



# Effect of Applying Protection Motivation Theory in COVID-19 Information Channels on Preventive Behaviors in Southwest Iran



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## ABSTRACT

**Aims** The World Health Organization recommends preventive behaviors despite the approval of several vaccines to control COVID-19. Mass media and digital technologies also play an important role in addressing public health issues. This study aimed to investigate the protection motivation theory constructs by COVID-related information channels on protective behaviors against COVID-19 in southwestern Iran.

**Instruments & Methods** In this cross-sectional descriptive study from July to August 2021, 255 patients referred to urban health centers were included by simple random sampling. Data were analyzed by SPSS 24 software using correlation and regression tests.

**Findings** 32.2% of the participants received COVID-19 information through radio, TV, and satellite, and 30.6% through WhatsApp and Telegram social networks. Awareness predicted 11% of protective behavior ( $p < 0.001$ ;  $R = 0.118$ ;  $\beta = 0.343$ ). Protective motivation (behavioral intention) predicted 49.5% of behavior ( $p < 0.001$ ;  $R = 0.495$ ;  $R^2 = 0.487$ ).

**Conclusion** Using protection motivation theory by information channels facilitates preventive behavior against COVID-19.

**Keywords** Motivation; COVID-19; Health Behavior; Information Sources; Intention; Fear

## CITATION LINKS

[1] Coronavirus Disease 2019 ... [2] Factors associated with preventive behaviours of COVID-19 among hospital ... [3] COVID-19 vaccines: The status and perspectives ... [4] Understanding the impact of information sources on ... [5] Investigating the factors affecting protective ... [6] Predicting hand washing, mask wearing and social distancing behaviors ... [7] Prevalence of facemask use among general public when ... [8] A review of COVID-19 (Coronavirus Disease-2019) ... [9] Mask use among pedestrians during the COVID-19 ... [10] Hope, fear and consumer behavioral change ... [11] Knowledge, attitudes, and practices towards COVID-19 among Chinese residents ... [12] Meta-analysis of the reasoned action ... [13] Knowledge, attitudes, and preventive ... [14] COVID-19 information on social media and preventive ... [15] Mental health problems and social media exposure ... [16] Protective behavior against COVID-19 among the public ... [17] A protection motivation theory of fear appeals and attitude ... [18] Use of protection motivation theory to assess preventive behaviors of ... [19] Knowledge of COVID-19 and its relationship with preventive behaviors and ... [20] Predictors of protective behaviours ... [21] The impact of social distancing on community case count ... [22] Using fear appeal theories to understand the effects ... [23] Application of the protection motivation ... [24] Preventive behaviors towards COVID-19 pandemic among ... [25] A meta-analysis of the association between gender and ... [26] Using social media for research and public health ... [27] Social media use, self-efficacy, perceived threat, and preventive behavior ... [28] Risk perception and media in shaping protective ... [29] Integrating terror management theory into fear ... [30] Association between the level of education and knowledge ... [31] Subjective deterioration of physical and psychological health ... [32] Knowledge, attitudes, practices, and the effects of ... [33] Assessment of Knowledge, Attitude, and Factors ... [34] Relationship between Fear, Attitude and Knowledge ... [35] Protection motivation theory to predict intention ... [36] Protection motivation theory: A proposed ... [37] Using an integrated social cognition model to ... [38] COVID-19 pandemic among Latinx farmworker and ...

## Introduction

COVID-19 has devastated people's lives worldwide and has led to many deaths [1]. Iran has also been affected by COVID-19 in the Middle East and is one of the countries where this virus spread quickly [2]. Many Iranians lost their lives due to COVID-19 [3]. The World Health Organization (WHO) recommends preventive behaviors despite the approval of several vaccines to control the disease [4, 5]. Therefore, considering this issue, preventing transmission in society and public places includes health-protective behaviors such as using masks, social distancing, disinfection, regular and thorough handwashing, respiratory hygiene, etc. [6].

Gobi indicated that 99.7% of the general population wears a face mask when visiting wet markets in Malaysia [7]. In a study, 75% of the participants believed that using a mask can prevent contracting COVID-19. However, only 35% were willing to wear masks [8]. Rahimi showed the prevalence rate of face mask use was fairly low, especially in men and younger people, and the observed rates are unlikely to protect people from COVID-19 [9]. What distinguishes COVID-19 from other recent epidemics is its large-scale effect and duration the prolongation of the pandemic requires that investigations be updated [6]. The high percentage of face mask use among the general population is a good indicator of the strategy of public health measures [7]. However, proper operation and observance of these principles require sufficient awareness in this field [5]. The experiences of other infectious diseases, such as Sars and MERS, show that insufficient knowledge and negative attitudes towards this disease create a feeling of fear of the disease, which can complicate efforts to prevent the spread of the disease [10, 11].

Awareness of a disease may affect a person's attitude and intention, and the intention may turn into behavior [12]. One study found that participants had a relatively good level of knowledge, positive attitude, and good behavior about COVID-19 [10]. Another study showed that people had average knowledge about COVID-19 [13]. On the other hand, another study reported a favorable knowledge and attitude score [11]. At the same time as the spread of COVID-19, face-to-face contact was severely limited, knowledge transfer became popular online, and people had to rely on social media for news and information about COVID-19 [14]. As a result, social media quickly emerged as an important communication medium for producing, distributing, and using information [15].

Mass media and digital technologies also play an important role in addressing public health issues. A study showed that knowledge increases through social networks and the Internet, but this knowledge may be both useful and harmful [14]. The findings showed that social networks and mass media affect individual risk perception and preventive measures against Corona [11, 15]. However, actions such as

improving awareness, attitude, and preventive behaviors of COVID-19 among preventive strategies are the first step in health planning [11].

The psychology of health behaviors has long examined individuals' motivation to adopt behavior changes in response to perceived threats to health. Motivating people to change their behavior to prevent the spread of the disease becomes a vital and conscientious matter [16]. Also, Experts believe that psycho-social models are an intellectual framework for educational planning [17]. The study of determinants of preventive behaviors with a clear and logical framework is very important [15].

In this regard, protection motivation theory (PMT) can be useful in identifying fears, beliefs, practices, and risk perceptions as important factors in people's responses to health behaviors [17]. PMT has been used in various studies to predict preventive behaviors [2, 18]. This theory focuses first on motivation and then on the development of adaptive skills [3]. The PMT and behavior explain the processes of cognitive mediation, threat assessment, coping assessment, and the construct of fear. Threat assessment includes the constructs of sensitivity, severity, and perceived rewards; coping assessment includes the constructs of self-efficacy, response efficacy, and perceived response costs. Fear is an intermediate variable between perceived sensitivity and threat assessment [17]. Protective motivation mediates the stages of threat assessment, coping assessment, and preventive behavior [17, 19]. Motivation is synonymous with behavioral intention. To evoke perceived protection motivation, perceived sensitivity and severity must overcome the rewards of maladaptive response (Lack of self-protection), and perceived self-efficacy must overcome the adaptive response costs 'self-protection' [11, 12]. In a study, it was reported that this model was able to predict 78% of the variance of disease-preventive behaviors [12]. In contrast, in another study, PMT could predict 5% of behavior [14]. It seems that to increase behavioral intention, the perceived severity of the infection should be highlighted and focus on the perception of people in performing protective behaviors. Also, at the beginning of the epidemic, fear predicted the adoption of preventive behavior, but over time, the perceived severity of the disease also showed stronger effects [20]. PMT affects individual behavior, vulnerable populations, and social distancing [21].

Considering that PMT has been validated in previous pandemic studies, the unique circumstances of COVID-19 should also lead to a critical examination of this theory in the context of a new pandemic. Therefore, it is critical to comprehensively examine PMT constructs concerning subsequent emotional reactivity and changes in behavioral patterns that have emerged during the COVID-19 outbreak. Hence, due to the prolongation of the pandemic, the importance of preventive behaviors against

infectious diseases, and the lack of a study on the mediating role of theoretical constructs in protective behaviors and information sources of coronavirus, this research was conducted during the pandemic in southwestern Iran.

## Instrument and Methods

In this cross-sectional descriptive study from July to August 2021, 255 patients participated. The sample size was determined based on estimating a proportion in the population ( $\alpha=0.05$ ;  $p=80\%$ ;  $z=1-\alpha/2$ ). The names of urban health centers of Abadan city were listed, and six were selected randomly. The list of names of subjects covered by each center was determined using the health care delivery system by a simple random method. Then, the subjects with at least a primary education level, inhabitants in the area covered by the urban health center, with no cognitive impairment were asked to come to the health center to answer the questionnaire. The participants who could not answer the questionnaire in person at the health center answered the questionnaire over the phone. Incomplete questionnaires were excluded. The data collection tool was a researcher-made questionnaire based on PMT. The design of the protection motivation theory constructs questions was inspired by previous studies and in consultation with health education professors [18]. After designing the questions, the wording of each construct of the questionnaire according to the content validity review form was given to 8 experts (A health education professor and a PhD candidate in health education), and its content validity was checked. Its Content Validity Ratio was based on Lawshe (CVR=0.87) and the Content Validity Index according to Waltz and Bausell (CVI=0.79). Also, Cronbach's alpha test was used for reliability ( $\alpha=0.880$ ). This questionnaire included awareness questions (19 questions in the 19-57 score range), perceived sensitivity (6 questions in the 6-30 score range), perceived severity (5 questions in the 5-25 score range), internal and external rewards (6 questions in the 6-30 score range), response-cost (5 questions in the 5-25 score range), perceived response efficacy (7 questions in the 7-35 score range), self-efficacy (8 questions in the 8-40 score range), fear (7 questions in the 7-35 score range), protection motivation (10 questions in the 10-50 score range), behavior (10 questions in the 10-50 score range). The scale of awareness questions (yes-no-I do not know) was the scale of attitude (5-option Likert scale and score (1-5)).

Data were analyzed by SPSS 24 software using Kruskal-Wallis, Pearson correlation, and linear regression analysis tests.

## Findings

The participants were 146 (57.3%) men and 109 (42.7%) women. Diabetes was the most common disease among the subjects (Table 1).

**Table 1)** Some of the sociodemographic characteristics of the subjects

Parameter (N=255)		Frequency	Percent
Age (year)	13-20	40	15.7
	21-30	57	22.4
	31-40	51	20.0
	41-50	50	19.6
	51-60	25	9.8
	61-70	15	5.9
	Up 70	17	6.7
Education	Elementary school	42	16.5
	Junior high school	48	18.8
	Diploma	84	32.9
	Academic	81	31.8
Job	Unemployed	65	25.5
	Housewife	54	21.2
	Manual worker	40	15.7
	Employee	32	12.5
	Self-employment	49	19.2
	Retired	15	5.9
	Income	very good	32
Good		84	32.9
Medium		104	40.8
Weak		25	9.8
Very weak		10	3.9
COVID-19 information	Relatives & friends	42	16.5
	Health expert or doctor	24	9.4
	Radio and TV	83	32.5
	Internet	28	11.0
	WhatsApp & Telegram	78	30.6
Chronic disease	High blood pressure	26	10.2
	Diabetes	37	14.5
	Cardiovascular	20	7.8
	Kidneys and urinary tract	3	1.2
	Cancer	1	0.4
	Immunodeficiency	1	0.4
	Pulmonary	22	8.6
	No disease	145	56.9

The knowledge scores of 32 subjects (12.5%) were moderate, and 223 (87.5%) were good. The mean score of preventive behavior was higher in women ( $35.36 \pm 7.48$ ) compared to men ( $33.30 \pm 7.10$ ) but was not statistically significant ( $p=0.593$ ; Table 2).

**Table 2)** Mean and standard deviation structures of protection motivation theory

Constructs	Mean	SD	Min	Max	Range
<b>Perceived rewards</b>	19.63	3.64	9	30	21
<b>Perceived response cost</b>	13.88	3.05	6	25	19
<b>Self-efficacy</b>	28.18	4.63	17	40	23
<b>Fear</b>	22.17	3.99	10	34	24
<b>Protection motivation</b>	38.48	4.69	29	50	21
<b>Response effectiveness</b>	25.50	6.28	9	35	26
<b>Behavior</b>	34.20	7.32	18	50	32
<b>Perceived threat</b>	62.59	6.65	47	80	33
<b>Knowledge</b>	42.87	3.77	33	57	24

The age of the subjects was related to all constructs except perceived reward, cost and behavior. Subject education levels were associated with all constructs except cost ( $p<0.001$ ). Also, marital status was related only to the perceived reward constructs ( $p=0.02$ ;  $df=1$ ;  $\chi^2=4.99$ ). Subjects' jobs were associated with perceived reward, self-efficacy, protective behavior, awareness, and perceived threat ( $p<0.001$ ). Economic status was related to all constructs except cost-response ( $p<0.001$ ). Spearman correlation test showed that receiving

news and information related to coronavirus was positively and significantly correlated with coping assessment ( $p<0.004$ ;  $r=0.178$ ), and motivation ( $p<0.001$ ;  $r=0.222$ ). There was a significant relationship between chronic disease and perceived fear and reward constructs ( $p<0.001$ ). Spearman correlation test showed that protective behavior was associated with all constructs except fear and had a strong correlation with behavioral intention ( $p<0.001$ ;  $r=0.579$ ) and perceived response self-efficacy ( $p<0.001$ ;  $r=0.470$ ). Knowledge about COVID-19 was also associated with all constructs except fear and strongly correlated with perceived reward ( $p<0.001$ ;  $r=0.405$ ). Spearman correlation matrix of PMT constructs is shown in Table 3.

"Washing hands regularly with soap and water for 20 seconds" (51%), "covering the face with a paper towel or elbow or when sneezing or coughing" (39.2%), "keeping a distance of 1.5 meters with others" (33.3%), "referring for a corona test if you have symptoms" (18.4%), "disinfecting hand-contact surfaces at work" (14.1%), "using a mask when confronting a person suspected of having a corona" (55.7%), "opening of workplace windows for ventilation intermittently" (20%), "disinfecting

personal items such as mobile phones, keys, bank cards, etc." (9%), "non-touching contaminated and disinfected hands with a mask" (22.4%) and "presence in crowded places" (28.2%) were the perpetual observance by individuals.

Knowledge predicted 11% ( $R=0.337$ ;  $R^2=0.113$ ;  $p<0.001$ ;  $CI=0.427-0.879$ ) of protective behavior, and demographic parameters predicted 17.9% ( $R=0.423$ ;  $R^2=0.179$ ;  $p<0.001$ ) of PMT constructs variance. The subjects' education level was the strongest predictor of the structures of protection motivation theory (Table 4).

All constructs of PMT, except perceived response cost, sensitivity, and perceived severity, predicted protective behavior ( $p<0.001$ ;  $R=0.495$ ;  $R^2=0.487$ ). In general, the constructs of this theory predicted 49.5% of the variance of protective behavior, and that protection motivation (behavioral intention) was the strongest predictor of behavior. Linear regression analysis also showed that in total, 37.5% of the model constructs predicted protective motivation (behavioral intention) against COVID-19 ( $p<0.001$ ;  $R=0.375$ ;  $R^2=0.367$ ) among which the evaluation of coping was a strong predictor of protection motivation (Table 5).

**Table 3)** Spearman correlation coefficient matrix of PMT theory constructs regarding COVID-19 protective behaviors

Parameter	8	7	6	5	4	3	2	1
1-Behavior	0.348**	0.178**	0.379**	0.383**	0.341**	0.579**	0.1	1
2-Fear	0.306**	0.058	0.034	0.199**	0.034	0.447**	1	
3-Motivation	0.377**	0.074	0.202**	0.418**	0.203	1		
4-Perceived sensitivity	0.153*	0.262**	0.319**	0.363**	1			
5-Perceived severity	0.279**	0.031**	0.307**	1				
6-Perceived reward	0.089	0.246**	1					
7-Cost-response	0.117	1						
8-Response efficiency	1							

\*Significant at 0.05; \*\*Significant at 0.01

**Table 4)** Liner regression analysis of demographic variables as predictors of PMT constructs

Parameter	$\beta$	P	Confidence Interval
Age	0.034	0.676	2.15-1.63
Sex	0.184	0.004	2.63-14.11
Education	0.240	0.001	2.07-8.12
Marital status	0.009	0.912	4.85-5.43
Job	0.157	0.035	0.15-4.18
Income	0.157	0.017	6.70-0.67

**Table 5)** The regression analysis of PMT structures as predictors of protective behavior

Parameter	B	SE	$\beta$	t	P	R <sup>2</sup>
Constant	-9.841	4.138	-2.378	0.018		
Perceived threat	0.283	0.807	0.176	3.255	0.001	
Perceived rewards	0.467	0.104	0.234	4.494	0.001	
Perceived response cost	0.001	0.120	0.001	0.008	0.994	0.448
Self-efficacy	0.086	0.086	0.064	1.006	0.316	0.432
Fear	-0.299	0.103	-0.164	-2.911	0.004	
Response effectiveness	0.551	0.801	0.391	3.536	0.001	
Intention	0.221	0.062	0.191	6.784	0.001	

## Discussion

This study aimed to evaluate the constructs of the PMT model in preventive behaviors against COVID-19 and the effect of the media in receiving information related to COVID-19. The results of the present study showed that half of the patients had moderate preventive performance, and the other half

had a good performance. However, few people have always practiced healthy behaviors. Our research findings are similar to other studies [11, 18]. This may be due to reduced restrictions and health messages, simplification, and mortality due to COVID-19.

In the present study, demographic variables were related to PMT model constructs. The present results



showed that there is a significant relationship between age and some constructs of the PMT model. In other words, older people are more likely to understand perceived awareness and threats. In general, threat information can significantly influence people's threat appraisals and emotions (Fear and anxiety), which can also be influenced by people's personalities and previous experiences [22]. In addition, perceived severity is age-related and is higher among the elderly than the young [23]. Women also had better protective performance than men. The results of the Mortada study support the present study's findings [24]. This difference may be related to society, social norms, and women's responsibilities. From this perspective, programs are needed to fill this gap and strengthen preventive behavior [25, 5].

In the present study, participants received more corona-related news from mass media and social networks. People search and share information during epidemics. Also, the use of social media continues to increase its popularity due to the facilities provided by their platforms for exchanging information, opinions, and activities [26]. Liu reported that social media influences audience perceptions of threats and enhances self-efficacy in disseminating COVID-19 information [14]. Social media information can have positive and negative effects [26, 27]. Threat assessment is attractive in health messages and may affect people's attitudes [14, 28-30]. However, experimental results regarding the fear appeal's effectiveness are inconclusive [31]. The source of information also had a stronger correlation with motivation (Behavioral intention). The mass media has a large audience, and their training may affect people's intentions to change behavior. It is possible that emotional attitudes, along with perceiving the threat posed by trust in new media, can positively affect the intention to take protective measures during a health crisis [4, 24]. Media use seems to be associated with self-efficacy and preventive behaviors [4, 24, 27].

In the present study, demographic variables predicted the constructs of the protection motivation theory against COVID-19; among them, the level of education is the stronger predictor. Education seems to play a role in disease prevention to control disease transmission and empower individuals [32, 33]. protective behavior in this study was associated with all constructs except fear. Our results are inconsistent with Khazaei et al. [18].

In the present study, most subjects had good knowledge. Health education seems to have had a positive effect [32]. However, knowledge could predict protective behavior to some extent and had a high correlation with perceived reward. Further awareness seems to lead to a better understanding of the benefits of preventive behavior [33]. The present study's results showed a correlation between preventive behaviors against COVID-19 and all constructs except fear. Despite reporting a positive

relationship between fear, attitude, and performance in other studies, the present study did not confirm this relationship [34].

In our study, behavioral intent showed a stronger association with behavior. The intention is considered a representative close to the behavior itself. As a person becomes more motivated to take preventive behavior against COVID-19, he or she is more likely to do so [2]. In the present study, fear, protective motivation, threat assessment, and coping assessment predicted approximately half the probability of preventive behavior occurring against COVID-19, with protective motivation (Intention) being the strongest predictor of behavior and similar to other studies [24, 35]. The role of coping assessment in this prediction was more than threat assessment. This means that people should feel threatened and feel they can do something about it. Theoretically, a high-threat assessment should lead to negative arousal, coping, and increased psychological symptoms. However, one study found that among individuals with low coping assessments, high-threat assessments could be interpreted as "unprotected" behaviors and inappropriate responses such as denial or avoidance [36]. In addition, the coping assessment had a strong effect on intention and, compared to other constructs, better-predicted protection motivation and was consistent with the study of others [23, 24, 28]. In general, Lin et al. [37] and Quandt et al. [38] identified self-efficacy and coping to perform a preventive behavior as the most critical construct in the context of appropriate behaviors against COVID-19. If the ability to fight the disease increases, the motivation and intention to take protective action against COVID-19 will also increase. It seems this research contributes to the public health crisis literature and its better management.

Although some studies have used the PMT model, the present study is the first to be conducted in southwestern Iran since the beginning of the COVID-19 pandemic to investigate different constructs affecting behavior and behavioral motivation. The present study also provides insights into the role of fear and self-efficacy and mass and social media in performing protective behavior against COVID-19. However, due to the self-reporting data collection tool, the answers may be exaggerated in some constructs, and the number of people with stable health behavior in this study was low. In our study, knowledge and behavior are in the same direction. Also, news sources may be able to influence the intent to perform protective behaviors and coping skills, and rewards of maladaptive behaviors and fear are negative predictors of protective behaviors against COVID-19. However, fear alone does not change behavior and can be a powerful tool to create fearsome campaigns. Protection motivation (Intent) also played an important role in observing the preventive behavior of COVID-19. In contrast, the coping assessment affected protection motivation.

Finally, using appropriate coping techniques, strengthening news sources (Mass and social media) and, gaining people's trust, continuing to send educational materials until the end of the pandemic and the disappearance of coronavirus in the target population may help maintain conservative behavior and vaccination.

## Conclusion

Protection motivation theory is effective in predicting protective behavior against COVID-19 infection.

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**Ethical Permissions:** Because data collection was through a questionnaire and there was no risk to life, informed consent was not obtained.

**Conflicts of Interests:** The authors have no conflicts of interest.

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