Prevalence of smoking among adult males in Colombo District, Sri Lanka

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ABSTRACT

The study aimed to estimate prevalence of smoking among adult males in the district of Colombo
Methods: A community based cross-sectional study drew a representative sample of males aged 20-59 years (n=1200) the district and the information on smoking was gathered using an interviewer-administered questionnaire designed based on the classification by the Centres for Disease Control and Prevention of United States. **Results:** Prevalence of ever smoking among adult males in Colombo district was 54.1% (95% CI 51.0-57.2). Prevalence of current smokers was 36.5% (95% CI 33.8%-39.3%) while prevalence of former smokers was 17.6% (95% CI 15.3%- 19.9%) Prevalence of ever smoking was higher among >40 years old (p<0.0001), with lower educational qualifications (p<0.01), married (p=0.002) and not having children (p<0.0001). Among current and former smokers, 98.0% (612/624) were consuming cigarettes while 9.9% (62/624) were bidi smokers. The current daily smokers smoked a significantly lesser number of mean cigarettes per day (7.7, SD=6.6) compared to former daily smokers (mean cigarettes per day 12.92, SD=15.5). Among current smokers 60.3% (n=254) had attempted to quit smoking at least once in their life with an average of 3.2 quit attempts. **Conclusion:** The prevalence of ever and current tobacco smoking among adult males in Colombo district was high. Smokers were more likely to beelders, less educated, married and without children and authorities should be advocated on focused efforts to prevent smoking among them. High rate of failed quit attempts indicate poor support which needs to be brought to the attention of the authorities.

Keywords: Tobacco, current smoker, former smoker, ever smoker, quit attempts

Introduction

Non-communicable diseases (NCD) are a leading cause of deaths globally. The major risk factors of NCD are tobacco usage, unhealthy diet, insufficient physical activity and the harmful use of alcohol [1]Tobacco smoking is associated with ill-health, disability and death, as well as with an increased risk of death from communicable diseases[2].Tobacco has been named as the only 'legal drug' that kills its users when used exactly as intended by manufacturers[2].Exposure to tobacco occurs in both

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smokeless and smoking forms. Smoking form is the commonest and manufactured cigarettes represent the major form of smoked tobacco in the world [1].WHO has estimated that smoking and smokeless tobacco use is currently responsible for the death of about six million people across the world each year with many of these deaths occurring prematurely. This total includes about 600,000 people estimated to die from the effects of second-hand smoke[2, 3]. It is projected that by 2030, 6·8 million of the 8·3 million tobacco-related deaths will occur in low-income and middle income countries (LMIC) [4].Prevalence of smokers is an indicator that is used to assess the magnitude of the problem of smoking in the country. World Health Organization (WHO)(6) and Centre for Disease Control, Atlanta, United States (CDC)(7) have advocated the researchers to use standard definitions in estimates of prevalence of smoking in community surveys. The WHO classifies 'a person who smokes

any tobacco product either daily or occasionally at the time of survey' as a 'smoker' and the 'a person who does not smoke at the time of survey' as a 'non-smoker'[5]. Smokers are then classified as 'daily smoker' and an' occasional smoker' based on whether they smoke a tobacco product at least once a day or not. The other widely accepted definition used in surveys is by the CDC[6]. It categorizes smokers into 'current smokers' and 'non-smokers'. 'Persons who had smoked 100 cigarettes in their lifetime and currently smoked cigarettes every day or some days' are classified as 'current smokers' and are further classified as 'current daily smokers 'and 'current non-daily smokers' based on whether they smoke every day or only on some days. 'Persons who had not smoked a cigarette or who had smoked fewer than 100 cigarettes in their entire lifetime' are classified as 'never smokers 'and 'persons who had smoked at least 100 cigarettes in their lifetime, but said they currently do not smoke' are classified as 'former smokers'. Former smokers and current smokers together form the 'ever smokers' in the CDC classification. Former smokers are further classified into 'former daily' and 'former non-daily smokers' based on whether they smoked every day or only on some days at the time they were smoking. Globally, in 2013, 21% of adults amounting to 1.1 billion, 950 million men and 177 million women were smokers. Though this is a decline of prevalence of smokers from 2007 where 23% were smokers accounting for the increase in the global population, the total smokers in the world remains the same[7]. In contrast to the fact that a major proportion of tobacco related deaths occurring in the LMIC, prevalence of smoking is highest in high-income countries. In 2013, a quarter of adults in high income countries were smokers while the corresponding proportion of adult smokers were 21% in middle-income countries and 16% in low-income countries [7].However, there is evidence that the global smoking epidemic is now moving from the rich to the poor countries[8]. The prevalence of tobacco smoking varies widely among the six WHO regions. In 2010, the highest overall prevalence for smoking was estimated at 30% in the European Region, while the lowest was in the African Region (12%). The highest prevalence of smoking among men was in the Western Pacific Region (49%). The prevalence of smoking in South East Asia among both sexes was 18.2% while among men it was 33.1%[2].Global Adult Tobacco Surveys in few South Asian countries conducted from 2009 to 2014 have assessed the problem of smoking and the estimates indicate prevalence of current smoking among males to be 24.3% in India,22.2% in Pakistan and 44.7% in Bangladesh [9-11].Sri Lanka has taken several major

steps towards tobacco control in the recent past. Sri Lanka was one of the first countries to ratify the Framework Convention on Tobacco Control (FCTC), by the WHO in 2003[12]. As a result, the country enacted the National Authority on Tobacco and Alcohol (NATA) Act No 27 in 2006 with the intention of eliminating tobacco and alcohol-related harm through different public health policies and their implementation. Implementing of the requirement to have 80% pictorial warnings on cigarette packs since January 2015 is a highly acclaimed success towards tobacco control in the country [13]. Prevalence of smoking among adult men in Sri Lanka has been assessed serially in the past two decades in the WHO STEPs surveillance for NCD risk factors has been conducted by the Ministry of Health in 2003, 2006 and in 2014-2015.The 2003 surveillance had been conducted only in one Health Area in Western Province among a sample of25 to 64 year old 1500 males and 1500 females. Among men 40.3% were smokers (32.6% daily smokers and 7.7% occasional smokers) and the 59.7% were non-smokers. The corresponding proportions of smokers among females was1% and non-smokers was 99%. Manufactured cigarettes was used by a great majority (males 93.1%%: females 80%) while the mean number of cigarettes smoked by current daily smokers was 7.1 among males and 6.8 among females[14]. The STEPs survey in 2006 in Sri Lanka was among 2000 (1000 males and 1000 females) 25 to 64 year olds residing in five randomly selected districts out of the 25 districts of the country. Results revealed 29.8% men to be smokers (22.8%daily smokers and 7% occasional smokers). The proportion of non-smokers was 70.2%. Among females 0.4% was smokers and 99.6% were non-smokers. Manufactured cigarettes was used by a great majority (males 85.7%: females 94.4%) while the mean number of cigarettes smoked by daily smokers was 9 among males and 13.8 among females[15]. Results of the 2014-2015 STEPs survey have not been published as yet. Other than the STEPs surveys, a few large scale studies have been conducted in Sri Lanka that have estimated the prevalence of smoking among adults. A study in 2005 on prevalence of tobacco smoking among 500 adults who were more than 18 years of age in seven out of the all nine provinces of Sri Lanka in 2005 found that the prevalence of 'current smokers' among adult male was 35.3%. However, the current smokers were defined as those who were smoking any form of tobacco (cigarettes, bidi,or cigars) either every day or on some days at the time of the study or within the preceding 6 months which is different to the definitions of WHO or CDC. The prevalence was highest among the 20-60 year olds with

the prevalence of smoking among 20-29 years being 44.6% , 30-39 years being 42.9, 40-49 years being 42% and 50-59 years being 35% [16]. The study was conducted in the year 2012to estimate the prevalence of smoking among adult males aged 20-59 years in the Colombo District of Sri Lanka. The purpose was to obtain updated prevalence estimated for a broader study which required quantification of smoking as a risk factor for lung cancer in Sri Lanka.

Methods and materials

The study utilized the community based cross-sectional design. A study unit was defined as an adult male aged 20 to 59 years and residing in Colombo District at least for six months. Size of the sample of study units to be included was calculated using the formula to estimate sample sizes for prevalence estimates[17]and used the previous prevalence of 38% (95% CI 34.7-41.3)[16]male smokers in the calculation. Using a desired level of precision of 4% and a design effect of 2 and also allowing a 5%for non-response, the sample size was estimated as 1200.The sample was selected from all the 13 Divisional Secretariat Divisions (DSD) of the district of Colombo and cluster sampling method was used. The lowest level administrative in the DSD, aGrama Niladhari Division (GND) which was considered as the cluster and the cluster size was 25. The district has557 GNDs and 48 (1200/25=48) GND clusters. Each DSD was allocated a number of GNDs proportionate to the size of the adult male population in that DSD. The required number of GNDs was selected randomly from each DSD using a list as a sampling frame. From each selected GND, 25 eligible study units were selected randomly using the voters list taking care to select only one study unit per household. The data collectors visited the households of the selected study units and upon verification of the eligibility criteria obtained informed consent and included them in the study. Those who were not present in the households were met by appointment and those who could not be contacted even after three attempts were classified as non-responders.

Information on smoking was obtained using an interviewer administered questionnaire and the questions were designed to obtain information required to classify the study units into smoker categories defined by the CDC. Medical officers awaiting internship were trained as data collectors. The reliability of questionnaire was assessed employing test-retest method. The reliability of the questionnaire was found to have good reliability with minimum Cohen's kappa coefficient 0.93 for information related to smoking. Data entry was carried out using the Epidata software (version 3.1) and statistical analysis was conducted by employing the evaluation version of the software package SPSS- Statistical Package for Social Sciences (Version 20). The ethical approval was granted by the Ethics Review Committee, Faculty of Medicine, University of Colombo. Prevalence of different categories of smokers is presented by percentages with the 95% Confidence Interval. Further, the prevalence of smoking among different age categories, educational level and marital status are presented. The types of tobacco products used by the smokers, mean number of cigarettes consumed per day, mean age of initiation of smoking, mean duration of smoking and average number of times of quitting and duration since quitting also are analysed.

Results

Of the 1200 selected adult males, 46 (3.8%) could not be recruited making the response rate of the study 96.2%.The age categories of 30-39 and 40-49 comprised half of the study population (n=581, 50.3%). Of the study population, approximately one quarter each had studied up to General Certificate of Education (GCE) Ordinary level (n=299, 25.9%) and had passed GCE Ordinary level (n=298, 25.9%). Considering the occupation, most were skilled workers (n=654, 56.67%) with 124 (10.75%) being professionals. A majority (n=890, 77.1%) of the population were married (Table 1).

Table 1: Socio demographic characteristics of the study population

Characteristic		Number (1154)	Percentage (%)
Age categories(in years)	20-29	216	18.7
	30-39	283	24.5
	40-49	298	25.8
	50-59	357	30.9
Highest educational level	No formal schooling	16	1.4
	Upto grade 5 or less	102	8.8

	Upto G.C.E*. Ordinary Level	299	25.9
	Passed G.C.E*. Ordinary Level	298	25.8
	Upto G.C.E*. Advanced Level	146	12.7
	Passed G.C.E*. Advanced Level	220	19.1
	Higher education	73	6.3
Occupation	Professionals	124	10.8
	Clerical, service and sales workers	169	14.8
	Skilled workers	654	56.7
	Armed Forces	21	1.8
	Others	10	0.9
	Not Employed	174	15.1
Marital status	Currently married	890	77.1
	Unmarried	255	22.1
	Separated	1	0.1
	Widowed	7	0.6
	Divorced	1	0.1

*GCE= General Certificate of Examination

Prevalence of smoking by different categories

The prevalence of current smokers among males of the age between 20-59 years was 36.5% (95% CI 33.8%-39.3%) while prevalence of non-smokers was 65.3% (95% CI 62.5%- 67.9%).Current daily smokers was 29.8% (95% CI 27.2%-32.6%). Prevalence of former smokers was 17.6% (95% CI 15.3%- 19.9%) while never smokers was 45.9% (95% CI 43.0%-48.9%)(Table 2).

Table 2: Prevalence of smoking among adult males in the age between 20 to 59 years

Smoking category	Number	Percentage (95% Confidence)
Current smoker	**421**	**36.5 (33.8-39.3)**
Current daily smoker	**344**	**29.8 (27.2-32.6)**
Current non-daily smoker	**77**	**6.7 (5.3-8.3)**
Non-smoker	**753**	**65.3 (62.5-67.9)**
Ever smoker	**624**	**54.1 (51.1-57.0)**
Former smoker	**203**	**17.6 (15.3-19.9)**
Never smoker	**530**	**45.9 (43.0-48.9)**

Assessing socio-demographic characteristics of ever and never smokers (Table3) indicated that majority of males above 40 years of age were ever smokers (n= 376, 60.3%) while males below 40 years or less were never smokers (n=282, 53.2%) t (p< 0.0001).Higher percentage of males with lower educational qualification (n=452, 63.2%) were ever smokers compared to the males never smokers (n=263, 36.8%) (p<0.001).A majority of ever married males were ever smokers (n=508, 56.5%) compared to never married among whom the majority were never smokers (n=139, 54.5%) (p=0.002). While a majority of the males who had one or more children were never smokers (n=191, 55.8%), a majority pf males who had no children were ever smokers (n=473, 58.3%) (p<0.0001).

Table 3: Distribution of the study population by ever and never smoker status and socio demographic characteristics

		Smoking status				Sig
		Ever smoker		Never smoker		
		Number	Percent	Number	Percent	
Age	Age 40 or less	248	46.8%	282	53.2%	$\chi2$ =20.919, df=1, p<0.0001
	Age more than 40	376	60.3%	248	39.7%	

Highest Educational Level	Having passed*GCE Ordinary level or less	452	63.2%	263	36.8%	χ2 =63.28, df=1, p<0.0001
	up to GCE Advanced level or higher	172	39.2%	267	60.8%	
Marital status	Ever Married (Currently married/divorced/separated/ widowed)	508	56.5%	391	43.5%	χ2 =9.71, df=1, p=0.002
	Never married	116	45.5%	139	54.5%	
Having a child/children	Having a child/children	151	44.2%	191	55.8%	χ2 =19.26, df=1, p<0.0001
	No children	473	58.3%	339	41.7%	

*GCE= General Certificate of Examination

Among current and former smokers, 98.0% (612/624) were consuming cigarettes while 9.9% (62/624) were bidi smokers. A great majority of all categories of current smokers and former smokers were/had been using manufactured cigarettes (current daily smoker (96.8%), current nondaily smoker (100 %), former daily smoker (99.4%), former non-daily smoker (99.3%)).The mean no of cigarettes smoked by the current daily smokers per day (7.7 ±SD=6.6) was significantly lower than the mean number that had been smoked per day by the former daily smokers (12.9, ±SD=15.5) (p=0.001).   The mean no of cigarettes being smoked by the current non-daily smokers per day (6.1 ±SD=4.7) was not significantly different to the mean number that had been smoked per day by the former non-daily smokers (5.1, ±SD=3.25) (p=0.219). Mean age at initiation of smoking for current daily smokers was significant higher (22.2 years(95% CI 21.6-22.8))than the corresponding figure for former daily smokers (19.9years (95% CI 19.3-20.6)) (p=0.001). A majority of the current smokers (60.3%, n=254) had attempted to quit smoking at least once in their life time. The mean number of attempts to quit from smoking among current smokers was 3.2 (95% CI 2.9-3.5) and mean number of months since last quit attempt was 5.29 months (95% CI 4.2-6.4).

Discussion

The descriptive cross-sectional study design was used to determine the prevalence of smoking as it is the most appropriate design. Adult males who were in the age of 20 to 59 years of age were selected as the study population based on the past evidence of this age group being the group with highest prevalence of smoking in Sri Lanka as well as in the world [1, 14, 16, 18, 19].

The prevalence of smoking among women in Sri Lanka had been found to be low with them being 1.6% in 1971, 1% in 1988 and 0.67 in 2003 and 0.3% in 2005 [14, 16, 20, 21]. Hence, the decision to include only men in this study which was a part of the broader study to quantify smoking as a risk factor for lung cancer in Sri Lanka. Cluster sampling [22]allowed to obtain a sample by probability proportionate to the size of the adult males in the age of 20-59 years living in different DS divisions of the district. Careful operationalization of the definition of smoking offered by the CDC allowed accurate categorisation of the study units into groups with different smoking patterns. Of the different categories of smokers in the CDC classification, magnitude of the problem of smoking is most closely represented by the 'current smokers'. It should be noted that the category of 'current smokers' in the CDC classification is very similar to the category of 'smokers' in the WHO classification. The only difference is that CDC classification define the current smoker by having smoked at least 100 of the tobacco products while WHO does not accounted for the number of products.

The present study estimated the prevalence of current smokers as 36.5% (95% CI 33.8-39.30) among men aged 20-59 years. The WHO NCD STEPS risk factor surveys in 2003, reported a prevalence of40.4% of 'smokers' among men in the age 15-74 years old. This survey covered only one Health Area of the Western Province and the age group included was wider [14]. Inclusion of older age categories can be a likely reason for the higher prevalence of smokers in the STEPs survey of 2003. The STEPs survey in 2006 covering entire Sri Lanka among 2000 males aged 25 to 64 year showed that prevalence of 'smokers' of 29.8% (22.8% -daily smokers,7%- occasional smokers) [15].Though

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the age group in 2006 STEPs was similar to the present study, the differences in the study settings precludes any direct comparison of the prevalence estimates to interpret the trend of the problem of smoking using this estimate and the present study. The prevalence of smoking in the present study showed mixed results when compared with prevalence estimates of smoking of tobacco from South Asian Regions. Global Adult Tobacco Survey (GATS) in 2009-2010 estimated that 24.3% of the males in India smoked any form of tobacco products[23]. The GATS in Pakistan in 2014 estimated the prevalence of smoking of tobacco among males as 22.2%[11].The reason for the lower figures compared to the present study can been attributed to high percentages of males who are addicted to smokeless tobacco rather than smoking in some parts of India and Pakistan..Estimates of tobacco smoking in 2009 GATS indicated 44.7% smoking among men in Bangladesh[10] which is higher than the estimates of the resent study. The prevalence of smoking estimated by the Bangladesh urban health survey in 2006 found that overall prevalence of smoking in Bangladesh to be 49.3% while 53.3% of men in slum areas were found to be current smokers[24].A great majority of smokers used manufactured cigarettes (98%) in the present study. In contrast, in India and Bangladesh the prevalence of cigarette smoking and bidi smoking were found to be almost similar (In India 10.3% and 16% respectively and in Bangladesh (28.3% and 21.4% respectively)[9, 10].Similar to the present study many studies found that higher percentage of smokers to have low educational background [25-28]in contrast to the present study which found more married to be ever smokers, many researchers have found a higher prevalence of smoking among unmarried[28, 29]. Mean number of cigarettes consumed by a smoker per day in the present study (7.7 $\pm$SD=6.6) has been declining in the past two decades in Sri Lanka [30]. National tobacco control policies in Sri Lanka have included tax increases on cigarettes and tobacco products, restrictions on public and mass media advertising of tobacco products since 2007[31]. The annual report of Ceylon Tobacco Company, indicates the increase of prices of cigarettes in Sri Lanka as the main reason for the reduction of sale[32]. Mean age at initiation of smoking for current daily smokers and for former daily smokers in the present study was 22.2 years (95% CI 21.6-22.8) and19.9 years (95% CI 19.3-20.6), respectively. The findings are compatible with other studies in Sri Lanka and Asian countries and European countries [33-37]. The spot survey done by Alcohol and Drug Information Centre in 2013, covering 10 districts in Sri Lanka among 2465 males

from the age above 15 years found that the mean age of initiation smoking as 19.3 years [37].

Sixty point three percent of males had attempted to quit smoking at least once in their life and average of 3.2 quit attempts had been attempted by them. The survey done by Alcohol and Drug Information Centre in 2013 found out that 60% of current smokers have tried quitting tobacco use[37]. GATS done in India in 2009-2010 found that 38.3% male smokers attempted to quit smoking during past 12 months, and in Bangladesh it was 47.8% which are low figures Comparing to the present study.

Conclusions and recommendations

The prevalence of ever and current smoking among adult males in Colombo district was high and needs the intense attention of the authorities. Prevalence of ever smoking higher among males who were married and were more than 40 years of age, with lower educational qualifications, and not having children. Mean number of cigarettes consumed by current smokers was less compared to former smokers which may indicate a decreasing trend of amount smoked by smokers over the years. High rate of failed quit attempts indicate poor support and the relevant authorities should be advocated to support those who want to quit smoking.

Acknowledgement

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