Original Article

The Effect of Public Service Advertising on Cardiovascular Disease in Korea

Juhyun JANG [1], Baeg Ju NA [2], Moo-Sik LEE [3], Soonryu SEO [1], Changhyun SUNG [1], Hyun Joo KIM [4], *Jin Yong LEE [5, 6]

1. Division of Chronic Disease Control, Korea Centers for Disease Control and Prevention, Cheongju, Korea
2. Seoul Metropolitan Government Seobuk Hospital, Seoul, Korea
3. Dept. of Preventive Medicine, Konyang University College of Medicine, Daejeon, Korea
4. Dept. of Nursing Science, Shinsung University, Dangjin, Korea
5. Public Health Medical Services, Boramae Medical Center, Seoul National University College of Medicine, Seoul, Korea
6. Institute of Health Policy and Management, Medical Research Center, Seoul National University, Seoul, Korea

*Corresponding Author: Email: jylee2000@gmail.com

Abstract

Background: Public Service Advertising (PSA) is a public interest message disseminated in the form of an advertisement communication and its main purpose is to promote public behavioral changes regarding a social issue. Korea Centers for Disease Control and Prevention (KCDC) has been delivering PSA by various media. However, the effect of PSAs has never been evaluated. The purpose of this study was to estimate the effects of broadcasted PSA produced by KCDC on cardiovascular disease (CVD).

Methods: One thousand adult participants throughout 15 provinces in Korea were chosen through the quota sampling method in 2012. A face-to-face research survey with 13 questions was conducted using a Computer Assisted Personal Interview (CAPI) system. Previous exposure to the PSA message, understanding, and behavioral intention to change was assessed.

Results: After watching the PSA, about 75% of participants answered that they could understand the contents well and 70% had willingness to change their behaviors associated with CVD. However, only 24% of participants answered they watched the PSA during the past year.

Conclusion: The PSA had positive effects on increasing the level of understanding and intention to change behaviors regarding CVD. However, the level of exposure was low. KCDC should make an effort to increase the public exposure level, which could be an important success factor regarding the PSA. In addition, KCDC should consider customized PSA for vulnerable people such as multi-cultural families, the disabled, and the elderly.

Keywords: Public service advertising, Cardiovascular disease, Exposure level, Understanding, Intention

Introduction

Public communication campaigns (PCCs) refer to an organized set of communication activities directed at large audiences in order to generate specific outcomes within a specified time period. The purpose of PCCs is to influence and change the behaviors of individuals (1-3). The most frequently used type of public communication campaign is the Public Service Advertising (or advertisement) (PSA) via mass media. PSAs are public interest messages disseminated in the form of an advertisement communication and are easily apprehensible and persuasive to promote behavioral changes of the public towards a social issue (4, 5). PSA can act as a window to increase knowledge about a particular issue related to the public because it can play an important role as an in-

formant or a carrier for the viewers to change their attitude (6). In addition, unlike commercial advertisements that mainly focus on creating "product images" and inducing "purchasing the product", PSA concentrates on actual behavioral change through information. Eventually, if it is possible to enhance the effect of PSA that stimulates behavioral change, then PSA can be used as an important tool to achieve social objectives.

"Cardiovascular disease (CVD) refers to a wide variety of heart and blood vessel diseases, including coronary heart disease, stroke, and peripheral artery disease. CVD is of paramount public health importance because it is widespread across the world and can potentially be prevented" (7). In response, the Korea Centers for Disease Control and Prevention (KCDC) has been delivering PSA by various media sources in order to improve awareness about cardiovascular disease, to correct behaviors, and to educate and promote prevention management regarding pre-existing diseases.

Community campaign or education including PSA was an effective way to reduce the risks of CVD (8-14). In particular, there have been landmark projects such as the Stanford Heart Disease Prevention Project in the United States (8, 9) and The North Karelia Project in Finland (11-14) showing substantial improvement in CVD risk factors as a result of PSA. Unfortunately, in Korea, PSA is in a premature stage, therefore, the effect of PSAs has never been evaluated.

The purpose of this study was to assess the effectiveness of the PSA on cardiovascular disease through surveying, with the goal of understanding the following three factors; 1) How many people have watched the advertisement (exposure level), 2) How well people understood the message (level of understanding), and 3) Whether people became willing to change their behavior after watching the PSA.

Methods

Sample and collection methods

This research involved surveying 1,000 male and female adults who were age 19 yr or over throughout 15 provinces in Korea (excluding Jeju Province), using the quota sampling method based on gender, age and population proportions in each province ($\pm 3.1\%$ margin of error at a 95% confidence level). The survey was performed from the 15th of Mar until the 10th of Apr 2012, about four wk.

This study was exempted from the approval by the institutional review board of Seoul National University Boramae Medical Center (IRB No. 07-2015-3).

A CAPI (computer-assisted personal interview) survey system was used in which enumerators conduct face-to-face interviews using notebook computers in order to show video format advertisement.

Advertisement contents

The PSA used in this research to assess the effectiveness of PSA, 'the Silent Killer' (15). The main message was 'preventing and managing cardiovascular disease by quitting or not smoking.' This advertisement was delivered from the 1st of Nov until the 31st of Dec in 2011 (for two mo). This advertisement, which was 44 sec in length, improved attention span thorough video contents containing descriptive and emotional expressions similar to movie trailers. It stimulated willingness to prevent and manage cardiovascular disease by using gunshot noises and depicting to shoot the heads and hearts of actors with an intention to use the notion of danger in smoking (threat appeal). The descriptive content was narrated by a specialist from a related medical society, "The chance of cardiovascular disease can be reduced by half if you quit smoking for even one year only". At the end of the advertisement, the actors were still being targeted but they easily dodged the bullets, ending the advertisement positively and showing the 'Red Circle Campaign' scene, symbolizing a healthy blood vessel.

Research tools

The primary method of approach for assessing effectiveness of PSA uses SMCRE (Source-Message-Channel-Receiver-Effect) derived by Lasswell, 1948 (16). This method can assess the effectiveness of PSA based on exposure to the

message, understanding of the message and the actual actions of the viewer from the point of receiving the message to the point of actual behavioral change.

Analytical Methods

The general characteristics of subjects were analyzed using frequency and percentage. The level of exposure, understanding, and intention to change was analyzed by the chi-square test using the PASW Statistics 18.0 program. The statistical significance level of this research was set at 0.05.

Results

General characteristics

Table 1 shows the summary demographic information about the 1,000 survey participants including sex, age, region, education level, monthly income, marital status, and occupation.

Table1: General characteristics of study participants (n=1,000)

Characteristics	Classification	Frequency (Number of persons)	Proportion (%)
Total		1000	100
Sex	Male	493	49.3
	Female	507	50.7
Age	19~44	508	50.8
	45~64	390	39.0
	65 and Older	102	10.2
Region	Seoul & Vicinity	499	49.9
	Chungcheong	103	10.3
	Gyeongsang	265	26.5
	Honam	103	10.3
	Gangwon	30	3.0
Education	High School or less	584	58.4
	College or higher	416	41.6
Average Monthly Household Income	Less than 4 million KRW	635	63.5
	4 million KRW or Above	365	36.5
Marital Status	Married	756	75.6
	Not Married	244	24.4
Occupation	White Collar	183	18.3
	Blue Collar	451	45.1
	Housewife	223	22.3
	Other	143	14.3
Smoking per day	Less than ten cigarettes	71	7.1
	11-19 cigarettes	36	3.6
	More than one pack	131	13.1
	Non-smoker	762	76.2
Knowledge level about the disease	Low	111	11.1
	High	889	88.9
Experience with the disease	First-hand	125	12.5
	Close people	316	31.6
	No experience	559	55.9

The exposure level of the PSA by general characteristics

After watching the PSA, study participants were asked whether they had previously seen the CVD advertisement and 239 (23.9%) people said 'yes', and 761 (76.1%) people said 'no' to the question. The exposure level in the Gangwon (40.0%) and Gyeongsang (31.1%) area was relatively high and the Honam area was low (16.5%) (*P*=0.028). The groups with low exposure levels (*P*<0.05) also

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included individuals with an average household income less than 4 million KRW (21.4%), non-married (18.4%), and low level of knowledge (15.3%) (Table 2).

Table 2: The exposure level of the PSA by general characteristics

Characteristics	Classification	Exposure level			
		Yes	**No**	**Total**	**P-value**
Have you watched the advertisement? Yes/No		239 (23.9)	761 (76.1)	1000 (100)	
Sex	Male	108 (21.9)	385 (78.1)	493 (49.3)	.145
	Female	131 (25.8)	376 (74.2)	507 (50.7)	
Age	19~44	109 (21.5)	399 (78.5)	508 (50.8)	.080
	45~64	108 (27.7)	282 (72.3)	390 (39.0)	
	65 and Older	22 (21.6)	80 (78.4)	102 (10.2)	
Region	Seoul & Vicinity	120 (24.0)	379 (76.0)	499 (49.9)	.028*
	Chungcheong	58 (21.9)	207 (78.1)	265 (26.5)	
	Gyeongsang	32 (31.1)	71 (68.9)	103 (10.3)	
	Honam	17 (16.5)	86 (83.5)	103 (10.3)	
	Gangwon	12 (40.0)	18 (60.0)	30 (3.0)	
Education	High School or less	142 (24.3)	442 (75.7)	584 (58.4)	.715
	College or higher	97 (23.3)	319 (76.7)	416 (41.6)	
Average Monthly House-hold Income	Less than 4 million KRW	136 (21.4)	499 (88.6)	635 (63.5)	.015*
	4 million KRW or Above	103 (28.2)	262 (81.8)	365 (36.5)	
Marital Status	Married	194 (25.7)	562 (74.3)	756 (75.6)	.022*
	Not Married	45 (18.4)	199 (81.6)	244 (24.4)	
Occupation	White Collar	49 (26.8)	134 (73.2)	183 (18.3)	.075
	Blue Collar	94 (20.8)	357 (79.2)	451 (45.1)	
	Housewife	65 (29.1)	158 (70.9)	223 (22.3)	
	Other	31 (21.7)	112 (78.3))	143 (14.3)	
Smoking per day	Non-smoker	192 (25.2)	570 (74.8)	762 (76.2)	.292
	Less than ten cigarettes	16 (22.5)	55 (77.5)	71 (7.1)	
	11-19 cigarettes	8 (22.2)	28 (77.8)	36 (3.6)	
	More than one pack	23 (17.6)	108 (82.4)	131 (13.1)	
Knowledge level about the disease	Low	17 (15.3)	94 (84.7)	111 (11.1)	.024*
	High	222 (25.0)	667 (75.0)	889 (88.9)	
Experience with the disease	First-hand	35 (28.0)	90 (72.0)	125 (12.5)	.514
	Close people	73 (23.1)	243 (76.9)	559 (55.9)	
	No experience	131 (23.4)	428 (76.6)	559 (55.9)	

*$P<0.05$, **$P<0.001$, chi-square test

Channels to expose the PSA

We investigated which media is the most common contact channel for exposure to the PSA among the 239 participants who saw the PSA before. It was seen via major TV broadcasting companies (KBS, MBC, SBS) by 82% of partici-pants, followed by cable TV (24.7%). The other media sources occupied very small portions: exterior electronic billboard on buildings (4.6%); internet (4.2%); PDPs at health centers and hospitals (2.1%); subway (1.3%); and others (0.8%) (Table 3).

The level of understanding after watching the PSA

After the participants watched the PSA, we estimated whether the content of the PSA was understandable or not. About 75% of people had a high level of understanding. Educational background (*P*=0.038) and knowledge level about the disease (*P*=0.045) affected the level of understanding (*P*<0.05). In addition, age group (*P*=0.005), household income (*P*=0.001), and previous exposure to the advertisement (*P*<0.0001) were statistically significant variables (Table 4).

Table 3: Contact channels for the PSA (n=239 persons, multiple answers allowed)

Channels for advertisement contact	Frequency (number of persons)	Percentage	Case percentage (%)
Major TV (KBS, MBC, SBS) stations	196	68.5	82.0
Cable TV stations	59	20.6	24.7
Exterior electronic billboards on buildings	11	3.8	4.6
Subway	3	1.0	1.3
PDPs at health center and hospitals	5	1.7	2.1
Internet	10	3.5	4.2
Others	3	0.7	0.8
Total	286	100	

Table 4: The level of understanding after watching on the PSA

Characteristics	Classification	Effect of advertisement(Level of understanding)			
		Low	High	Total	*P*-value
Total		255 (25.5)	745 (74.5)	1000 (100)	
Sex	Male	126 (25.6)	367 (74.4)	493 (49.3)	.967
	Female	129 (25.4)	378 (74.6)	507 (50.7)	
Age	19~44	138 (27.2)	370 (72.8)	508 (50.8)	.005**
	45~64	81 (20.8)	309 (79.2)	390 (39.0)	
	65 and Older	36 (35.3)	66 (64.7)	102 (10.2)	
Region	Seoul & Vicinity	127 (25.5)	372 (74.5)	499 (49.9)	.963
	Gyeongsang	70 (26.4)	195 (73.6)	265 (26.5)	
	Honam	26 (25.2)	77 (74.8)	103 (10.3)	
	Chungcheong	26 (25.2)	77 (74.8)	103 (10.3)	
	Gangwon	6 (20.0)	24 (80.0)	30 (3.0)	
Education	High School or less	163 (27.9)	421 (72.1)	584 (58.4)	.038*
	College or higher	92 (22.1)	324 (77.9)	416 (41.6)	
Average Monthly Household Income	Less than 4 million KRW	185 (29.1)	450 (70.9)	635 (63.5)	.001**
	4 million KRW or Above	70 (19.2)	295 (80.8)	365 (36.5)	
Marital Status	Married	187 (24.7)	569 (75.3)	756 (75.6)	.329
	Not Married	68 (27.9)	176 (72.1)	244 (24.4)	
Occupation	White Collar	44 (24.0)	139 (76.0)	183 (18.3)	.331
	Blue Collar	119 (26.4)	332 (73.6)	451 (45.1)	
	Housewife	49 (22.0)	174 (78.0)	223 (22.3)	
	Other	43 (30.1)	100 (69.9)	143 (14.3)	
Smoking per day	Non-smoker	199 (26.1)	563 (73.9)	762 (76.2)	.437
	Less than ten cigarettes	20 (28.2)	51 (71.8)	71 (7.1)	
	11-19 cigarettes	10 (27.8)	26 (72.2)	36 (3.6)	
	More than one pack	26 (19.8)	105 (80.2)	131 (13.1)	
Knowledge level about the disease	High	218 (24.5)	671 (75.5)	111 (11.1)	.045*
	Low	37 (33.3)	74 (66.7)	889 (88.9)	
Previously viewed the advertisement	Yes	40 (16.7)	199 (83.3)	239 (23.9)	.000*
	No	215 (28.3)	546 (71.7)	761 (76.1)	
Experience with the disease	First-hand	25 (20.0)	100 (80.0)	125 (12.5)	.259
	Close people	79 (25.0)	237 (75.0)	316 (31.6)	
	No experience	151 (27.0)	408 (73.0)	559 (55.9)	

P<0.05, **P*<0.001, chi-square test

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Intention to behavioral change after watching on the PSA

After watching the PSA, 70% of participants answered that they had willingness to change their behaviors. The following groups had a higher intention of behavioral changed than other groups (*P*<0.05): aged 45 to 64, married, high level of understanding the PSA, and high knowledge level about CVD (Table 5).

Table 5: Intention to behavioral change after watching on the PSA

Characteristics	Classification	Intention to change behavior			
		Do not have intention (%)	Have intention (%)	Total	*P*-value
	Total	300 (30.0)	700 (70.0)	1000 (100)	
Sex	Male	146 (29.6)	347 (70.4)	493 (49.3)	.793
	Female	154 (30.4)	353 (69.6)	507 (50.7)	
Age	19~44	177 (34.8)	331 (65.2)	508 (50.8)	.001**
	45~64	90 (23.1)	300 (76.9)	390 (39.0)	
	65 and Older	33 (32.4)	69 (67.6)	102 (10.2)	
Region	Seoul & Vicinity	139 (27.9)	360 (72.1)	499 (49.9)	.461
	Gyeongsang	89 (33.6)	176 (66.4)	265 (26.5)	
	Honam	32 (31.1)	71 (68.9)	103 (10.3)	
	Chungcheong	33 (32.0)	70 (68.0)	103 (10.3)	
	Gangwon	7 (23.3)	23 (76.7)	30 (3.0)	
Education	High School or less	168 (28.3)	416 (71.2)	584 (58.4)	.313
	College or higher	132 (31.7)	284 (68.3)	416 (41.6)	
Average Monthly Household Income	Less than 4 million KRW	197 (31.0)	438 (69.0)	653 (63.5)	.351
	4 million KRW or Above	103 (28.2)	262 (71.8)	365 (36.5)	
Marital Status	Married	207 (27.4)	549 (72.6)	756 (75.6)	.001**
	Not Married	93 (38.1)	151 (61.9)	244 (24.4)	
Occupation	White Collar	54 (29.5)	129 (70.5)	183 (18.3)	.083
	Blue Collar	136 (30.2)	315 (69.8)	451 (45.1)	
	Housewife	56 (25.1)	167 (74.9)	223 (22.3)	
	Other	54 (37.8)	89 (62.2)	143 (14.3)	
Smoking per day	Non-smoker	255 (29.5)	537 (70.5)	762 (76.2)	.492
	Less than ten cigarettes	27 (38.0)	44 (62.0)	71 (7.1)	
	11-19 cigarettes	10 (27.8)	26 (72.2)	36 (3.6)	
	More than one pack	38 (29.0)	93 (71.0)	131 (13.1)	
Knowledge level about the disease	High	250 (28.1)	639 (71.9)	889 (88.9)	.000**
	Low	50 (45.0)	61 (55.0)	111 (11.1)	
Level of understanding	Low	174 (68.2)	81 (31.8)	255 (25.5)	.000**
	High	126 (16.9)	619 (83.1)	745 (74.5)	
Experience with the disease	First-hand	28 (22.4)	97 (77.6)	125 (12.5)	.138
	Close people	97 (30.7)	219 (69.3)	316 (31.6)	
	No experience	175 (31.3)	384 (68.7)	559 (55.9)	

*P<0.05, **P<0.001

Discussion

Little is known about the effect of the PSA on CVD in Korea, broadcasted since 2006. In our research, we estimated the level of exposure, understanding, and intention of behavioral change among 1,000 people who were representatives of the Korean population. This study showed that the PSA had positive effects on increasing viewers' level of understanding and intention of behavioral changes regarding CVD. However, the level of exposure was low (24%).

The ultimate goal of PSAs is to achieve a change in attitude or behavior among viewers. To do so, the first step is to increase exposure to the message among the intended viewers (17). However, only 24% of respondents had previously seen the advertisement. Researchers in advertising suggest that a minimum theoretical number of impressions are required in order to impact consumer purchase of all products and brands. For cigarettes, each smoker needs to be exposed to a TV commercial 16 times in order to stimulate their purchase reaction (18). Besides, one research study revealed a campaign was effective among 45% of targeted viewers who received repetitive exposures (at least three repetitive exposures for media including TV, radio and newspaper; and at least twelve exposures for exterior billboard advertisements) (19). KCDC should consider how to increase the current exposure rate from 24% to 45%. First of all, the strategy and planning about the PSA on CVD should be reviewed. According to our study, major TV and cable TV stations were the most common contact channel from which people recognized the PSA. Other media occupied a negligible proportion. Therefore, KCDC should focus on TV channels for maximizing the effect of the PSA. Of course, we understand that KCDC is suffering from a limited budget. However, advertisement draws a wasteful result with no effect whatsoever if the minimum repetitive exposure is not achieved. That is, KCDC needs to select the media source that viewers frequently use to ensure the minimum number of exposures. Increased exposure

would affect attitudes and actions through increased access to information. Therefore, effective strategy and budget consideration are necessary in order to broadcast the PSA during peak view times so that PSA campaigns are successfully broadcasted to most people in the nation (20). In addition, PSA should be continuous over a long period of time along with a series of communication actions integrated under a clear objective (21). Another thing KCDC should consider is making a customized plan to disseminate the PSA across the country. Our results show that non-married people (18.4%) and Honam region (16.5%) had relatively low exposure levels. In the case of non-married group, they are mostly part of the young generation that may prefer mobile messaging as a contact channel. That is, KCDC could consider mobile PSA as a customized method to reach young generations. Regarding geographical variation of exposure level, we did not investigate why Honam region showed a low exposure level. Therefore, further study is needed to identify what factors are affecting the exposure level.

Regarding the level of understanding, 75% of respondents answered that it was easy to understand the contents of the PSA. However, we should be cognizant of the groups that showed a low level of understanding, such as the elderly (64.7%), people with a low level of education (72.1%), people with a low level of household income (70.9%), and people with a low level of knowledge regarding CVD (66.7%). For the groups who have a low level of understanding, enforcing pilot testing could be a solution because pilot test helps PSA developers understand which part of the PSA is losing viewers' attention or is hard to understand. Therefore, pilot test is thought to be important for a successful outcome by ensuring that the target audience can comprehend the specific message presented (22, 23). In addition, KCDC could consider using the concept of "Need for Cognition" when developing another PSA in the future. "Need for cognition" can be defined as the degree of willingness for voluntary acceptance in a given situation requiring cognitive efforts. People with higher cogni-

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tive needs put more effort into remembrance and cognition when receiving a persuading message and have more motive to willingly process the message, consequently affecting their attitudes regarding the message assessment being formed after the persuasion (24). Therefore, if the PSA stimulates the viewers' need for cognition, it could improve their level of understanding the PSA.

Lastly, 70% of participants showed a high intention for behavioral change after watching the PSA on CVD. Interestingly, the group with a low level of understanding had extremely low intention (31.8%) to change their behaviors. That is, level of intention might be higher when viewers can easily understand the PSA and the level of understanding could improve by increasing exposure frequency.

This research has the following limitations. First, there is a possibility for inaccurate survey answers due to individuals' memory loss and confusion as the survey was conducted after showing the advertisement and was based on remembering the content. Second, the PSA on CVD might induce behavioral change. However, we could not estimate the real level of behavioral change but instead only estimated the level of intention to change behaviors. Therefore, further research should be performed to evaluate the real effect of the PSA on behavioral change. Third, we did not perform multivariate analysis to reveal the factors affecting exposure, understanding, and intention of behavioral change but we did conduct univariate analysis using the chi-square test. However, in the near future, further studies should be conducted to define what factors are related to the level of exposure, understanding, and intention of behavioral change. Lastly, we excluded people who are a multi-cultural family member because they could not understand Korean language very well. Therefore, the level of exposure and understanding might be slightly reduced than the results of this study. Despite of these limitations, we believe this research can provide meaningful information to policy makers.

Conclusions

The PSA had a positive effect on increasing the level of understanding and intention of behavioral changes regarding CVD. However, the level of previous exposure was low. Therefore, KCDC should make an effort to increase the exposure level, which could be an important success factor regarding the PSA. In addition, KCDC should consider customized PSA that is easily understandable by vulnerable people such as multi-cultural families, the disabled, and the elderly.

Ethical considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

Acknowledgement

References

1. Rogers EM, Storey JD (1987). Communication campaign. In: *Handbook of communication science.* Sage Publications. CA. p.410-45.
2. Weiss JA, Tschirhart M (1994). Public information campaigns as policy instruments. *J Policy Anal Manage,* 13:82-119.
3. Atkin CK, Rice RE (2013). Theory and principles of public communication campaigns. In*: Public communication campaign.* 4th ed., Thousand Oaks, CA: Sage Publication; p.3-20.
4. Noar SM (2006). A 10-year retrospective of research in health mass media campaigns: where do we go from here? *J Health Commun,* 11(1):21-42.
5. Atkin C (2001*). Impact of public service advertising_ Research evidence and effective strategies.* Menlo

Park, CA: Kaiser Family Foundation. Available from: www.learningace.com/doc/1648360/0c951c8e031ecccdef0a8f83e26afd7b/impact-of-public-service-advertising_-research-evidence-and-effective-strategies.

6. Hsieh CR, Yen LL, Liu JT, Lin CJ (1996). Smoking, health knowledge, and anti-smoking campaign: an empirical study in Taiwan. *J Health Econ,* 15(1):87-104.

7. Remington PL, Brownson RC, Wegner MV (2010). *Chronic disease epidemiology and control.* Washington: American Public Health Association; p. 383-428.

8. Farquhar JW, Wood PD, Breitrose H, Haskell WL, Meyer AJ, Maccoby N, Alexander JK, Brown BW, Mcalister AL, Nash JD, Stern MP (1977). Community education for cardiovascular health. *The Lancet*, 4;1(8023):1192-5.

9. Farquhar JW, Fortmann SP, Flora JA, Taylor CB, Haskell WL, Williams PT, Maccoby N, Wood PD (1990). Effects of communitywide education on cardiovascular disease risk factors. The Stanford Five-City Project. *JAMA*, 18;264(3):359-65.

10. Maccoby N, Farquhar JW, Wood PD, Alexander J (1977). Reducing the risk of cardiovascular disease: effects of a community based campaign on knowledge and behavior. *J Community Health,* 3(2):100-14.

11. Puska P, Vartiainen E, Laatikainen T, Jousilahti P, Paavola M (2009). The North Karelia Project: From north karelia to national action. National Institute for Health and Welfare= Terveyden ja hyvinvoinnin laitos (THL). https://www.thl.fi/documents/189940/261635/Teema%202009%201.pdf.

12. Puska P, McAlister A, Niemensivu H, Piha T, Wiio J, Koskela K (1987). A television format for national health promotion: Finland's "Keys to Health". *Public Health Rep*, 102(3): 263-9.

13. Puska P, McAlister A, Pekkola J, Koskela K (1981). Television in health promotion: evaluation of a national programme in Finland. *Int J Health Educ,* 24(4): 238-50.

14. Puska P, Wiio J, McAlister A, Koskela K, Smolander A, Pekkola J, Maccoby N (1985). Planned use of mass media in national health promotion: the "Keys to Health" TV program in 1982 in Finland. *Can J Public Health,* 76(5): 336-42.

15. Korea Centers for Disease Control and Prevention (2010). Cardiovascular disease public health advertising-Silent Killer. Korea Centers for Disease Control and Prevention, Korea. http://www.cdc.go.kr/CDC/notice/CdcKrInfo0210.jsp?menuIds=HOME001-MNU0004-MNU0007-MNU0566&cid=3195.

16. Lasswell HD (1948). The structure and function of communication in society. In L.Bryson (ed.), *The communication of ideas* (pp. 37-51). New York: Cooper Square.

17. Pechmann C, Ratneshwar S (1994). The effects of antismoking and cigarette advertising on young adolescents' perceptions of peers who smoke. *J Consum Res,* 21:236-51.

18. Brown LO, Lesler RO, Weilbacher WM (1957). *Advertising Media*. New York: Allyn and Bacon.

19. Murray GB, Jenkins JRG (1992). The Concept of Effective Reach in Advertising. *J Advert Res*, 32:34-42.

20. Solomon DS (1982). Mass media campaigns in health promotion. *Prevention in Human Services*, 2:115–23.

21. Flay BR, Burton D (1990). Effective mass communication strategies for health campaigns. In: *Mass communication and public health: Complexities and conflicts*. Thousand Oaks, CA; Sage Publications, p.129-146.

22. Catalán-Matamoros D (2011). *The role of mass media communication in public health, health management-different approaches and solution, Dr. Krzysztof Smigorski (Ed.)* InTech, 399-414. Open Access Book http://www.intechopen.com/books/health-management-different-approaches-and-solutions/the-role-of-mass-media-communication-in-public-health

23. Hornik R. Woolf KD (1999). Using cross-sectional surveys to plan message strategies. *Soc Mar Q,* 5:34–41.

24. Cacioppo JT, Petty RE (1982). The need for cognition. *J Pers Soc Psychol*, 42:116-31.