

RESEARCH ARTICLE

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Effectiveness of a Mass Media Campaign on Oral Carcinogens and Their Effects on the Oral Cavity

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Abstract

Objective: To develop a mass media campaign on oral carcinogens and their effects on the oral cavity in order to increase awareness among the general population. **Methods:** Documentary and public service announcements highlighting the effects of tobacco and its products were designed and developed based on principles of behavior change. A questionnaire, designed to determine the knowledge, attitude and practice of people regarding oral carcinogens, was used to conduct a baseline survey at various sites in eastern Nepal. Local television channels and radio stations broadcasted the documentary and public service announcements. An evaluation survey was then performed to assess the effectiveness of the campaign. **Results:** Baseline and evaluation surveys covered 1,972 and 2,140 individuals, respectively. A third of the baseline population consumed quid, 22% chewing tobacco, 16% gutka (commercial preparation of arecanut, tobacco, lime and chemicals) and 25% cigarettes. Tobacco consumption differed significantly between 3 ecologic regions with greater use in the Terai region. The knowledge prevalence regarding the oral carcinogens quid (70%), chewing tobacco (82%), gutka (58%) and cigarettes (93%) significantly increased in the evaluation population. Females were more aware about the various tobacco products and their effects on health. More people knew about the harmful effects of tobacco on their health and oral cavity, and had their mouth examined and the frequency of consumption of these products reduced significantly after the campaign. Attitudes towards production, sale and advertisements of tobacco also improved significantly. **Conclusions:** The mass media campaign was an effective tool for increasing awareness among the population.

Keywords: Mass media campaign- oral cancer- oral carcinogens

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Introduction

Oral Cancer is prevalent in the Nepalese community due to ignorance about oral health and poor awareness of the effects of oral carcinogens. Lucrative marketing strategies of tobacco companies attract young and old towards developing tobacco related habits, thus, increasing the risks for oral cancer (FDI/WHO, 2005). Like many other cancers, oral cancer is also caused by tobacco use, unhealthy diets, alcohol consumption, inactive lifestyles and infection, with tobacco use being the most avoidable cause. In addition to oral cancer, tobacco consumption also causes cancer of lung, pharynx, larynx, oesophagus, stomach, pancreas, liver, kidney, ureter, urinary bladder, uterine cervix and bone marrow (Peterson, 2009). Although a national survey estimated overall tobacco use prevalence was 44.7%, with higher prevalence in rural areas (45.8%), a recent study conducted at that time showed 78% smokers and 69% smokeless tobacco users in a rural setting in Nepal (Shrestha et al., 2013).

Most of the oral cancers are preceded by oral potentially malignant disorders (OPMDs) like leukoplakia, erythroplakia, lichen planus, oral submucous fibrosis,

etc. These conditions lead to oral health impacts in terms of pain, suffering, impairment of function and effect on quality of life (Sfeatcu et al., 2011). If diagnosed early, OPMDs can easily be cured with medicinal management and its progression to cancer can be minimized. In its sixtieth world health assembly, WHO has urged its member states "to take steps to ensure that prevention of oral cancer is an integral part of national cancer control programmes..." (Peterson, 2009). As per the Crete Declaration on Oral Cancer Prevention, national and international health authorities, research institutions, non-governmental organizations and civil societies are encouraged to improve their efforts for effective control and prevention of oral cancer (Peterson, 2009; Peterson, 2009).

Awareness to the public, about oral health related diseases, can be generated by various mass media campaigns like broadcasting in television, radio, public campaigns, etc. Mass media campaigns also provide important baseline data for the planning of public health policies (Saleh et al., 2012) and are effective in influencing providers' screening for signs and symptoms of oral cancer (Durkin et al., 2012). Mass media campaigns

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to promote quitting are important investments as part of comprehensive tobacco control programs to educate about the harms of smoking, set the agenda for discussion, change smoking attitudes and beliefs, increase quitting intentions and quit attempts, and reduce adult smoking prevalence (Durkin et al., 2012). Various surveys carried out to determine public awareness and knowledge of oral cancer have suggested that media campaign informing the public about oral cancer is clearly required (Warnakulasuriya et al. 1999; Turk et al., 2012; Saleh et al., 2012). Up to our knowledge, there have not been any mass media campaigns carried out in Nepal on oral carcinogens. The aim of the study was to increase awareness on oral carcinogens to large group of population of eastern Nepal using a mass media campaign.

Materials and Methods

The study was designed such that a baseline (pre-campaign) survey was carried out prior to conducting the mass media campaign, followed by an evaluation (post-campaign) survey. Approval for this study was obtained from the Research Committee, B.P. Koirala Institute of Health Sciences (BPKIHS). The target population was 16-70 year olds living in the 3 different ecological zones of eastern Nepal. The study was carried out from March 2010 to May 2011 in which the surveys were carried out at various sites in Solukhumbu, Ilam, Dhankuta, Sunsari and Morang districts, representing the ecological zones of eastern Nepal. A questionnaire was designed to determine the knowledge, attitude and practice of oral carcinogens. The developed questionnaire was pre-tested and validated (face and content) using standard methods and reliability was assessed using Cronbach's alpha. The same had also been used among a different population (Shrestha et al., 2013) prior to being used in the present study.

A baseline survey was conducted on randomly selected clusters of population from eastern Nepal, before the campaign. A sample size of 2200 (inclusive of 10% for non-response) was estimated based on WHO Oral Health Surveys criteria (WHO, 1997). The survey was conducted in 5 of the 16 districts in eastern Nepal, randomly selected to represent the 3 ecological regions: the himalayan, the hilly and the plains. Local/district organizations organized oral health camps in 4 randomly selected villages/towns of each district. The sampling frame was people attending the oral health camps. Equal number of participants (110) were conveniently selected from each oral health camp. Those consenting to participate in the study were provided with the self-administered questionnaire. The completed questionnaires were collected by dental surgeons and handed over to the investigators.

A documentary and radio-television public service announcement (PSA) were designed and developed based on principles of behavior change consisting of focus on target audience, modeling of the behavior, motivation for behavior change, repeated broadcast for reminder and behavior reward. The mass media product was pretested and a trial was conducted of the produced documentary and PSAs. National TV channels, radios and FM stations

were approached to broadcast the documentary/PSAs. However, due to technical and financial difficulties, only local television channels and cable television operators agreed and broadcasted the documentary and/or PSAs. Local FM stations aired the audio PSAs. Places inaccessible to such mass media were identified and attempts were made to reach the community for public health talk/education.

A public oral health specialist was actively involved in organizing oral health education, providing expertise in the planning, implementation and evaluation of the project, liaison with district organizations for the organizing the surveys, and supervised the entire project. An oral medicine expert was actively involved in designing educational material for oral cancer / OPMDs and its effect on quality of life. Dental surgeons were trained in implementing pre and post campaign questionnaires, for delivering oral health education regarding oral cancer and OPMDs and conducting baseline as well as evaluation surveys, assisting the specialists during the project. A technical assistant was trained and assigned for handling audiovisual equipment, administrative work like log book maintenance of activities and equipment, and arranging collected data in logical format. The volunteers (non-medical) were responsible for liaison with local organization for planning and implementation of campaign. A media agency designed and developed the documentary and PSAs under the advice of the specialists.

Three months after the mass media campaign, an evaluation survey was conducted to know the effectiveness of the campaign. The evaluation survey was conducted in the same villages/towns. The questionnaires were checked for completeness and only those completely answered were included in the analyses. The data collected using pro forma was entered into MS Excel and analyzed using Statistical Package for Social Sciences (SPSS) version 17. The comparisons of different proportions were done using Chi square tests. Associations of knowledge, practice and attitude regarding oral carcinogens with the mass media campaign was assessed with logistic regression analysis. The level of significance was set at $p < 0.05$.

Results

Baseline and evaluation surveys, conducted in eastern Nepal, included 1,972 and 2,140 individuals, respectively. The Cronbach's alpha value for the validated questionnaire was 0.76. The survey population represented the 3 geographic regions of the country: himalayan (high mountains), hilly (mid hills) and plains (terai). The surveys had 47% males and 53% females. The mean age of the study population was 35 (± 14) years. A third of the baseline population consumed quid, 22% chewing tobacco, 16% gutka® (commercial preparation of arecanut, tobacco, lime and chemicals) and 25% cigarettes. The prevalence differed significantly between males and females with more consumption of the oral carcinogens among the males (Table 1). Females were more aware about the various tobacco products and their harmful effects on health (Table 1). More women also had attitude against the oral carcinogens. The prevalence of tobacco

Table 1. Pre- Campaign Data Regarding Knowledge, Attitude and Consumption of Oral Carcinogens

Gender-wise comparison of knowledge on oral carcinogens				
Carcinogen	Gender frequency (%)		X ²	p value
	Male (n=932)	Female (n=1,040)		
Quid	584 (62.6)	812 (78.0)	56.5	<0.001
Chewing tobacco	744 (79.8)	888 (85.3)	10.6	0.001
Gutka	492 (52.7)	664 (63.8)	24.7	<0.001
Cigarette	876 (93.9)	964 (92.6)	1.34	0.24
Gender-wise comparison of awareness of harmful effects of oral carcinogens				
Carcinogen	Gender frequency (%)		X ²	p value
Quid	232 (24.8)	404 (38.8)	83.4	<0.001
Chewing tobacco	344 (36.9)	504 (48.4)	77.9	<0.001
Gutka	212 (22.7)	412 (39.6)	105.6	<0.001
Cigarette	404 (43.3)	576 (55.3)	63.9	<0.001
Gender-wise comparison of oral carcinogens consumers				
Carcinogen	Gender frequency (%)		X ²	p value
Quid	387 (41.5)	270 (25.9)	17	<0.001
Chewing tobacco	266 (28.5)	193 (18.5)	7.53	0.006
Gutka	203 (21.7)	92 (8.8)	37.7	<0.001
Cigarette	284 (30.4)	218 (20.9)	4.8	0.02
Gender-wise comparison of attitude towards oral carcinogens				
Attitude	Gender frequency (%)		X ²	p value
Health workers advise against	167 (17.9)	208 (20)	17.5	<0.001
Adolescents should not use	80 (8.5)	103 (9.9)	15.2	<0.001
Stop advertisement	645 (69.2)	585 (56.2)	1.1	0.5
Stop manufacture sale and use	587 (62.9)	620 (59.6)	27.7	<0.001
Mouth examined	261 (28)	273 (26.2)	3.9	0.04

use differed significantly between 3 ecological regions with more consumption in the terai region (Table 2).

The awareness on harmful effects of oral carcinogens among the baseline population significantly increased in the evaluation population (Table 3). More people were aware about the various tobacco products and their harmful effects on their health. The consumption of all the types of tobacco products also significantly decreased in the post-campaign survey. Attitude of the participants against production, sale and advertisements of tobacco also differed significantly (Table 3). A significantly higher number of people also had their mouth examined. More people also informed that healthcare workers need to advise against the use of oral carcinogens. In order

Table 2. Baseline Data Regarding Ecologic Region-Wise Oral Carcinogens Consumers

Carcinogen	Consumers (%)			X ²	p value
	Himalayan	Hilly	Terai		
Quid	52 (6.9)	287 (36.6)	296 (67.2)	613.3	<0.001
Chewing tobacco	80 (10.7)	164 (21.1)	180 (40.9)	264.1	<0.001
Gutka	32 (7.7)	196 (25.2)	80 (18.1)	228.4	<0.001
Cigarette	164 (21.9)	168 (21.6)	168 (38.1)	125.1	<0.001

Table 3. Post- Campaign Comparison Regarding Knowledge, Attitude and Consumption of Oral Carcinogens

Knowledge on oral carcinogens				
Carcinogen	Survey		X ²	p value
	Baseline (n=1,972)	Evaluation (n=2,140)		
Quid	1396	1564	1.9	0.1
Chewing tobacco	1632	1800	0.26	0.6
Gutka	1156	1324	10.1	0.001
Cigarette	1840	2008	0.4	0.4
Awareness of harmful effects of oral carcinogens				
Quid	636 (32.2)	804 (37.5)	23.8	<0.001
Chewing tobacco	848 (43.0)	1016 (47.4)	18.2	0.02
Gutka	624 (31.6)	792 (37)	26.5	<0.001
Cigarette	980 (49.6)	1148 (53.6)	13.4	0.04
Consumption of oral carcinogens				
Quid	657 (33.3)	498 (23.2)	51.2	<0.001
Chewing tobacco	459 (23.2)	354 (16.5)	29.3	<0.001
Gutka	295 (14.9)	270 (12.6)	4.75	0.02
Cigarette	502 (25.4)	429 (53.6)	17.1	<0.001
Change in attitude towards oral carcinogens				
Attitude				
Health workers advise against	375 (19.0)	436 (20.4)	9.3	0.009
Adolescents should not use	183 (9.3)	231 (10.8)	5.6	0.06
Stop advertisement	1230 (62.4)	1427 (66.7)	10.1	0.006
Stop manufacture sale and use	1187 (60.2)	1354 (63.3)	6.17	0.04
Mouth examined	534 (27.1)	759 (35.5)	33	<0.001

to assess the associations of knowledge, practice and attitude regarding oral carcinogens with the mass media campaign, logistic regression analysis was carried out (Table 4). The baseline population formed the unexposed group while the evaluation population formed the group exposed to the mass media campaign. In the univariate analysis, the odds of the exposed group with regards to the oral carcinogens was significantly different from the odds of the unexposed group. After adjusting for all the confounding factors, it was seen (Table 4) that the odds of the exposed group with those of the unexposed group significantly differed in terms of awareness on harmful effects of gutka® (OR=3.9), reduction in consumption of quid (OR=7.3) and chewing tobacco (OR=4.8), and having their mouth examined (OR=6.3).

Discussion

The current study has attempted to assess the effectiveness of a mass media campaign on oral carcinogens and their effects on oral cavity. Mass media campaigns are widely used to provide large populations with messages through routine uses of existing media, such as television, radio, and newspapers. As the exposure to such messages is generally passive, such campaigns are frequently competing with factors, such as persistent product marketing, prevailing social norms, and behaviors

Table 4. Association Between Campaign Exposure and Oral Carcinogen-Related Knowledge, Attitude and Practice

Carcinogen	Knowledge on oral carcinogens					
	Survey		OR ¹	p value	Adj OR ²	p value
	Unexposed (n=1,972)	Exposed (n=2,140)				
Quid	1396	1564	1.9	0.1	-	-
Chewing tobacco	1632	1800	0.62	0.6	-	-
Gutka	1156	1324	3.1	0.001	0.9	0.6
Cigarette	1840	2008	0.56	0.45	-	-
	Awareness of harmful effects of oral carcinogens					
Quid	636 (32.2)	804 (37.5)	2.9	<0.001	0.73	0.5
Chewing tobacco	848 (43.0)	1016 (47.4)	1.6	<0.001	0.93	0.5
Gutka	624 (31.6)	792 (37)	5.2	<0.001	3.9	0.04
Cigarette	980 (49.6)	1148 (53.6)	2.4	<0.001	0.2	0.8
	Consumption of oral carcinogens					
Quid	657 (33.3)	498 (23.2)	8.1	<0.001	7.3	<0.001
Chewing tobacco	459 (23.2)	354 (16.5)	5.9	<0.001	4.8	0.003
Gutka	295 (14.9)	270 (12.6)	2.4	0.02	0.4	0.4
Cigarette	502 (25.4)	429 (53.6)	4.7	<0.001	0.1	0.7
	Change in attitude towards oral carcinogens					
Attitude						
Health workers advise against	375 (19.0)	436 (20.4)	1.3	0.2	-	-
Adolescents should not use	183 (9.3)	231 (10.8)	2.5	0.09	-	-
Stop advertisement	1230 (62.4)	1427 (66.7)	2.8	0.004	0.2	0.6
Stop manufacture sale and use	1187 (60.2)	1354 (63.3)	3.4	0.03	1.8	0.1
Mouth examined	534 (27.1)	759 (35.5)	6.8	<0.001	6.3	<0.001

OR¹, Unadjusted odds ratio; Adj OR², Adjusted odds ratio

driven by addiction or habit. Wakefield et al., (2010) discussed the outcomes of mass media campaigns in the context of various health-risk behaviours and concluded that mass media campaigns can produce positive changes or prevent negative changes in health-related behaviours across large populations. They proposed that investment in longer better-funded campaigns may be required to achieve adequate population exposure to media messages.

According to Karki et al., (2002) as cited by Government of Nepal, Ministry of Health and Population (2011), the overall tobacco use prevalence was: the mountain region (68.2%), the terai (42.4%) and mid hills (40.9%). Smoking prevalence was 57.1% in the high mountains, 38.9% in the hills, and 35% in the terai, which were contrary to the present study. In view that ethnicity affects tobacco habits, it has been shown that aboriginal and Torres Strait Islander Australians (Indigenous Australians) have more than twice the smoking prevalence of non-Indigenous Australians (Stewart et al., 2011).

Richardson et al., (2011) observed that smoking cessation media messages sufficiently influenced cessation-related cognitions and contributed to behavior change in low socioeconomic subgroups. It was found, in a Malaysian study that the level of awareness differed between the distinct ethnic subgroups and the reach of the campaign was not uniform across all ethnicities (Saleh et al., 2012). In the review by Wakefield et al., (2010), the outcomes of mass media campaigns in the context of various health-risk behaviours (e.g. use of tobacco,

alcohol, and other drugs, heart disease risk factors, sex-related behaviours, road safety, cancer screening and prevention, child survival, and organ or blood donation) were discussed. They concluded that mass media campaigns can produce positive changes or prevent negative changes in health-related behaviours across large populations. What contributed to those outcomes were concurrent availability of required services and products, availability of community-based programmes, and policies that support behaviour change. In our study, the knowledge prevalence on oral carcinogens among the baseline population significantly increased in the evaluation population. Frequency of consumption of these products reduced significantly after the campaign. More people knew about the various tobacco products and their harmful effects on their health and had their mouth examined. Attitude towards production, sale and advertisements of tobacco also improved significantly. None the less, it has been observed that the odds of reduction in consumption of quid and tobacco is significant among those exposed to the mass media campaign. Similar results have also been shown by Turk et al., (2012). Among other tobacco products, the awareness of harmful effect of gutka® has also been associated with the campaign and so has the attitude towards mouth examination.

There were several limitations in the study in terms of issues related to the study approach, sampling, cultural, ethnicity, education and economic considerations.

A pre-post controlled design would have been more appropriate, but the main idea behind the campaign was to educate the mass without any exception. Also, a random sample would have been more representative of the study area. Careful integration of the audience characteristics in the analysis, more specifically in the regression analysis, would provide more insight into factors associated with tobacco habits. However, an accountable number of persons became aware of the mass media campaign on oral cancer/OPMDs and oral carcinogens. They received education on oral cancer and OPMDs, were able to recognize oral cancer and OPMDs causing agents and factors, and received information on knowledge, attitude and practice of oral carcinogens. We recommend that such a campaign be nationalized so as to achieve the long term outcomes. The general population of the country would have increased knowledge on oral cancer/ OPMDs and oral carcinogens. They would also be encouraged to undergo examination for oral cancer/OPMD, and would restrict use of oral carcinogens.

In conclusion, the mass media campaign proved to be an effective tool for generating awareness among large group of population. The campaign also showed reduced tobacco consumption and changed attitude towards tobacco products.

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