Self-Care Behaviors in Preventing COVID-19: A Health Belief Model-Based among Families in Yazd City

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ABSTRACT

Background: Identification of self-care behaviors and barriers in the COVID-19 pandemic can help health policymakers design appropriate and practical plans. This study aimed to investigate the efficacy of self-care behaviors in preventing COVID-19 based on the health belief model (HBM) among families in Yazd City.

Methods: The present cross-sectional study was conducted using the convenience sampling method in 2020. The research data were collected via a researcher-made questionnaire based on the HBM. The validity and reliability of the questionnaire were confirmed before its distribution on social networks. A total of 226 questionnaires were collected and analyzed using SPSS software version 22.

Results: The results showed no significant correlations between the mean scores of HBM constructs and participants' age, gender, and education level ($p > 0.05$). Also, the linear regression test indicated that perceived self-efficacy (B = 0.88), perceived susceptibility (B = 0.63), and perceived intensity (B = 0.74) were the most predictive constructs, demonstrating statistical significance. ($P < 0/05$). The HBM constructs could significantly predict preventive behaviors of COVID-19 and accounted for 29.6 % of their changes (Adjusted R^2 = 0.296, F = 18.85, $p \leq 0.000$).

Conclusion: Implementing effective interventions based on the health belief model, with a particular focus on improving self-efficacy, perceived susceptibility, and perceived severity can reduce the incidence of COVID-19 and its associated complications.

1. Introduction

Given the exponential prevalence, mortality rate, and complications of COVID-19, the World Health Organization (WHO) introduced it as a global pandemic and a public health emergency of international concern [1]. On March 11, 2020, the WHO and the Center for Disease Control and Prevention (CDC) published a pamphlet containing recommendations to reduce and control disease transmission, including washing hands frequently with soap and water, avoiding gatherings, maintaining a distance of at least one meter from other people, and avoiding touching the eyes, nose, and mouth by hands. Individuals were also recommended to stay at home, rest, and follow the health recommendations in the case of observing mild symptoms of respiratory disease [2-4]. To date, no definitive treatment or

vaccine has been discovered for COVID-19, and studies are still ongoing [5-7]. Due to the lack of a definitive treatment, adherence to the recommended preventive measures is of high significance in disease prevention and control. Observing the disease prevention behaviors by individuals is a simple, cost-effective, and reliably available method of controlling the spread of the disease. However, employing these behaviors may not be very desirable for the public. In this vein, behavioral and health science researchers have investigated behavioral change theories and models to clarify and explain the reasons for some individuals' lack of compliance with the recommended health behaviors [8-10]. One such model is HBM administered as a useful and valuable tool for understanding and justifying health behaviors. As one of the oldest theories derived from behavioral science theories, the HBM remains a widely applied and well-known model in healthcare behaviors, focusing on individual's attitudes and opinions regarding behavior change [11]. The components of HBM include 1) Perceived susceptibility, defined as a person's understanding of being susceptible to a disease or a health condition, which indicates that people's susceptibility to diseases varies according to their perception and attitude about the risk of disease. 2) Perceived severity refers to a person's belief about the severity of harm caused as a result of the disease development or its harmful conditions raised by a specific behavior. 3) Perceived benefits are related to the individuals' trust in the benefits of the proposed methods to reduce the disease risks and complications or its harmful consequences resulting from specific behaviors. These benefits refer to the effectiveness of preventive measures in reducing the disease threat. 4) Perceived barriers are associated with the potential negative dimensions of people's perceptions acting as obstacles to performing a behavior. 5) Self-efficacy results from ensuring that a person has the necessary ability to pursue a behavior [12-15]. In other words, HBM believes that individuals react well to disease prevention messages when they feel that they are at risk (perceived susceptibility) of a life-threatening and serious danger (perceived severity). Consequently, they conclude that changing health-related behaviors is beneficial for them (perceived benefits) to remove the existing barriers to performing the health behaviors (perceived barriers). In this regard, educational interventions and programs can be effective [16-17]. As a result, identifying these behaviors and the existing barriers can help health policymakers to design suitable plans to address these obstacles and increase the individuals' susceptibility to adopting health behaviors. Thus, we aimed to investigate self-care behaviors in preventing COVID-19 among families in Yazd City using the HBM.

2. Materials and Methods

In this descriptive-analytical research, 226 men and women from Yazd City were studied in 2020. The sampling method employed was non-random and accessible, utilizing a questionnaire distributed in channels created on Telegram and WhatsApp. The questionnaires were completed online by the participants. The sample size was determined using the following formula that is used for descriptive correlation studies.

$$N = \left[\frac{z_{1-\frac{\alpha}{2}} + z_{1-\beta}}{0/5\log\frac{1+r}{1-r}} \right]^2$$

taking into account $\alpha = 0.05$ and $\beta = 0.2$, and based on previous studies with a correlation coefficient $r = 0.6$, the estimated correlation between the constructs of the HBM was anticipated to be 124 individuals. Considering the potential loss of 1.6, the sample size was estimated to be 198 individuals. To ensure greater certainty, 226 participants were included in the study. Due to the pandemic conditions, the distribution of the questionnaires was conducted online using social networks (Telegram and WhatsApp). Before data collection, necessary permissions were obtained from the Ethics Committee of Shahid Sadougi University of Medical Sciences (IR.SSU.REC.1400.007). The online link of the questionnaire was then sent to public virtual groups related to Yazd City through WhatsApp and Telegram. The participants could access and complete the questionnaire online by clicking on the provided link. Before completing the questionnaires, respondents were provided with the necessary explanations about the study objectives, confidentiality of the information, and access to a summary of the results. Finally, the thoroughly completed questionnaires from individuals meeting the inclusion criteria (i.e., willingness to participate in the study, reading and writing literacy, and being 18 years of age and older) were separated and automatically stored in the researcher's drive. These collected data were then analyzed. The administered questionnaire consisted of two parts. the first part was a demographic information questionnaire including four items, including age, gender, economic status, and educational level. The second part was an HBM questionnaire consisting of 48 items with 5 dimensions: perceived susceptibility (6 items), perceived severity (6 items), perceived benefits (6 items) (each with a minimum score of 6 and a maximum score of 30), perceived barriers (10items), self-efficacy (10 items), and self-care behaviors (10 items) (each with a minimum score of 6 and a maximum score of 50). The respondents were required to answer the items based on a 5-point Likert scale, ranging from "I completely agree" (5 points) to "I completely disagree" (1 point). The selection of the constructs for each question was based on a thorough review of the literature. To ensure the validity and reliability of these questionnaires, content validity methods and Cronbach's alpha test were used, respectively. To determine the validity of the questionnaire, it was sent to 10 health education specialists. Based on the opinions of the experts, necessary amendments were applied to the questionnaire. The validity of the questionnaire was higher than 80 %. To measure the reliability, the questionnaire was completed by 30 of the studied subjects using Cronbach's alpha test, the reliability coefficient of the perceived sensitivity was 0.75, perceived severity was 0.78,

and perceived benefits were 0.75. perceived barriers were calculated as 0.84, self-efficacy as 0.86, self-efficacy as 0.78, and self-care behaviors as 0.74. The data were analyzed using SPSS version 20 software, and statistical tests such as ANOVA, Pearson correlation, and linear regression statistical tests were used. The normality of the data was checked by the Kolmogorov-Smirnov test.

2.1 Study outcomes

The primary outcome was to assess self-care behavior during the COVID-19 pandemic. The secondary outcome aimed to evaluate the constructs of the HBM, including perceived susceptibility, perceived severity, perceived benefits, perceived barriers, and self-efficacy.

3. Results and Discussion

Based on the descriptive analysis, the participants' mean age was 35.5 ± 11.9 years, ranging from 18 to 77 years. Among the participants, 77.4 % were female, and 22.6 % were male. In terms of economic status, 7.5 %, 49.1 %, and 30.6 % of the participants were at a low, moderate, and good economic status, respectively. Regarding the participants' level of education, 15.9 %, 65.9 %, and 18.2 % had diplomas or lower degrees, bachelor's degrees, and master's degrees or higher. The mean scores of HBM constructs had no significant association with age, gender, and educational level ($P > 0.05$) (Table 1). Although a significant and direct correlation was found among the HBM constructs, no significant correlation was observed between the constructs of perceived severity and self-care behaviors ($p = 0.494$) as well as between the constructs of perceived severity and perceived barriers ($p = 0.487$) Table (2). According to Table 3, the HBM constructs could predict self-care behaviors to prevent COVID-19, which accounted for 29.6 % of the behavioral changes (Adjusted R squared = 0.296, F = 18.85, $p \leq 0.000$). Among the HBM constructs, self-efficacy (B = 0.88), perceived susceptibility (B = 0.63), and perceived severity (B = 0.74) were more effective in predicting the preventive behaviors against COVID-19.

Table 1. The mean scores of HBM constructs based on individual characteristics

HBM constructs		Perceived susceptibility			Perceived severity			Perceived benefits			Perceived barriers			Perceived self-efficacy		
Individual characteristics		N	Mean (Std. deviation)	p-Value	N	Mean (Std. deviation)	p-Value	N	Mean (Std. deviation)	p-Value	N	Mean (Std. deviation)	p-Value	N	Mean (Std. deviation)	p-Value
Age	18- 34	107	22.26 (2.43)	0.14	107	22.27 (3.82)	0.52	107	18.05 (2.89)	0.11	107	33.25 (6.8)	0.61	107	35.28 (5.27)	0.26
	35-77	119	25.45 (3.35)		119	22.93 (4.24)		119	19.2 (3.63)		119	33.7 (6.49)		119	35.92 (5.78)	
Gender	Female	175	25.7 (2.9)	0.70	175	22 (3.9)	0.50	175	18.8 (3.37)	0.64	175	33.36 (6.4)	0.58	175	35.74 (5.38)	0.58
	Male	51	25.8 (3.08)		51	22.43 (4.19)		51	19.05 (3.11)		51	33.94 (7.1)		51	35.19 (6.13)	
Education	Secondary school or lower	36	25.55 (3.55)	0.82	36	21.8 (4.63)	0.56	36	18.38 (3.45)	0.49	36	34.04 (6.04)	0.63	36	35.63 (5.7)	0.58
	Bachelor's degree	149	25.51 (2.93)		149	22.01 (3.97)		149	18.87 (3.88)		149	32.2 (6.96)		149	35.41 (5.65)	
	Master's degree and higher	41	26.65 (2.28)		41	22.68 (3.50)		41	19.29 (3.65)		41	33.87 (6.01)		41	36.41 (4.94)	

The exponential development of COVID-19 has put significant pressure on various aspects of lives, including physical, social, economic, and mental health. To effectively manage the disease, taking preventive measures by observing health protocols and performing health behaviors set by global and local standards have been emphasized as the main ways to avoid contracting the virus. This study aimed to investigate the individuals' adherence to self-care behaviors in preventing COVID-19 based on the HBM. The results of the linear regression analysis showed that there was a statistically significant relationship between the constructs of perceived susceptibility, perceived severity, and self-efficacy with the variable of prevention behavior of COVID-19. Among these constructs, self-efficacy was the most predictive of COVID-19 prevention behavior. Individuals with high self-efficacy were more likely to engage in preventive behaviors against COVID-19. This finding is consistent with a study by Zareipour *et al.* (2020) [13], which showed a significant relationship between self-efficacy and the behavior of preventing coronavirus in the elderly. Self-efficacy refers to an individual's belief in their ability to prevent COVID-19. Therefore, increasing self-efficacy can be an effective approach to controlling the disease of COVID-19 and promoting preventive measures.

Table 2. Correlation of HBM constructs

Constructs	Perceived susceptibility	Perceived severity	Perceived benefits	Perceived barriers	Perceived self-efficacy	Self-care behavior
Correlation	r	r	r	r	r	r
	p	p	p	p	p	p
Perceived susceptibility	1.000					
	0.000					
Perceived severity	0.359	1.000				
	0.000	0.000				
Perceived benefits	0.413	0.245	1.000			
	0.000	0.000	0.000			
Perceived barriers	0.199	-0.002	0.278	1.000		
	0.001	0.487	0.000	0.000		
Perceived self-efficacy	0.500	0.259	0.484	0.493	1.000	
	0.000	0.000	0.000	0.000	0.000	
Self-care behavior	0.182	-0.001	0.279	0.513	0.380	1.000
	0.003	0.494	0.000	0.000	0.000	0.000

Furthermore, the study found a significant relationship between perceived susceptibility variables and self-care behavior in preventing COVID-19. Higher perceived susceptibility among individuals led to better performance in preventive behaviors. This aligns with a study by Razmara *et al.* (2018), which emphasized the role of perceived susceptibility in preventing COVID-19 during the outbreak [14]. When individuals perceive themselves as being at risk of contracting the Coronavirus, [17] they are more likely to engage in preventive behaviors. Also, the results showed that there is a significant relationship between the perceived severity structure and COVID-19 prevention behavior. Awareness of the serious risks associated with COVID-19, such as breathing difficulties, extreme fatigue, neurological problems, dizziness, impaired sense of smell and taste, the possibility of cardiovascular and kidney diseases, and potential long-term damage to other organs, contributes to a higher level of perceived severity. In their study, Delshad *et al.* (2020) [15,16] showed that there is a significant relationship between the perceived severity of the coronavirus and the increase in self-care behaviors in the prevention of the coronavirus based on the HBM model [18]. Therefore, increased awareness of the complications of the COVID-19 disease and the fear of experiencing these complications motivate individuals to adhere to COVID-19 preventive behaviors. The mean scores of perceived susceptibility, perceived severity, and perceived benefits, which are critical factors in controlling the epidemic, were at an appropriate level. These findings are supported by a study conducted in Hong Kong, which reported that over 77 % of the participants were at a good level of health performance during COVID-19. This study recommended a timely assessment of the risk perception, exposure to information, and adoption of preventive measures in the early stages of COVID-19. Despite the early ambiguity surrounding the disease, people in the community had high levels of perceived susceptibility and perceived severity. A slight increase in the general anxiety level was reported during the study period and nearly all respondents practiced personal hygiene and avoided traveling [18]. Although gender has been identified as a critical variable influencing preventive behaviors in previous studies [16-18], we observed no significant difference between males and females in terms of

their scores in HBM constructs. Liu *et al.* (2020) investigated the H1N1 pandemic in Hong Kong and concluded that women performed better than men in preventing the disease [19]. This finding can be justified by the high average level of education in our study leading to an equal performance between women and men in terms of perceived susceptibility, perceived severity, and perceived barriers. However, our participants were not at favorable levels of perceived barriers and self-efficacy. Yastica *et al.* (2020) [20] examined health beliefs and descriptive information related to perceived susceptibility to COVID-19. They found that while many participants were concerned about infection with COVID-19, relatively few individuals considered themselves at high risk of developing COVID-19. This necessitates the need to increase risk perception among the public because risk perception translates into preventive measures in many infectious disease outbreaks and enhances epidemic control [21].

Table 3. Regression analysis of the HBM constructs' predictors in preventing COVID-19

Variables	B	SE B	Beta	T-test	P- value
self-efficacy	0.88	0.674	0.134	3.671	0.01
Perceived susceptibility	0. 63	0.454	0.110	2.152	0.04
Perceived severity	0. 74	0. 569	0. 126	1.078	0.02
Perceived benefits	0.101	0.060	0.074	1.685	0.093
Perceived barriers	0.123	0.042	0.041	2.313	0. 14
$p \leq 0.000$ ، F = 18.85 ، Adjusted R squared = 0.296					

4. Conclusion

According to the results of this study, it is suggested to carry out detailed educational planning for community members based on the HBM based on the constructs of self-efficacy, perceived susceptibility, and perceived severity, which are strong predictors of self-care behavior to prevent COVID-19. So that we can prevent this disease and its complications.

4.1 Limitation and recommendation

One limitation of the current study is the virtual completion of the questionnaire by study participants. This problem may reduce the accuracy of people completing the questionnaire. It is possible that when filling out a questionnaire, one asks a question that cannot be answered. It seems likely that in cases where such studies are conducted with larger, in-person samples, they will yield more reliable results.

Authors' Contributions

Fateme Rahighee: Article writing. Leila Asadi: Data collection. Fateme Moshirenia: Study design. Seyedeh Mahdieh Namayandeh: Data analysis. MoradAli Zareipour: Submit and revise the article. Mahdieh Hardani: Implementation of the plan. Behjat Khorsandi: Study design and article writing.

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Conflicts of Interest

There are no conflicts of interest.

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Ethical considerations

This study is the result of a research project with the ethical code (IR.SSU.REC.1400.007) in the Research Ethics Committee of Yazd University of Medical Sciences.

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