

Abstract

Introduction and objectives

Tobacco smoking is a risk factor for six of the eight leading causes of death in the world including lung cancer. Both developed and developing countries spend a large proportion of resources to manage the lung cancer, which could have been prevented if smoking was prevented. No recent studies have been conducted in Sri Lanka to measure the extent of smoking problem and assess the burden of lung cancer attributed to smoking.

The present study was designed with the objectives of determining the prevalence and factors associated with smoking among adult males aged 20-59 years in Colombo district. It also aimed to estimate the cost of treatment of lung cancer attributed to smoking, among male lung cancer patients in Colombo district.

Methodology

The study consisted of three components: A community based cross-sectional study, a hospital based case control study and a hospital based cost estimation study.

The descriptive cross sectional study design was used to determine the prevalence of smoking and to identify the factors associated with smoking among adult males aged 20-59 years. A representative sample of 1200 adult males selected using multistage cluster sampling technique served as the study population. Categorization of smoking was based on the definition of smoking offered by the Centers for Disease Control (CDC) and Prevention identification of factors associated with smoking was based on the PRECEDE model. This model recognizes that health behaviors have multiple factors, which must be evaluated in order to assure appropriate intervention. PRECEDE is an acronym for Predisposing, Reinforcing, Enabling, Constructs in Educational Diagnosis and Evaluation. Information on status of smoking and factors associated with smoking were assessed using an interviewer-administered questionnaire. Data entry was done by Epidata software (v 3.1) and analysis done by SPSS Version 20. Analysis was performed to estimate prevalence of different categories of smokers a disaggregated by socio demographic profile and presence of a chronic diseases with 95% Confidence intervals. In assessing factors associated with smoking, data was analysed based on PRECEDE model.

A case control study was carried out among 62 newly diagnosed male lung cancer patients originated from the district of Colombo and presented to National Cancer Institute- Maharagama. Four controls per case were randomly selected from the same Grama Niladhari area as the participants matched for the age of the cases within 10 years. Cases were recruited at their initial clinic visit to CIM. Controls were recruited in a household survey. The selected controls were medically examined to confirm, that they do not have lung cancer. Information on smoking, other potential risk factors and confounders were obtained using an interviewer-administered questionnaire administered by trained data collectors with a medical background. Univariate analysis and conditional Logistic regression were performed to assess the risk factors of lung cancer.

Disease-specific cost estimation approach to the treatment cost of lung cancer that can be attributable to smoking was done using the 91 records of persons who were registered in the year of 2008 in CIM. Using the scenario building technique all items that contributed to the cost of management of lung cancer were listed and cost was estimated. The 62 lung cancer patients who served as the cases in the case control study participated in the household cost estimation. The relevant information was obtained using two interviewer-administered questionnaires.

Results

The 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%). Disaggregating the current smokers into current daily smokers and current non-daily smokers showed that the prevalence of current daily smokers was 29.8% (95% CI 27.2%-32.6%) while the prevalence of current non-daily smokers was 6.7% (95% CI 5.3%-8.3%). Prevalence of former daily smokers and former non-daily smokers were 14% (95% CI 12.1%-16.2%) and 3.6% (95% CI 2.6%-4.8%), respectively.

Among the ever smokers, prevalence of smoking was higher among age of who were in the age group of 50-59 years of age (20.3%), Sinhala (46.2%) Buddhists (43.9%), educated level G.C.E. O/L or less (17.9%), married (43.5%), doing a job (44.4%) and earns less than Rs. 40,000.00 per month (38.6%). The prevalence of smoking was

higher among the ever smokers, who were hypertensive (0.06%) and having Diabetes Mellitus (0.07%).

Manufactured Cigarette was found to be by far the most popular form of smoking among the study population. Prevalence of current bidi smoking was 15.7% and 12.7% reported former bidi smoking.

The mean number 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 (12.92, SD=15.5). Mean age at initiation of smoking for current smokers was 20 years and for former smokers was 19 years. Sixty point three percent of current smokers had attempted to quit smoking at least once in their life with an average of 3.2 quit attempts.

The prevalence of secondhand smoking among adult males was 26.8% (95% CI 24.2%-29.4%). Among them 10.3% (8.7%- 12.0%) have exposed inside the home, 13.5% (11.6%- 15.5%) exposed in a vehicle and 8.2% (6.7%-9.8%) exposed to secondhand smoking inside a closed public place.

In the present study, possessing unfavorable attitudes on smoking was found to be a significant predisposing factor associated with initiation and maintenance of smoking ($p < 0.001$).

History of smoking by the father ($p < 0.001$), having a family member smoking in the presence of the respondent when the respondent was young ($p = 0.004$), having close friend who smoked regularly when the respondent was young ($p < 0.001$), having a close friend offering cigarette/ bidi/other tobacco products to the respondent when the respondent was young ($p < 0.001$) and getting frequently invitations to parties where friends regularly smoke when the respondent was young ($p < 0.001$) were factors that were found to reinforce smoking habit of adult males.

Availability and accessibility to tobacco products were considered as the factors enabling smoking. Ninety-two percent of the ever smokers who started smoking at the age between 20 to 30 years of age have bought the tobacco products by themselves. Some have received tobacco products by their friends and a little percentage have received by one of the family members. Thirteen point four percent have bought the tobacco products as packets and 91.4% (540) have bought as single or multiple sticks at

a time. A further 12% had received the cigarettes free of charge. Most of the ever smokers (93.7%) who started smoking at the age between 20 to 30 years of age have said that there was a place to buy tobacco products near their house/ school/ work station. Most of the shops had cigarettes (98.7%) and bidi (72.6%) available. Majority have said that they could reach a shop to buy a tobacco product within 10 minutes when they were young.

In multivariate logistic regression, four variables were identified as significant risk factors for lung cancer among the males, after being adjusted for the confounding. When the effects of confounding variables were controlled, ever smokers were found to be at a 10.74 times (3.54-32.59) higher risk of lung cancer compared to never smokers. An educational level of passing GCE O/L or less (OR= 5.61 (2.37-13.28), having been ever exposed to X rays (OR= 2.81 (1.14-6.94) and having a family history of any cancer (OR= 2.83 (1.09-7.30), were the other risk factors for lung cancer among males adjusted for confounding. Being a current alcohol drinker (OR= 0.20 (0.08-0.48) was found to be a protective factor of lung cancers among males.

The present study data estimated that PAR% of smoking on lung cancer on adult males as 84.04%. This confirms that if smoking among males were prevented, 84% of lung cancers cases could be prevented.

Total treatment cost of lung cancer patient in Colombo district was Rs. 407808.70, including systemic cost of Rs. 169181.50 and household cost of Rs. 238627.30. Therefore, treatment cost of lung cancer attributed to smoking, among male lung cancer patients in Colombo district was Rs. 43,183,026.40. If smoking can be prevented among adult males in Colombo district, this amount of money could have been averted annually for other Health Programs.

Conclusion

The study concluded that the prevalence of ever smoking among adult males in Colombo district was high. Presence of unfavourable attitudes and several enabling and reinforcing factors have been identified as important for initiation and maintenance of smoking. Approximately one fourth of the adult males have been exposed to second hand smoking. Ever smoker has a 10.74 times higher risk of lung cancer compared to never smoker when adjusted for confounding factors and exposure to second hand smoking, having lesser education, exposure to X ray and having family history of any

cancer have been found as risk factors for developing lung cancer. Population attributable risk percent (PAR%) of smoking for lung cancer was 84.04% and if smoking had prevented, Rs. 43,183,026.40 a year would have been averted to any other Health Programs.

Recommendation

It is recommended that the high prevalence and strength of smoking in the country should be brought to the notice of the relevant authorities as evidence of poor success of tobacco preventive initiatives and take into account the identified predisposing, reinforcing and enabling factors of smoking. Strengthening the already available measures and formulating new policies to minimise second hand smoking are needed to be focused more. Averting the high treatment cost of lung cancer by preventing smoking should be made use in public awareness programmes and in efforts against tobacco promotional activities.

Keywords: Tobacco smoking, Lung cancer, Treatment cost, Odds ratio