Journal of Biostatistics and Epidemiology

J Biostat Epidemiol. 2019;5(4): 246-255

Original Article

The Behavioral Responses of Consumers to the Intensity and Type of Fear Appeals Used in Anti-Obesity Advertisements: An Experimental Study on College Students in Tehran

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ARTICLE INFO

Received 25.07.2019
Revised 16.08.2019
Accepted 25.09.2019
Published 03.12.2019

Key words:
Social marketing;
Obesity;
Fear appeal;
Severity;
Susceptibility;
Behavioral intention

ABSTRACT

Introduction: Some communicators resort to negative appeals such as fear to encourage consumers to healthy behaviors. Nonetheless, the effectiveness of this type of content is yet questioned. Present study has been conducted to investigate how fear intensity and fear type applied in anti-obesity advertisements prompt preventive behavior among consumers.

Methods: 208 college students in Tehran province were randomly classified in 7 groups (6 experimental and 1 control group) based on a factorial design; 2 (fear intensity: high and low) x 3 (fear type: physical, social, and reappraisal). Research hypotheses were tested applying appropriate statistical tests including structural equation modeling and analysis of variance, based on data gathered through questionnaire and interventions such as presenting participants with visual contents.

Findings: it was revealed that there is a significant and positive relationship between the perceived severity and perceived fear, as well as between perceived susceptibility and perceived fear, and also between perceived fear and behavioral intention. Analysis of variance confirmed the significant main effect of fear intensity on behavioral intention. The main effect of the fear type on behavioral intention was not approved. However, findings indicate the significant interaction effect of fear intensity and fear type on behavioral intention so that highly intense messages that representing physical harm and lowly intense messages that representing social harm stimulate more behavioral intention.

Conclusion: It is concluded that applying fear appeal in health warning advertisements is effective in inviting consumers to healthy behavior, especially once a proper combination of the type and intensity of fear is applied in messages.

Introduction

Against substantial attempts of medical community to prevent obesity and a multi-billion dollar weight loss industry, it is still an issue (1). According to statisticians, obesity rate has tripled since 1975, so that currently over 1.9 billion of adults, 18 years and older, are overweight and over 650 million of whom suffer from obesity(2). It must be noted that overweight people are increasingly exposed to chronic diseases including cardiovascular diseases (mainly heart disease and stroke), type 2 diabetes, musculoskeletal disorders, high blood pressure, and some cancers (2, 3). Physical problems are not the only consequences of obesity, but some psychological disorders including depression, anxiety, eating disorders, and body shape dissatisfaction are as well bothersome. Furthermore, the obese and overweight people are usually discriminated against in the society

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Please cite this article in press as Eshghipour N, Jafari P, Ekhtiari H. The Behavioral Responses of Consumers to the Intensity and Type of Fear Appeals Used in Anti-Obesity Advertisements: An Experimental Study on College Students in Tehran*; 5(4): 246-255*

and they suffer from social biases. This in turn devalues their quality of life (4-6).

The World Health Organization (WHO) has recently announced the rate of prevalence of overweight/obesity among Iranians is 61.6%. In fact, 58% of men and 65.2% of women were reported to be overweight (7). Furthermore, several studies stress the increasing trend of overweight and obesity among Iranians (8). Since overweight and obesity are caused by a combination of individual, environmental, biologic, and genetic factors, it is not reasonable to expect that a discrete intervention solely impact considerably upon the rate of this epidemic. However, in line with other strategies, mass media campaigns are regarded promising in reaching to the target population with messages warning against this disease (9). The results of a literature review on general hygiene campaigns in mass media highlight the capacity of such instruments in creating positive changes and preventing negative trends (10). Nonetheless, one of the biggest challenging tasks for advertising is encouraging people to change their behaviors and avoid alternatives that endanger their lives (11). In this regard, some advertising campaigns have resorted to negative appeals such as fear, guilt, and shame to prompt people to some good behaviors (brushing the teeth, have an annual health checkup), or to prevent them from some negative ones (smoking, abusing alcohol, overeating)(12).

Using fear appeal in advertisements is common, particularly in social marketing contexts in which organizations encourage people to having a healthy lifestyle (13). This sort of message basically focuses upon the risk of using or not using a special product, service, or idea and represents the terrible consequences of negligence. In other words, factors which threaten one's welfare and wellbeing are stressed and the person is prompted to a particular action (14). Accordingly, once the appraisal of the perceived threat increases (if enough levels of perceived self-efficacy exist), people probably adapt their behavior so as to protect their health (15). Regarding the critical nature of obesity, researchers in different disciplines have increasingly started investigating this subject (9, 10, 16-19). Since anti-obesity advertisements are extremely costly, it is of high importance to know how health-based advertisements impact upon consumers' decisions (20). More studies are therefore needed for; 1- appraisal of the effectiveness of advertisement contents, and 2- explaining why some advertisements are more effective than others. Present study is an attempt to investigate the impact of different levels of fear intensity and fear type embedded in anti-obesity advertisements upon preventive behaviors of consumers.

Literature and conceptual framework

Within the last six decades, numerous studies have been conducted on fear appeal. As a result, many theories about the levels of fear appeal and the way it falls effective have been put forward (15, 21, 22). Initial researches around fear appeal have relied on drive theory to explain the results (15). Drive-reduction model conceives fear as a drive that propels people to take recommendations that help to reduce the unpleasant state (14). Fear-As-Acquired Drive Model developed by Carl Hovland et al. (1953), Family of Curves developed by Jains (1967), and Non-monotonic Models developed by Mcguire (1968), explain how levels of fear aroused by fear appeal (as a drive), motivates one to take appropriate action(15). Drive reduction model is based on two assumptions regarding fear appeals. First, when the fear is sufficiently intense, proper response is driven. Second, any cognitive or behavior response that reduces a negative emotion such as fear is inherently strengthening (23).

Another theory in this regard is the Parallel Response Model. This model presumes that there is a parallel relationship between emotional responses (such as fear) and adaptive responses (24). Generally, parallel process model states that encountered with danger, one goes through two processes in parallel; first, danger control (efforts to control the threat/danger; second, fear control (fear due to threat or danger). This model therefore separates cognitive processes from emotional ones (15). Witte (1992) developed Extended Parallel Process Model (EPPM) referring to Parallel Response Theory and stated that once one faces a message containing fear appeal, two things are envisaged; i.e. perceived threat (severity, susceptibility), and perceived efficacy (self-efficacy, response efficacy). How dangerous the threat is, and how able one is to respond to it determines the fear control and threat control process (25). The Expectancy Value theory is as well relevant. This theory is related to Subjective Expected Utility (SEU), such as Protection Motivation Theory (PMT) (26), and makes an attempt to respond logically to this question that what makes fear appeal effective. As a matter of fact, this model states that the tendency to do a certain action is a

function of the expected consequences of that special action, and the significance of those consequences (27).

Based on parallel response model, protection motivation theory, and extended parallel process model, the stimulating effect of fear appeal is primarily a function of the augmented perceived threat (severity, and susceptibility), and as well, the reduction of the threat through the perceived efficacy (self-efficacy, and response efficacy). In this regard, the perceived threat refers to the attitudes toward the significance of the threat that forms in the mind of receivers of the message. Susceptibility is related to one's attitude toward the likelihood of facing with and experiencing a threat (25, 26, 28). Efficacy as well refers to consumers' attitude toward the capability of doing a certain action successfully (self-efficacy), and the effectiveness of the presented solution (response efficacy) (29).

Accordingly, the suggested model in present study relies on evidence achieved from protection motivation models (26, 30-32). Logic of the model is based on the fact that when threatening stimulus is perceived by the addressee with different threat levels (fear intensity: high and low), it changes attitude of the addressee to that stimulus (advertisement) and consequently, it will cause tendency to show behavior. In this regard, the results of a meta-analysis over 127 studies revealed the positive effect of fear appeal on consumers' attitude, intention, and behavior (21). With regard to the fact that perceived self-efficacy for improving diet is at moderate levels, using a fear cue can lead to positive changes and adaption in one's behavior and will increase the determination of the consumer to be able to resist better against natural impulses of unhealthy food overconsumption (33). Research hypotheses are as follow;

H1: there is a relationship between the perceived severity of harm and perceived fear of obesity.

H2: there is a relationship between the perceived susceptibility of harm and the perceived fear of obesity.

H3: there is a relationship between the perceived fear of obesity and the behavioral intentions to adopt a healthy diet.

On the other hand, based on literature review, there are two dominant categorizations of fear appeals: the first one is the intensity of the fear (high intensity, low intensity), and the second one is types of fears (including physical harms and social harms) (34). Many studies have focused on the effect of fear intensity upon the effectiveness of message. In this regard, numerous and sometimes contradictory results have been reported. Some point out that messages containing high fear intensity leave stronger positive effect on behavior and attitude (27, 34-37); whereas, some others emphasize that messages of low fear intensity are more influential and stimulating (38, 39). Thus, the forth hypothesis is as follows;

H4: the intensity of fear appeal in anti-obesity advertisements impacts on the behavioral intentions of consumers to adopt a healthy diet.

Many studies have investigated different types of fears, separately (31, 32, 40, 41). Researchers generally scrutinize the difference between two kinds of fear i.e. the fear of physical harms, and that of social harms. Some claim that messages loaded with physical fear are more effective than messages containing social fear (42), but some others indicate the stronger effect of messages representing social fear compared with those representing physical fear (32, 34, 40). Besides, cognitive reappraisal is a kind of emotion regulating strategy that entails reinterpretation of an emotional stimulus (43). This type of strategy is as well used in advertisements based on fear appeal. Therefore, many studies examine the effectiveness of this sort of message (44, 45). Present study has assessed the effect of three types of fears used in advertisements (i.e. fear of physical harms, social harms, and cognitive reappraisal) upon the tendency of consumers to take healthy diet. The fifth research hypothesis is therefore as follows;

H5: the type of message containing fear appeal used in anti-obesity advertisements impacts on the behavioral intentions of consumers to follow healthy diet.

Research Methodology

The present study is of experimental type since it is conducted in a controlled environment and intervention is done. The simultaneous effects of two independent variables (fear intensity, fear type) upon dependent variables have been measured. Based on a between subjects factorial design; i.e. 2 (fear intensity) x 3 (fear type), participants were randomly classified in 7 groups (6 experimental and 1 control group). Participants were exposed to the stimulus (anti-obesity advertisements) combining the intensity of fear at two levels (high, low) and fear type at three levels (physical harm, social harm, and cognitive reappraisal). Following

intervention, the data gathering instrument (i.e. questionnaire) was distributed among participants. Control group didn't receive any intervention, but questionnaire was similarly distributed and gathered.

To select fear appeal stimuli, a series of 673 posters were initially extracted from international anti-obesity campaigns. In fact, relevant key words were searched in the internet. Afterwards, a group of elites including two graphic designers, two marketing research specialists, and two academic experts screened the posters based on research objectives, and 150 posters were finally selected. These posters were categorized in six groups (each group containing 25 images) including those warning against high intensity physical harm (HIPH), low intensity physical harm (LIPH), high intensity social harm (HISH), low intensity social harm (LISH), high intensity cognitive reappraisal (HICR), and low intensity cognitive reappraisal (LICR). A sample of the content is provided in the supplementary data.

In the next phase (an initial pilot study), to assess the significance of the differences in fear stimulated based on the two groups of images (high intensity, low intensity), 42 participants were exposed to stimuli, and the stimulated fear was measured through 6 items (31) based on the Likert five point scale ($\alpha = 0.85$). ANOVA test showed that the stimulated fear based on high intensity images (M=3.19) was significantly ($F= 26.98$, $p< 0.01$) higher than the stimulated fear based on low intensity images (M=1.88).

College students, as research population, were the focus of many studies around warning advertisements (46-48). Therefore, college students were as well considered as the statistical population. In this study, 208 undergraduate students of the IAU, North Tehran Branch, and IAU, Science and Research Branch, were sampled in 2019 as research participants (table 1). Participants were divided into 7 groups (6 experimental groups, 1 control group), and each group was exposed to 25 images (each image about 8 seconds).They afterwards responded to items related to research variables through a questionnaire. There were 13 questions measuring "perceived severity of harm" (3 items) (49), "perceived susceptibility of harm" (3 items) (50), "perceived fear of obesity" (4 items) (51), "behavioral intentions to adopt a healthy diet" (3 items) (49). The five point scale was used for designing this part. It must be noted that the ethic code of this study is IR.IUMS.REC.1398.170, which shows this study is approved by the ethics committee of Iran University of Medical Sciences. Accordingly, all participants were informed about the process of the study and they gave permission to be tested.

Table 1. Demographic Characteristics of Respondents (n=208)

variable		Frequency	%	mode
Gender	male	108	51.90%	male
	female	100	48.10%	
Age	18-24	125	60.10%	18-24
	25-29	37	17.80%	
	30-34	24	11.50%	
	35-39	14	6.70%	
	40-44	3	1.40%	
	45-50	4	1.90%	
	Over 50	1	0.50%	
Body mass index (BMI)	M=24.06	SD=4.04		

Findings

In order to test the relationship between variables in present study, structural equation modeling was applied (52, 53). In this regard, LISEREL software version 8.8 was used for data analysis. Figure 1 shows the research model in standardized estimation situation and t-value situation which is indicative of the relationship between observed variables (rectangle, which is directly measured by the researcher) and latent variables (circle, which is implied from the relationship or correlation between measured variables).

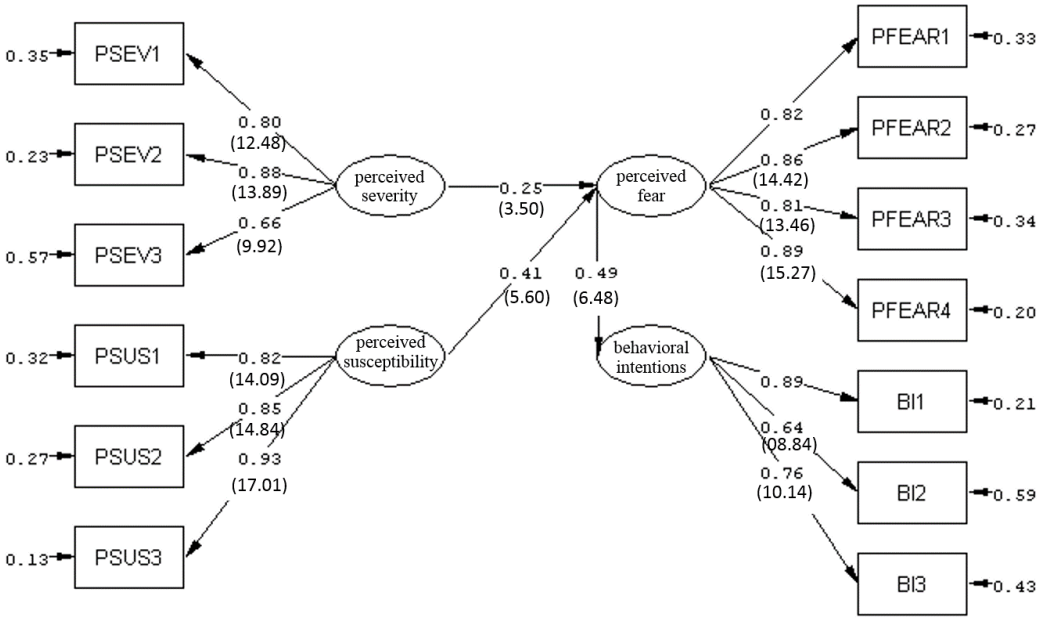

Figure 1. The Research Model in Standardized Estimation and t-Value Situation

To evaluate construct validity, confirmatory factorial analysis was applied. The results of confirmatory factorial analysis are summarized in table 2. As shown in the table, t-values indicate that all loadings are significant at 0.001. It can be asserted that the research enjoys good construct validity. Since AVE of all variables in this study was over 0.5, the convergent validity of model constructs is approved (54). On the other hand, according to the alpha Cronbach, which was over 0.7 for each variable, the data gathering instrument was found to have good internal consistency reliability (55).

Table 2. The model's goodness of fit indices

indexes	chi^2/df	GFI	AGFI	CFI	NFI	NNFI	RMSEA
Recommended value	< 3	> 0.90	> 0.80	> 0.90	> 0.90	> 0.90	< 0.08
Actual value	1.76	0.93	0.89	0.98	0.95	0.97	0.061

Notes:
chi^2/df is the ratio between Chi-square and degrees of freedom, GFI is Goodness of Fit Index, AGFI is the Adjusted Goodness of Fit Index, CFI is the Comparative Fit Index, NFI is the Normed Fit Index, NNFI is the Non-Normed Fit Index, RMSEA is Root Mean Square Error of Approximation

Generally, in structural equation modeling, model's goodness of fit is not interpreted merely based on individual indexes. In fact, all indexes must be interpreted together. Table 3 lists the recommended (56), and actual values of some fit indexes. As shown in the table, the various indexes used show the model goodness of fit.

Table 3. Loading Factors of Research Constructs

Factor Item	perceived severity	perceived susceptibility	perceived fear	behavioral intentions	Cronbach's alpha	AVE
PSEV1	0.80**					
PSEV2	0.88**				0.818	0.617
PSEV3	0.66**					
PSUS1		0.82**				
PSUS2		0.85**			0.903	0.753
PSUS3		0.93**				
PFEAR1			0.82**			
PFEAR2			0.86**		0.907	0.715
PFEAR3			0.81**			
PFEAR4			0.89**			
BI1				0.89**		
BI2				0.64**	0.795	0.593
BI3				0.76**		

Notes: **p < 0.01

According to the results of path coefficient and t-value, represented in figure 1, there is a positive and significant relationship between the perceived severity of harm and the perceived fear of obesity (γ=0.25, t=3.50), as well as between the perceived susceptibility of harm and the perceived fear of obesity (γ=0.41, t= 5.60), and also between the perceived fear of obesity and the behavioral intentions to adopt a healthy diet (β=0.49, t=6.48). Consequently, hypothesis one, two, and three were supported.

On the other hand, to assess the effect of fear intensity and the type of fear used in anti-obesity advertisements upon the behavioral intentions to adopt a healthy diet, the two-way between subjects ANOVA was applied. The results are indicative of the significant main effect of fear intensity on behavioral intention (F (1, 172) = 4.28, P=0.04<0.05). It was therefore revealed that the behavioral intentions once one is exposed to warning advertisements representing high intensity fear (M=3.72, SD=0.64) is higher than once one is exposed to warning advertisements representing low intensity fear (M=3.46, SD= 0.77). Therefore, hypothesis 4 was supported. However, it was found out that the main effect of the fear type on behavioral intention is not significant (F (2,172) =1.59, p= 0.206>0.05). Hypothesis 5 is thus not supported.

Besides, the interaction effect was analyzed using simple effects analysis and Tukey HSD test. Results indicate the significant interaction effect of fear intensity and fear type on behavioral intention (F (2, 172) =10.49, P=0.000<0.01). As depicted in figure 2 and table 4, when images containing a message around physical harm (F (1, 63) =17.66, p=0.000<0.01), or social harm (F (1, 49) =2.06, p=0.037<0.05) are represented, fear intensity has a significant effect on behavioral intention. In this regard, the mean of the scores of behavioral intention was higher in the group receiving physical harm messages of high fear intensity (M=3.96, SD=0.58) compared to the group receiving physical harm messages of low fear intensity (mean= 3.21, SD=0.84). On the contrary, the mean of the scores of behavioral intention was higher in the group receiving social harm messages of low fear intensity (M=3.93, SD=0.69) compared to the group receiving social harm messages of high fear intensity (M=3.52, SD=0.64). It must be noted that the effect of fear intensity on the behavioral intention following being exposed to images containing cognitive reappraisal was not significant (F (1, 60) =3.12, p=0.082>0.05).

Table 4. Mean and Standard Deviation Score of Behavioral Intentions as a Function of Fear Intensity and Fear Type

	Type of fear appeals								
	fear of physical harm			fear of social harm			fear base on cognitive reappraisal		
Fear intensity	n	M	SD	n	M	SD	n	M	SD
high	33	3.96	0.58	26	3.52	0.64	30	3.64	0.64
low	32	3.21	0.84	25	3.93	0.69	32	3.46	0.77

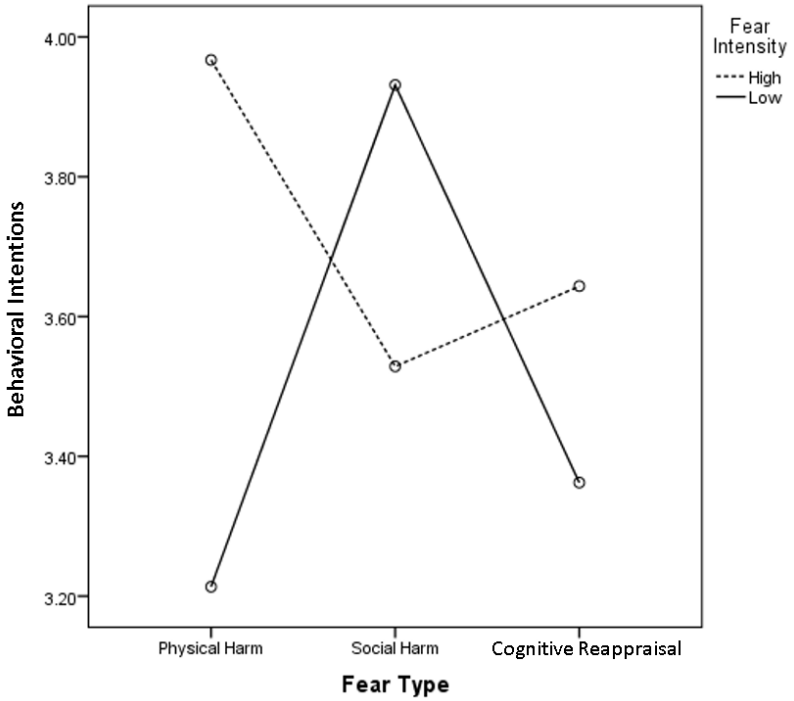

Figure 2. Interaction Effect of Fear Intensity and Fear Type on Behavioral Intention

Discussion and Conclusion

Within the last six decades, the application and effectiveness of fear appeal has come to limelight among advertising and consumer behavior researchers (34). Present study made an attempt to investigate the effect of fear intensity and fear type applied in anti-obesity advertisements upon the consumers' intentions to adopt a healthy diet. According to data gathered from 208 college students in Tehran, who were randomly categorized in 7 groups (6 experimental groups and 1 control group) based on a between subjects factorial design; 2 (fear intensity) x 3 (fear type), and based on statistical outcomes of structural equation modeling method, the first, second, and third hypothesis were supported at 99% significance level. It was found out that there is a positive and significant relationship between the perceived severity of harm and the perceived fear of obesity, as well as between the perceived susceptibility of harm and the perceived fear of obesity, and also between the perceived fear of obesity and the behavioral intentions to adopt a healthy diet. Regarding the positive path coefficient, it is stated that the relationship between these variables is both direct and parallel. It is therefore expected that the more perceived severity and susceptibility of harm, lead to the more fear is stimulated, and more fear leads to the behavioral intentions of adopting a healthy diet. This finding agrees

with that of some preceding studies (17, 26, 30-32).

Analysis of variance of behavioral intentions scores of the six experimental groups indicate significant main effect of fear intensity on behavioral intention (hypothesis 4 supported). Therefore, in accordance with some previous studies (27, 34-37), and regarding the acquired results, it is expected that exposure of consumers to images representing high fear intensity, generates higher behavioral tendency for adopting a healthy diet. On the other hand, the findings of previous studies about the effectiveness of different types of fears are inconsistent. Some researchers argue that fear appeals which depict physical harm are more effective than fear appeals that depict social harm (57, 58); whereas, some others had focused on the effectiveness of warning messages that depict social harms (32, 34, 40). However, present study revealed that the main effect of the fear type on behavioral intention is not significant. Hypothesis 5 is therefore not supported. It must be noted though that, findings indicate the significant interaction effect of fear intensity and fear type on behavioral intention so that highly intense messages that representing physical harm and lowly intense messages that representing social harm stimulate more behavioral intention. Notwithstanding, it was found out that, the effect of fear intensity on behavioral intention was not significant when images based on cognitive reappraisal were shown.

The results of present study are applicable for effective design of messages of public health. Needless to say, there were some limitations, too. The consumers' behavioral intentions to adopt a healthy diet was measured immediately following interventions, and this may bear the problem of immediate effect. It is therefore recommended that in future, follow up studies examine the effect of fear appeal levels in specified time intervals following intervention. Sampling was done out of students living in Tehran. Providing sampling is also done out of other strata, the research concept will be delved into more deeply. Further studies are recommended to extend sampling to other strata of the society, too.

Acknowledgements

The authors thank all the participants of this research for their effort and time to help out with this research, we sincerely acknowledge their contribution.

Conflicts of interests

The authors declare that there is no conflict of interest.

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