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Full Length Research Paper

Prevalence and correlates for tobacco smoking among persons aged 25 years or older in Lusaka urban district, Zambia

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Tobacco use is the leading cause of non communicable diseases. There is paucity of information on correlates for tobacco smoking among adults in Zambia. The objective of this study was to determine the prevalence of tobacco use and its correlates in Lusaka urban district. A total of 1928 individuals aged 25 years or older participated in the survey, of which 33.0% were males. About half (53.2%) of the participants were of age 25 to 34 years, and 35.8% of them had attained secondary level of education. Overall, 6.8% of the participants currently smoked cigarettes (17.5% among males, and 1.5% among females). Female respondents were 90% (Adjusted Odds Ratio (AOR) = 0.10, 95% CI [0.05, 0.23]) less likely to smoke cigarettes compared to males. Compared to respondents who had <18.5 Body Mass Index (BMI), respondents who had higher BMI were less likely to smoke (AOR = 0.30 (95% CI [0.15, 0.61]) for 18.5 to 24.9 BMI; AOR = 0.12 (95% CI [0.05, 0.31]) for 25.0 to 29.9 BMI; and AOR = 0.03 (95% CI [0.00, 0.26]) for 30+ BMI. We conclude that the tobacco smoking epidemic is in its early stage in Zambia. Zambia must act now to curtail the epidemic. The association between smoking and body mass index should further be explored so that an intervention can be designed that addresses both smoking and nutrition.

Key words: Tobacco smoking, body mass index, adults.

INTRODUCTION

Tobacco use is the leading cause of non communicable diseases (Mathers and Loncar, 2006). Smoking is a risk factor for chronic diseases, including cardiovascular diseases, cancer and chronic respiratory conditions (Worley, 2010). There is evidence to suggest that tobacco use is on the increase in developing countries (Lopez and Mathers, 2006). Boutayeb and Boutayeb (2005) estimated that tobacco consumption was increasing in developing countries by 3.4% per annum and 80% of the smokers in the world live in these countries. Between 2001/2002 and 2007, using the Zambia Demographic and Health Surveys, the prevalence of cigarette smoking drastically increased from 0.5 to 0.7% among females, and from 13.7 to 23.8% among males (Central Statistical Office, 2003, 2009). It is extremely important that developing countries that are in Stage I of the smoking epidemic act now to curtail this increase in smoking prevalence (Lopez et al., 1994).

Generally, tobacco use has been declining in developed countries (United States of America, Canada, United Kingdom, Australia, Norway and Sweden); except for women in Norway who showed an increase in tobacco use (Pierce, 1989). Specifically, in Australia, the rate of smoking significantly decreased in both sexes from 35% in 1980 to 23% in 2001 (White et al., 2003), and the authors speculated that this decline followed the control efforts in the country. In the United Kingdom, Robinson and Bugler (2010) using the 2008 General Household Survey (GHS) data, observed a reduction in the prevalence of cigarette smoking from 45% in 1974 to 35% in 1982 and then slowly reduced to 21% in 2007 and

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2008.

Although, detailed data analyses of the Global School-based Student Health Surveys and Global Youth Tobacco Survey enquiring on the lifestyles of adolescents, including tobacco use, have been conducted in Zambia (Muula and Siziya, 2007; Siziya et al., 2008; Siziya et al., 2007), there is paucity of information on the older age groups. The Zambia Demographic and Health Surveys (ZDHS) of 2001/2002 and 2007 have reported on the prevalence of smoking by socio-demographic characteristics that included persons aged 15 years or older (Central Statistical Office, 2003, 2009). Using the 2001/2002 ZDHS data, Pampel (2005) conducted a study to determine correlates for tobacco smoking but did not consider body mass index and sedentary behaviour that have been found to be associated with tobacco use because these data have not been collected in the ZDHS. Body mass index has been reported to be associated with smoking (Pednekar et al., 2006; Molarius et al., 1997; Akbartabartoori et al., 2005). Meanwhile, prevalence of sedentary lifestyle has been reported to be higher among current smokers than non smokers in 15 Member States of the European Union (Varo et al., 2003) and among workers in a tea industry in India (Medhi et al., 2006).

The 56th World Health Assembly unanimously adopted the first global health treaty, the Framework Convention on Tobacco Control (FCTC) on 21st May 2003. Five years later, Zambia acceded to the FCTC on 28th May 2008. However, before Zambia acceded to FCTC, it passed the following regulations on tobacco control in 1992 by banning sale of tobacco to persons below the age of 16 years; tobacco advertisement in mass media and smoking in government buildings, private work sites, education and health facilities, public transport, and other public places. Cigarette smoking among females and males aged 15 to 49 years in Zambia increased by 40 and 74%, respectively, between 2001 and 2008 (Central Statistical Office, 2003, 2009), demonstrating that these regulations seem to have had little or no impact on decreasing the smoking prevalence. Zambia must design interventions guided by the FCTC. It is important that interventions are designed and put in place to curtail the level of smoking in Zambia and to curtail the epidemic. Targeted interventions can only be effectively designed with the identification of the characteristics for smokers. The objective for study was to determine the prevalence of tobacco use and its correlates among persons aged 25 years or older living in Lusaka urban district.

MATERIALS AND METHODS

Study setting and design

A cross sectional study was conducted in Lusaka district in low, medium and high density residential areas. The study utilised a modified WHO STEPwise approach for chronic diseases risk factors surveillance methodology (WHO, 2005).

Eligibility criteria

Individuals (male or female) aged 25 years or older were eligible to participate in the study.

Sample size determination

A study was designed to obtain prevalence estimates for non communicable diseases and their risk factors, including tobacco smoking; and in that study a total sample size of 6128 respondents was calculated for the entire country. This sample size was powered to produce estimates for each selected district. In that sample, Lusaka district had a sample size of 1915 participants.

Sampling

We conveniently selected Lusaka district being the most urbanised district in Zambia. We hypothesized that prevalence rates for non communicable diseases and their risk factors would be highest in urbanized areas. A district was administratively divided into constituencies, then into wards, Census Standard Areas (CSAs) and finally into Standard Enumeration Areas (SEAs). Lusaka district had 7 constituencies out of which 5 were randomly selected. From each selected constituency, one ward was selected stratified by type of residential area (low, medium and high density areas). We did not consider a CSA in our sampling. The number of Standard Enumeration Areas (SEAs) selected in each ward was proportional to its population size. The number of SEAs varied from 15 to 45, and a 1 in 4 systematic random sampling technique was used to select SEAs, except in one ward in which a 1 in 3 systematic method was used. Households were systematically sampled to widely cover the selected SEAs. Finally, all persons of age 25 years or older were requested to participate in the survey.

Data collection

An interview schedule was used to elicit responses from the interviewees. The questionnaire was divided into among others the following sections: Demographic information, tobacco use, alcohol consumption, physical activity (physical activity at work, for transport, during leisure time, and sedentary behaviour), and biological measurements (including height and weight). Study factors that have been reported to be associated with smoking in the literature were selected from the questionnaire. These included socio-demographic factors (age, sex and education), body weight, alcohol consumption and physical activity. The questions were phrased as follows: Do you currently smoke any tobacco products, such as cigarettes, cigars or pipes? Do you currently use any smokeless tobacco such as snuff and chewing tobacco? Have you consumed alcohol such as beer, wine, spirits, fermented cider, *chibuku* (local brew) or *kachasu* (local brew) within the past 12 months? And the last question was: How much time do you usually spend sitting or reclining on a typical day?

Measurements

Height

The Seca Brand 214 Portable Stadiometer was used to measure the height of the participant. Height was measured without the participant wearing foot or head gear. Before the reading was taken, the participant was requested to have feet together, heels against the back board, knees straight, and look straight ahead. Height was recorded in centimetres.

Table 1. Distributions of age and education by gender for the sampled population.

Factor	Total	Male	Female	p value
	n (%)	n (%)	n (%)	
Age group (years)				0.955
25-34	1015 (53.2)	337 (53.7)	675 (52.9)	
35-44	413 (21.6)	135 (21.5)	277 (21.7)	
45+	481 (25.2)	156 (24.8)	323 (25.3)	
Education				<0.001
None	408 (21.5)	76 (12.2)	330 (26.0)	
Primary	276 (14.5)	61 (9.8)	214 (16.9)	
Secondary	679 (35.8)	242 (38.8)	435 (34.3)	
College/university	534 (28.1)	244 (39.2)	290 (22.9)	

Weight

Weight was measured using the Heine Portable Professional Adult Scale 737. Participants were asked to stand still, face forward, and place arms on the sides of the body. Weight was recorded in kilograms.

Data entry

Two data entry clerks were trained to enter the data using Epi data version 3.1. Data was double entered and validated. The data entry template had consistency and range checks embedded in it. The data entry clerks were trained and supervised by SS. The validated data was exported to SPSS version 14.0 for analysis.

Data analysis

The analysis included running frequencies, cross-tabulations, bivariate, and multivariate logistic regression after considering the clustering effect. In order to adjust for clustering effect, using a SEA as a cluster, we conducted analyses using the Complex Samples for logistic regression in SPSS version 17.0. We could not use a household as a cluster because household identification numbers were not unique and others did not have them. Body mass Index (BMI) was categorized as <18.5 (lean), 18.5 to 24.9 (normal), 25.0 to 29.9 (over weight), and 30+ (obese). We obtained unadjusted odds ratios (OR) and their 95% confidence intervals (CI), and also adjusted odds ratios (AOR) and their 95% CIs after considering only the factors in the model that were significantly associated with the outcome at bivariate analyses.

Ethical considerations

The study protocol was reviewed and approved by the University of Zambia (UNZA) Research Ethics Committee (REC). Informed consent was sought from the eligible persons. Participants were informed that their non participation in the study would not affect the treatment they receive at a health facility.

Only persons who consented were enrolled into the study. Further information was given to persons who consented to take part in the study, that they were free not to respond to some questions if they so wish. All questionnaires were kept in the office of the Principal Investigator (SS). Entry forms were only viewed by approved study personnel.

RESULTS

Demographics

A total of 1928 individuals participated in the survey, of which 33.0% were males. About half of the participants were of age 25 to 34 years (53.2%), and a third of the respondents had attained secondary level of education (35.8%) as shown in Table 1.

Tobacco use prevalence

Overall, 6.8% of the participants currently smoked cigarettes (17.5% among males, and 1.5% among females; p<0.001). Current use of smokeless tobacco was estimated at 0.6%, with no significant difference (p=0.519) between males (0.3%) and females (0.7%). These results are shown in Table 2.

Correlates for current tobacco smoking

When determining factors associated with tobacco smoking, sex, BMI, and current alcohol use were significantly associated with smoking in bivariate analyses (Table 3). However, only sex and BMI were independently associated with smoking. Female respondents were 90% (AOR = 0.10, 95% CI [0.05, 0.23]) less likely to smoke cigarettes compared to male respondents. Compared to respondents who had <18.5 BMI, respondents who had higher BMI were less likely to smoke (AOR = 0.30 (95% CI [0.15, 0.61]) for 18.5 to 24.9 BMI; AOR = 0.12 (95% CI [0.05, 0.31]) for 25.0 to 29.9 BMI; and AOR = 0.03 (95% CI [0.00, 0.26]) for 30+ BMI.

DISCUSSION

We found a current smoking prevalence of 6.8% (17.5%

Table 2. Tobacco use stratified by gender.

Factor	Total	Male	Female	p values
	n (%)	n (%)	n (%)	
Currently smoked cigarettes				<0.001
Yes	130 (6.8)	111 (17.5)	19 (1.5)	
No	1795 (93.2)	522 (82.5)	1267 (98.5)	
Currently used smokeless tobacco				0.519
Yes	11 (0.6)	2 (0.3)	9 (0.7)	
No	1892 (99.4)	611 (99.7)	1275 (99.3)	

Table 3. Factors associated with tobacco smoking.

Factor	Bivariate analyses	*Multivariate analysis
	OR (95% CI)	AOR (95% CI)
Age (years)		
25-34	1	-
35-44	1.36 (0.88, 2.12)	
45+	1.20 (0.77, 1.85)	
Sex		
Male	1	1
Female	0.07 (0.04, 0.12)	0.10 (0.05, 0.23)
Completed level of education		
None	1	-
Primary	1.21 (0.69, 2.09)	
Secondary	0.92 (0.58, 1.47)	
College/university	0.62 (0.36, 1.06)	
Body Mass Index (kg/m^2)		
<18.5	1	1
18.5-24.9	0.43 (0.27, 0.69)	0.30 (0.15, 0.61)
25.0-29.9	0.12 (0.06, 0.24)	0.12 (0.05, 0.31)
30+	0.05 (0.02, 0.18)	0.03 (0.00, 0.26)
Consumed alcohol in past 30 days		
Yes	1	1
No	0.39 (0.20, 0.76)	0.68 (0.32, 1.44)
Time usually spent sitting or reclining on a typical day		
<1.5	1	-
1.5-3.4	1.06 (0.68, 1.67)	
3.5+	0.98 0.61, 1.58)	

OR Odds ratio; AOR Adjusted odds ratio; CI Confidence Interval; * Adjusted for all significant factors in bivariate analyses.

among males and 1.5% among females). Comparing our findings with those of the neighbouring countries (http://www.who.int/chp/steps/reports/en/index.html) that used the same WHO STEP wise approach for chronic diseases risk factors surveillance methodology, we note that our findings were lower than those from Zimbabwe (overall 11.8%, males 33.4%, females 5.0%), Botswana (overall 19.7%, males 32.8%, females 7.8%) and Malawi

(overall 14.1%, males 25.7%, females 2.9%). These findings suggest that the cigarette epidemic is moving slowly in Zambia compared with Zimbabwe, Botswana and Malawi such that Zambia is still in Stage I of the epidemic and the other countries have moved on to Stage II (Lopez et al., 1994).

We found that the prevalence of smoking was higher among males than females. This result has also been reported by Townsend et al. (2006) and Pampel (2008). While the same finding was reported by Pierce (1989) in the United States, United Kingdom, Australia, Canada and Norway, in Sweden the prevalence has been higher among females than males since 1978. An interesting changing epidemiology of prevalence of smoking is

reported in Australia, where while the prevalence has been higher in males, the difference in prevalence between males and females has been getting narrower since 1980, largely due to a greater proportion of males who quit smoking compared with the proportion of females who smoke (White et al., 2003). The consistent pattern in sub-Saharan Africa of more males than females who smoke may partly be due to culture of non tolerance of females who smoke in Africa.

We also found that overweight or obese people were less likely to be current smokers than lean people. The results from a cross sectional EPIC-PANACEA study covering 42 populations from 21 countries worldwide also showed that, current smokers have lower BMI compared with never smokers (Molarius et al., 1997; Akbartabartoori et al., 2005), this suggests that, the decline in body weight may be a long term effect of smoking as found in a Finish study, that years of smoking was inversely related to BMI (Marti et al., 1989). However, our study was not powered to determine the relationship between years of smoking and BMI.

Limitations

Though the study design provides reliable and valid information, the study may have some limitations. The survey was done in Lusaka district, and hence the results can only be generalized to the sampled population. We did not have reliable information on the number of household members of age 25 years or older, in order to enable us to compute the response rate. Therefore, we could not compute weights that could have been used in the analysis. Our overall estimate for prevalence for smoking for both males and females may have been underestimated because we oversampled females who had a lower smoking rate than males. Furthermore, our findings may be biased to the extent that non-respondents differed from those that participated in the survey.

However, we are unable to suggest the direction of bias. We did not collect reliable data on the socio-economic status of the population (too much missing information); and hence we did not determine whether socio-economic status confounded the relationship between BMI and smoking. In addition, not too many respondents reported the number of cigarettes smoked in a day and therefore we did not determine the smoking index. Some study factors in our survey were obtained through self-reports, and as in all such studies, both inadvertent and deliberate reporting is a concern. In spite of the stated limitations, we believe that our findings may not have been significantly affected.

Conclusion

We conclude that the tobacco smoking epidemic is in its early stage in Zambia. Zambia must act now to curtail the epidemic. The association between smoking and body mass index should further be explored, so that an intervention can be designed that addresses both smoking and nutrition.

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