

The Reach of Media to Smokers and Smokeless Tobacco Users in India: Evidence from the Global Adult Tobacco Survey (GATS)

S. K. Singh¹, Jean J. Schensul² and Gyan Chandra Kashyap³

Abstract

This study focuses on the impact of mass media in creating awareness and enhancing efficacy of tobacco control interventions by disseminating knowledge to the public about the harmful effects of tobacco. It examines variations in awareness of tobacco's health hazards and anti-tobacco campaigns among 69,296 adults aged 15 and above based on gender and tobacco use (smoked or smokeless) and the role of the media in cessation attempts by tobacco users using data from the Global Adult Tobacco Survey (GATS). The GATS is a household survey which was conducted in India during 2009-10. The study found that a higher proportion of adults was exposed to anti-smoking information across different media compared with anti-smokeless tobacco information. Tobacco users are also less likely to be aware of the health hazards of tobacco compared with non-users. Noticing anti-tobacco messages and knowing the health hazards of smokeless tobacco use are significantly associated with cessation attempts among tobacco users in India. Males are more likely to notice anti-smoking and anti-smokeless tobacco information through any media compared with females.

Keywords

Cessation; hazard; health; media; tobacco

Introduction

The World Health Organization (WHO) estimates that tobacco use claims nearly 6 million lives every year and between 2000 and 2050 around 450 million adults will die as a result of smoking (WHO, 2011). Around half of these adults would be aged between 30 and 69 years (Jha, 2009). According to WHO Global Tobacco Epidemic Report (WHO, 2011), more than 70 percent of the world's population did not see witness any national tobacco counter-advertising activity during the last two years. According to WHO Global Tobacco Epidemic Report Worldwide, around one billion people have seen large, graphic warning labels on the tobacco products (WHO, 2013). Results of a study undertaken in India showed that more than half of males and little less than one-fourth of females read the health warning on smokeless tobacco products

¹ Professor, International Institute for Population Sciences, Govandi Station Road Donor Mumbai, 400088, India, Email: sksingh31962@gmail.com

² Senior Scientist and Founding Director, Institute for Community Research, Hartford, CT, Research Professor (Adjunct) School of Dental Medicine, UCONN Health, Professor (Adjunct) Department of Community Medicine, UCONN Health, Email: Jean.Schensul@icrweb.org

³ Ph.D. Student, International Institute for Population Sciences, Govandi Station Road Donor Mumbai, 400088, India, Email: statskashyap@gmail.com

(Oswal, Raute, Pednekar, & Gupta, 2011). This study will show that the mass media plays a significant role in controlling and preventing tobacco use. Hard-hitting campaigns can compel tobacco users to quit and promote behavioral change in both smokers and non-smokers (The Union, 2015). Anti-smoking and anti-smokeless tobacco promotions and campaigns through mass media have the ability to spread awareness of the adverse effect of smoking as well as smokeless tobacco (US Department of Health and Human Services, 2014).

The Framework Convention on Tobacco Control (FCTC) has provided guidelines for the packaging and labeling of tobacco products and calls upon countries to adopt and implement effective measures to ensure that packaging, labeling and promotion of tobacco products do not endorse or encourage the use of tobacco products (WHO, 2010). The Framework also provides the basis for counter-marketing, a social marketing approach that uses communications strategies to reduce the prevalence of tobacco consumption. According to Centers for Disease Control and Prevention (2013), “counter-marketing attempts to counter pro-tobacco influences and increase pro-health messages and influences throughout a state, region, or community (Article 12 of the WHO FCTC obliges the parties to promote and strengthen public awareness of tobacco control through increased effectiveness of education, communication and training efforts to enhance public awareness of the issues related to tobacco control). India ratified the Framework Convention on Tobacco Control in February 2004 and the comprehensive tobacco control legislation came into force on May 1, 2004 (Kaur & Jain 2011; Rachel & Heather, 2011). The Cigarette and Other Tobacco Products Act prohibits the advertisement of tobacco products and its violation can lead to a hefty fine (Kaur & Jain 2011).

Mass media campaigns are a common approach for tobacco control. However, only about 28% of the world's population is exposed to effective anti-tobacco mass media campaigns. India is one of the 24 highest achieving countries on the Anti-Tobacco mass media campaign front (WHO, 2011). The Government of India allocates approximately US\$ 5 million every year to the National Tobacco Control Programme (NTCP) for anti-tobacco campaigns in the mass media. The need for collaboration between public health workers and media representatives is particularly urgent in developing countries such as India, where the prevalence of tobacco use is increasing (Narain, Sardana, Gupta & Sehgal, 2011). Tobacco smoking is widespread among men across the country, primarily in the form of cigarettes and bidi (Goodman, 2005). Anti-smoking messages delivered through the mass media can be employed as effective measures to reduce smoking in India (Viswanath, Ackerson, Sorensen, & Gupta, 2010). A recent campaign highlights the harmful effects of tobacco consumption (Mullin, 2011); and has been shown to have effects (IARC, 2009). It has been shown that Indian men who watched the television on daily basis and cinema at least once in a month were more likely to smoke as well as use smokeless tobacco (Viswanath, Ackerson, Sorensen, & Gupta, 2010). Public smoking in India has been banned since October 2008, and the harmful effects of direct or indirect use of tobacco through health advisory in films and television serials has been enforced since 2005.

One fallout of the ban on public smoking has been an increase in the consumption of smokeless tobacco (Viswanath, Ackerson, Sorensen & Gupta, 2010). Smokeless tobacco products include (Betel quid with tobacco, *Khaini* or tobacco lime mixture) and are used by both males and females. Studies on the role of media and its impact on tobacco smoking and use of smokeless tobacco in India is limited. This study provides insights into the reach of media to reduce tobacco smoking and predictors of tobacco consumption in India This study is motivated by the fact there is a dearth of research on the influence of anti-tobacco messages on use of smokeless tobacco and that the public have a fundamental right to information about the harmful effects of tobacco and governments have a legal obligation to provide it. It is against this backdrop that this paper examines and compares awareness of anti-tobacco messages

delivered through various media outlets and their effect on adult male and female smokers and smokeless tobacco (SLT) users, their perception of health hazards associated with tobacco use, and their effect on attempts at cessation.

Materials and Methods

This study used data from the Global Adult Tobacco Survey (GATS, 2009-10), a global standard for systematically monitoring adult tobacco use (smoking and smokeless), and for tracking key tobacco control indicators. GATS-India is a nationally representative household survey among the population ages 15 and above. It covers all the 29 states and two Union Territories in India. A multistage sampling procedure was adopted for each state. Samples were independently drawn from rural and urban areas. A total of 69,296 respondents completed the survey of which, 33,767 and 35,529 were males and females respectively. The survey covers tobacco use (smoking and smokeless tobacco), exposure to second-hand smoke, cessation, exposure to media information on tobacco use; and knowledge of, attitudes and perceptions towards tobacco use (Global Adult Tobacco Survey, India GATS-India, 2009-2010). In the GATS-India survey, all the respondents were asked whether they noticed any anti-smoking and anti-smokeless tobacco information for specific types of media including newspaper, magazines, television, radio, internet, wall hoardings, posters, etc. This survey also collected information on their knowledge, attitudes, and perceptions regarding the adverse effects of tobacco use and efforts to quit tobacco smoking as well as the use of smokeless tobacco in the past 12 months.

Sampling Design

For GATS India survey, sampling was done independently in each state/UT and within the state/UT, in urban and rural areas. In urban areas, three-stage sampling was adopted for the selection of households. The primary sampling units (PSUs) were the city wards, secondary sampling units (SSUs) were census enumeration blocks (CEBs), and tertiary sampling units (TSUs) were households. At the first stage, primary sampling units (PSUs) were selected using probability proportional to size (PPS) sampling. At the second stage, a list of all census enumeration blocks (CEBs) in every selected ward formed the sampling frame from which one CEB was selected by PPS from each selected ward. At the third stage, a list of all the residential households in each selected CEB formed the sampling frame from which a sample of the required number of households was selected. In rural areas, two-stage sampling was adopted for the selection of households. The primary sampling units (PSUs) were villages and secondary sampling units (SSUs) were households. All the villages were first stratified into different strata by using geographical regions, and further stratified by village size, proportion of scheduled caste, scheduled tribe population and female literacy. At the first stage, the list of all the villages in a state/UT formed the sampling frame. The required number of villages, i.e. PSUs, was selected according to the probability proportional to size (PPS) sampling, within each stratum. At the second stage, a list of all the residential households in each selected village formed the sampling frame from which a sample of required number of households was selected.

Bivariate and multivariate logistic regression analyses were used to determine the effect of covariates on dependent variables. The dependent variables in the study were: (a) noticed anti-smoking information and noticed anti-smokeless tobacco information in newspaper/magazines, television, radio and somewhere else categorized into electronic (TV/radio) and print (newspaper/magazines/billboards) media; b) made quit attempts during the last 12 months, and c) thought of quitting after seeing warning labels on tobacco products in last 30

days. Covariates in the analyses and models included age, gender, place of residence and education, geographic region, tobacco use status, exposure to electronic and print mass media, noticed anti-smoking messages, noticed anti-smokeless messages, smoking causes serious illness, smokeless tobacco causes serious illness, second-hand smoke causes serious illness. The variable attempts to quit tobacco use in the past 12 months and thought of quitting after seeing warning labels on tobacco products in last 30 days was also included as covariates in the analyses and models. All analyses were performed using SPSS software (SPSS, 2011). The GATS India survey protocols were approved by the Ethics Review Committee, Institutional Review Board (IRB) of IIPS. The committee reviewed the survey protocols and questionnaire and suggested modifications in the consent form to protect the rights of the research subjects.

Results

Table 1 shows, over three-fifths of adults (75%) noticed anti-smoking information (or messages) in various media 30 days preceding the survey and 66 percent had noticed anti-smokeless tobacco information. Prevalence of tobacco varied by different type of tobacco consumption. Majority noticed anti-smoking information in the *electronic media* (62%) and *print media* (54%), while a lower proportion noticed anti-smokeless tobacco information in *electronic media* (52%) and *print media* (45%). Fewer females than males noticed anti-tobacco information in print media (60% versus 44%). Urban-rural differences were pronounced irrespective of the media source. Urban adults were more likely to notice anti-tobacco information in *electronic media* and *print media* than rural adults. However, there were significant regional differences in noticing anti-tobacco information. The North-East region had the lowest proportion of adults who noticed anti-smoking (59 %) and anti-smokeless tobacco (47%) information (and messages) from *any media* (electronic/ print/any other media). Multivariate logistic regression analysis shows electronic media has made a significant contribution to the dissemination of anti-smoking information. Older people (65 years and above) are less likely to notice anti-smoking (OR=0.73; CI=0.66-0.81) and anti-smokeless tobacco (OR=0.80; CI=0.73-0.88) information in *any media*. Those who watched television (OR=1.88; CI=1.79-1.98) and listened to radio (OR=1.43; CI=1.36-1.50) in their homes are more likely to have noticed anti-smoking information from *any media*. The odds are those who exposed to television (OR=1.64; CI=1.56-1.72) and exposed to the radio (OR=1.27; CI=1.22-1.33) with reference to those noticing anti-smokeless tobacco information from *any media*.

Table 1: Adults aged 15 and above who noticed anti-tobacco information in different media 30 days preceding the survey based on demographics, 2009-10

	Anti-smoking Information					Anti-smokeless Tobacco Information				
	Electronic Media ¹	Print Media ²	Any Media ³	Odds Ratio ⁴	95% CI ⁵	Electronic Media ¹	Print Media ²	Any Media ³	Odds Ratio ⁴	95% CI ⁵
Overall	61.5	53.6	75.4			52.3	44.8	66.2		
Age Group										
15-24(ref)	65.6	57.9	79.2	1.00		56.4	48.1	69.6	1.00	
25-44	60.9	54.1	75.0	0.85**	[0.80-0.90]	51.6	45.3	65.6	0.92**	[0.87-0.97]
45-64	59.7	49.1	72.9	0.85**	[0.79-0.91]	50.6	41.7	64.7	0.95	[0.89-1.01]
65+	50.2	38.1	65.2	0.73**	[0.66-0.81]	41.6	31.4	56.2	0.80**	[0.73-0.88]

	Anti-smoking Information					Anti-smokeless Tobacco Information				
	Electronic Media ¹	Print Media ²	Any Media ³	Odds Ratio ⁴	95% CI ⁵	Electronic Media ¹	Print Media ²	Any Media ³	Odds Ratio ⁴	95% CI ⁵
Sex										
Male (ref)	61.6	60.1	77.3	1.00		53.3	51.1	68.5	1.00	
Female	61.4	44.1	73.0	0.99	[0.94-1.03]	51.1	35.6	63.3	0.92**	[0.88-0.96]
Residence										
Rural (ref)	56.9	49.2	72.0	1.00		48.8	40.7	63.4	1.00	
Urban	70.3	61.2	81.8	1.32**	[1.26-1.38]	59.1	51.7	71.5	1.27**	[1.21-1.32]
Education										
No schooling (ref)	46.2	24.1	60.7	1.00		39.3	20.0	53.5	1.00	
Less than primary	53.3	41.2	67.0	1.48**	[1.38-1.59]	45.3	32.8	57.4	1.42**	[1.32-1.52]
Less than secondary	62.1	53.2	75.5	2.11**	[1.98-2.24]	52.7	44.6	66.3	1.90**	[1.79-2.01]
Secondary and above	74.2	69.3	86.1	3.14**	[2.94-3.35]	63.3	58.3	76.1	2.72**	[2.56-2.89]
Radio at Home										
No (ref)	58.4	52.1	73.3	1.00		49.2	43.4	64.0	1.00	
Yes	70.0	58.2	81.3	1.43**	[1.36-1.50]	60.5	49.0	72.3	1.27**	[1.22-1.33]
Television at Home										
No (ref)	44.4	42.3	63.5	1.00		39.4	36.0	57.3	1.00	
Yes	68.7	58.5	80.6	1.88**	[1.79-1.98]	57.8	48.6	70.1	1.64**	[1.56-1.72]
Tobacco Use Status										
Non-users (ref)	63.7	55.0	76.6	1.00		53.1	45.1	66.3	1.00	
Users	56.9	50.4	72.8	1.37**	[1.30-1.44]	50.6	44.1	66.2	1.37**	[1.31-1.43]
Region										
North (ref)	76.6	59.3	83.4	1.00		64.9	49.6	73.7	1.00	
Central	65.7	59.1	81.3	1.20**	[1.10-1.31]	62.9	55.7	78.9	1.69**	[1.57-1.84]
East	50.8	38.5	63.3	0.44**	[0.40-0.47]	42.7	30.3	54.8	0.50**	[0.47-0.54]
North-East	47.4	42.9	59.2	0.46**	[0.43-0.49]	37.1	32.4	46.8	0.43**	[0.41-0.46]
West	57.5	53.9	72.8	0.64**	[0.60-0.69]	49.7	48.3	65.1	0.70**	[0.66-0.75]
South	67.3	59.4	81.2	1.05	[0.97-1.13]	50.3	42.8	63.5	0.60**	[0.56-0.64]

Note: ¹Electronic media includes TV/radio. ²Print media includes newspaper/magazine/billboards. ³Any media includes electronic/print/any other media. ⁴Odds ratio is calculated for any media. ⁵CI means Confidence interval, ** $p < 0.01$, * $p < 0.05$, ref= reference category.

Educational attainments and urban place of residence are other prominent factors that significantly affect recall of anti-tobacco information from *any media*. An analysis of regional variations in the effectiveness of anti-tobacco campaign reveal that adults living in the central region are more likely to notice anti-tobacco (Anti-smoking (OR=1.20; CI=1.10-1.31) and anti-smokeless (OR=1.69; CI=1.57-1.84)) information among those exposed to *any media*.

Based on the results in Table 2, nine-tenths of respondents believe that smoking and use of smokeless tobacco cause serious illness. Additionally, 83 percent of adults believe that passive smoking or secondhand smoking secondary smoking (inhaling other people's smoke) causes serious illness among non-smokers. The awareness of health hazards of tobacco use differs according to demographic and social characteristics. Adults who watch television at home have greater knowledge of smoking's health risks (93%) compared with those (86%) without a television at home. A higher proportion of adults in the age group 15-24 (92%) as against 82 percent of those aged 65 and above believe that smoking causes serious illness. Majority of male adults living in urban areas, non-users and those with a higher level of education believe that smoking tobacco causes serious illness. Regionally, North Indians had greater knowledge of the health hazards of tobacco.

The regression analysis shows that the odds of knowledge of the health hazards of tobacco were the highest among adult smokers who had secondary level and above education (OR=4.05; CI=3.69-4.45), smokeless tobacco users (OR=3.84; CI= 3.52-4.19) and those had exposure to second hand smoke (SSH) (OR=3.79; CI=3.53-4.07). Those aged 65 years and above were less likely to have knowledge about the health hazards of tobacco. Urban place of residence, education, and region are significant predictors and are associated with knowledge of tobacco health hazards. Accessibility to television is significantly associated with higher odds of knowledge of health hazards of tobacco. The analysis also portrays regional differences in the knowledge of health hazards of tobacco. Adults living in the western region (OR=0.37; CI=0.34-0.42)

Table 2: Adults aged 15 and above who believe that tobacco in any form causes serious illness, 2009-10

	Smoking			Smokeless tobacco			Second-hand smoke		
	Percent	Odds ratio	95% CI ¹	Percent	Odds Ratio	95% CI ¹	Percent	Odds ratio	95% CI ¹
Overall	90.2			88.8			82.9		
Age Group									
15-24 (ref)	92.4	1.00		91.6	1.00		86.6	1.00	
25-44	91.1	1.17**	[1.08-1.27]	89.6	1.16**	[1.08-1.26]	83.5	1.06	[1.00-1.13]
45-64	88.1	1.11*	[1.01-1.22]	86.1	1.09*	[1.00-1.19]	79.8	1.01	[0.94-1.09]
65+	82.0	0.85**	[0.76-0.95]	79.8	0.77**	[0.70-0.86]	72.9	0.81**	[0.74-0.89]
Sex									
Male (ref)	91.5	1.00		90.1	1.00		84.9	1.00	
Female	88.8	1.03	[0.96-1.09]	87.3	0.88**	[0.84-0.94]	80.8	0.89**	[0.85-0.94]
Residence									
Rural (ref)	88.7	1.00		87.0	1.00		80.8	1.00	
Urban	93.8	1.22**	[1.15-1.31]	93.0	1.24**	[1.16-1.31]	88.0	1.16**	[1.11-1.22]
Education									
No schooling (ref)	82.3	1.00		80.1	1.00		72.2	1.00	
Less than primary	88.5	1.62**	[1.49-1.77]	86.9	1.55**	[1.43-1.67]	79.4	1.48**	[1.39-1.59]
Less than secondary	93.6	2.56**	[2.37-2.76]	92.0	2.15**	[2.01-2.31]	86.6	2.17**	[2.04-2.30]
Secondary and above	96.3	4.05**	[3.69-4.45]	95.9	3.84**	[3.52-4.19]	92.6	3.79**	[3.53-4.07]
Radio at Home									
No (ref)	89.7	1.00		88.1	1.00		81.8	1.00	
Yes	92.2	0.96	[0.90-1.02]	91.3	0.99	[0.94-1.06]	87.0	1.13**	[1.07-1.19]
Television at Home									
No (ref)	86.1	1.00		84.1	1.00		77.5	1.00	
Yes	93.1	1.54**	[1.45-1.64]	92.1	1.64**	[1.55-1.74]	86.8	1.53**	[1.46-1.61]
Tobacco Use Status									
Non-users (ref)	91.6	1.00		90.4	1.00		84.9	1.00	
Users	87.5	0.90**	[0.84-0.95]	85.7	0.76**	[0.72-0.81]	79.1	0.87**	[0.83-0.91]
Region									
North (ref)	94.0	1.00		92.0	1.00		90.6	1.00	
Central	88.8	0.63**	[0.57-0.70]	88.5	1.01	[0.92-1.11]	83.8	0.82**	[0.76-0.89]
East	90.0	0.69**	[0.62-0.77]	88.3	0.99	[0.90-1.09]	81.6	0.69**	[0.64-0.75]
North-East	91.2	0.50**	[0.45-0.55]	88.8	0.64**	[0.59-0.70]	82.6	0.55**	[0.51-0.60]
West	87.3	0.37**	[0.34-0.42]	87.5	0.62**	[0.56-0.68]	83.0	0.53**	[0.49-0.57]
South	93.3	0.74**	[0.66-0.82]	89.7	0.76**	[0.69-0.83]	81.1	0.53**	[0.49-0.57]

¹CI means Confidence interval, **p<0.01, *p<0.05, ref= reference category.

and in the North-East region (OR=0.5; CI=0.45-0.55) are less likely to be aware of the health hazards of smoking compared with those living in the northern region. Smokeless tobacco users are 24 percent less likely to be knowledgeable about the health hazard of smokeless tobacco and 13 percent less likely to have knowledge about the dangers of SHS. Females are negatively and significantly associated (p<0.01) with knowledge of the health hazards of smokeless tobacco use and SHS.

Variables such as 'thought about quitting' because of the warning label on tobacco products, and noticing anti-smoking messages past 30 days were analyzed to understand attempts by tobacco users to quit their habits. The assumption was that the behavior of tobacco users had not changed much over the past 12 months. Table 3 shows the effect of several indicators of awareness levels associated with smoking hazard by smokers who made attempts to quit during the 12 months preceding the survey.

In a logistic regression analysis in Model I, residence, education and region are significant predictors associated with attempts among smokers to quit during the 12 months preceding the survey. After adjusting for other covariates, it was found that smokers who saw anti-smoking messages are more likely to make attempts to quit (OR=1.58; CI=1.41-1.76). Smokers from the central, western and southern regions of India are more likely to make attempts to quit. In the second model, it was observed that awareness of anti-tobacco messages is still a significant predictor of attempts to quit. Smokers with knowledge of the hazards of second-hand smoke are more likely to quit (OR=1.39; CI=1.20-1.59).

The effect of awareness of the dangers of smoking is positively associated with attempts to quit, though insignificant. Model III shows that smokers who quit because of the warning label are more likely to try to quit (OR=3.13; CI=2.82-3.48). Noticing anti-smoking messages and knowledge that SHS causes serious illness significantly affect attempts to quit after controlling other factors. After adjusting for other covariates in Model I, smokeless tobacco users who have noticed anti-smokeless tobacco messages are more likely to make attempts to quit (OR=1.42; CI=1.30-1.56).

Table 3: Odds Ratio and 95% confidence interval for tobacco users who made attempts to quit during the 12 months preceding the survey by background characteristics.

	Smokers			Smokeless tobacco users		
	Model I	Model II	Model III	Model I	Model II	Model III
Age group						
15-24 (ref)	1.00	1.00	1.00	1.00	1.00	1.00
25-44	0.89	0.88	0.92	0.85*	0.85**	0.96
	[0.75-1.05]	[0.75-1.04]	[0.77-1.11]	[0.76-0.96]	[0.75-0.96]	[0.84-1.09]
45-64	0.91	0.90	1.01	0.81**	0.81**	0.96
	[0.76-1.08]	[0.76-1.08]	[0.83-1.23]	[0.70-0.93]	[0.70-0.92]	[0.83-1.11]
65+	0.87	0.89	1.02	0.70**	0.70**	0.87
	[0.70-1.10]	[0.71-1.12]	[0.79-1.33]	[0.56-0.85]	[0.56-0.85]	[0.70-1.08]
Sex						
Male (ref)	1.00	1.00	1.00	1.00	1.00	1.00
Female	1.27**	1.30**	1.57**	1.00	1.00	1.10
	[1.08-1.49]	[1.11-1.53]	[1.31-1.88]	[0.91-1.10]	[0.91-1.09]	[0.99-1.21]
Residence						
Rural (ref)	1.00	1.00	1.00	1.00	1.00	1.00
Urban	0.86**	0.85**	0.85**	0.98	0.97	0.96
	[0.77-0.95]	[0.76-0.94]	[0.76-0.94]	[0.90-1.07]	[0.89-1.06]	[0.88-1.06]
Education						
No schooling (ref)	1.00	1.00	1.00	1.00	1.00	1.00
Less than primary	1.12	1.10	1.01	1.09	1.08	1.01
	[0.96-1.31]	[0.94-1.28]	[0.86-1.18]	[0.95-1.25]	[0.94-1.24]	[0.88-1.17]
Less than secondary	1.19*	1.16*	1.03	1.26**	1.24**	1.11
	[1.05-1.37]	[1.02-1.34]	[0.89-1.20]	[1.12-1.42]	[1.11-1.40]	[0.98-1.26]
Secondary and above	1.26**	1.20*	1.00	1.41**	1.37**	1.16*
	[1.10-1.46]	[1.05-1.40]	[0.86-1.18]	[1.24-1.60]	[1.21-1.57]	[1.01-1.33]
Region						
North (ref)	1.00	1.00	1.00	1.00	1.00	1.00
Central	2.49**	2.50**	2.60**	2.87**	2.85**	2.62**
	[2.12-2.91]	[2.12-2.92]	[2.17-3.11]	[2.39-3.41]	[2.37-3.39]	[2.17-3.15]

East	1.03 [0.87-1.22]	1.05 [0.89-1.25]	1.22* [1.01-1.49]	1.20* [1.00-1.45]	1.19 [0.99-1.43]	1.23* [1.01-1.49]
North-East	1.03 [0.91-1.17]	1.05 [0.92-1.19]	1.29** [1.11-1.49]	1.05 [0.89-1.25]	1.05 [0.89-1.25]	1.20* [1.01-1.44]
West	1.62** [1.33-1.96]	1.69** [1.39-2.05]	1.64** [1.32-2.02]	2.06** [1.72-2.48]	2.07** [1.73-2.49]	1.69** [1.39-2.05]
South	2.78** [2.39-3.25]	2.84** [2.43-3.31]	2.97** [2.51-3.53]	3.29** [2.67-4.03]	3.28** [2.67-4.03]	3.57** [2.87-4.42]
Anti-smoking messages						
No (ref)	1.00	1.00	1.00			
Yes	1.58** [1.41-1.76]	1.51** [1.35-1.69]	1.26** [1.11-1.43]			
Anti-smokeless messages						
No (ref)				1.00	1.00	1.00
Yes				1.42** [1.30-1.56]	1.39** [1.27-1.52]	1.13* [1.03-1.24]
Smoking causes illness						
No (ref)		1.00	1.00			
Yes		1.10 [0.92-1.33]	1.03 [0.84-1.27]			
SHS causes illness						
No (ref)		1.00	1.00			
Yes		1.39** [1.20-1.59]	1.35** [1.14-1.57]			
Smokeless tobacco causes illness						
No (ref)					1.00	1.00
Yes					1.39** [1.20-1.61]	1.20* [1.02-1.39]
Thought of quitting because of warning						
No (ref)			1.00			1.00
Yes			3.13** [2.82-3.48]			3.41** [3.12-3.73]
-2*log likelihood	11,217.61	11,158.64	9,310.10	1,111,114,097.07	14,050.39	1,113,051.16
Cox & Snell R Square	0.04	0.05	0.10	0.05	0.05	0.11

** $p < 0.01$, * $p < 0.05$, ref= reference category.

Model II shows that smokeless tobacco users who knew about the health hazard of smokeless tobacco are more likely to quit (OR=1.39; CI=1.20-1.61). Model III shows those smokeless tobacco users who thought about quitting because of the warning label are more likely to attempt to quit (OR=3.41; CI=3.12-3.73). Model III shows noticing anti-smokeless tobacco messages and knowing about the health hazards of smokeless tobacco use are significant.

Discussion

Analysis of GATS data and the campaigns against smoking in India shows that the reach of anti-smoking messaging is greater than that of anti-smokeless tobacco messaging. Nearly one-fourth of India's adult population are smokeless tobacco users, and campaign improvements could have a significant effect on user's motivations to smokeless tobacco. Women in particular, who are almost exclusively users of SLT, are less responsive to media based anti-tobacco messages and should be the target of media campaigns tailored to women's needs and use patterns. Adults with access to the electronic media in their homes were more likely to have knowledge about the health hazards of tobacco consumption. These gaps in the reach of anti-tobacco messaging argued for the need to direct anti-tobacco campaigns more aggressively to users of smokeless tobacco (Popova, 2014), especially women, and to those who do not have electronic media in their homes.

This study shows that education plays a significant role in influencing adults to pay attention to anti-tobacco messages and in improving their awareness. Findings of this study are also confirmed by earlier ones which show that education is a major contributor to increased knowledge of the health hazards of tobacco use, resulting in decreases in tobacco consumption (Adekunle, 2011). Urban-rural differences in the reach of message and quitting attempts are more pronounced irrespective of the source and type of media. Thus, there is a pressing need to implement innovative strategies to enhance the reach and impact of anti-tobacco campaigns among rural populations.

Tobacco users are less likely to be aware of the health hazards of tobacco, especially smokeless tobacco. Awareness of the health hazards of tobacco is significantly associated with attempts to quit smokeless tobacco, but not with smoking. Thus, the media should be specifically tailored to different types of tobacco users, especially smokeless tobacco users. There are significant regional variations in awareness of the ill effects of tobacco. States in which higher proportions of the population are unaware of harmful effects should be prioritized for anti-tobacco campaigns, with the goal to minimize regional differences.

Conclusion

Researchers have shown that use of mass media to convey anti-tobacco messages can contribute to decrease in tobacco consumption (Cotter, Perez, Dessaix, & Bishop, 2008). This paper has shown that anti-tobacco messages do reach both smokers and smokeless tobacco users, increasing their awareness of tobacco hazards and causing them to consider quitting. The tobacco industry has begun to promote smokeless tobacco products which are not affected by current tobacco control policies (Viswanath, Ackerson, Sorensen & Gupta, 2010). Messaging campaigns are less effective at reaching and influencing smokeless tobacco users, especially women. Hence, government-sponsored mass media campaigns should target smokeless tobacco users. A number of studies show that there is a direct relationship between tobacco marketing and tobacco knowledge, its initiation and use especially among teens and young adults (Arora, Gupta, Nazar, Stigler, Perry & Reddy, 2012; Dongre, Deshmukh, Murali & Garg, 2008). Increased anti-tobacco messaging should be able to counter pro-tobacco messages to promote anti-tobacco messaging tailored to women, adolescents and those living rural areas. The campaigns should target to reduce initiation of tobacco products, and stimulate consideration of their harms and quit efforts among current users. Campaigns based on the new graphic images and testimony by victims of tobacco use that are based on advances in neuroscience and appeal both to emotions as well as cognitive reasoning should further enhance the impact of anti-tobacco campaigns in India in the face of persistent pro-tobacco efforts at all levels (Durkin, Bayly, Cotter, Mullin & Wakefield, 2013; Durkin, Brennan & Wakefield, 2012; Turk, Chaturvedi, Murukutla, Mallik, Sinha & Mullin, 2016; Gravely, Fong, Driezen, Quah, Sansone, & Pednekar, 2016).

Acknowledgment

The authors thank International Institute for Population Sciences, Mumbai for providing GATS-India data.

Declaration of Conflicting Interests

The authors affirm that there are no conflicts of interests in this study and that they alone are responsible for the contents of this paper.

References

- Adekunle, S. (2011). Effects of health education on cigarette smoking habits of young adults in tertiary institutions in a northern Nigerian state. *Health Science Journal*.
- Arora, M., Gupta, V.K., Nazar, G.P., Stigler, M.H., Perry, C.L., & Reddy, K. S. (2012). Impact of tobacco advertisements on tobacco use among urban adolescents in India: results from a longitudinal study. *Tobacco control, 21*(3), 318-324.
- Centers for Disease Control and Prevention. (2003). *Designing and implementing an effective tobacco counter-marketing campaign*. Atlanta, Georgia: US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health.
- Cotter, T., Perez, D.A., Dessaix, A.L., & Bishop, J.F. (2008). Smokers respond to anti-tobacco mass media campaigns in NSW by calling the Quitline. *New South Wales public health bulletin, 19*(4), 68-71.
- Dongre, A.R., Deshmukh, P.R., Murali, N., & Garg, B.S. (2008). Tobacco consumption among adolescents in rural Wardha: where and how tobacco control should focus its attention? *Indian journal of Cancer, 45*(3), 100.
- Durkin, S., Bayly, M., Cotter, T., Mullin, S., & Wakefield, M. (2013). Potential effectiveness of anti-smoking advertisement types in ten low and middle income countries: Do demographics, smoking characteristics and cultural differences matter? *Social Science & Medicine, 98*, 204-213.
- Durkin, S., Brennan, E., & Wakefield, M. (2012). Mass media campaigns to promote smoking cessation among adults: an integrative review. *Tobacco control, 21*(2), 127-138.
- Global Adult Tobacco Survey (2009-10) International Institute for Population Sciences (IIPS), Mumbai, India. The Ministry of Health and Family Welfare (MOHFW), Government of India. Retrieved from <http://mohfw.nic.in/WriteReadData/1892s/1455618937GATS%20India.pdf>
- Goodman, J. (2005). *Tobacco in history: The cultures of dependence*. Routledge.
- Gravelly, S., Fong, G.T., Driezen, P., Xu, S., Quah, A.C., Sansone, G., & Pednekar, M.S. (2016). An examination of the effectiveness of health warning labels on smokeless tobacco products in four states in India: findings from the TCP India cohort survey. *BMC public health, 16*(1), 1246.
- International Agency for Research on Cancer. IARC Handbooks of Cancer Prevention, Tobacco Control, Volume 13, Evaluating the Effectiveness of Smoke-free Policies; [represents the Views and Opinions of an IARC Working Group on Evaluating the Effectiveness of Smoke-Free Policies which Met in Lyon, France, 31 March-5 April 2008]. IARC; 2009.
- Jha, P. (2009). Avoidable global cancer deaths and total deaths from smoking. *Nature Reviews Cancer, 9*(9), 655-664.
- Kaur, J., & Jain, D.C. (2011). Tobacco control policies in India: implementation and challenges. *Indian journal of public health, 55*(3), 220.
- Mullin, S. (2011). Global anti-smoking campaigns urgently needed. *The Lancet, 378*(9795), 970.
- Narain, R., Sardana, S., Gupta, S., & Sehgal, A. (2011). Age at initiation & prevalence of tobacco use among school children in Noida, India: A cross-sectional questionnaire based survey. *The Indian journal of medical research, 133*(3), 300.
- Oswal, K.C., Raute, L.J., Pednekar, M.S., & Gupta, P.C. (2011). Are current tobacco pictorial warnings in India effective? *Asian Pac J Cancer Prev, 12*(1), 121-124.
- Popova, L. (2014). Scaring the snus out of smokers: Testing effects of fear, threat, and efficacy on smokers' acceptance of novel smokeless tobacco products. *Health communication, 29*(9), 924-936.
- Rachel, L.S., & Heather, L.W. (2011). Jonathan MS. India's progress in implementing the Framework Convention on Tobacco Control. *Indian J MedRes, 133*, 455-457.
- SPSS, I. (2011). IBM SPSS statistics base 20. *Chicago, IL: SPSS Inc.*

- The Union. (2015). Mass media campaigns: Factsheet 5 fact sheet. February 2015. Retrieved from www.tobaccofreeunion.org
- Turk, T., Chaturvedi, P., Murukutla, N., Mallik, V., Sinha, P., & Mullin, S. (2016). Raw and real: an innovative communication approach to smokeless tobacco control messaging in low and middle-income countries. *Tobacco control*, tobaccocontrol-2016.
- US Department of Health and Human Services. (2014). *The health consequences of smoking – 50 years of progress: a report of the Surgeon General*. Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 17.
- Viswanath, K., Ackerson, L.K., Sorensen, G., & Gupta, P.C. (2010). Movies and TV influence tobacco use in India: findings from a national survey. *PLoS One*, 5(6), e11365.
- World Health Organization. (2011). *WHO report on the global tobacco epidemic, 2011: warning about the dangers of tobacco*. Geneva: World Health Organization.
- World Health Organization. (2013). *WHO report on the global tobacco epidemic, 2013: enforcing bans on tobacco advertising, promotion and sponsorship*. World Health Organization.
- World Health Organization. (2010). *Guidelines for implementation of Article 12 of the WHO Framework Convention on Tobacco Control (education, communication, training and public awareness)*. Geneva: World Health Organization.