Original Paper

Factors Affecting Prevention Behaviors Against Covid-19 Infection Among Iranian Pregnant Women: Application of Protection Motivation Theory

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ABSTRACT: Considering the epidemic of corona disease in the world and the importance of paying attention to pregnant women as one of the most important vulnerable groups, it is felt necessary to conduct studies and properly teach them preventive behaviors. Therefore, the present study was conducted with the aim of investigating the factors influencing the prevention of covid-19, based on the Protection Motivation Theory (PMT), among pregnant women. This cross-sectional study was conducted during 2020 with the participation of 231 pregnant women who referred to the comprehensive health service centers of Langrod city, who were selected by simple random sampling. The tool of data collection was a questionnaire consisting of two sections of demographic information and PMT constructs. According to the results, 10.32% reported a history of Covid-19 infection. Carrying out protective behaviors, such as using a mask (94.4 percent), washing hands frequently with soap and water (88.8 percent), maintaining a distance of at least one and a half meters from other people (84.5 percent) in a favorable position and avoiding. The participation in the periods (71.4 percent) was relatively favorable. The result of linear regression analysis showed that perceived self-efficacy (β=0.450) and perceived response effectiveness (β=0.305) were predictors of protective motivation or intention to perform protective behaviors against Covid-19. Also, 66.7% of women were on the path of perceived risk. The PMT can be used as a framework in designing educational programs in order to perform preventive behaviors against infectious diseases such as Covid-19.

KEYWORDS: Pregnant Women, Covid-19, PMT, Preventive Behaviors.

Introduction

First reported on December 31, 2019, in Wuhan, China, COVID-19 is a severe infectious respiratory disease caused by the coronavirus.

The disease soon affected 222 countries and regions worldwide due to its very high transmission rate.

Thus, it was named the century's epidemic by the World Health Organization [1] and caused rigorous social, economic, and psychological pressure worldwide [2].

An essential component in the management of any threat of communicable diseases is the care of the vulnerable population.

In this regard, pregnant women are among the high-risk groups during the outbreak of infectious and respiratory diseases, which will lead to their mortality with increased disease complication [3,4].

The lethality of the virus is high, particularly in vulnerable populations and communities where the health system is not sufficiently prepared to deal with this disease [5].

The immune response of the placenta to viruses and pathogens plays a vital role in determining the vulnerability of the pregnant mother to infectious diseases during pregnancy [6].

The immunodeficiency during pregnancy makes pregnant women more susceptible to viral infections than the general population [7].

Pregnant women with COVID-19 present milder symptoms than the general population, and their RT-PCR tests may be negative despite the pneumonia symptoms [8].

In addition, premature delivery, low birth weight, cesarean delivery, and hospitalization may also occur in the newborn intensive care units (NICUs) [9].

The spread of the disease is largely affected by the behavior of the people in society [10], and the prevention of contagious and infectious diseases is the key to the health of society and

protecting the health of vulnerable people, particularly pregnant women [11].

Individual and group preventive measures play an essential role in disease control.

Individual preventive behaviors include wearing a mask, washing hands, keeping social distancing, and non-participation in gatherings. In this regard, the government plays a major role in group preventive behaviors [12].

Other factors such as knowledge, behavior control, environmental factors, ethical norms, and preventive guidelines by the government are also effective on people's intention to perform or not perform the behavior [13].

Although knowledge of the problem is important, understanding the risk is the key factor in attitude and behavior changes in preventing the disease outbreak during the pandemic [14].

Health and preventive behaviors have been examined using various theories.

Among the most widely used theories to examine factors affecting individuals' motivation to perform protective behaviors upon facing an epidemic health threat (e.g., COVID-19) is the Protection Motivation Theory (PMT) (Figure 1) [15] developed by Rogers (1975).

According to the assumptions of this theory, threat and coping appraisals are two parallel cognitive processes that lead to protection motivation.

PMT emphasizes how people's perception creates motivation and movement and causes them to behave.

Threat appraisal includes the constructs of perceived vulnerability, severity, and rewards.

On the other hand, coping appraisal includes the constructs of self-efficacy, response efficacy, and perceived response costs.

Fear is an intermediate variable between perceived vulnerability and threat appraisal. Protection motivation is synonymous with behavioral intention and causes the motivation or continuation of behavior [15].

Given the severe transmission of this disease, the virus related-factors, and the prescription of antiviral drugs, COVID-19 treatment has become a significant challenge during pregnancy.

Therefore, this necessitates conducting studies and highlights the role of education and beliefs related to protective behaviors in preventing COVID-19 infection in pregnant women.

Accordingly, the present study aimed to determine the factors affecting PMT-based preventive behaviors against COVID-19 infection among pregnant women.
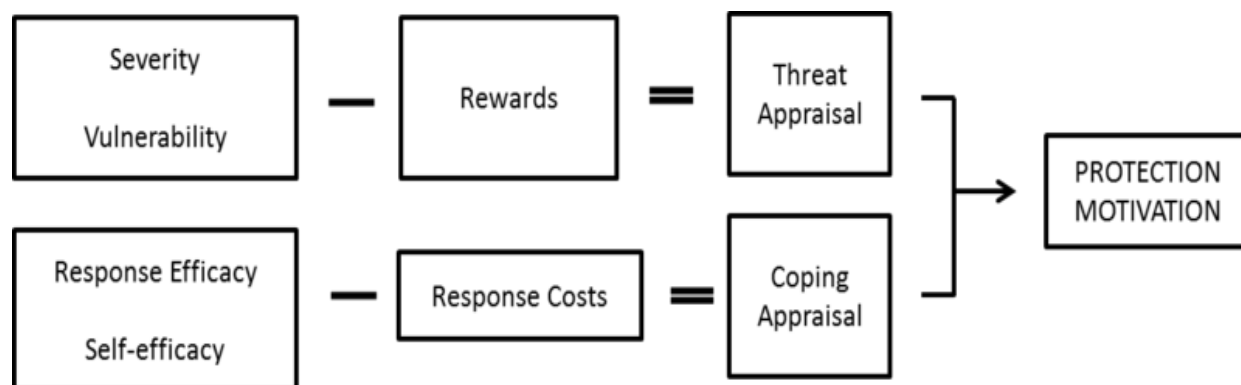

Figure 1. Protection Motivation Theory framework.

Methods

The present descriptive-analytical cross-sectional study was conducted on 213 pregnant women referring to collective health service centers in Langroud city, north of Iran, in 2020.

The research participants were selected by simple random sampling and included in the study according to inclusion criteria.

To this end, the list of pregnant women covered by all collective health service centers

(2 urban centers, 3 rural centers, and 7 rural-urban centers) was first extracted from these centers.

Then, the research samples were selected by a simple random method to investigate the conditions for their inclusion in the study.

Then, those who met the inclusion criteria were contacted by phone.

If they were willing to participate in the study, the link to the electronic questionnaire

was sent to the pregnant women and asked to complete with the self-report method.

The inclusion criteria were having electronic pregnancy records in the health centers, literacy, singleton pregnancy, no history of mental illness in pregnancy records, access to the Internet and smartphones, and willingness to participate in the study.

Ultimately, the data of pregnant mothers who completed the questionnaire incompletely were excluded from the study.

This research was approved by the ethics committee of Hamadan University of Medical Sciences (ID: IR.UMSHA.REC.1399.996).

The data collection tool was a researcher-made questionnaire designed based on similar studies [16-18].

The tool consisted of two general sections of demographic information and items of PMT constructs.

Demographic questions were measured with 16 questions, including age, education level, occupation, gravidity, gestational age, number of previous births, number of miscarriages, number of live children, underlying disease, history of COVID-19 disease, loss of first-degree family members due to COVID-19 infection, receiving prenatal care, and sources of information about COVID-19 disease.

The constructs of PMT were measured with 35 items.

Perceived susceptibility with 4 questions (e.g., "I may be infected with COVID-19"), perceived severity with 5 questions (e.g., "COVID-19 can lead to death"), perceived response efficacy with 5 questions (e.g., "using a mask can prevent COVID-19"), perceived self-efficacy with 6 questions (e.g., "I can wear a mask continuously outside the house"), perceived response cost with 5 questions (e.g., "long-term use of a mask causes shortness of breath"), fear with 4 questions (e.g., "thinking about COVID-19 makes me anxious"), and protection motivation with 2 questions (e.g., "I plan to avoid participating in family gatherings to prevent COVID-19") were measured with a Likert scale of 1-5 points from strongly disagree [1] to strongly agree [5].

Preventive behaviors against COVID-19 infection were measured by 4 questions with a 3-point scale, including never (=0), sometimes (=1), and always (=2).

In this study, the threat appraisal score was calculated from the sum of perceived susceptibility and severity scores divided by the number of questions.

In addition, the coping appraisal score was estimated from the sum of self-efficacy and perceived response efficiency minus perceived response cost divided by the number of questions.

Then, the coping appraisal score was subtracted from the threat appraisal score, and the obtained positive (≥ 0) and negative (≤ 0) values indicated one's involvement in the risk perception process and the fear understanding process, respectively.

The content validity was verified by sending the questionnaire to 10 health education and health promotion specialists.

Also, the content validity ratio (CVR) and content validity index (CVI) indices were estimated, and the necessary corrections were made afterward.

Furthermore, reliability was measured by presenting the questionnaire to 30 pregnant women to estimate the internal consistency of the questions.

The estimated Cronbach's alphas of susceptibility, severity, response efficacy, self-efficacy, response cost, fear, protection motivation, and behavior were 0.71, 0.72, 0.87, 0.88, 0.78, 0.84, 0.92, and 0.74, respectively.

The data were analyzed using SPSS software version 16 by linear regression, one-way analysis of variance (ANOVA), independent t-test, and Pearson's correlation tests at a significance level of <0.05 in all tests.

Results

The mean age of the research participants was 28.57±5.7 years, with a range of 13-40 years.

According to the findings, 64% of the participants held high school diplomas and dropout education degrees and 90.5% were housewives.

Wanted and primigravida pregnant women comprised 86.9% and 50% of the subjects, and 10.32% reported a history of infection with COVID-19.

Other demographic information of the research participants is summarized in Table 1.

Table 1. Demographic characteristics of the samples (n=213).

Variable	number	percentage
Age		
<20	21	9.8
20-30	112	52.6
>30	80	37.6
Education		

Under diploma and diploma	137	64
Bachelor degree	19	9
Master s degree and above	57	27
Occupation		
Housewife	193	90.5
Working outside the home	20	9.5
Parity		
Nulliparous	106	49.8
Prim parous	79	37.1
Multiparous	28	13.1
Pregnancy status		
Desired pregnancy	185	89.6
Unwanted pregnancy	28	13.1
Gestational age (Wk)		
<14	28	13.1
14-28	91	42.8
>28	94	44.1
Number of children		
No child	119	55.86
1	85	39.90
>2	9	4.21
COVID-19 Infected		
Yes	22	10.32
No	191	89.68

The study of preventive behaviors against COVID-19 infection revealed that the conditions of frequent hand washing with soap and water (88.8%), a minimum distance of 1.5m from other people (84.5%), and wearing a mask (94.4%) were desirable.

Meanwhile, the behavior of avoiding participation in gatherings (71.4%) had a relatively desirable condition.

Moreover, 66.7% of the research participants were on the path to understanding the risk of this disease.

Table 2 represents the mean, standard deviation, range of obtainable scores, and the average percentage of the maximum obtainable score of the PMT constructs.

As can be seen, the constructs of behavior, perceived self-efficacy, perceived response efficacy, and protection motivation were in satisfactory conditions.

However, the conditions of the constructs of perceived vulnerability and perceived severity were not desirable.

Table 2. Mean, standard deviation, range of obtainable scores, and the average percentage of the maximum obtainable score of the PMT constructs.

Constructs	Mean	SD	Range	Percentage
Perceived Susceptibility	10.44	2.29	4-20	40.25
Perceived Severity	14.92	2.16	5-25	49.60
Perceived Response Efficiency	21.30	2.72	5-25	81.50
Perceived Self-Efficacy	25.19	3.20	6-30	79.95
Perceived Response Cost	16.49	3.42	5-25	57.45
Fear	13.69	3.34	4-20	60.56
Motivation to Protect	8.43	1.17	2-10	80.37
COVID-19 Prevention Behaviors	7.31	1.02	0-8	91.37

The results of the linear regression analysis of the PMT constructs in predicting the protection motivation and behavior constructs are presented in Table 3 and Table 4.

As can be seen, the constructs of perceived self-efficacy (β=0.450) and perceived response efficacy (β=0.305) were the predictors of protection motivation or the intention to perform protective behaviors against COVID-19 and explained 52.8% of the changes in the variance of the protection motivation construct.

Besides, the protection motivation construct was a strong predictor of performing protective behaviors against COVID-19 and explained 17% of the variance of the protection motivation construct.

Table 3. Linear regression of the PMT constructs in predicting the protection motivation (Intention).

Constructs	β	B	SE	95% CI Lower	95% CI Upper	P_{value}
Perceived susceptibility	-0.020	-0.010	0.025	-0.060	0.039	0.677
Perceived severity	0.033	0.018	0.028	-0.038	0.073	0.534
Perceived response efficiency	0.305	0.131	0.028	0.076	0.186	0.001
perceived self-efficacy	0.450	0.164	0.023	0.118	0.210	0.001
Perceived response cost	-0.086	-0.029	0.019	-0.066	0.007	0.117
Fear	0.103	0.036	0.020	-0.002	0.075	0.065
Constant	--	1.345	0.649	0.066	2.623	0.039

Note: Note: β=Beta, B=unstandardized regression coefficient, SE=Standard Error

Table 4. Linear regression of the PMT constructs to predict Covid-19 preventive behaviors.

Constructs	β	B	SE	95% CI		P_value
				Lower	Upper	
Protection Motivation	0.412	0.360	0.055	0.252	0.468	0.001
Constant	--	4.274	0.466	3.355	5.194	0.001

Note: Note: β=Beta, B=unstandardized regression coefficient, SE=Standard Error

Discussion

This study aimed to determine the factors affecting the preventive behaviors of Iranian pregnant women against COVID-19 based on the PMT.

The results showed that the following preventive behaviors against COVID-19 infection were at satisfactory levels: wearing a mask, frequent hand washing with soap and water, and a minimum distance of 1.5m from other people.

Besides, avoiding participation in social gatherings was at a relatively favorable level.

These findings are in line with those of studies conducted in Iran [5,16,19] and a study in Saudi Arabia [20].

Overall, these outcomes can be attributed to the high prevalence of this disease in Iran and worldwide, high mortality and hospitalization rates in a short period, and extensive media information and various campaigns to create awareness and sensitize pregnant women to perform preventive behaviors. Since COVID-19 is an emerging disease that has affected all countries, information sources are continuously being updated.

Therefore, adopting protective behaviors is expected at an acceptable level.

In this study, the perceived vulnerability and perceived severity scores were not satisfactory, which corresponds to a previous study [21].

However, this result of our study does not agree with that of another report [22].

This finding can be justified by the fact that high perceived fear and vulnerability can adversely affect adopting protective measures.

A high level of perceived vulnerability increases negative feelings, so people consider themselves susceptible to the disease.

Consequently, they try to perform preventive behaviors.

Based on the linear regression analysis of the PMT constructs in predicting protection motivation (intention), perceived response efficacy and perceived self-efficacy could significantly predict the intention to perform protective behaviors against COVID-19.

This finding corroborates those reported previously [23,24,26], meaning that an increase in one's understanding of the efficacy of protective behaviors will be associated with more motivation to protect and vice versa.

Our results are consistent with a previous investigation [21].

According to our results, if pregnant women feel that they can protect themselves against the disease on their own and that these measures have the necessary efficacy, they will be more willing to perform such behaviors.

This can also be linked to the importance of education and knowledge so that enough education offered to pregnant women will give them self-confidence in properly handling protective actions.

Higher self-efficacy can improve preventive behaviors in a vulnerable population [25].

This result of our study is confirmed by a previous study [26], so that pregnant women with a higher level of self-efficacy showed more tendency toward preventive behaviors against the disease, and self-efficacy was the highest behavioral predictor.

Our results are consistent with those of other studies [23-26], suggesting that the PMT constructs could predict protection motivation, and self-efficacy was the most important predictor of behavioral intention.

These results demonstrate that self-efficacy should be prioritized in educational interventions to increase people's motivation.

In this study, protection motivation (behavioral intention) was the strongest predictor of performing behaviors against COVID-19.

The results of some studies [23,24,27] are consistent with these findings as the PMT constructs could predict behavioral changes.

Thus, preventive behaviors against COVID-19 are positively correlated with protection motivation.

The limitations of this study include the online completion and self-report of the

questionnaire to collect information, which may affect the reliability of the data.

Besides, completing the questionnaire by only people owning a smartphone with access to the Internet can reduce the participation of individuals without these facilities in such studies.

Conclusion

The results of this study confirm the suitability of applying the PMT in predicting preventive behaviors against COVID-19 infection as a suitable framework for predicting adaptive behaviors.

Therefore, future studies are recommended to use this theory to improve health behaviors.

Conflicts of interest

The authors did not report any conflict of interest.

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