Educational and Wealth Inequalities in Smokeless Tobacco Use: An Analysis of Rural-Urban Areas of Bangladesh and India

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ABSTRACT: This study aims to investigate the educational and wealth inequalities in smokeless tobacco (SLT) use in rural and urban areas of Bangladesh and India, the 2 largest global SLT users. Using the Global Adult Tobacco Survey, both absolute and relative measures of inequality were estimated. The analysis reveals that the educational inequalities in SLT use were higher in urban areas of India and in rural areas of Bangladesh, whereas the wealth inequalities in SLT use were higher in urban areas of both the countries. Moreover, the logit model showed that the odds of SLT use declined with an increase in the level of education and wealth in rural and urban areas of India. However, no consistent pattern was observed in rural and urban areas of Bangladesh. The findings clearly delineate the subgroups which require immediate attention for SLT cessation interventions in these 2 countries.

KEYWORDS: educational inequality, smokeless tobacco use, survey data analysis, urban-rural, wealth inequality

Background and Aims

In many developing countries, noncommunicable diseases (NCDs) such as cancers and cardiovascular diseases are rapidly emerging as major threats.[1] These NCDs are mostly triggered by poor diet, deficient exercise, and high tobacco dependence, which are more prevalent in lower socioeconomic groups.[2] For instance, deprived households spending on tobacco were found to have lower consumption of essential commodities, thus resulting in lower per capita nutrition ingestion among the tobacco users.[3] In addition, the purchase of tobacco was found to divert the resources of lower socioeconomic groups from essential nutrients.[4] Thus, a deficiency of vital nutrients makes one more vulnerable to not only tobacco-caused diseases but other diseases as well. There is robust evidence of tobacco-attributed mortality between the advantaged and disadvantaged groups on a global perspective.[5] Studies have shown that a part of this may be attributed to the socioeconomic status (SES), position that a person occupies in the social or economic structure of the society, which directly influences the individuals' propensity to use tobacco.[6] In recent years, there has been an upsurge in smokeless tobacco (SLT) use in developing countries following the ban on smoking in public places, because unlike smoking, consuming SLT does not require going to any designated place.[7] Smokeless tobacco is also being increasingly used as a harm-reducing alternative for quitting smoking, but on the contrary, they make themselves vulnerable to the risk of oral cancers, high blood pressure, cardiac, and dental diseases.[8] In fact, the health care costs incurred by an SLT user to cure these diseases could further widen the disparities in SES. Therefore, there is an urgent need to

understand the relationship between SES and SLT use, which remains a research and policy priority in many low- and middle-income countries such as Bangladesh and India, having almost 80% of the total global SLT users.[9]

Unlike many developed countries, the threat of SLT is eminent in south Asian countries of India and Bangladesh, which experience the highest risk-weighted exposure. Smokeless tobacco is the prime cause for oral and esophageal cancers in India, where more than half of the global deaths attributable to SLT occur.[10] According to studies using national or other databases, it has been found that men in India and women in Bangladesh have greater prevalence of SLT and hence a joint study of both of them together would help to understand the inequalities of SLT use from gendered perspective as well.[11,12] Education and wealth are often identified as important determinants of individual's SES. As education signifies skills requisite for acquiring positive social and economic resources, an increase in education leads to a higher socioeconomic position. Similarly, access to tangible and intangible resources such as food, shelter, health services, and health-related information depends on individuals' wealth, which determines his or her position in the SES. Therefore, these 2 factors could lead to a variation in the SLT use behavior pattern across socioeconomic groups. Moreover, studies suggest that human behaviour is partly a function of local context, and thus tobacco using habits are also influenced by contextual and neighbourhood effects.[13] Wide disparities in health habits and access to health resources or facilities are known to exist between rural and urban areas, with the latter being the more advantaged. Poor people living in economically deprived (rural) areas are more likely to be using tobacco than their

counterparts living in less deprived (urban) areas.[14] This could be because youth in rural areas have limited access to education, job opportunities, and cessation treatment services owing to demographic characteristics and geographic context of their place of residence.[15] The availability and utilization of information also vary between the rural and urban residents as well as between different SES groups. For instance, when the knowledge about the risks of smoking had emerged in the mid-20th century, people of higher SES altered their smoking habits more than people of lower SES.[16] Thus, understanding educational and wealth inequalities in SLT use on rural and urban dimensions is vital in formulating effective government policies and initiatives for national tobacco control. In addition, there is a consensus in previous studies that no single measure of inequality is ideal, and therefore a variety of measures should be employed in any empirical study and inequality should always be reported by both absolute and relative indices.[17] This is essential because, with declining frequency of the problem, the relative differences may increase but conversely absolute differences may decrease.[18] As both the measures may lead to different conclusions about the magnitude and changes in inequalities, an examination of both is important to present a complete picture.[19] Among the measures of inequality, the slope index of inequality (SII) and relative index of inequality (RII) are often recommended as indicators of absolute and relative inequality, respectively.[20] Concentration index (CI) has also been used widely to measure the relative inequality to ensure the use of all available data and take account of respective population sizes in the socioeconomic groups.[21]

Considering the above discussions, the objective of this study was to provide evidence on the existence of educational and wealth inequalities in SLT use for Bangladesh and India, the 2 largest global SLT users. The data used for this study were Global Adult Tobacco Survey (GATS) of 2009-2010. The GATS wave I has been conducted in almost 25 low- and middle-income countries and is devoted solely to capture the tobacco using habits of adults. No other national or international survey does that so comprehensively. In view of the differences due to contextual and neighbourhood effects as discussed above, this study thus examines inequalities in SLT use with respect to rural and urban areas. Furthermore, the study has effectively employed absolute and relative measures such as SII, RII, and CI for revealing inequalities in SLT use. Moreover, this study also investigates education and wealth as social determinants of SLT use using multivariate logistic regression model for both countries.

Methods

Data source

This study has used the GATS of Bangladesh and India, which is a sample of 9629 and 69 296 respondents, respectively, aged 15 years and older. The study has used data from wave I because wave II has been recently conducted only in India but the data are yet to be released. Centers for Disease Control and Prevention

(CDC) and the World Health Organization (WHO) provided the technical assistance for designing and implementing GATS, with funding provided by Bloomberg Philanthropies and Bill and Melinda Gates Foundation. In both the countries, survey was conducted under the guidance of Ministry of Health and Family Welfare of the respective national governments. In Bangladesh, the National Institute of Preventive and Social Medicine in collaboration with the Bangladesh Bureau of Statistics and the National Institute of Population Research and Training was designated for conducting the survey, whereas in India, the International Institute for Population Sciences, Mumbai, was designated for the purpose.[22,23] The data have been obtained from the Web site of CDC where it is freely available for general researchers.[24] Parental consent for minor individuals under 17 years of age and informed consent for the rest of the respondents were obtained. In Bangladesh, the survey was conducted during July 2009 to August 2009, with an overall response rate of 93.6%. In India, the survey was conducted during June 2009 to January 2010 and the overall response rate was 91.8%. Detailed description of the sample characteristics can be accessed from the full reports of the respective countries.[22,23] Ethics approval for the use of GATS data is not required as it is available for public use.

Measures

SLT use: Current use of SLT was the dependent variable. The related question which was asked in the GATS survey to the interviewer was "Do you currently use smokeless tobacco?" The responses included "daily," "less than daily," and "not at all." A dichotomous variable called "User" was created which took value 1 if the responses were either "daily" or "less than daily," otherwise, it was 0.

Socioeconomic status: We have used 2 indicators of SES: education attainment and wealth index. The GATS recorded the highest level of education into 8 categories. They were as follows: no formal education, less than primary school completed, primary school completed, less than secondary school completed, secondary school completed, higher secondary school completed, college/university completed, and postgraduate degree completed. These responses were merged into 4 categories by clubbing the successive ones and holding the higher category as education level for that particular category. Accordingly, the 4 categories included "less than primary," "less than secondary," "completed high school," and "completed university or above." For assessing the economic condition, information of the assets possessed by households was used to calculate a wealth index score. The respondents were asked whether their household had assets such as car, television, motorcycle, refrigerator, fixed and mobile telephones, radio, table, washing and sewing machines, almirah, bed, chair, and watch. In addition, whether the house had flush toilets, electric supply, and the material used for the construction of the roof of the house was also incorporated

in calculating the wealth score of household assets. But for a nationally representative survey, such as GATS, an asset may hold different relation with respect to SES across diverse subgroups, for example, ownership of farmland may more represent wealth in rural areas and similarly electric supply may be more representative of urban wealth. Principal component analysis (PCA), which is a statistical method, helped to resolve these disparities.[25] The PCA determined the relative importance (factor weights) of each asset irrespective of the strata (urban-rural). Then, these factor weights were used to calculate the wealth index score for each respondent in the national survey data set. The entire population was then grouped into 5 wealth quintiles based on these wealth index scores. The poorest 20% of the households formed the first quintile and the wealthiest 20% formed the fifth quintile of wealth index.

Control variables: Knowledge, occupation, sex, and age were taken as the control variables. Knowledge about the hazards of using SLT products was comprehended through the question, "Based on what you know or believe, does using smokeless tobacco cause serious illness?" From the responses, a binary variable "knowledge" was created which took value 1 if the respondent said yes and 0 if he said no. In the GATS, the options for primary work status of the respondent for the past 12 months included various occupational categories. The options were many and differed between the 2 countries. However, they did not varied much in respect to the nature of work. Therefore, for the ease of analysis, options were clubbed into 4 categories such as "employed," "nonemployed," "self-employed," and "others." In the survey, sex was determined by observing the respondents and it was a binary variable having value 1 for men and 0 for women. Age which was recorded on continuous scale for convenience was categorized into 6 groups, such as 15 to 24, 25 to 34, 35 to 44, 45 to 54, 55 to 64, and 65+.

Statistical analysis

All analyses in this study were conducted after stratifying the samples into urban and rural areas, based on the respondent's place of residence as ascertained in the GATS. To accommodate the complex survey design and provide estimates for the population, the data were appropriately weighted by applying sample weights and adjusting for multistage clustered sampling designs. STATA version 14 was used for the statistical analyses and "svy" (survey) was prefixed in the estimation commands. Prevalence rates of the SLT use were then estimated for the population across rural and urban areas and multivariate logistic regression was applied to assess the role of education and wealth on the likelihood of SLT use. Finally, the existence of education and wealth inequalities in SLT use was estimated using several measures of absolute and relative inequality. Accordingly, the SII and RII were calculated to measure the absolute and relative inequalities in SLT use,

respectively. The SII and RII are the difference and ratio, respectively, of estimated values of SLT use between the most disadvantaged and most advantaged population subgroups. Both of them were calculated using a regression model with logit link after taking into consideration all the other subgroups and ranking the most unprivileged subgroup as 0 to the most privileged one as 1. For the cumulative population distribution, the range was fixed from the population of these subgroups, and the midpoint of this range was then calculated. Against this midpoint value, SLT use was regressed using a generalized linear model with logit link. The predicted values of SLT use were estimated for the 2 boundaries of rank 1 and rank 0. When inequality is absent, values of SII and RII are 0 and 1, respectively. Greater SII values signify higher inequality. Positive SII values points out that the underprivileged groups have greater prevalence of SLT use, whereas negative value implies the opposite. However, RII values can only be positive. When RII > 1 the prevalence of SLT use is more among the underprivileged group, and when RII < 1 prevalence of SLT use is more among the privileged group.[18] However, as previously discussed, relying on any single inequality measure may lead to wrong conclusions. Therefore, Wagstaff normalized CI (WNCI) was calculated as an alternative measure of relative inequality in SLT use. This measure has been specifically developed by rescaling the standard CI to include binary outcome and therefore is suited for our study.[26] It points out the level to which a health indicator (here SLT use) is spread among the underprivileged or the privileged sections. Wagstaff normalized CI has values –1 and +1 as 2 boundaries and is 0 in absence of inequality. Positive values signify that SLT use is more prevalent among the advantaged, whereas negative values imply that it is more prevalent among the disadvantaged. This index assigns greater weight on relative invariance with respect to the presence of the characteristic (here, SLT use). As a result, it is closer to the normative principle imposed by the standard CI.[21]

Results
Prevalence and odds of SLT use

Table 1 shows the prevalence of SLT use in percentages, and results of multivariate logistic regression model predicting the odds of SLT use are presented in parenthesis. The results showed that rural areas had a higher prevalence of SLT use in most of the socioeconomic indicators. However, an exception was noted in Bangladesh among those who had completed primary education but attained less than secondary education. In this category, the urban residents (17.9%) showed a slight increase in prevalence than their rural counterparts (17.5%). Prevalence of SLT use declined with an increase in the level of education in urban areas of both the countries. However, in rural areas, only SLT users in India showed this pattern. For wealth index, the prevalence of SLT use declined with increasing wealth in India, irrespective of place of

Table 1. Prevalence and odds of SLT use in Bangladesh and India by urban and rural areas.

EXPLANATORY VARIABLES	BANGLADESH		INDIA	
	URBAN	RURAL	URBAN	RURAL
Gender				
Female (*ref.*)	23.4 (1.00)	29.6 (1.00)	11.1 (1.00)	21.3 (1.00)
Male	21.6 (0.64***)	28.1 (0.92***)	23.6 (2.21***)	36.8 (1.90***)
Age				
15-24 (*ref.*)	6.0 (1.00)	6.8 (1.00)	10.6 (1.00)	18.2 (1.00)
25-34	16.9 (2.92***)	21.1 (3.08***)	18.0 (1.80***)	31.0 (1.78***)
35-44	27.5 (5.43***)	37.8 (6.64***)	21.0 (1.98***)	35.1 (1.96***)
45-54	.41.2 (9.65***)	48.7 (10.29***)	20.8 (1.98***)	33.9 (1.86***)
55-64	44.5 (12.58***)	50.7 (10.96***)	22.4 (2.14***)	37.4 (2.25***)
65+	49.3 (14.70***)	58.2 (13.82***)	23.8 (2.25***)	37.4 (2.23***)
Education				
Less than primary (*ref.*)	34.3 (1.00)	39.3 (1.00)	27.2 (1.00)	34.8 (1.00)
Less than secondary	17.9 (0.77**)	17.5 (0.67***)	19.9 (0.73***)	27.5 (0.85***)
Completed high school	9.1 (0.37***)	9.2 (0.36***)	11.9 (0.46***)	18.5 (0.59***)
Completed university or above	8.6 (0.23***)	22.9 (0.68)	8.6 (0.31***)	18.3 (0.59***)
Wealth index				
Lowest (*ref.*)	32.8 (1.00)	36.4 (1.00)	39.2 (1.00)	38.7 (1.00)
Low	29.8 (0.91**)	30.6 (0.93)	28.3 (0.67***)	33.2 (0.79***)
Medium	23.2 (0.65)	26.5 (0.79)	26.1 (0.66***)	25.2 (0.59***)
High	23.9 (0.83)	24.7 (0.73**)	16.8 (0.41***)	21.3 (0.49***)
Highest	16.1 (0.63)	21.5 (0.75)	10.6 (0.31***)	14.1 (0.32***)
Knowledge				
No (*ref.*)	22.2 (1.00)	28.5 (1.00)	17.1 (1.00)	28.8 (1.00)
Yes	27.8 (0.88)	32.4 (1.04)	24.5 (0.96)	32.4 (1.00)
Occupation				
Employed (*ref.*)	21.1 (1.00)	28.2 (1.00)	22.6 (1.00)	37.2 (1.00)
Self-employed	28.9 (1.12)	30.9 (1.06)	26.0 (0.98)	38.1 (0.96)
Unemployed	20.2 (0.40***)	35.0 (1.18)	30.2 (1.17)	37.3 (0.94)
Others	20.8 (0.67**)	27.5 (1.04)	10.0 (0.61**)	17.6 (0.56**)

residence (urban-rural). However, a similar pattern was observed only for rural residents of Bangladesh. The results suggest that in urban and rural areas of both countries, more educated people were less likely to use SLT compared with those with no formal education. Improved conditions of wealth considerably decreased the odds of SLT use in both urban and rural areas of India. In Bangladesh, odds of SLT use were lower for urban respondents in the low-wealth category and rural respondents in the high-wealth category relative to the respondents in the highest wealth and lowest wealth categories, respectively. Regarding the control variables, Indians who were in the others category of occupation, both in urban and rural areas, were less likely to use SLT when compared with those who were employed. An older person was more likely to use SLT in both rural and urban areas of Bangladesh and India. Bangladeshi men were less

Table 2. Educational and wealth inequalities in SLT use among urban and rural residents of Bangladesh and India.

	BANGLADESH				INDIA			
	URBAN		RURAL		URBAN		RURAL	
Wealth								
WNCI	−0.18	(0.04)[a],***	−0.13	(0.02)[a],***	−0.27	(0.02)[a],***	−0.23	(0.01)[a],***
RII	3.21	(2.00; 5.15)[b],***	2.60	(1.82; 3.70)[b],***	8.34	(6.65; 10.47)[b],***	5.44	(4.50; 6.58)[b],***
SII	0.30	(0.20; 0.40)[b],***	0.27	(0.24; 0.30)[b],***	0.18	(0.09; 0.27)[b],**	0.16	(0.09; 0.23)[b],**
Education								
WNCI	−0.31	(0.04)[a],***	−0.26	(0.01)[a],***	−0.27	(0.02)[a],***	−0.17	(0.01)[a], ***
RII	10.52	(6.34; 17.45)[b],***	13.60	(9.62; 19.22)[b],***	5.78	(4.76; 7.02)[b],***	3.58	(2.99; 4.29)[b],***
SII	0.21	(0.14; 0.29)[b],**	0.20	(0.08; 0.32)[b],**	0.30	(0.22; 0.39)[b],***	0.26	(−0.34; 0.85)

Abbreviations: RII, relative index of inequality; SII, slope index of inequality; WNCI, Wagstaff normalized concentration index (WNCI).
[a]Standard error for the WNCI in parenthesis.
[b]95% confidence intervals for SII and RII in parenthesis.
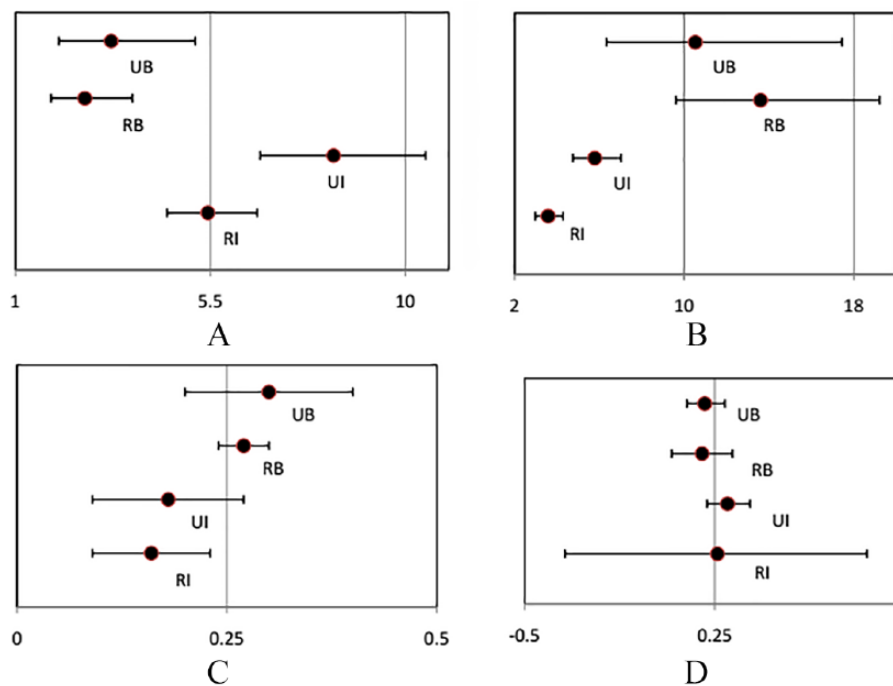**P < .05; ***P < 0.01.

Figure 1. Slope index of inequality (SII) and relative index of inequality (RII) point estimates with 95% confidence interval for educational and wealth inequalities in SLT use in Bangladesh and India: (A) RII for wealth, (B) RII for education, (C) SII for wealth, and (D) SII for education.
Urban Bangladesh (UB), Rural Bangladesh (RB), Urban India (UI), Rural India (RI).

likely to use SLT when compared with the women in both urban and rural areas. However, in urban and rural India, men were more likely to use SLT when compared with the women.

Educational and wealth inequalities in SLT use

Table 2 shows the results of absolute (SII) and relative (RII and WNCI) educational and wealth inequalities in SLT use. The confidence interval plots for the point estimator of SII and RII values are shown in Figure 1. The plots depict that RII provides better estimates of inequality than SII as it shows the proportional difference in SLT use among subgroups independent of the unit. The results convey that across rural and urban areas of the 2 countries, the calculated SII and RII values were found to be less than 1 and greater than 1, respectively, for educational and wealth inequalities in SLT use. Hence, it can be inferred that the individuals in lower sections had a greater prevalence of SLT use relative to the individuals in upper

sections. The RII in SLT use due to wealth were higher in urban areas (India = 8.34, Bangladesh = 3.21) as compared with the rural areas (India = 5.44, Bangladesh = 2.60). Similarly, in India, the relative inequality for education was higher in urban areas (5.78) than the rural areas (3.58). However, in Bangladesh, the educational inequalities in SLT use were more in rural areas (urban = 10.52, rural = 13.6). Similar patterns of educational and wealth inequalities were seen in negative WNCI values and thus this corroborates the findings of RII values.

Discussion

The opposite association of SLT use with education and wealth, as observed in this study, is consistent with previous studies. Sreeramareddy et al[27,28] have reported similar findings for Bangladesh and India by analyzing data from the Demographic and Health Survey (DHS). However, DHS mainly provides indicators related to mother and child health and gives only limited insight to tobacco use. A recent study on GATS data has observed similar effect of wealth and education on tobacco use in these 2 countries.[29] However, these studies do not provide distinct picture of SLT use pattern as they have combined smoking and chewing into a single variable of tobacco use. The large educational inequalities in SLT use observed equally in both rural and urban areas illuminate the fact that the less educated should be given special attention. Inequalities in SLT use caused due to education are found to be more pronounced in urban areas of India and rural areas of Bangladesh. Hence, both the countries would require different strategies to counter the menace of SLT. For instance, in urban areas, restriction in sales and spitting in public should be forcefully imposed, and in rural areas, community awareness programs have proved effective for building awareness and bringing desired outcomes.[30] Also, including SLT-related health warnings in the school curriculum of primary sections would benefit even those who cannot continue higher education. Smokeless tobacco cessation interventions have to be developed ensuring that the most vulnerable segments of the population are covered.[31] Such interventions should be directed at eliminating the root causes of socioeconomic inequalities, such as illiteracy, poverty, and social evils. There is a need for intersectoral actions between health and education sectors within the public sphere to achieve a reduction in educational inequalities in SLT use.[32]

The greater prevalence of SLT among lower sections of wealth emphasizes that any program aimed at bringing improvement in the health outcomes of the poor and underprivileged should necessarily include effective measures of SLT control. Both in Bangladesh and India, the SLT market is largely informal. Hence, as a preventive measure these markets need to be strictly regulated. This will ensure that an increase in tobacco taxes result in the increased price of SLT products, hence considerably reducing the tobacco affordability of lower socioeconomic groups. At the same time, there

has to be strict control over the rampant cross-border illegal trade of SLT products.[33] This is essential as the smuggled SLT products may negate the effect caused by increased price. Moreover, the welfare state policies which generally aim to neutralize existing wealth inequality have to be integrated with effective SLT control policies. Being developing countries, Bangladesh and India suffer a great burden of NCDs relative to the rich and developed countries. Therefore, reducing the prevalence of SLT among the weaker and disadvantaged sections of the society may also help to lower the incidences of NCDs. The wealth-related inequality is greater in the urban areas. In urban areas, living a destitute life may create more depression and frustration among individuals compared with the rural areas where lower socioeconomic people are in more abundance. Hence, further study about the psychographic and contextual factors might reveal the deeper complexities of SLT use.

The finding that women were more likely to use SLT is a cause of greater concern for Bangladesh, where the SLT use has much deeper roots in the tradition and customs. Tobacco use has been identified as a behavioral problem and health advice has proved to be useful. Therefore, importance should be given to educating the women about benefits of SLT cessation during their contact with health care provider. However, the lesser use of SLT by men may be because they are usually more likely to smoke than women. Smoking possibly adequately satisfies their need for nicotine such that necessity to also use SLT may not exist. Younger individuals are seen to be less addicted to SLT use than the elderly in both the countries. This is in contrast to other forms of substance abuse where adolescents and youth are more vulnerable.[34] But in these 2 countries, SLT use is largely perceived as a social custom and as a refuge to cope with frustration, depression, anger, and boredom.[35,36] These are emotions which the elderly people experience more often as they indulge more in social gatherings and may also feel bored due to lack of regular work compared with the younger people. Another possible reason may be that during earlier days, social norms against smoking were much more stringent in both these countries. So the present older adults had possibly started using SLT in their youth as an alternative to smoking and may be they are unable to quit this habit with age, whereas younger adults are more likely to smoke as norms against smoking have somewhat become weaker and thus they do not depend solely on SLT use to meet their need for nicotine. Hence, older adults visit health care facilities on a more frequent basis; here, they should be targeted for SLT cessation interventions such as medications, nicotine replacement therapy, and behavioral health counseling. The findings put forth higher prevalence of SLT among those who do not have sufficient knowledge about the harmful effects of SLT use. This highlights the need to critically assess how knowledge about harmful effects of SLT use is communicated and

the need to close the existing gap. Because most of the SLT used is in unprocessed form without proper packaging, they escape the regulation of having pictorial and text warning as mandated by the World Health Organization Framework Convention on Tobacco Control.

Limitations

This study has some limitations that must be addressed in future research. First, GATS has used a self-reported questionnaire and hence responses may suffer from recall bias and social desirability bias. Second, as survey weights were provided for single-stage clustering only, it was not possible to conduct multilevel analysis to obtain the nested effect of the indicators within states and regions. Third, list of household items provided in the survey fits better for the urban areas and is not a true representation of household assets of rural areas, as essential information for rural wealth such as size of land holding and number of various categories of cattle were not collected. Fourth, the data are of cross-sectional nature and hence the cause and effect relationship cannot be clearly concluded. Thus, use of longitudinal data would have allowed for the inclusion of former SLT users in the analysis and may give better results. Finally, another limitation is that the GATS data used in this study are almost 9 years old and may not reflect the present state of the SLT epidemic in these 2 countries. Although recent GATS data of India for 2016-2017 have been made available, but not of Bangladesh, it is not appropriate to compare the 2 countries on the basis of data belonging to different times. In addition, a comparative analysis of the 2 surveys (GATS 1 and GATS 2) would help in studying the efficacy of antitobacco policies and legislations which were implemented after 2010 in India. Therefore, we leave this issue as future research agenda.

Conclusions

The study provides an important perspective to one of the greatest forms of tobacco epidemic in the place where it is present in its most vicious form. The rural residents and the persons from lower sections of the society were found to have a greater prevalence of SLT use. The wealth and educational inequalities in SLT use were found to exist in both the countries. Thus, it can be convincingly concluded that both the countries require antitobacco policies with a special focus on SLT, which takes into account the rural-urban divide and largely targets the socioeconomically deprived sections of the society.

Author Contributions

AB has conceived the idea and collected the data. AB and MI have analysed the data and wrote the article.

REFERENCES

1. Bygbjerg IC. Double burden of noncommunicable and infectious diseases in developing countries. *Science*. 2012;337:1499–1501.
2. Pampel FC, Krueger PM, Denney JT. Socioeconomic disparities in health behaviors. *Annu Rev Sociol*. 2010;36:349–370.
3. John RM. Crowding out effect of tobacco expenditure and its implications on household resource allocation in India. *Soc Sci Med*. 2008;66:1356–1367.
4. Efroymson D, Ahmed S, Townsend J, et al. Hungry for tobacco: an analysis of the economic impact of tobacco consumption on the poor in Bangladesh. *Tob Control*. 2001;10:212–217.
5. Harper S, McKinnon B. Global socioeconomic inequalities in tobacco use: internationally comparable estimates from the World Health Surveys. *Cancer Causes Control*. 2012;23:11–25.
6. Gruer L, Hart CL, Gordon DS, Watt GC. Effect of tobacco smoking on survival of men and women by social position: a 28 year cohort study. *BMJ*. 2009;338:b480.
7. Gurung MS, Pelzom D, Dorji T, et al. Current tobacco use and its associated factors among adults in a country with comprehensive ban on tobacco: findings from the nationally representative STEPS survey, Bhutan, 2014. *Popul Health Metr*. 2016;14:1–9.
8. Binns C, Low WY, Hewitt K. Betel chewing and public health. *Asia Pac J Public Health*. 2011;23:1021–1024.
9. Asma S, Mackay J, Song SY, et al. *The GATS Atlas: Global Adult Tobacco Survey*. Atlanta, GA: CDC Foundation; 2015.
10. Gakidou E, Afshin A, Abajobir AA, et al. Global, regional, and national comparative risk assessment of 84 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990-2016: a systematic analysis for the Global Burden of Disease Study 2016. *Lancet*. 2017;390:1345–1422.
11. Nargis N, Thompson ME, Fong GT, et al. Prevalence and patterns of tobacco use in Bangladesh from 2009 to 2012: evidence from International Tobacco Control (ITC) study. *PLoS ONE*. 2015;10:e0141135.
12. Rani M, Bonu S, Jha P, Nguyen SN, Jamjoum L. Tobacco use in India: prevalence and predictors of smoking and chewing in a national cross sectional household survey. *Tob Control*. 2003;12:e4–e4.
13. Rachele JN, Wood L, Nathan A, Giskes K, Turrell G. Neighbourhood disadvantage and smoking: examining the role of neighbourhood-level psychosocial characteristics. *Health Place*. 2016;40:98–105.
14. Hanifi SMA, Mahmood SS, Bhuiya A. Smoking has declined but not for all: findings from a study in a rural area of Bangladesh. *Asia Pac J Public Health*. 2011;23:662–671.
15. Rhew IC, Hawkins JD, Oesterle S. Drug use and risk among youth in different rural contexts. *Health Place*. 2011;17:775–783.
16. Seabrook JA, Avison WR. Socioeconomic status and cumulative disadvantage processes across the life course: implications for health outcomes. *Can Rev Sociol*. 2012;49:50–68.
17. Harper S, King NB, Meersman SC, Reichman ME, Breen N, Lynch J. Implicit value judgments in the measurement of health inequalities. *Milbank Q*. 2010;88:4–29.
18. Regidor E. Measures of health inequalities: part 2. *J Epidemiol Commun Heal*. 2004;58:900–903.
19. Blair YI, Mcmahon AD, Macpherson LM. Comparison and relative utility of inequality measurements: as applied to Scotland's child dental health. *PLoS ONE*. 2013;8:e58593.
20. Mackenbach JP, Kunst AE. Measuring the magnitude of socio-economic inequalities in health: an overview of available measures illustrated with two examples from Europe. *Soc Sci Med*. 1997;44:757–771.
21. O'Donnell O, O'Neill S, Van Ourti T, Walsh B. Conindex: estimation of concentration indices. *Stata J*. 2016;16:112–138.
22. World Health Organization, Country Office for Bangladesh. Global Adult Tobacco Survey: Bangladesh report 2009. Dhaka, Bangladesh: WHO; 2009. Website. http://www.who.int/tobacco/surveillance/global_adult_tobacco_survey_bangladesh_report_2009.pdf. Accessed March 1, 2017.
23. Ministry of Health and Family Welfare, Government of India. Global Adult Tobacco Survey: India report 2009–10. New Delhi, India: Ministry of Health and Family Welfare; 2010. Website. http://www.nhm.gov.in/NTCP/Surveys-Reports Publications/Global_Adult_Tobacco_Survey_India_2009-2010-Report.pdf
24. Centers for Disease Control Prevention. Global tobacco surveillance system data (GTSS data). Office of Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion. Website. https://www.cdc.gov/tobacco/global/gtss/gtssdata/index.html. Accessed February 22, 2017.
25. Fry K, Firestone R, Chakraborty NM. *Measuring Equity with Nationally Representative Wealth Quintiles*. Washington, DC: Population Services International; 2014:6–7.
26. Wagstaff A. The bounds of the concentration index when the variable of interest is binary, with an application to immunization inequality. *Health Econ*. 2005;14:429–432.
27. Sreeramareddy CT, Pradhan PMS, Mir IA, Sin S. Smoking and smokeless tobacco use in nine South and Southeast Asian countries: prevalence estimates and social determinants from Demographic and Health Surveys. *Popul Health Metr*. 2014;12:22
28. Sreeramareddy CT, Harper S, Ernstsen L. Educational and wealth inequalities in tobacco use among men and women in 54 low-income and middle-income countries. *Tob Control*. 2018;27:26–34.

29. Palipudi KM, Gupta PC, Sinha DN, et al. Social determinants of health and tobacco use in thirteen low and middle income countries: evidence from Global Adult Tobacco Survey. *PLoS ONE*. 2012;7:e33466.

30. O'Neill J, Tabish H, Welch V, et al. Applying an equity lens to interventions: using PROGRESS ensures consideration of socially stratifying factors to illuminate inequities in health. *J Clin Epidemiol*. 2014;67:56–64.

31. Hutcheson TD, Greiner KA, Ellerbeck EF, Jeffries SK, Mussulman LM, Casey GN. Understanding smoking cessation in rural communities. *J Rural Health*. 2008;24:116–124.

32. Shankardass K, Solar O, Murphy K, Greaves L, O'Campo P. A scoping review of intersectoral action for health equity involving governments. *Int J Public Health*. 2012;57: 25–33.

33. Siddiqi K, Scammell K, Huque R, et al. Smokeless tobacco supply chain in South Asia: a comparative analysis using the WHO framework convention on tobacco control. *Nicotine Tob Res*. 2015;18:424–430.

34. Barnett JH, Werners U, Secher SM, et al. Substance use in a population-based clinic sample of people with first-episode psychosis. *Br J Psychiatry*. 2007; 190:515–520.

35. Kakde S, Bhopal RS, Jones CM. A systematic review on the social context of smokeless tobacco use in the South Asian population: implications for public health. *Public Health*. 2012;126:635–645.

36. Messina J, Freeman C, Rees A, et al. A systematic review of contextual factors relating to smokeless tobacco use among South Asian users in England. *Nicotine Tob Res*. 2013;15:875–882.