrapped in a temburni leaf and tied with a small string) [15], 3.9% *Gutka* (the generic name for a product that contains tobacco, areca nut and several other substances sold in powdered or granulated form in small sachets) [17] and 1.3% used *pan* (a mixture of betel leaf, areca nut, slake lime and catechu) [16] with tobacco.

Within the currently smoking group, all women and 85.4% of men smoked during every one of the 30 days preceding the survey. On the days they smoked, 45.8% of the men consumed up to 5 sticks (cigarettes/*Bidi*) per day, 45.8% consumed 6–10 sticks per day, and 8.4% consumed more than 10 sticks per day. Half of the currently smoking women consumed up to 5 sticks per day and the rest 6–10 sticks per day. Among smokeless tobacco users, 95.3% of the men and all women chewed during every one of the 30 days preceding the survey.

All the participants were aware of the harmful effects of tobacco use; 96.8% were aware of cancer, 90.2% of chronic obstructive pulmonary diseases, 44% of tuberculosis, 28.1% of cardiovascular diseases and 0.3% of diabetes mellitus. A small proportion of the respondents (2.7% men, 1.9% women) reported that tobacco use was beneficial. Ninety-seven percent of the respondents were aware of the government's tobacco control measures, such as the ban on smoking in public places. However, only 8.8% of the respondents had heard about the FCTC. Awareness of the FCTC was highest among physicians (46.2%).

Correlates of ever tobacco use were age, sex, alcohol use, friends' use and reported beneficial effects from tobacco use (Table 3). Among these variables, age and reported beneficial effects of tobacco were not found to be associated with current tobacco use. Sex-disaggregated analysis did not show any difference.

Most of the current users (96.6%) had the desire to quit tobacco (93.1% men; all women). However, only 68.8% (69.4% men and 60% women) had tried to quit during the year preceding the survey. Responding to the question "When do you plan to quit tobacco use?" nearly three-fourths of the current users had no definite future plans for quitting. Among male current users, 8.3% reported a plan to quit tobacco within one month and 20.8% within one year from the date of the survey. All female current users reported no definite plans to quit.

Data regarding health professionals' self-reported cessation interventions targeting tobacco users is given in Table 4. Current tobacco users were significantly less likely to always ask ($p < 0.001$) and advise their clients on tobacco use ($p < 0.001$). Fifty percent of men and 56% of women professionals always asked patients about their tobacco use ($p > 0.05$) while 60.4% men and 74.2% women always advised to quit using tobacco ($p = 0.003$). The numbers for asking are lower than for advising because some health professionals advise without asking due to a lack of time.

Discussion

This report constitutes one of the first descriptive studies on tobacco use among health professionals in Nepal and the first on the role of health professionals in tobacco cessation. We found that, among health professionals, 32.4% of men and 3.2% of women were current tobacco users. This prevalence was much lower than that of the general population (73.1% men and 28.8% women) of Nepal [8], but extremely high compared to that of health professionals in the US (3.3%) [18] and in the UK (5%) [19]. The prevalence of tobacco use in our study was also higher than that reported for the Indian state of Kerala, where 13.1% of male health service physicians and 15% of medical school faculty were

Table 3 Correlates of ever and current tobacco use: results of multivariate analysis

Variables	Ever use			Current use		
	Prevalence (%)	Adjusted odds ratio (95% CI)	<i>p</i> Value	Prevalence (%)	Adjusted odds ratio (95% CI)	<i>p</i> Value
Age group						
<30	29 (26.6)	1.00		17 (15.6)	1.00	
30–39	32 (24.8)	1.75 (0.74–4.13)	0.202	19 (14.7)	1.15 (0.43–3.05)	0.772
40–49	47 (42.7)	2.44 (1.05–5.70)	0.038	30 (27.3)	1.61 (0.61–4.25)	0.330
≥50	17 (58.6)	6.08 (1.91–19.32)	0.002	11 (37.9)	2.92 (0.87–9.80)	0.082
Sex						
Females		11 (7.1)	1.00	5 (3.2)	1.00	
Males	114 (51.4)	10.09 (4.56–22.32)	<0.001	72 (32.4)	6.87 (2.41–19.53)	<0.001
Religion						
Hindus		121 (33.3)	1.00	74 (20.4)	1.00	
Others	4 (28.6)	1.19 (0.28–4.98)	0.810	3 (21.4)	1.92 (0.41–8.89)	0.401
Marital status						
Married	110 (33.5)	1.00	70 (21.3)	1.00		
Unmarried	15 (30.6)	1.41 (0.51–3.89)	0.498	7 (14.3)	0.55 (0.15–1.98)	0.366
Household monthly income						
Rupees < 5000	46 (25.7)	1.00	28 (15.6)	1.00		
Rupees ≥ 5000	79 (39.9)	1.17 (0.64–2.13)	0.595	49 (24.7)	1.11 (0.57–2.18)	0.746
Alcohol use						
No	58 (22.1)	1.00	26 (9.9)	1.00		
Yes	67 (58.2)	1.97 (1.10–3.55)	0.022	51 (44.3)	3.91 (2.08–7.36)	<0.001
Friends' use						
No	39 (17.1)	1.00	22 (9.6)	1.00		
Yes	86 (57.7)	4.13 (2.36–7.23)	<0.001	55 (36.9)	3.40 (1.79–6.45)	<0.001
Family use						
No	55 (26.4)	1.00	36 (17.3)	1.00		
Yes	70 (41.4)	1.67 (0.92–3.00)	0.086	41 (24.3)	0.91 (0.47–1.73)	0.774
Reported beneficial effect of tobacco						
No	118 (32.1)	1.00		72 (19.6)	1.00	
Yes	7 (77.8)	12.85 (1.37–120.22)	0.025	5 (55.6)	5.79 (0.98–34.04)	0.052

Statistically significant (<0.05) results are italicized.

Table 4 Self-reports by health providers of tobacco cessation intervention

Current tobacco use	Frequency			χ^2 p value ^a
	Not always	Always	Total	
<i>Asked patients about their use of tobacco</i>				
Yes	60 (77.9)	17 (22.1)	77 (100.0)	<0.001
No	119 (39.7)	181 (60.3)	300 (100.0)	
Total	179 (47.5)	198 (52.5)	377 (100.0)	
<i>Advised patients to quit tobacco use</i>				
Yes	54 (70.1)	23 (29.9)	77 (100.0)	<0.001
No	74 (24.7)	226 (75.3)	300 (100.0)	
Total	128 (34.0)	249 (66.0)	377 (100.0)	

Figures in parentheses are percentages.

^a χ^2 p values refer to the difference between the yes/no populations for 'always' responses.

current tobacco users [20]. Current tobacco use among Costa Rican health professionals (19%) was also lower than among ours [21]. However, 45% of health professionals in Bosnia were current tobacco users [22]. These results are not surprising considering the high prevalence of tobacco use in a population where its use is culturally normative.

Predictors of current tobacco use in our study were male sex, alcohol use and friend's use of tobacco. A similar association between current tobacco use and friend's use was reported for the general population of Kerala state in India [23] and among medical students in Orissa state [24]. Alcohol use was also found to be highly correlated with tobacco use among the general population in India [25]. It is important to note that correlates for tobacco use among health professionals were not much different from those for the general population. It should be noted that a few of the female health professionals were also found to be tobacco users in this study, although their proportion was much less than that of the general female population in Nepal and significantly less than that of male professionals.

Cigarette smoking was the most common form of tobacco use, followed by *khaini* and *panmasala*. Current users predominantly used tobacco daily in the 30-day period preceding the survey, indicating an addiction. Among current smokers, over 90% of the professionals consumed 10 or fewer numbers of sticks per day. It has been reported from studies in India and Indonesia that not all health professionals are aware that even relatively low levels of smoking carry detrimental health effects. Indian physicians reported that a mean of 5–6 cigarettes a day was relatively safe to smoke whereas Indonesian physicians reported 10 [11]. This is likely to be applicable for Nepalese health professionals, although we did not capture the information on

the number of sticks that the health professionals thought to be relatively safe. Health professionals in Nepal, like those in surrounding countries, need to be informed about the harmful effects of low level smoking. This is extremely important in the light of recent reports that adolescents who smoked an average of 3.5 cigarettes per day had a mean cotinine level of 44.1 ng/ml, which was highly correlated with nicotine dependence [26].

Most interviewed health professionals were aware of some harmful effects of tobacco use. However, their awareness of associations between tobacco use and certain specific diseases varied widely. As reported in many previous studies, most were aware of the linkages between tobacco and cancer and, to some extent, chronic lung diseases. However, more than a quarter of the health professionals were unaware of the linkages between tobacco and heart disease, the primary cause of fatality attributed to tobacco use. In the year 2000, cardiovascular fatalities topped the number of deaths attributed to tobacco, at 1.69 million globally [4]. Similarly, the most important risk factor for acute myocardial infarction among the age group of 35–69 years has been reported to be smoking [27]. Surprisingly, only 0.3% of the health professionals were aware that tobacco use was harmful in diabetes mellitus. Diabetes is a major public health problem both throughout the world and in urban Nepal, where 19% of the population aged 40 years and over was reported to have diabetes mellitus [28]. Smoking has been identified as a modifiable risk factor for the development of both diabetes [29] and complications arising from it [30]. Almost all of the health professionals in our study were unaware of these linkages. Additionally, less than 50% of the health professionals knew that tobacco is harmful to tuberculosis, even though it has been reported that half of the male

tuberculosis deaths in neighbouring India were attributed to smoking [3]. Lack of proper awareness of health implications of tobacco use warrants training of health professionals on the subject with provision of updated health information.

Even though the FCTC was adopted by the 56th World Health Assembly in May 2003, by 2005, when this study was conducted, only 8.8% of the respondents had heard of it. Even among physicians, who demonstrated the greatest awareness, less than 50% had knowledge of the FCTC. It can be assumed that the awareness among the general population is even lower than that among health professionals. This lack of awareness will be one of the major challenges for the implementation of FCTC in Nepal.

Among all categories of health professionals in this study, the group with the highest proportion of current tobacco users, at 50%, was male physicians, although the physician sample size was small. Since physicians are team leaders in health care provision and are expected to be models of healthy behaviour for both the health team and society at large, their habits are likely to carry the greatest influence. Nevertheless, the role of other health professionals is also important in tobacco use control and has to be taken into account.

When health professionals themselves use tobacco, their ability to intervene in the use of tobacco by a patient is limited. This study found that those who used tobacco were less likely to ask and advise their patients on tobacco use. Indeed, tobacco cessation intervention was found to be less than optimal. Furthermore, self-reported interventions for cessation of tobacco use, and thus our finding that 66% of the health professionals always advised on tobacco use, are likely to be overestimates, an observation also reported in a previous study [11]. The health community in Nepal must target tobacco use among health professionals because this use not only endangers the health of the health providers, but also reduces their ability to effectively control and intervene in patients' tobacco use. An area of future inquiry is the formative research into the best methods of control of tobacco use among health professionals in Nepal.

Limitations of the study

Self-reported tobacco use data were not corroborated with cotinine estimations. Generalization of these findings to the entire country has limitations

because only two districts out of 75 were included in the study. Nevertheless, districts of both lower and upper socioeconomic status were selected, thus maximizing representation of all districts of Nepal, as previously described.

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References

- [1] World Health Organization. World Health Report 2002, Reducing Risks, Promoting Healthy Life; 2002.
- [2] Bartal M. Health effects of tobacco use and exposure. *Monaldi Arch Chest Dis* 2001;56:545–54.
- [3] Gajalakshmi V, Peto R, Kanaka TS, Jha P. Smoking and mortality from tuberculosis and other diseases in India: retrospective study of 43,000 adult male deaths and 35,000 controls. *Lancet* 2003;362:507–15.
- [4] Ezzati M, Lopez AD. Estimates of global mortality attributable to smoking in 2000. *Lancet* 2003;362:847–52.
- [5] Stepanov I, Hecht SS, Ramakrishnan S, Gupta PC. Tobacco specific nitrosamines in smokeless tobacco products marketed in India. *Int J Cancer* 2005;116:16–9.
- [6] Teo KK, Ounpuu S, Hawken S, et al. Tobacco use and risk of myocardial infarction in 52 countries in the INHERENT study: a case-control study. *Lancet* 2006;368:647–58.
- [7] Centre for Disease control and Prevention. Cigarette smoking among adults – United States, 2003. *MMWR* 2005;54: 509–12.
- [8] Ministry of Health (Nepal), New ERA, and ORC Macro. 2002. Nepal Demographic and Health Survey 2001. Calverton, Maryland, USA: Family Health Division, Ministry of Health; New ERA; and ORC Macro.
- [9] World Health Organization. Country Health Profile Nepal. <http://w3.who.org/ncd/index1.asp> [accessed October 9, 2006].
- [10] World Health Organization. Policy recommendations for smoking cessation and treatment for tobacco dependence. WHO Geneva: Switzerland; 2003.
- [11] Nichter M., for the Project Quit Tobacco International Group. Introducing tobacco cessation in developing countries: an overview of Project Quit Tobacco International. *Tob Control* 2006;15(Suppl. 1):12–7.

- [12] World Health Organization. Framework convention on tobacco control. World Health Assembly Resolution 56.1, May 21, 2003. <http://www.who.int/tobacco/framework/en/> [accessed 5 October, 2006].
- [13] World Health Organization. Guidelines for controlling and monitoring the tobacco epidemic. Geneva: World Health Organization; 1998.
- [14] His Majesty's Government of Nepal. District Level Indicators of Nepal for Monitoring Overall Development (Based on Selected Socio-Economic Indicators). National Planning Commission Secretariat, Central Bureau of Statistics, Ramshah Path, Thapathali, Kathmandu, Nepal; 2003. <http://www.cbs.gov.np/others/districtleveldevelopmentindicators.pdf> [accessed February 10, 2007].
- [15] World Health Organization. Tobacco or health: a global status report. Geneva: World Health Organization; 1997.
- [16] Reddy KS, Gupta PC. Report on tobacco control in India, Ministry of Health & Family Welfare, Government of India and Centre for disease Control and Prevention (USA), New Delhi, India; 2004.
- [17] Gupta PC. The case against gutka in India. *Lifeline* 2000;3: 12–4.
- [18] Nelson DE, Giovino GA, Emont SL, Brackbill R, Cameron LL, Peddicord J, et al. Trends in cigarette smoking among US physicians and nurses. *JAMA* 1994;271:1273–5.
- [19] Hussain SF, Tjeder-Burton S, Campbell IA, Davies PD. Attitudes to smoking and smoking habits among hospital staff. *Thorax* 1993;48:174–5.
- [20] Mohan S, Pradeepkumar AS, Thresia CU, et al. Tobacco use among medical professionals in Kerala, India: the need for enhanced tobacco cessation and control efforts. *Addict Behav* 2006;21:2313–8.
- [21] Grossman DW, Knox JJ, Nash C, Jimenez JG. Smoking: attitudes of Costa Rican physicians and opportunities for intervention. *Bull World Health Org* 1999;77:315–21.
- [22] Hodgetts G, Broers T, Godwin M. Smoking behavior, knowledge and attitudes among Family Medicine physicians and nurses in Bosnia and Herzegovina. *BMC Fam Practice* 2004;5:12 [Published online 2004 June 11. doi:10.1186/1471-2296-5-12].
- [23] Pradeepkumar AS, Mohan S, Gopalakrishnan P, Sarma PS, Thankappan KR, Nichter M. Tobacco use in Kerala: findings from three recent studies. *Natl Med J India* 2005;18: 148–53.
- [24] Ramakrishna GS, Sarma PS, Thankappan KR. Tobacco use among medical students in Orissa. *Natl Med J India* 2005;18:285–9.
- [25] Gupta PC, Maulik PK, Pednekar MS, Saxena S. Concurrent alcohol and tobacco use among a middle-aged and elderly population in Mumbai. *Natl Med J India* 2005;18:88–91.
- [26] Rubinstein ML, Thompson PJ, Benowitz NL, Shiffman S, Moscicki AB. Cotinine levels in relation to smoking behavior and addiction in young adolescent smokers. *Nicotine Tob Res* 2007;9:129–35.
- [27] Yusuf S, Hawken S, Ounpuu S, Dans T, Avezum A, Lanas F. Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study. *Lancet* 2004;364:937–52.
- [28] Shrestha UK, Singh DL, Bhattarai MD. The prevalence of hypertension and diabetes defined by fasting and 2-h plasma glucose criteria in urban Nepal. *Diabet Med* 2006;23:1130–5.
- [29] World Health Organization. The cost of diabetes. Fact Sheet Number 236. Geneva: Switzerland; 2002.
- [30] Will JC, Galuska DA, Ford ES, Mokdad A, Calle EE. Cigarette smoking and diabetes mellitus: evidence of a positive association from a large prospective cohort study. *BMJ* 2000;321:323–9.

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