RESEARCH ARTICLE

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Awareness about Tobacco Causing Head and Neck Cancers via Mass Media: A Case-Control Study from India

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Abstract

Objective: This study aimed to assess the awareness of people about the adverse effects of tobacco (smoking and chewing) consumption causing head and neck cancers (HNCs) via mass media channels like television, cinema, radio and newspapers or magazines, wall painting or billboards / hoardings, public transportation and packets of chewing tobacco, bidis or cigarettes. **Methods:** Hospital-based case–control was conducted in Pune, Maharashtra, India. Face to face interviews were conducted for the purpose of data collection on 225 cases and 240 controls. The relationship between two categorical variables were estimated using chi-square test with a 2-tailed P value of <.05. SPSS software was used for data analysis. **Results:** Controls as compared to cases had good awareness scores for chewing (59.9%) and smoking tobacco (63.7%), P<0.001. The most common form of mass media was television where the cases (60.4%) and controls (77.9%) had heard messages about tobacco in chewing and smoking form causing HNCs. Level of awareness of tobacco causing HNCs amongst tobacco users, stratified by their status (cases versus controls) showed that cases were 1.68 times less likely than controls to have heard or seen messages about the association between chewing tobacco and HNCs via radio. Males (61.3% and 61.0%) had significantly (P<0.001) more awareness as compared to females (46.9% and 43.5%) about chewing and smoking tobacco as a causal factor for HNCs. **Conclusion:** Mass media needs to create a social environment which discourages tobacco consumption and promotes oral health at the population level. Additionally, there should be easy access to the availability of support services like Quitline and other community support services.

Keywords: Awareness- knowledge- tobacco- head and neck cancers- mass media- television- radio- cinema

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Introduction

Tobacco in both smoking and chewing forms is addictive and a major risk factor for cardiovascular diseases, malignant neoplasms and many other debilitating health conditions like chronic respiratory diseases and infections (Kendrick et al., 2021; Reitsma et al., 2021). More than eight million lives are lost annually due tobacco .In addition, tobacco remains the leading behavioural risk factor for both genders globally in terms of cancer disability adjusted life years (Tran et al., 2022; World Health Organization, 2022). The annual worldwide incidence of head and neck cancers (HNCs) is approximately 890,000 making it the sixth commonest cancer resulting in 450,000 deaths during the year 2018 (Bray et al., 2018; Ferlay et al., 2019). HNCs are the commonest malignancy in India amongst men and fifth commonest amongst women while the oral cavity remains the most affected site (Johnson et al., 2020).

HNCs are a major public health challenge in India not only because of high incidence but also because of low 5-year survival rates as well as relatively late presentation at time of diagnosis and seeking treatment. (van der Waal, 2013). An increased emphasis is required to achieve primary prevention of HNCs with a radical shift to prevent physical, socio-economic and psychological burden and catastrophic health expenditure directly related to the cancer diagnosis and treatment (Jan and Laba, 2021). In this study, HNCs are defined according to WHO ICD-10 coding as cancers of lip and oral cavity (ICD C00-06), oropharynx (ICD C09-C10), hypopharynx (ICD C13) and larynx (ICD C32).

Tobacco consumption remains a major risk factor along with alcohol for HNCs. Awareness levels about risk factors of HNCs and their early signs and symptoms remains relatively low in India, particularly in population groups with low socio-economic status, lower education and poor health literacy. Also, India holds the dubious distinction of being a world leader in both tobacco production as well as consumption (second largest) (Rani et al., 2003; Rooban et al., 2010). As per Global Adult Tobacco Survey, 2016-17 (Tata Institute of Social Sciences (TISS); Mumbai and Ministry of Health and Family Welfare & India., 2016-17) , 29% of all adults in India use tobacco in some form (smoking, chewing or both) with chewing tobacco (Khaini) being the more

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prevalent form. Globally, India presents the highest burden of consumption of tobacco in chewing form as compared to smoking (185·8 million [171·3–202·5] users; 67·83% [65·77–69·75] (Reitsma et al., 2021)..

This high level of tobacco use could be attributed to tobacco industry's interference in adequate implementation of tobacco control measures, marketing of newer and emerging nicotine and tobacco products which are claimed to be relatively safe, like electronic(e) nicotine delivery systems which includes "e-hookahs", "e-pipes" and "e-cigarettes, "vapes", or "vape pens" (Mejia and Ling, 2010; World Health Organization, 2022). Additionally, in many parts of South Asia it is culturally and socially accepted that there may be health benefits of chewing tobacco (Kakde et al., 2012).

In view of the significant burden imposed on society by tobacco use, it is extremely important that the community is aware of these challenges and risks imposed by tobacco use. Mass media campaigns are one of the ways to increase the community's awareness about early symptoms as well as risk factors of HNCs, like tobacco consumption, and formulate an agenda to influence knowledge, attitudes and behaviour towards tobacco use and seeking early healthcare in case of symptoms.

It is well established that mass media can induce positive health related behaviour or avert negative behaviour patterns across large population groups (Wakefield et al., 2010). Accordingly, mass media channels like television, radio, billboards, magazines and newspapers have been widely used by governmental and non-governmental organizations to raise the level of public awareness about the role of tobacco as a cause of HNCs (Hammond et al., 2013; Wakefield et al., 2010). However, advertisements and messages conveyed as a part of a campaign through these channels are generally passive and compete with extremely prevalent tobacco product marketing, peer pressure and psychological behaviours determined by addiction.

We conducted this study to assess the impact of mass media on peoples' awareness regarding smoking or chewing tobacco as a cause of HNCs. The various mass media channels used in our study were radio, cinema, television, newspapers, billboards and public transport, local newspaper or magazines and packets of chewing or smoking tobacco.

Materials and Methods

This was a frequency matched hospital based case-control study conducted in Pune, Maharashtra, India from 2014-2015, and the preliminary findings have been published in the past with details on participant selection and recruitment (Bhawna et al., 2017; Guptaet al., 2016). Here, we briefly describe our methods: all the study participants were selected from Inlaks and Bhudrani and Command hospital. Cases (N=225) and controls (N=240) were matched to each other by gender and± 5 year age group. We included males and females from within age ranging from 30-80 years. All the study participants shared the same hospital catchment populations. Medical records were accessed to confirm the clinical diagnosis of diseases for both the cases and controls. Cases were positive with clinical and histopathological confirmed diagnosis of squamous cell carcinoma of any sub-site of HNCs as classified by WHO ICD-10 codes (World Health Organization, 2015) and controls were patients attending the same hospitals as indoor/outdoor patients from several hospital departments like orthopaedics, trauma, eye diseases and obstetrics.

Controls were recruited evenly throughout the ascertainment period of the incident cases. Participants were excluded from the study if they had any debilitating condition that did not allow them to speak or write and give informed verbal consent in the presence of a witness. This study was conducted in accordance with the declaration of Helsinki ethical principles and ethics was obtained from Griffith University and participating hospitals (Reference No: DOH/10/14/HREC).

Face to face interviews using a standardized questionnaire were conducted as a part of a survey and study participants self-reported their demographics, socio-economic status, medical and dental check-ups history,behaviors including detailed history on tobacco and alcohol consumption, and awareness on the adverse effects of tobacco causing HNCs . A calendar of life events was used to improve recall bias in this study (Berney and Blane, 2003). Participants who smoked bidi or cigarette or chewed tobacco in any form, at least once a day for a minimum of six months prior to the diagnosis of cancer were recorded as 'ever' smokers or chewers. Those who drank alcoholic beverages at least once a week for a minimum of six months were recorded as 'ever' drinkers. Abstinence or history of infrequent smoking or chewing tobacco and alcohol were recorded as 'never' users of these respective habits. Additionally, participants were recorded as 'never' if they rarely had made any dental visits and 'ever' if they had made frequent dental visits.

Survey questions on awareness of tobacco causing HNCs were developed after reviewing relevant literature and modified from a previously validated and published questionnaire in Indian population. Participants were asked the following two questions

(1) In the past 5 years, if they had heard or seen any message about chewing tobacco causing HNCs (cancers of mouth, oropharynx, larynx) on any of the mass media means of communication (radio, television, cinema, local newspaper or magazines, wall painting or billboards / hoardings, on public transportation vehicles/s stations and on chewing/smoking tobacco packets)

(2) In the past 5 years, if they had heard or seen any message about smoking tobacco causing HNCs (cancers of mouth, oropharynx, larynx) on any of the mass media means of communication (radio, television, cinema, local newspaper or magazines, wall painting or billboards / hoardings, on public transportation vehicles/s stations and on chewing/smoking tobacco packets). Answers for both the questions were recorded as Yes or No. Campaigns using new technologies like internet and mobile phones were not included in this study as most of the recipients in this study were from rural background and had limited access to the internet and social media .Statistical analysis: The baseline characteristics of the study participants and

all the other questions related to the level of awareness of tobacco causing head and neck cancers were expressed in numbers and percentages. The relationship between two categorical variables were estimated using chi-square test. A 2-tailed P value of <0.05 indicated statistical significance. Data were analysed using SPSS software (v.20; IBM Corp).

Results

Baseline Characteristics

Table 1 shows that of the 465 patients, 32.8% were females and 67.2% were males. Majority of the cases and hospital based controls were from low-income, rural areas and in group of 41-60 years. Chewing tobacco was statistically significant among the cases as compared to controls (P<0.001). More than 67% of the cases only visited dentists at the time of tooth pain. Seventy-six percent of the patients were at Stage III cancer when diagnosed with the same. Further, controls as compared to cases had good awareness score for chewing (59.9%) and smoking tobacco (63.7%), P<0.001.

Table 2 shows that the most common form of mass media was television where the cases (60.4%) and controls (77.9%) had heard about the messages about harmful effects of tobacco in chewing and smoking form causing HNCs followed by the messages on wall painting or billboards/hoardings (cases 48.4% and controls 67.5%). Surprisingly, less then 50% of the cases had seen the warning messages in cinema or on packets of smoking or chewing tobacco.

Level of awareness of tobacco causing HNCs amongst tobacco users, stratified by their status (cases versus controls) in the study is summarized in Table 3. It shows that cases were 1.68 times less likely than controls to have heard or seen messages about the association between chewing tobacco and HNCs via radio; 1.28 times less likely to have heard or seen via cinema; 1.68 times less likely via TV; 1.35 times less likely via newspapers or magazines; 1.49 times less likely via wall paintings or billboards/hoarding; 1.52 times less likely via public transport vehicles/stations; 1.46 times less likely via images on packets of chewing tobacco. Likewise, cases were 1.62 times less likely than controls to have heard or seen messages about smoking tobacco causing HNCs via radio; 1.31 times less likely via cinema; 1.54 times less likely via TV; 1.45 times less likely via newspapers or magazines; 1.56 times less likely via wall paintings or billboards/hoarding; 1.61 times less likely via public transport vehicles/stations; 1.47 times less likely via images on packets of bidis or cigarettes.

Table 4 describes the results of the questions that were asked to study participants about their awareness on tobacco in both smoking and chewing forms causing HNCs. Males (61.3% and 61.0%) had significantly (P<0.001) more awareness as compared to females (46.9% and 43.5%) about chewing and smoking tobacco being the cause of HNCs.

Statistically significant disparities (P<0.001) were also found among males (61.9% and 61.3%) as compared to females (41.5% and 42.2%) for having heard or seen messages about tobacco causing HNCs in local newspapers or magazines. Messages about chewing and smoking tobacco causing HNCs on wall or billboards/ hoarding were also more commonly heard or seen by males (65.4% and 61.9%) as compared to females (42.9% for both).

More than 60% of the males as compared to nearly 43% of the females reported to have heard or seen messages about tobacco causing HNCs on public transportation vehicle/s or on stations. A higher proportion of males (62.6% and 66.7%) and females (42.2% and 42.9%) had also heard or seen or messages about tobacco causing HNCs on tobacco packets/bidis or cigarettes.

Discussion

In this study, the exposure to different mass media was measured amongst cases as well as controls to assess the patients' awareness about tobacco being one of the casual factors for HNCs. Television was the most common form of mass media through which both the cases and controls heard messages about harmful effects of tobacco consumption, whereas warning messages in cinema or packets of smoking or chewing tobacco were noticed the least. This is similar to the effect noticed in a study, which involved secondary data analysis of National Family Health Survey data from India to assess the use of mass media for dissemination of information for awareness about ill-effects of tobacco (Rooban et al., 2010).

Amongst all the types of mass-media studied, cases were less likely to have seen messages about tobacco as a cause of HNCs as compared to controls. This can be explained by the socio-demographics of this study population, as there was a high proportion of cases (31.6%) who were illiterate as compared to controls (19.2%). Consequently, cases may not have understood written messages on newspapers or wall paintings/ billboards/boarding's or on public transport or magazines or packets of chewing tobacco /bidis or cigarettes leading to lower levels of awareness and recall of messages despite exposure to these mass media. In addition, the anti-tobacco warning messages on the packs are not well understood by all sub-populations since it requires extensive health education, awareness, and warnings are often in English, which is not commonly understood (Zahiruddin et al., 2011). It was observed in a study from India that health warning labels used on packets of chewing tobacco in Maharashtra are selectively blurred or manipulated in a fashion that obscures parts of the health warning image (Iacobelli et al., 2020). Similarly, It is well known that there is a general wear-out effect among smokers pertaining to public health warnings which mandates new labels periodically to maintain warning effectiveness over time (Tripathy and Verma, 2022).

Furthermore, mass media channels against tobacco often use fear-based messages to highlight the negative effects of tobacco. However, there is neuroscientific evidence to support that threatening health commercials cause attentional avoidance among those for whom the health threat is self-relevant, such as the risk of head and neck cancers in tobacco users (Kessels et al., 2014).

Table 1. Baseline Characteristics of Study Participants

Variable Name	Cases (N=225) N (%)	Controls (N=240) N (%)	P-Value	Chi-Square
Gender				
Females	68 (30.2)	79 (32.9)	0.532	0.39
Males	157 (69.8)	161 (67.1)		
Age group (years)				
≤40	28 (12.4)	19 (7.9)	0.24	3.376
41-60	110 (48.9)	114 (47.5)		
≥61	87 (38.7)	107 (44.6)		
Residence				
Urban	94 (41.8)	122 (50.8)	0.05	3.828
Rural	131 (58.2)	118 (49.2)		
Religion				
Muslims	25 (11.1)	31 (12.9)	0.55	0.357
Hindu and others	200 (88.9)	209 (87.1)		
Marital status				
Unmarried/widow or widower	18 (7.6)	8 (3.3)	0.044	
Currently married	202 (92.4)	232 (96.7)		
Education of study subject				
More than high school	54 (24.0)	42 (17.5)	<0.001	17.106
High school	100 (44.4)	152 (63.3)		
Illiterate	71 (31.6)	46 (19.2)		
Employment				
Home-maker	29 (12.9)	47 (19.6)	0.028	9.136
Self-employed	33 (14.7)	49 (20.4)		
Salaried workers	81 (36.0)	80 (33.3)		
Farmers	82 (36.4)	64 (26.7)		
Family income				
≤15,000	139 (61.8)	188 (78.3)	<0.001	15.251
≥15,000	86 (38.2)	52 (21.7)		
Co-morbidities status				
Absent	168 (74.7)	179 (74.6)	0	0.984
Present	57 (25.3)	61 (25.4)		
Family History of any type of cancer				
Absent	182 (85.3)	213 (88.8)	0.272	1.206
Present	33 (14.7)	27 (11.3)		
Chewing tobacco				
Never	30 (13.3)	121 (50.4)	<0.001	72.828
Ever	195 (86.7)	119 (49.6)		
Smoking				
Never	159 (70.7)	203 (84.6)	<0.001	13.043
Ever	37 (15.4)	66 (29.3)		
Drinking alcohol				
Never	120 (64.2)	173 (72.1)	0.08	3.056
Ever	67 (27.9)	67 (27.9)		
Diet				
Non-veg	168 (74.7)	170 (70.8)	0.354	0.86
Veg	57 (25.3)	70 (29.2)		
Dental check-ups				
Rarely	61 (32.6)	139 (57.9)	<0.001	27.011
Only when in pain	126 (67.4)	101 (42.1)		

Table 1. Continued

Variable Name	Cases (N=225) N (%)	Controls (N=240) N (%)	P-Value	Chi-Square
Stage of Cancer				
Stage I	70 (31.1)			
Stage II	102 (45.3)			
Stage III	27 (12.0)			
Stage IV	26 (11.6)			
Awareness Score for Chewing Tobacco				
Poor awareness	124 (58.2)	89 (41.8)	<0.001	15.2014
Good awareness	101 (40.1)	151 (59.9)		
Awareness Score for Smoking Tobacco				
Poor awareness	129 (57.3)	87 (36.3)	<0.001	20.753
Good awareness	96 (42.7)	153 (63.7)		

Therefore, such messages delivered via mass media may not be effective in promoting awareness as people respond defensively to threatening health information.

In our study, reach of different mass media amongst tobacco users and non-users can be arranged in declining order as follows: television> newspapers/magazines> messages on wall painting or billboards/hoardings> radio> warning messages in cinema> warnings on packets of smoking or chewing tobacco. Television was the single most common mass media to which both genders were exposed including cases as well as controls. A well-designed tobacco information and control campaign through multiple popular television channels will contribute in improving the public awareness about harmful effects of tobacco and rein in its usage.

There is variable quality of evidence available about the behaviourally focussed messages conveyed about tobacco being a causal factor for HNCs through mass media amongst general population (Wakefield et al., 2010). Also, most of the studies have extraneous influences on tobacco consumption, like targeted social and interpersonal support interventions by credible channels like healthcare workers, e.g. Quitline. Furthermore, influence of mass media has not shown any consistent pattern as per age, education or gender (Bala et al., 2017).

It is well documented that the use of various mass media channels are successful in establishing communities' awareness and priorities regarding tobacco control by not just informing and reminding about the harms caused by tobacco but also reinforcing this

Table 2. Level of Awareness of Tobacco Causing Head and Neck Cancers amongst Study Participants

Characteristics	Cases	Controls	P-Value
Heard any message about chewing or smoking tobacco causing HNCs on radio			
No	123 (54.7)	78 (32.5)	<0.001
Yes	102 (45.3)	162 (67.5)	
Heard or seen any message about chewing or smoking tobacco causing HNCs on cinema			
No	128 (56.9)	100 (41.7)	0.001
Yes	97 (43.1)	140 (58.3)	
Heard or seen any message about chewing or smoking tobacco causing HNCs on television			
No	89 (39.6)	53 (22.1)	<0.001
Yes	136 (60.4)	187 (77.9)	
Heard or seen any message about chewing or smoking tobacco causing HNCs in local newspaper or magazines			
No	119 (52.9)	88 (36.7)	<0.001
Yes	106 (47.1)	152 (63.3)	
Heard or seen any message about chewing or smoking tobacco causing HNCs on wall painting or billboards / hoardings			
No	116 (51.6)	78 (32.5)	<0.001
Yes	109 (48.4)	162 (67.5)	
Heard or seen any message about chewing or smoking tobacco causing HNCs on public transportation vehicles/s stations			
No	120 (53.3)	79 (32.9)	<0.001
Yes	105 (46.7)	161 (67.1)	
Heard or seen any message about chewing or smoking tobacco causing HNCs on chewing/smoking tobacco packets			
No	121 (53.8)	83 (34.6)	<0.001
Yes	104 (46.2)	157 (65.4)	

Table 3. level of Awareness of Tobacco Causing Head and Neck Cancers amongst Tobacco Users Stratified by Their Status (Cases versus Controls) in the Study

	Chewing tobacco			Smoking tobacco		
	Cases (N=225)	Control (N=240)	P-value	Cases (N=225)	Control (N=240)	P- value
Have you heard any message about tobacco causing HNCs on radio?						
No	123 (54.7)	78 (32.5)	<0.001	128 (56.9)	79 (32.9)	<0.001
Yes	102 (45.3)	162 (67.5)		97 (43.1)	161 (67.1)	
Have you heard or seen any message about tobacco causing HNCs on cinema?						
No	128 (56.9)	100 (41.7)	0.001	136 (60.4)	104 (43.3)	<0.001
Yes	97 (43.1)	140 (58.3)		89 (39.6)	136 (56.7)	
Have you heard or seen any message about tobacco causing HNCs on television?						
No	89 (39.6)	53 (22.1)	<0.001	97 (43.1)	63 (26.3)	<0.001
Yes	136 (60.4)	187 (77.9)		128 (56.9)	177 (73.8)	
Have you heard or seen any message about tobacco causing HNCs in local newspaper or magazines?						
No	119 (52.9)	88 (36.7)	<0.001	123 (54.7)	85 (35.4)	<0.001
Yes	106 (47.1)	152 (63.3)		102 (45.3)	155 (64.6)	
Have you heard or seen any message about tobacco causing HNCs on wall painting or billboards / hoardings?						
No	116 (51.6)	78 (32.5)	<0.001	125 (55.6)	80 (33.3)	<0.001
Yes	109 (48.4)	162 (67.5)		100 (44.4)	160 (66.7)	
Have you heard or seen any message about tobacco causing HNCs on public transportation vehicle/s or on stations?						
No	120 (53.3)	79 (32.9)	<0.001	127 (56.4)	79 (32.9)	<0.001
Yes	105 (46.7)	161 (67.1)		98 (43.6)	161 (67.1)	
Have you heard or seen any message about tobacco causing HNCs on chewing tobacco packets/bidis or cigarettes?						
No	121 (53.8)	83 (34.6)	<0.001	113 (50.2)	77 (32.1)	<0.001
Yes	104 (46.2)	157 (65.4)		112 (49.8)	163 (67.9)	

Table 4. Questions Asked to Assess the Awareness of Tobacco Causing Head and Neck Cancers amongst Study Participants

	Awarene					
	Chewing tobacco causing cancers of HN			Smoking tobacco causing cancers of HN		
Questions	Males	Females	P-value	Males	Females	P-value
Heard any message about tobacco causing cancers of HN on radio						
No	123 (38.7)	78 (53.1)	0.005	124 (39.0)	83 (56.5)	<0.001
Yes	195 (61.3)	69 (46.9)		194 (61.0)	64 (43.5)	
Heard or seen any message about tobacco causing cancers of HN on cinema						
No	141 (44.3)	87 (59.2)	0.004	155 (48.7)	85 (57.8)	0.07
Yes	177 (55.7)	60 (40.8)		163 (51.3)	62 (42.2)	
Heard or seen any message about tobacco causing cancers of HN on television						
No	82 (25.8)	60 (40.8)	0.002	99 (31.1)	61 (41.5)	0.04
Yes	236 (74.2)	87 (59.2)		219 (68.9)	86 (58.5)	
Heard or seen any message about tobacco causing cancers of HN in local newspaper or magazines						
No	121 (38.1)	85 (58.5)	<0.001	123 (38.7)	85 (57.8)	<0.001
Yes	197 (61.9)	61 (41.5)		195 (61.3)	62 (42.2)	
Heard or seen any message about tobacco causing cancers of HN on wall painting or billboards / hoardings						
No	110 (34.6)	84 (57.1)	<0.001	121 (38.1)	84 (57.1)	<0.001
Yes	208 (65.4)	63 (42.9)		197 (61.9)	63 (42.9)	
Heard or seen any message about tobacco causing cancers of HN on public transportation vehicle/s or on stations						
No	115(36.2)	84(57.1)	<0.001	123(38.7)	83(56.5)	<0.001
Yes	203(63.8)	63(42.9)		195(61.3)	64(43.5)	
Heard or seen any message about tobacco causing cancers of HN on chewing tobacco packets/bidis or cigarettes						
No	119(37.4)	85(57.8)	<0.001	106(33.3)	84(57.1)	<0.001
Yes	199(62.6)	62(42.2)		212(66.7)	63(42.9)	

knowledge specially when the messages involve high emotions or testimonial advertisements (Wakefield et al., 2010). However, awareness through mass media messages have been able to achieve desired results of lowering tobacco consumption only when there is wide availability of support services, e.g. Quitline and other community support facilities/services, to enhance the help-seeking behaviour of individuals positively influenced. At present, most parts of India do not have the requisite infrastructure or facilities available to support individuals seeking support to quit tobacco consumption. Mass media can increase awareness about harm caused by tobacco and even stigmatize tobacco consumption, influencing attitudes of the wider community and can increase the cessation rates by motivating the tobacco users to quit the same. However, the awareness messages through various campaigns or social marketing programmes will achieve its aim of lowering tobacco consumption in all forms only in presence of easy availability of support facilities reinforcing help-seeking behaviour induced by the campaign and its ability to reach the populations living in remote areas and from all socio-economic backgrounds.

Media messages about the adverse effects of tobacco on health can produce positive changes or prevent negative decision making in tobacco consumption across large populations (Wakefield et al., 2010). Surrogate advertising through actors on television and cinema continues to influence initiation of smoking amongst adolescents and young adults continue to occur using positive/glamorous portrayal of smoking through imagery appealing to aspirations of individual independence, liberation, rebelliousness, attractiveness, sophistication, glamour, peer acceptance and inclusion, as well as being "cool"(Hanewinkel and Sargent, 2008; Thrasher et al., 2014). A systematic review on impact of advertising on youth by concluded that tobacco advertising and promotion increases the likelihood that adolescents will start to smoke (Lovato et al., 2011). Therefore, adolescents and young adults need to be the focus of various mass media campaigns aiming to decrease tobacco consumption.

The limitations of this case-control study include the self-reporting bias where participants are likely to report answers that they believe to be socially accepted especially when questions are regarding behavior risk factors like tobacco. Recall bias is another potential problem as the health outcome in this study was head and neck cancers and most of the participants at the time of interview were immune-compromised and distressed with their existing personal and financial conditions.

Future Directions

Worldwide, more than 80 percent of individuals now have a mobile-broadband ("smart phone") subscription, which is five times the number in 2008 (Edquistet al., 2018; Kalia et al., 2022). With exponential improvement in access to internet and increasing penetration of online social media, digital and mobile smart phone technology have a huge potential capability to complement traditional mass media channels, and need to be exploited for a higher population level impact.

Awareness through various mass media channels need to create a social environment which discourages tobacco consumption and promotes oral health at the population level. Awareness programmes need to be complemented by enhanced availability of support services like Quitline, health education and other community support services. Tobacco-free movies/television are a need of the hour through legislation and policy development. If considered essential for the storyline, tobacco scenes need to have an audio-visual disclaimer or a health warning as a static message. Popular media personalities, like film and TV actors perceived as "role models", should be encouraged to dissociate themselves with surrogate advertising for tobacco products. Furthermore, surrogate advertising for tobacco products also needs to be curbed through policy development and implementation.

There is a felt need to enhance health education about the need for tobacco control through personalization of potential harm and specific negative consequences of tobacco use. The anti-tobacco warning messages on tobacco packs are not well understood by all sub-population groups and they need to be reinforced through enhanced health education personalizing the potential harm of tobacco use through various mass media channels (Mullin et al., 2011).

Cost-effective interventions and practices to reduce the consumption and disrupt the demand-supply chain of tobacco in high-risk communities have been introduced by the WHO 'MPOWER' package (M: monitor tobacco use; P: protect people from tobacco smoke; O: offer help to quit tobacco use; W: warn about the dangers of tobacco; E: enforce bans on tobacco advertising and promotion and sponsorship; R: raise taxes on tobacco products) (World Health Organization, 2022). Nevertheless, significant gaps remaining need to be bridged on priority in countries which are at early stages of implementation of MPOWER package.

In conclusions, there is a huge economic and physical impact of tobacco consumption at a global level and many countries have prioritized tobacco control implementing WHO's MPOWER package to varying extent. Awareness through mass media channels as a part of social marketing programmes can possibly be an extremely powerful tool in this multipronged strategy to achieve positive behavioural changes related to tobacco control influencing the level of knowledge, attitudes and practices at a population level. Policy makers need to exploit this tool in the context of local cultural, regional and national practices, with increasing emphasis on digital and social media along with conventional mass media.

Author Contribution Statement

BG, NK and AK made substantial contributions to conception and design and acquisition of the data. Analysis and interpretation of data was done by BG, NK and AK. BG wrote the manuscript. BG, NK and AK revised it critically for important intellectual content. Final approval of the version to be published was done by BG, NK and AK.

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