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Evaluation of a social marketing campaign for the early detection of oral potentially malignant disorders and oral cancer: Sri Lankan experience

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ABSTRACT

Introduction: The present study evaluated a national social marketing campaign (SMC) conducted in 2008, with the ultimate aim of improving control of oral cancer in Sri Lanka. The approach was based on our published Risk Factor Model (RFM).

Methods: Social marketing tools were developed to educate the public on the major risk factors for oral cancer. A cross-sectional community-based cluster survey was carried out in 2013 by interviewing 491 citizens >25 years of age to assess any improvements to the level of disease awareness in the community. Changes in the number of case presentations were obtained from registrations at Government Hospital Dental Clinics (GHDC) from the year 2008–2015.

Results: A random sample of 491 members of the public was interviewed in 2013. Most (93%) were aware of oral cancer; but only 45.4% of oral potentially malignant disorders (OPMD). Statistically significant improvements were observed on awareness of oral cancer and OPMD and of the risk factors for oral cancer. A marked increase in the detection of oral leukoplakia and of oral cancer occurred in the GHDC surveillance system in the years 2012 and 2013, at the time the SMC campaign was implemented.

Conclusion: The improvement in public awareness of oral cancer and of its major risk factors, and the changed public behavior seen in the increased attendance at healthcare facilities for mouth examination, may be attributed, at least in part, to our SMC. Such Risk Factor-based approaches to social marketing are proposed for control of oral cancer.

1. Introduction

Social Marketing Campaigns (SMC) are accepted interventional tools for increasing public awareness on disease causation and for changing health behaviors. A SMC is the application of marketing principles to enable individual and collective ideas and actions in the pursuit of effective, efficient, equitable, fair and sustained social transformation. Advertising techniques used successfully to promote commercial products can be used to promote social and health issues.[1] In Sri Lanka, a mass media social campaign undertaken by the Anti Leprosy Campaign was very successful in detecting new cases of leprosy in 1993.[2] In the USA, early detection of breast and cervical cancers among Vietnamese-American women improved substantially following a social marketing campaign.[3] In 2004 an oral cancer awareness campaign was conducted in the West of Scotland and over 40% of dentists reported that, during the active phase of the campaign, patients had asked for information concerning the program and 66% of dentists indicated that registered patients had asked for advice regarding a specific lesion in their mouth.[4]

Many approaches have been proposed for the prevention and early detection of oral cancer (OC) in South and South East Asia. Screening for oral cancer has been carried out at various levels and settings, ranging from whole communities, targeted to high-risk groups and opportunistically in clinical environments.[5–9] Visual screening of the mouth offers the principal means of diagnosis of oral potentially malignant disorders (OPMD)[10] and for small (comparatively early stage) malignant disease, and such screening has been shown to reduce mortality from oral cancer in Kerala, India, among high-risk individuals.[5]

In the 1980s, the World Health Organization (WHO), working with Sri Lankan experts, introduced a Primary Health Care Model (PHC) to

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screen the oral cavities of the whole population in two large Districts, with an encouraging outcome. Screening was undertaken by Primary Health Care workers employed by the Ministry of Health.[6,11] Unfortunately this screening activity has not been sustained due to an overburden of the functions of the PHC staff with other preventive activities.[12] Considering the obstacles to effective oral cancer screening over the intervening three decades, we developed a Risk Factor Model (RFM) for the identification of people likely to have an OPMD and validated this in a community sample.[13] Areca nut/betel quid chewing was assigned the highest score for OPMD risk among adults.

In 2010, following a regional study, we highlighted an alarming lack of awareness and knowledge on oral cancer and associated risk factors among the Sri Lankan population, indicating an urgent need to implement public health education and promotion strategies.[14] In 2011/2012, the National Cancer Control Program took several important initiatives to strengthen oral cancer control in Sri Lanka. These included the development of Guidelines for Management of OPMD,[15] establishment of a nationwide surveillance system for OPMDs, delivering district-level training programs for Medical Officers of Health (MOH) & Dental Surgeons in all 25 Districts of the nation. We launched a social marketing campaign to educate the public on the dangers of smokeless tobacco use and areca nut/betel quid chewing. Members of the public who regarded themselves as at risk of oral cancer were invited to present to a dental clinic for mouth examination.

Based on this RFM, social marketing tools were developed to educate the public on areca nut/packaged areca nut products as the major risk factor for oral cancer. The activities included two 30 s TV spots/two 30 s radio clips, a teledrama, posters for institutions and stickers & leaflets for school vans & for public transport buses (Fig. 1). On the 27th July 2012 a media campaign was launched and continued for 3 months. TV spots and radio clips were telecast/broadcast during prime time 6 times a day for three months in popular Sinhala and Tamil TV and radio channels. Overall, more than 20 episodes on TV news and more than 20 radio discussions were held and around 50 newspaper articles were published.

District level training programs were conducted island-wide to sensitize the MOH, technical officers at Regional Health offices, and dental surgeons in the districts: the latter were assigned to provide comprehensive oral screening on public demand, to conduct outreach clinics in distant places and to conduct awareness programs at grass root level. In parallel with the media campaign, oral cancer awareness walks were organized in 5 districts, poster campaigns initiated, and street dramas performed involving high risk groups: there were 20 awareness programs for bus drivers and conductors, and 3 programs specifically for drivers of three-wheeler vehicles. On the July 31, 2012, a bus sticker launching ceremony was carried out at the Central Bus Station, Colombo followed by three ceremonies in Chilaw, Gampaha, and Nuwaraeliya. 36,000 bus stickers were pasted inside private and Ceylon Transport Board buses.

On the 30th of October 2012, an advocacy program for Buddhist religious leaders was initiated with the participation of Hon. Minister of Health, Sri Lanka. A traditional betel tray, as used in formal activities of the Buddhist culture, contains betel leaves, tobacco, areca nut and lime. Here, a new "betel" tray was introduced by removing tobacco, areca nut and lime and by inserting products with no known carcinogenicity: natural nutmeg, mace, cardamom, cloves and aromatic ginger. District level advocacy programs for Buddhist priests were conducted to introduce the new "betel" tray concept.

The purpose of the present communication is to determine what improvements, if any, have followed since the 2012 social marketing campaign. This was addressed by: (1) A cross sectional survey carried out in two randomly selected MOH areas to assess the level of awareness of OC and its risk factors among the public and to compare the data with a base line study conducted in 2008.[14] (2) Analyzing the returns on cases, or suspected cases, of oral cancer and of OPMDs obtained through the national surveillance system of GHDC and published in the Annual Health Bulletins of Sri Lanka from the year 2008–2015.

2. Materials and methods

A cross-sectional community-based cluster survey was carried out in Kiriella MOH area in Ratnapura district and Nikawartiya MOH area in Kurunagala district by interviewing and screening 491 subjects >25 years of age to assess their levels of awareness of these diseases, the prevalence of risk factors and of actual OPMDs (Fig. 2). Subjects were selected from two districts according to the Multistage cluster sampling technique. Sample size was calculated using data from the baseline study: public awareness of oral cancer at 84% and a non-response rate of 8%. According to the Cochran formula[16] and with a design effect of 2, a minimum sample of 431 would be required. Five clusters were selected from each of the MOH areas and 50 subjects were selected from each cluster.

House to house surveys were conducted by identifying the first house from the voter's list, according to the random number assigned, and then the next nearest household was visited. The principal investigator and trained dental surgeons interviewed 491 subjects and conducted intra-oral examinations. The interviewer-administered questionnaire

Fig. 1. Social marketing tools: leaflets, stickers, posters and TV spots.

Fig. 2. House to house visit of the evaluation study.

consisted of questions to gather information on socio-demographic factors, the subjects' awareness of OPMDs and oral cancer and of relevant lifestyle risk factors.

The Ministry of Health had established a surveillance system for oral cancer and OPMD by introducing registries at GHDC and Oral & Maxillo-Facial Units across the nation. In 2006, this was piloted in Ratnapura and Kegalle Districts and expanded to the rest of the country from 2011 onwards (Fig. 3). We have used the returns obtained through the national surveillance system of GHDC and published in the Annual Health Bulletins of Sri Lanka from the year 2008–2015 for comparison with the situation in 2008.

Ethical clearance was obtained from the Ethical Review Committee, Faculty of Medicine, (EC -11-055 R) University of Colombo and signed informed consent was obtained from each subject before data collection. Data analysis was carried out with SPSS (version 13). Frequency distributions were plotted and chi-Square tests were used to test the hypothesis of differences between the evaluation study data and baseline study data.

3. Results

3.1. Comparison of the results of the baseline study and the evaluation study

The evaluation study sample consisted of 491 subjects: more female participants were represented in both surveys (Table 1). The majority of participants were Tamil speaking in the baseline study, Sinhala in the evaluation study. Significantly more participants in the baseline study were unemployed and had low educational attainments.

Among participants in the evaluation study, 93.3% were aware of oral cancer but only 45% of OPMDs. This is an improvement on the baseline

Fig. 3. Register for surveillance of OPMD at the primary care dental clinic.

Table 1
Comparison of the socio-demographic characteristics of the participants of two study settings.

Characteristics	Evaluation study in 2013 (N = 491) (%)	Baseline study in 2008 (N = 1029) (%)	X^2 P value
Sex			
Male	215 (43.8)	405 (39.3)	2.7
Female	276 (56.2)	624 (60.6)	0.10
Age			
30-39	110 (22.4)	245 (23.8)	1.44
40-49	134 (27.3)	259 (25.2)	0.695
50-59	111 (22.6)	255 (24.8)	
≻60	136 (27.7)	270 (26.2)	
Ethnicity			
Sinhalese	456 (92.8)	665 (64.6)	155.57
Tamils	24 (4.9)	359 (34.9)	P < 0.001
Others	11 (2.2)	5 (0.5)	
Education			
No schooling	13 (2.6)	112 (10.9)	119.79
Up to 8 years of education	160 (32.6)	541 (52.7)	P < 0.001
9–11 years of education	216 (44)	278 (27.1)	
12 or more years of education	102 (20.7)	95 (9.3)	
Occupation			
Unemployed house wives	94 (19)	480 (46.6)	109.32
Skilled and unskilled	373 (76)	502 (48.8)	P < 0.001
Professional & clerical	24 (4.8)	47 (4.6)	

study: 84% and 23% respectively.[14] Most respondents to both surveys were aware of the signs and symptoms of oral cancer (Table 2). At termination of the campaign, the level of awareness of early symptoms of oral cancer had increased by 43%.

At follow-up, 87% were aware that betel quid chewing was a risk factor for oral cancer and for OPMDs but only 20% were aware that chewing areca nut from packets is also a risk factor. The majority were

Table 2
Comparison of the level of Awareness of oral cancer, OPMD, symptoms and risk factors before and after the SM campaign.

Characteristics	Evaluation study in 2013 (N = 491) Aware (%)	Baseline study in 2008 (N = 1029) Aware- (%)	X^2 P value
Awareness of oral cancer	458 (93)	731 (84)	96.51 P < 0.001
Awareness of precancer (OPMD)	223 (45)	177 (23)	154.44 P < 0.001
Awareness of any early symptoms of oral cancer	358 (73)	245 (29.5)	334.86 P < 0.001
Awareness of risk factors for oral cancer			
Betel quid chewing	430 (87)	555(54)	164.92 P < 0.001
Smoking	330 (67)	271 (26)	252.29 P < 0.001
Alcohol use	190 (38)	138 (13)	125.25 P < 0.001
Vitamin deficiencies	53 (11)	18 (1.8)	61.07 P < 0.001
Poor oral hygiene	138 (28)	87 (8)	101.78 P < 0.001

aware that betel quid chewing, smoking & alcohol were risk factors for oral cancer compared to the base line study. The majority were aware that tobacco and areca nut were the harmful agents in a betel quid for developing oral cancer and this awareness level was higher than in the baseline study which was highly significant (Table 3).

People who were aware of oral cancer and OPMD were further questioned about their sources of information. Overall, mass media were the main source of information. The most popular media for gathering this awareness were TV (63%) and Radio and Newspapers (Fig. 4).

3.2. Results of the surveillance program of oral cancer and OPMD

Returns from the oral cancer and OPMD registers maintained in GHDC showed an increase in detection of OPMD compared to the year 2008[17] (Table 4). In 2008, 158 cases of leukoplakia and oral cancer were reported to GHDC in the Sabaragamuwa province: this is a 16% increase: 184 cases were reported in the year 2013.[17] Marked increases in the detection of leukoplakia and oral cancer were observed in 2012 and 2013, the period over which the SM campaign was implemented.

4. Discussion

This was the first time that a widespread social marketing campaign for the prevention and early detection of any particular cancer had been conducted in Sri Lanka. The media campaign was designed to target citizens engaged in risky behaviors, motivating them to quit such habits and encouraging them to present themselves to dentists for screening of the mouth. Overall, awareness of oral cancer and of OPMDs is higher in the present study than in that conducted in the Sabaragamuwa province of Sri Lanka in the year 2008. However, there were significant differences of educational level and of occupational category among the participants in the two study periods which is likely to partly explain the apparent improvements in health literacy.

A similar national mass media campaign has been conducted in India to warn against the dangers of smokeless tobacco. This ran for 6 weeks in October/November 2009. The majority of citizens surveyed recalled the campaign (70%); 75% of smokeless tobacco users and 77% of dual tobacco and areca nut users believed that the campaign had made them feel concerned about their habits and their health.[18] An increase in the detection of OPMDs and of oral cancer at dental clinics was reported nationally during and shortly after the campaign. A study in Michigan, USA, has shown a significant number of people presented for screening for oral cancer following a 2-year social marketing campaign.[19]

We do not have records of the number of people who refused screening, but informal discussions with hospital staff indicate that most citizens arriving with concerns of cancer received screening of their mouth. Nevertheless, despite the success of the campaign in achieving increased awareness among the public, we remain uncertain whether sufficient behavioral changes were achieved amongst both public and professionals. Oral cancer screening can be easily performed in a dental settings[20] but there were ad-hoc complaints from the public in some districts that access to government dental clinics were refused.

Apart from the imbalance in participant characteristics, weaknesses of the study include reliance on hearsay evidence for several outcomes. It is possible that some people visited private dental clinics following exposure to the campaign, but these were not recorded. Due to uneven distribution of ethnicity and language groups across Sri Lanka, results from the trial Districts may not be representative of the country as a whole.

Evaluation studies of this nature are rare in Sri Lankan literature, so our data provide a useful background to future work. Such programs have necessarily been abandoned in 2020 due to Covid-19 and concerns have been expressed across the globe about the impact of the pandemic on detection and management of other major diseases: other infectious diseases have reduced as a result of lockdowns and social distancing, but people with NCDs, including cancer, are disadvantaged.[21] This is evident in Sri Lanka itself.[22] Nevertheless, we have demonstrated that intense media campaigns, the content of which builds on our risk factor model, can form a basis for improving primary prevention and early detection of this devastating disease. These need to be widely implemented once the pandemic is controlled.

Table 3
Comparison of level of Awareness of carcinogenicity of ingredients of the betel quid.

Ingredients of betel quid	Evaluation study in 2013 (N = 491) Aware (%)	Baseline study in 2008 (N = 1029) Aware (%)	X^2 P value
Betel leaves	98 (20)	137 (13)	11.23 P < 0.001
Tobacco	382 (78)	423 (41)	179.63 P < 0.001
Areca nut	163 (33)	191 (18.5)	39.85 P < 0.001
Lime	307 (63)	304 (29.6)	150.41 P < 0.001

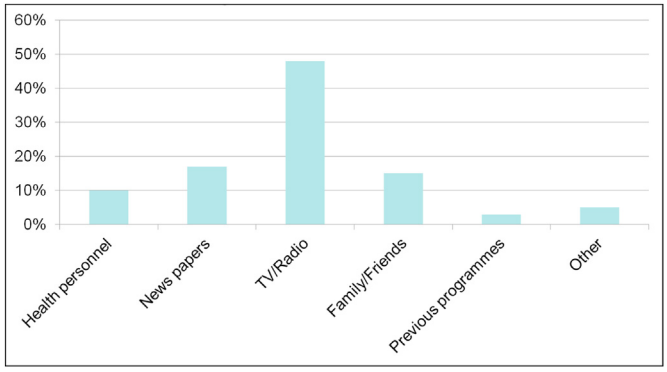

Fig. 4. Sources of information (N = 491).

Table 4
Number of leukoplakia and oral cancer cases reported to the Annual Health Bulletin of Sri Lanka from 2008 to 2015.

Year	No of Leukoplakia patients reported	No. of oral cancer patients reported	Total cases
2008	653	340	993
2009	675	360	1035
2010	736	412	1148
2012	842	504	1346
2013	979	373	1352
2014	912	156	1068
2015	839	339	1178

5. Conclusions

A sustainable social media campaign, based on a RFM approach, aimed at prevention of oral cancer is mandatory to improve awareness and for effecting behavior change, increasing the numbers of people seeking screening at healthcare facilities. Nation-wide efforts along these lines need to be promoted and rigorously evaluated.

Availability of data and materials

Data are available upon request to the corresponding author HA through email.

Declaration of competing interest

None to declare.

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