Investigating preventive health behaviors against COVID-19 in elementary school students’ parents: A cross-sectional study from Tehran – Capital of Iran

Maryam Bagherzadeh¹, Leili Salehi², Zohreh Mahmoodi³

Abstract:
BACKGROUND: Parents act as a role model for children in showing health behaviors. This study investigated factors affecting the preventive behavior in elementary school students’ parents based on protection motivation theory (PMT).
MATERIALS AND METHODS: This cross-sectional study was conducted in Tehran (Iran) in 2020. Multistage sampling was used to choose 660 elementary school students’ parents. The data collection instrument was a multi-sectional questionnaire, including sections on demographic characteristics, PMT constructs, self-reported health, and information sources related to COVID-19. In this study, descriptive statistics (mean and standard deviation) and analytical statistical methods (Pearson correlation and path analysis) were used to analyze the data. The range of Cronbach’s alpha of the study instrument varied from 0.71 to 0.97.
RESULTS: The results of the current study revealed significant association between all PMT constructs and preventive behaviors. Knowledge from both direct and indirect paths was related to preventive behaviors (B = 0.76). Preventive behaviors had the strongest, direct relationship with age (B = 0.76). Based on the final fitted model, knowledge had the greatest impact on preventive behaviors through indirect and direct routes.
CONCLUSION: Knowledge was the most important variable which influenced preventive behavior, and it should be noticed in prevention programs.
Keywords: Behavior change, COVID-19, path analysis, preventive behaviors, protection motivation theory, school students’ parents

Introduction
The new coronavirus, so-called COVID-19, causing the most severe respiratory disease, has originated and infected tens of thousands of people in Wuhan, China, and soon became a global epidemic with far-reaching consequences recently.¹ This infection does not have a definitive treatment. Supportive and maintenance therapies are only used for its control.² There are several proven and effective measures that people can take during an epidemic to reduce their chances of getting an infection, such as hand washing, mask-wearing, and social distancing.³,⁴ Iran is one of the countries with the highest prevalence of COVID-19 in the Middle East and the first country in the Middle East which reported the occurrence of COVID-19.⁴ According to

How to cite this article: Bagherzadeh M, Salehi L, Mahmoodi Z. Investigating preventive health behaviors against COVID-19 in elementary school students’ parents: A cross-sectional study from Tehran – Capital of Iran. J Edu Health Promot 2021;10:435.
the official statistics reported by the Iranian Ministry of Health on July 26, 2020, there were 215,000 confirmed cases of COVID-19 and 10,000 death tolls.\(^5\) Everyone in the community, including children, is at risk of getting COVID-19.\(^6\) Based on a recent report, \(<1\%\) of children under 10 were attacked with COVID-19.\(^7\) Recent research in the USA indicated that 1.7\% of the 15,000 positive cases of COVID-19 were children.\(^8\) There are no accurate statistics on the number of Iranian children infected with this virus. However, the infection will become severe in 2\% of the people under 18, which could be passed on to other people without any symptoms.\(^9\) Asymptomatic children transmit the virus to others.\(^10\) Therefore, it is essential to seriously consider health recommendations to prevent the occurrence of COVID-19 infection in children.\(^11\) Parents act as a role model for children in showing health behaviors.\(^12-14\) Children do not acquire the required cognitive and functional skills for taking care of their health. Consequently, this is the duty of their parents to take care of their kids’ health.\(^15\) Children at this age are under the supervision and control of parents and have not yet entered the community, and parents with control and supervision over their behavior can force and encourage them to do health behaviors such as hand washing and mask-wearing.

Fears, beliefs, and performances related to preventive behaviors play a key role in designing appropriate intervention programs.\(^16,17\) Protection motivation theory (PMT) is an important model used to identify beliefs and intentions related to preventive behaviors\(^18\) that have been used in various studies to predict protective behaviors.\(^19-21\) This model examines the factors affecting health behaviors from two routes, namely threat appraisal (perceived threat and reward) and coping appraisal (self-efficacy [SE], response efficiency, and response costs [RCs]).\(^22\) Based on PMT assumptions, fear is considered as one of the major factors which can affect healthy behaviors.\(^23\) This study assessed factors affecting preventive behavior in elementary school students’ parents based on PMT [Figure 1] by using the path analysis model.

**Materials and Methods**

**Study design and setting**
This was a descriptive–analytic cross-sectional study conducted on 660 elementary school students’ parents in 12 elementary schools in Tehran (Iran) in June 2020.

**Study participants and sampling**
Study participants were school student’s parents selected by stratified simple sampling. For sampling, at first, the educational offices of the 22 districts in Tehran were first determined. Then, two schools from each region were randomly selected by using a table of random numbers. The list of classes in each school was prepared. Then, two classes were selected from each school. In each class, all parents, either mother or father, were considered as the sample. Finally, after obtaining permission from education office, online questionnaires were sent to the parents. The inclusion criteria included willingness to participate in the study, having elementary student child (ren), being able to answer online questions, and being over 18 years old. However, the unwillingness to participate in the study was the exclusion criterion.

**Data collection tool and technique**
The data collection instrument in this study was an online multi-sectional questionnaire, including subsections on demographic characteristics, 42 questions based on the PMT, self-reported health (SRH), and information
sources of COVID-19. The PMT questions were scored on a five-point Likert scale from 1 (definitely disagree) to 5 (definitely agree). The content validity of the study instrument was examined by 10 experts (two health education, three health psychology, three epidemiology, and two infection disease). Cronbach’s alpha was used to assess the reliability of the instrument.

**Demographic characteristics**
They included the participants’ age, education, income level, SRH, and information sources for COVID-19.

**Self-reported health**
For assessing SRH, the participants were asked to self-assessment their current health status as excellent, very good, good, fair, and poor.[24]

**Sources of information**
It was determined by asking the respondents how often and where they saw, heard, or read about COVID-19.

**Knowledge**
Seven close-ended questions were used to measure knowledge about COVID-19–preventive behaviors (e.g., “drinking alcohol can prevent the COVID-19,” “proper social distance can be effective in preventing the transmission of the virus”). Each correct answer was given one point and the “I don’t know” and incorrect answer was scored as zero. Cronbach’s alpha and content validity index (CVI) for this scale were 0.82 and 0.98, respectively. The higher score presented more knowledge.

**Perceived susceptibility**
Perceived susceptibility indicates one’s beliefs about the possibility of developing a disease or condition which was assessed with five questions (e.g., I am at risk of coronavirus; only people with immunodeficiency and other underlying diseases are at risk of coronavirus). Cronbach’s alpha and CVI for this scale were 0.71 and 0.97, respectively.

**Perceived severity**
Perceived severity refers to the person’s opinions about how serious a condition and its consequences are (e.g., COVID-19 is deadly; there are several financial costs involved in getting COVID-19). This construct was assessed with five questions. Cronbach’s alpha and CVI for this scale were 0.92 and 0.98, respectively.

**Rewards**
They are the positive aspects of showing unhealthy behaviors. This construct was assessed with three questions such as “I breathe easier when I don’t use a mask,” “When I hug my friends, the intimacy between us increases,” and “By reducing the amount of hand washing, I feel more tenderness in the skin of my hands.” Higher scores in this subscale indicated more rewards related to unhealthy behaviors. Cronbach’s alpha and CVI for this scale were 0.76 and 0.97, respectively.

**Self-efficacy**
SE is an individual’s trust in his/her ability to take action and was assessed by items such as “I am sure I can use a mask at all times and places to prevent COVID-19,” “I am sure I can keep a proper social distance (1–1.5 m) from others in order to prevent COVID-19 transmission,” and “I’m sure I can get out of my house just in case of an emergency.” The higher scores in this subscale indicated higher SE related to healthy behaviors. Cronbach’s alpha and CVI for this scale were 0.71 and 0.97, respectively.

**Response efficacy**
Response efficacy (RE) refers to the proposed protective behavior for reducing risks. The items included “It is possible to overcome COVID-19 by observing hygienic standards,” “By following the advice of doctors and specialists regarding COVID-19, I can stay healthy,” and “Masking in public places can prevent COVID-19.” RE was assessed by four questions, and higher scores indicated higher RE related to healthy behaviors. Cronbach’s alpha and CVI for this scale were 0.72 and 0.98, respectively.

**Response cost**
RC associated with recommended protective behavior was regarded as RCs. RC was measured by five items such as “Repeated hand washing makes me tired” and “I lose my job by staying in quarantine.” Cronbach’s alpha and CVI for this scale were 0.79 and 0.96, respectively.

**Fear**
Fear indicates an unpleasant emotional experience caused by risky stimuli.[25] This construct was assessed by three questions (e.g., “I am afraid to be infected with COVID-19” and “I am horrified to hear about the number of people infected with and killed by the COVID-19”). Cronbach’s alpha and CVI were 0.79 and 0.96, respectively.

**Intention**
Intention indicates people’s decisions to perform particular actions.[25] Sample items include “I plan to use a mask in public places to prevent COVID-19” and “To prevent COVID-19, I intend to maintain a proper social distance with others.” This construct was measured by three questions. The Cronbach’s alpha and CVI for this scale were 0.86 and 0.97, respectively.

**Behavior**
Behavior was assessed by four items (e.g., “To prevent COVID-19, I must wash my hands regularly for at least 20s” and “I Avoid public spaces or crowds to prevent COVID-19”). Cronbach’s alpha and CVI for this scale were 0.77 and 0.97, respectively.
Data analysis

The Kolmogorov–Smirnov test was used to check the data normality. The significant correlation between the variables was considered the first hypothesis of the path analysis. There were eight independent variables affecting preventive behaviors such as knowledge, perceived susceptibility, perceived severity, SE, RC, RE, intention, and age, while there was only one dependent variable, i.e., preventive behaviors.

To evaluate model fitness, fitting indexes such as $\chi^2$/df, root mean square error of approximation (RMSEA), comparative fit index (CFI), goodness of fit index (GFI), normal fit index, and incremental fit indices were computed. Lisrel-8.8 and SPSS-19 (SPSS-19 (IBM Corp., Armonk, NY, USA) IBM Corp., Armonk, NY, USA) were used to analyze the data.

Ethical consideration

At the beginning of the study, the objectives of the study were explained to the parents. Participation in the study was voluntary, and the participants’ written consent was obtained.

The research was approved by the Ethics Committee of the Alborz University of Medical Sciences (Ethical Code: IR.ABZUMS.REC.1399.041).

Results

A total of 660 parents with a mean age of 38.77 years participated in this study. Most participants were female ($n = 541; 82$%), and 40.8% had a high-school diploma degree. Table 1 gives the participants’ other demographic characteristics.

Significant correlations were found between the independent variables and preventive behaviors ($r = 0.016–0.803$). SE ($r = 0.601$) had the strongest association with preventive behaviors [Table 2].

The default relationship between the study variables was based on the PMT [Figure 1]. Based on the correlations between the variables and the model indexes, the default model was tested in Figure 2.

In Figure 2, a significant relationship is observed between the variables based on $t$-values. Pathways with $t$-values $<1.96$ are not significant, and they are shown in red in Figure 2. However, pathways with $t$-values higher than 1.96 are significant. The results of the current study have revealed significant associations between all PMT constructs and preventive behaviors.

Based on the final model [Figure 3], only knowledge from both direct and indirect paths through SE had a significant relationship with behavior ($B = 0.76$). Among the variables directly affecting the behavior, age has the strongest correlation with behavior ($B = 0.76$) [Table 3].

The final path model has a good fitness (CFI = 0.95, RMSEA = 0.048, GFI = 0.95). The mean and standard deviation of the variables are presented in Table 4. Notably, all the variables entered in the model were quantitative.

| Variable | $n$ (%) |
|----------|---------|
| Gender | | |
| Male | 119 (18) |
| Female | 541 (82) |
| Education (years) | | |
| <12 | 77 (11.7) |
| 12 | 296 (40.8) |
| 14 | 80 (12.1) |
| 16 | 182 (27.6) |
| >18 | 52 (7.6) |
| Income | | |
| Very good | 7 (1.1) |
| Good | 107 (16.2) |
| Fair | 445 (67.4) |
| Bad | 84 (12.73) |
| Very bad | 17 (2.6) |
| Self-reported health | | |
| Excellent | 188 (28.5) |
| Very good | 356 (53.94) |
| Good | 102 (15.5) |
| Bad | 10 (1.5) |
| Very bad | 4 (0.6) |
| Source of information | | |
| Social network | 136 (20.6) |
| Web search | 53 (8) |
| TV and radio | 483 (66.4) |
| Health authority | 13 (1.97) |
| Family and friends | 6 (0.91) |
| Others | 14 (2.1) |
Table 2: Relationship among knowledge, fear, perceived susceptibility, perceived severity, reward, self-efficacy, response efficacy, response cost, intention, behavior variables

| Variable             | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    |
|----------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Knowledge            | 0.24  | 0.5237| 0.7637| 0.94  |       |       |       |       |       |       |
| Fear                 | -0.085|       |       |       |       |       |       |       |       |       |
| Perceived susceptibility | 0.016 | -0.021| 1     |       |       |       |       |       |       |       |
| Perceived severity   | 0.120**| -0.260**| 0.108**| 1     |       |       |       |       |       |       |
| Reward               | 0.241**| -0.060| 0.017  | 0.194**| 1     |       |       |       |       |       |
| Self-efficacy        | 0.204**| -0.115**| 0.118**| 0.256**| 0.596**| 1     |       |       |       |       |
| Response efficacy**  | 0.218**| -0.016| 0.101**| 0.170**| 0.607**| 0.656**| 1     |       |       |       |
| Response cost        | 0.016 | -0.217**| 0.080* | 0.328**| -0.118**| 0.072 | 0.803*| 1     |       |       |
| Intention            | 0.184**| -0.166**| 0.021  | 0.262**| 0.523**| 0.546**| 0.479**| 0.171**| 1     |       |
| Behavior             | 0.164**| -0.171*| 0.037  | 0.294**| 0.519**| 0.601**| 0.432**| 0.183*| 0.749**| 1     |

*Correlation is significant at the 0.05 level (two-tailed), **Correlation is significant at the 0.01 level (two-tailed)

Table 3: Path coefficients for study predictors on preventive behavior in parents

| Variable      | Direct effect | Indirect effect | Total effect | R²   |
|---------------|---------------|-----------------|--------------|------|
| Knowledge     | 0.24          | 0.5237          | 0.7637       | 0.94 |
| Fear          | -             | 0.36956         | 0.36956      |      |
| Self-efficacy | -             | 0.1748          | 0.1748       |      |
| Response efficacy | -       | 0.1748          | 0.1748       |      |
| Response cost | -             | 0.23            | 0.23         |      |
| Reward        | -             | 0.1058          | 0.1058       |      |
| Perceived treat | -          | 0.1748          | 0.1748       |      |
| Perceived sever | -            | 0.092           | 0.092        |      |
| Intention     | 0.46          | -               | 0.46         |      |
| Age           | 0.76          | -               | 0.76         |      |

Table 4: Mean and standard deviation of the study variables (knowledge, fear, perceived susceptibility, perceived severity, reward, self-efficacy, response efficacy, response cost, intention, behavior)

| Variable           | Mean | SD   | Minimum | Maximum |
|--------------------|------|------|---------|---------|
| Perceived susceptibility | 18.31| 2.29 | 11      | 30      |
| Perceived severity  | 8.96 | 2.76 | 4       | 20      |
| Reward              | 5.01 | 1.63 | 3       | 11      |
| Self-efficacy       | 7.46 | 2.74 | 4       | 20      |
| Response efficacy   | 8.78 | 1.89 | 5       | 19      |
| Response cost       | 7.40 | 2.77 | 4       | 20      |
| Knowledge           | 12.76| 1.88 | 7       | 21      |
| Fear                | 20.28| 7.02 | 3       | 27      |
| Intention           | 5.86 | 2.14 | 4       | 20      |
| Behavior            | 4.65 | 1.89 | 3       | 16      |

Discussion

Based on the final fitted model in our study, knowledge had the greatest impact on preventive behaviors through indirect (by SE) and direct routes. Another study conducted in Iran reported a high level of COVID-19-related knowledge and self-reported preventive behaviors.\(^{26}\) According to Maleki et al.'s study, the more awareness of the individuals related to the consequences and costs of the disease, the more the likelihood of their protective behaviors will be.\(^{27}\)

Furthermore, based on Zamanian et al., increasing public awareness via reliable mass media is recommended.\(^{28}\) Due to our study results, age had the strongest, direct relationship with preventive behaviors. A study also indicated a statistically significant relationship between health responsibility and age.\(^{29}\) According to Choi and Kim, age and knowledge were two factors that influence on preventive behavior during the Middle East respiratory syndrome-coronavirus among nursing students in South Korea.\(^{30}\) Knowledge has a significant role in providing the necessary information for the general population and maximizing citizen compliance with preventive recommendations.\(^{31}\)

Based on these study results, fear had the strongest association with preventive behaviors in the indirect path, in accordance with Barr et al., who found that fear predicted half of the preventive behaviors during the influenza pandemic in Australia.\(^{32}\) Several studies have reported a linear effect of fear on preventive health behaviors.\(^{33-38}\) People are more likely to exhibit precautionary behaviors when they feel greater fear during an outbreak.\(^{36}\)

The results presented in this study revealed significant associations between all PMT constructs and preventive behaviors. Along with this study, other study results also indicated the association between PMT construct and preventive behavior.\(^{37}\) According to Xiao et al.’s findings, there was a positive correlation between protective behaviors and perceived severity, as well as perceived susceptibility and SE, and a negative correlation between reward and RC. However, in the current study, the association between all PMT constructs and preventive behavior was a positive association. It seems that this difference was due to differences in sociodemographic characteristics of the study subjects and type of behavior. As in the study by Xia et al., 2014, preventive behavior against schistosomiasis has been considered in rural students,
while in this study, simple preventive behaviors (such as apply masks, wash hands frequently) against COVID-19 in parents with elementary school students were considered.

The study results are also similar to Sadeghi et al. that indicated a correlation between protection motivation and perceived susceptibility, perceived severity, RE, and fear and RC.[38]

Regarding PMT constructs, perceived susceptibility and perceived severity are related to one’s belief of the seriousness and the risk of contracting a specific disease, and they can motivate individuals toward disease prevention.[39]

SE is a strong factor, which influences on the adoption and preserves health behavior. According to the current study results, knowledge influences preventive behavior through SE.

In terms of RCs and response efficiency, these two factors play an important role in persuasion of people to engage in health behaviors.[40]

Along with these study results, all variables in PMT predicted 94% variance in preventive behavior, and this result is similar to Sharifirad et al.’s finding.[41]

The current study results revealed that all PMT constructs influenced behavior through intention. Due to the planned behavior model and PMT assumptions, intention is the strongest predictor of behavior. According to Rhodes and Dickau’s declaration, the intention was an essential factor for behavior.[42]

**Limitation and recommendation**
Given that the current study was conducted through cyberspace media, some factors such as misunderstanding of the questions might influence on the participant responses. Despite that, we attempt to adjust the appropriate guidance for the questionnaire responses. Related to another limitation in this study, we did not measure the behavior of children acquired from their parents through cognitive learning; however, as mentioned earlier and the role of parents as a model and control of children’s behavior, we expect children to reflect parental behavior. Children and teens react, in part, on what they see from the adults around them. When parents deal with the COVID-19 confidently, they can provide the best support for their children. Parents can be more reassuring to others around them, especially children, if they are better prepared.[43] In future researches, besides parental behavior, it is additionally recommended to study the protective behavior of elementary students in pandemics.

**Conclusion**

The results of this study showed that participants’ knowledge had the greatest association with their preventive behaviors, in both direct and indirect paths through SE. The provision of accurate information can help individuals to overcome problems and show preventive behaviors more appropriately. In addition, fear is another factor associated with preventive behaviors. Various supportive methods could be used to successfully manage the parents’ fear of developing such behaviors.

**Acknowledgment**

The authors would like to thank all the parents who participated in this study. Further, Alborz University of Medical Sciences is acknowledged for supporting this study. This study was approved by the Scientific Ethical Committee of Alborz University of Medical Sciences (Ethical Code: IR.ABZUMS.REC.1399.041) and conducted in accordance with the Helsinki Declaration.

**Financial support and sponsorship**

Nil.

**Conflicts of interest**

There are no conflicts of interest.

**References**

1. Wu F, Zhao S, Yu B, Chen YM, Wang W, Song ZG, et al. A new coronavirus associated with human respiratory disease in China. Nature 2020;579:265-9.

2. Liu W, Zhang Q, Chen J, Xiang R, Song H, Shu S, et al. Detection of Covid-19 in children in early January 2020 in Wuhan, China. N Engl J Med 2020;382:1370-1.
3. Chen H, Guo J, Wang C, Luo F, Yu X, Zhang W, et al. Clinical characteristics and intrathecal vertical transmission potential of COVID-19 infection in nine pregnant women: A retrospective review of medical records. Lancet 2020;395:809-15.
4. Karamouzian M, Madani N. COVID-19 response in the Middle East and North Africa: Challenges and paths forward. Lancet Glob Health 2020;8:e868-7.
5. Ministry of Health and Medical Education. Ministry of Health and Medical Education; 2020. Available from: https://behdasht.gov.ir. [Last accessed on 2020 Jun 15].
6. She J, Liu L, Liu W. COVID-19 epidemic: Disease characteristics in children. J Med Virol 2020;92:747-54.
7. Lee PI, Hu YL, Chen PY, Huang YC, Hsueh PR. Are children less susceptible to COVID-19? J Microbiol Immunol Infect 2020;53:371-2.
8. CDC C-RT. Coronavirus Disease 2019 in Children — United States, February 12 – April 2, 2020. Available from: https://www.cdc.gov/mmwr/volumes/69/wr/mm6904e4.htm#suggestedcitation (accessed 26 aug 2020).
9. Dong Y, Mo X, Hu Y. Epidemiological characteristics of 2143 pediatric patients with 2019 coronavirus disease in China. Pediatrics 2020;145:e20200702.
10. Seyedi SJ, Shojaeian R, Hizdrafar M, Mohammadipour A, Almandaran SA. Coronavirus disease 2019 (COVID-19) outbreak in pediatrics and the role of pediatricians: A systematic review. Iran J Pediatr 2020;30:e102784.
11. Spagnuolo G, De Vito D, Rengo S, Tatullo M. COVID-19 outbreak: An overview on dentistry. Int J Environ Res Public Health 2020;17:2094.
12. Schoeppe S, Vandelanotte C, Bere E, Lien N, Verloigne M, Schoeppe S, Vandelanotte C, Bere E, Lien N, Verloigne M, Vandelanotte C, Bere E, Lien N, Verloigne M, Vandelanotte C, Bere E, Lien N, Verloigne M. Factors associated with preventive behaviors of children and adolescents: A brief review. Am J Lifestyle Med 2011;5:171-81.
13. Trost SG, Loprinzi PD. Parental influences on physical activity behavior in children and adolescents: A review. J Pediatr Psychol 1997;22:157-72.
14. Granich J, Rosenberg M, Knuiman MW, Tierpery A. Individual, social, and physical environment factors associated with electronic media use among children: Sedentary behavior at home. J Phys Act Health 2011;8:613-25.
15. Bashirian S, Shirahmadi S, Seyedzadeh-Sabounchi S, Soltanian AR, Karimi-Shahjariani A, Vahdatinia F. Association of cares experience and dental plaque with sociodemographic characteristics in elementary school-aged children: A cross-sectional study. BMC Oral Health 2018;18:178.
16. Shojae Zadeh D, Mehrab Baic A, Mahmoudi M, Salehi L. To evaluate of efficacy of education based on health belief model on knowledge, attitude and practice among women with low socioeconomic status regarding osteoporosis prevention. Iran J Epidemiol 2011;7:30-7.
17. Pakpour AH, Griffiths MD. The fear of COVID-19 and its role in preventive behaviors. J Concurrent Dis 2020;2:58-63.
18. Rogers RW and Prentice-Dunn S. Protection motivation theory. In: Cochran DS, editor. Handbook of Health Behavior Research Press. New York: 29 Plenum; 1997. p. 113-32.
19. Bashirian S, Jenabi E, Khazaei S, Barati M, Karimi-Shahjariani A, Zareian S, et al. Factors associated with preventive behaviours of COVID-19 among hospital staff in Iran in 2020: An application of the Protection Motivation Theory. J Hosp Infect 2020;105:430-3.
20. Rogers RW. A protection motivation theory of fear appeals and attitude change. J Psychol 1975;91:93-114.
21. Maddux JE, Rogers RW. Protection motivation and self-efficacy: A revised theory of fear appeals and attitude change. J Exp Soc Psychol 1983;19:469-79.
22. Havaei M, Salehi L, Akbari-Kamrani M, Rahimzadeh M, Esmaelzadeh-Saieieh S. Effect of education based on protection motivation theory on adolescents' reproductive health self-care: A randomized controlled trial. Int J Adolesc Med Health 2019;20180195.
23. de Hoog N, Stroebe W, de Wit JB. The processing of fear-arousing communications: How biased processing leads to persuasion. Soc Infu 2008;3:84-113.
24. Lorem C, Cook S, Leon DA, Emaus N, Schirmer H. Self-reported health as a predictor of mortality: A cohort study of its relation to other health measurements and observation time. Sci Rep 2020;10:4886.
25. Sheeran P. Intention – behavior relations: A conceptual and empirical review. Eur Rev Soc Psychol 2002;12:1-36.
26. Taghir MH, Borazjani R, Shiraly R. COVID-19 and Iranian medical students; A survey on their related-knowledge, preventive behaviors and risk perception. Arch Iran Med 2020;23:249-54.
27. Maleki A, Shahnazi H, Hasanzadeh A. Application of protection motivation theory to the study of the factors related to skin cancer preventive behaviors in students. Int J Cancer Manag 2019;12:e89131.
28. Zamanian M, Ahmad I, Siddarreh S, Aleebrahim F, Vardanjani HM, Faghihi SH, et al. Fear and rumor associated with COVID-19 among Iranian adults, 2020. J Educ Health Promot 2020;9:355.
29. Mirghaforvand M, Baheireai A, Nedjat S, Mohammad E, Charandabi SM, Majd Kazemi R. A population-based study of health-promoting behaviors and their predictors in Iranian women of reproductive age. Health Promot Int 2015;30:586-94.
30. Choi JS, Kim JS. Factors influencing preventive behavior against Middle East Respiratory Syndrome-Coronavirus among nursing students in South Korea. Nurse Educ Today 2016;40:168-72.
31. van Velsen L, Beaujean DJ, van Gemert-Pijnen JE, van Steenbergen JE, Timen A. Public knowledge and preventive behavior during a large-scale Salmommella outbreak: Results from an online survey in the Netherlands. BMC Public Health 2014;14:100.
32. Barr M, Raphael B, Taylor M, Stevens G, Jorm L, Giffin M, et al. Pandemic influenza in Australia: Using telephone surveys to measure perceptions of threat and willingness to comply. BMC Infect Dis 2008;8:117.
33. Ali K, Zain-Ul-Abdin K, Li C, Johns L, Ali AA, Carcioppolo N. Viruses going viral: Impact of fear-arousing sensationalist social media messages on user engagement. Sci Commun 2019;41:314-38.
34. Hartmann P, Apoaloza V, D'souza C, Barrutia JM, Echebarria C. Environmental threat appeals in green advertising: The role of fear arousal and coping efficacy. Int J Adv 2014;33:741-65.
35. van Velsen L, Beaujean DJ, van Gemert-Pijnen JE, van Steenbergen JE, Timen A. Public knowledge and preventive behavior during a large-scale Salmommella outbreak: Results from an online survey in the Netherlands. BMC Public Health 2014;14:100.
36. Barr M, Raphael B, Taylor M, Stevens G, Jorm L, Giffin M, et al. Pandemic influenza in Australia: Using telephone surveys to measure perceptions of threat and willingness to comply. BMC Infect Dis 2008;8:117.
37. Ali K, Zain-Ul-Abdin K, Li C, Johns L, Ali AA, Carcioppolo N. Viruses going viral: Impact of fear-arousing sensationalist social media messages on user engagement. Sci Commun 2019;41:314-38.
38. Hartmann P, Apoaloza V, D'souza C, Barrutia JM, Echebarria C. Environmental threat appeals in green advertising: The role of fear arousal and coping efficacy. Int J Adv 2014;33:741-65.
39. van Velsen L, Beaujean DJ, van Gemert-Pijnen JE, van Steenbergen JE, Timen A. Public knowledge and preventive behavior during a large-scale Salmommella outbreak: Results from an online survey in the Netherlands. BMC Public Health 2014;14:100.
40. Barr M, Raphael B, Taylor M, Stevens G, Jorm L, Giffin M, et al. Pandemic influenza in Australia: Using telephone surveys to measure perceptions of threat and willingness to comply. BMC Infect Dis 2008;8:117.
41. Ali K, Zain-Ul-Abdin K, Li C, Johns L, Ali AA, Carcioppolo N. Viruses going viral: Impact of fear-arousing sensationalist social media messages on user engagement. Sci Commun 2019;41:314-38.
42. Hartmann P, Apoaloza V, D'souza C, Barrutia JM, Echebarria C. Environmental threat appeals in green advertising: The role of fear arousal and coping efficacy. Int J Adv 2014;33:741-65.
43. van Velsen L, Beaujean DJ, van Gemert-Pijnen JE, van Steenbergen JE, Timen A. Public knowledge and preventive behavior during a large-scale Salmommella outbreak: Results from an online survey in the Netherlands. BMC Public Health 2014;14:100.
44. Barr M, Raphael B, Taylor M, Stevens G, Jorm L, Giffin M, et al. Pandemic influenza in Australia: Using telephone surveys to measure perceptions of threat and willingness to comply. BMC Infect Dis 2008;8:117.
45. Ali K, Zain-Ul-Abdin K, Li C, Johns L, Ali AA, Carcioppolo N. Viruses going viral: Impact of fear-arousing sensationalist social media messages on user engagement. Sci Commun 2019;41:314-38.
46. Hartmann P, Apoaloza V, D'souza C, Barrutia JM, Echebarria C. Environmental threat appeals in green advertising: The role of fear arousal and coping efficacy. Int J Adv 2014;33:741-65.
Determination of preventive behaviors for pandemic influenza A/H1N1 based on protection motivation theory among female high school students in Isfahan, Iran. J Educ Health Promot 2014;3:7.

43. CDC. Helping Children Cope; 2020. Available from: https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/for-parents.html. [Last updated on 2020 Jul 01].