

Review Article

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Determinants of smokeless tobacco use in India

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Non-communicable diseases (NCDs) contributes to more than 50 per cent disability adjusted life years (DALYs) in India; and tobacco contributes to 7.4 per cent of DALYs which is next to diet and high blood pressure. According to Global Burden of Disease (GBD) 2015, tobacco use contributed to 5.9 per cent out of total DALYs in India. Smokeless tobacco (SLT) consumption is a multifactorial process influenced by varied range of contextual factors *i.e.*, social, environmental, psychological and the genetic factors which are linked to the tobacco use. The determinants associated with the SLT use are gender, educational level, wealth index (inverse association), urban-rural residence, socio-economic status and low tax. Taking the view from tobacco control programmes, there is a need to address determinants of SLT use with State level monitoring and socio-economic inequalities, progress and review of the taxation of the SLT use in India.

Key words Demography - determinants - noncommunicable diseases - smokeless tobacco socio-economic status

Introduction

Non-communicable diseases (NCDs) contribute to 55.4 per cent disability adjusted life years (DALYs) in India and of the total deaths, 61.8 per cent deaths were in 2015¹. The major risk factors for the NCDs are unhealthy diet, physical inactivity, alcohol and tobacco use. According to the per cent change leading causes of death by risk factors, low physical activity contributes to 18.9 per cent, diet contributes to 12.3, alcohol 6 and tobacco use 4.2 per cent of DALYs and are included in top five leading causes². Tobacco contributes to 5.9 per cent of DALYs which is next to diet (8.9% of DALYs) and high blood pressure (8.5% of DALYs) in India¹.

The global age-standardized summary exposure values for smokeless tobacco for the year 1990, 2006

and 2016 were 13.4 and 8.3, 15.6 and 9.3, and 15 and 8.6, respectively, for males and females². The mean per cent change for three time periods, between 1990 and 2006, 2006 and 2016, and 1990 and 2016, by risk level were found to be 16.4 and 11.6, -3.5 and -7.4, and 12.3 and 3.3, respectively, for males and females². The combined per cent change in the exposure values of smokeless tobacco was 9.1 globally from 1990-2016².

As per Global Adult Tobacco Survey (GATS) reports^{3,4}, tobacco use was reduced by six per cent points from 2009-2010 to 2016-2017³. The tobacco use was reduced from 34.6 to 28.6 per cent and that of smokeless tobacco (SLT) from 25.9 to 21.4 per cent in India from 2009-2010 to 2016-2017. About 28.6 per cent of adults aged 15 and above use any kind of tobacco that means

every 5th adult uses smokeless tobacco (SLT) and 75 per cent of these adults resides in rural areas³. Among the age group of 15-24 yr, there was a relative reduction of 33 per cent in SLT use and the mean age for consumption was 18.9 years³. The average expenditure incurred by these SLT consumers was ₹12.8, and it was almost doubled since the 2009-2010 GATS^{3,4}.

More than 40 forms of SLT are available and consumed globally^{5,6}. In India particularly, it is taken in the various forms and commonly as chewing, snuffing, application to teeth and gums. The SLT is available in India as *paan*, *paan masala*, *khaini*, *zarda* and *gutka*⁷. The prevalent misconception related with SLT is that it is considered as safer over smoking which could be on the grounds of its usage in terms of initiation and persistence. More than 28 chemicals have been extracted from SLT which are carcinogens⁸. In case of SLT, nicotine is directly absorbed into the body through the mucous membranes in the mouth or nose. Furthermore, the levels of nicotine in blood are similar in case of SLT users as well as smokers, and it remains in the bloodstream for longer duration^{9,10}. SLT consumption is related with several health issues such as oral cancers, cardiovascular diseases, low birth weight and mental illnesses¹¹.

The use of SLT is widespread in both males and females in India, the common forms consumed by men are *khaini* and *gutka* whereas females use betel quid with tobacco followed by oral application of tobacco and *khaini*¹². In India, almost 50 per cent users use SLT followed by smoking and dual use of tobacco¹³. A widespread perception regarding the SLT is that it is good for dental health¹⁴. In this review the determinants for the use of SLT in India alongwith issues related to taxation of the SLT use in India are discussed.

The literature was searched using keywords 'determinants' OR 'determinant' AND 'smokeless' OR 'chewable tobacco' OR 'NCD' OR 'Chronic diseases' OR 'Lifestyle Disease' OR 'NCDs' on PubMed and Google Scholar during 2005-2017. The search was limited to India and South-East Asia Region. We also searched open access websites of National Ministry, Conference proceedings and other agencies involved in NCD prevention and Tobacco Control such as Smokeless Tobacco and Public Health in India, Ministry of Health and Family Welfare, The Economics of Tobacco and Tobacco Taxation in India and Manual on Tobacco Control.

Determinants for SLT use

Tobacco use is not restricted to individual's behaviour but is a multifaceted process contributed by

a varied range of factors such as social, environmental, psychological and the genetic factors which are linked to the tobacco use¹⁵. The determinants associated with SLT consumption include gender, wealth index (inverse association) and association with scheduled tribe¹⁶. Other factors are parental use, peer usage, subjection to advertisements and furtherance of SLT. Lack of understanding of health hazards also contributes to higher SLT use risk. Awareness of SLT harms is higher in men, younger people, students, individuals with higher level of education and urban residence. The knowledge of SLT-related health risk has been reported to be lowest in West India and highest in North India and it decreases with increasing age¹⁶.

Age, gender and area of residence

The prevalence of tobacco consumption in all forms increases linearly with age in women¹⁷. SLT, as well as tobacco dual use, is highest in the age group of 25-44 yr¹⁷. Relative risks are generally higher for women compared with men being 1.34 (1.27-1.42) for women and 1.17 (1.05-1.42) for men. The deaths attributable estimated to be 368,127 with a higher number of deaths among women (217,076) compared with men (151,051). The relative risk for oral/oropharyngeal cancer is 7.74 for chewing betel quid with tobacco; being much higher in women (14.56) than in men¹⁷. The use of SLT increases to the maximum in the age group of 35-39 years, same for the dual use of tobacco in the age group of 40-44 years in men. Among men, the prevalence of dual use was 9.3 per cent and, among women, it was 1.1 per cent, with male to female ratio of 8.5 to 1^{13,17}. An Intervention Model for Protecting Adolescents and Children against Tobacco (IMPACT) has been proposed; this model explains the different determinants that influence tobacco use, especially in youth¹⁸. The significant association with rural residence was seen only in India with the odds ratio of 1.5. Dual use prevalence was 3.6 per cent in urban and 6.0 per cent in rural areas of India¹⁹.

Socio-economic status (wealth quantiles)

The prevalence of smoking and SLT usage was found to be higher in medium wealth quintiles groups in all Regions of SEAR. The SLT consumption was higher in North and North-East region of India. SLT use in India across the socio-economic status was as follows: poorest 30.9, poor 22.9, medium 36.4, rich 16.6 and richest 10.0 per cent²⁰. Odds ratios was computed for SLT use in comparison to no tobacco use with multiple logistic regression model with the

inclusion of Wealth index, considering highest wealth category as reference and the results showed the decreasing trend of odds with increasing wealth, it is significant nationally it is found to be 2.9 for poorest, 2.1 for poor, 3.3 for medium, 1.5 for rich and 1 for richest²⁰. SLT consumption (poorest: 26.2 to 33.9%, richest: 11.4 to 13.5%, Scheduled Tribe: 31.1 to 34.8% and general caste: 13.6 to 18.5%) increased for all households, with larger increase among richer, more educated and general caste²¹. A cross-sectional study conducted in a rural area of Karnataka showed a prevalence of 17.5 per cent for tobacco use. The usage was common among lower socio-economic group, older population and less educated²².

Educational status

In a study conducted in 13 low and middle income countries to examine the role of social determinant on current use of tobacco, odds ratios calculated for smokeless versus no use including education as predictor and taking highest level of education as the reference, came out to be 3.03 for non-formal education or less than primary, 1.96 for those who completed primary or less than secondary, 1.194 for those who completed secondary or high school and 1 for those who completed their college and university or above education qualification²³. A significant difference in the lower education category showed higher risk as compared to higher education categories. Adults with some primary school education showed the highest prevalence of dual-use (8.3%) compared to individuals with other levels of education. The highest prevalence of dual use was among those who were employed (8.3%) and lowest in students (1.4%)¹⁹.

Taxation

Various studies have revealed the estimates of price variations of tobacco products with respect to the socio-economic groups. In general, an increase in tax could lead to the reduction of tobacco consumption due to increase in prices of tobacco products²⁴. During 2008-2013, an increase in tax rate led to a rise in the prices of SLT products in India²⁵. However, the increased price was less than the per capita income growth which ultimately indicated the increased affordability²⁵. The responsiveness to the price has been seen in low middle income countries (LMICs) compared to the rich countries, evidence that may encourage the policymakers in the low- and middle-income countries to use taxation effectively in their tobacco control efforts²⁶. Several other studies

have also examined the impact of a price increase on tobacco use pattern of the adults and youths. It was found that adults were 2-3 times more responsive to tax and prices than older persons²⁷. All these evidence make the case for higher taxation on tobacco products. Corresponding to a 58 per cent rise in the prices of *khaini* in India, there was a 51 per cent decline in the consumption during the period 2008-2013. Similarly, the price of *zarda* increased by 28 per cent leading to a 24 per cent decline in the consumption during the same period²⁴. Since the demand is inelastic, the increase in prices should be very large to influence the consumption.

Discussion

The data available for India through National Family Health Survey (NFHS)²⁸ and GATS^{3,4} provide an overview of the determinants of tobacco use. From a GATS data, it is clear that SLT usage increases with age, which could be due to its increased adoption and reduced quitting so that may be by the time a particular age is reached, most adopt this habit²⁹. This relation might be due to the fact that by late middle age, effects of tobacco smoking manifest forcing people to quit and therefore, less people after this age use tobacco. Irrespective of gender, considering the higher-level education and unemployment it is found that there is less addiction towards tobacco use³⁰. SLT consumption is mostly found in the females, while that is distributed among the all kinds of uses amongst the males³¹. In India, tobacco usage is higher in males than in females¹³. Irrespective of gender, an equal distribution was observed among middle-aged and elderly for SLT²⁸. This depicts the equal vulnerability of the adult females as that of males, and increased risk of using SLT, particularly in the high age groups. As the age increases, the odds of tobacco use increase significantly¹³. The odds of consuming each type of tobacco are higher in elderly and middle-aged females. Dual use and smoking of tobacco among males is more common in middle-aged adults as well as in younger aged²⁹.

Irrespective of the form of tobacco usage education was found to be one of the most important determinant. There is less knowledge and awareness among the uneducated people which leads to higher usage of tobacco. Low socio-economic status was found to be significantly associated with increased use of SLT among males and use of SLT and dual use of tobacco among females in India¹³. The association

of tobacco consumption and the socio-economic markers is equivalent to associations observed in developed countries. Since the demand of SLT is inelastic, the increase in prices should be very large to reduce its consumption and varied estimates showed declined consumption as a result of rise in prices²⁴. There is increased availability due to high rise in income as well as fraudulent strategies adopted by the tobacco companies as a hindrance to the effective implementation of fiscal policy²⁴. There is a need to evaluate the anti-tobacco policy implementation and ensuring interventions for equity dimensions to significantly reduce the tobacco use inequalities. Another significant determinant of SLT and dual tobacco usage is its consumption variation in different regions of India¹⁶.

Conclusion

In India, there is a high burden of tobacco use in terms of its availability in different forms and magnitude. High prevalence of tobacco use is found in poor, uneducated and males. The socio-economic factors are important to be stressed on as the people with low socio-economic groups also lack the resources required to combat the ill effects or morbidities associated with the tobacco consumption. In addition, differences in the prevalence of tobacco consumption amongst higher and lower socio-economic groups, type, amount and dependency of tobacco usage also vary which further aggravates the differences in the disease burden contributed by tobacco. In spite of price increase due to tax, the laxity in the administration and tactics used by the tobacco companies reduce the effectiveness of tax. Some alternative provisions should be catered to collect tax from different varieties of SLT use in India. Different approaches such as mass media campaigns and related programmes are needed for SLT control. The varied marketing strategies of the tobacco industry, weak enactment of tobacco control policies, consistent affordability and partial knowledge about the health risks of tobacco are all factors that are leading to the higher use of SLT.

Conflicts of Interest: None.

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