

Covid-19 Preventive Behaviors in Iranian People: Applying Health Belief Model

MAJID BARATI¹, SAEID BASHIRIAN¹, MARYAM AFSHARI²,
SALMAN KHAZAEI³, ENSIYEH JENABI⁴, BEHZAD GHOLAMALIEE⁵,
SEPIDEH ZAREIAN⁶

¹*Social Determinants of Health Research Center and Department of Public Health, School of Public Health, Hamadan University of Medical Sciences, Hamadan, Iran*

²*Department of Public Health, Hamadan University of Medical Sciences, Hamadan, Iran*

³*Research Center for Health Sciences, Hamadan university of Medical Sciences, Hamadan, Iran*

⁴*Pediatric Developmental Disorders Research Center, Hamadan University of Medical Sciences, Hamadan, Iran*

⁵*Tuyserkan Health Center, Hamadan University of Medical Sciences, Hamadan, Iran*

⁶*Hamadan University of Medical Sciences, Hamadan, Iran*

ABSTRACT: Covid-19 disease, as a common infectious disease, has caused infection and death. Preventive behaviors are among the most important essential strategies of the Covid-19 disease prevention and control program. The health belief model (HBM) is one of the models that have been used to investigate the effective motivational factors and ultimately the protective behavior of the individual. Therefore, this study was conducted to define the factors related with Covid-19 protection behaviors among patients referred to comprehensive health service centers in Tuyserkan city using the HBM. A total of 800 patients referred to the comprehensive health service centers of Tuyserkan city during November 2021 were selected as the statistical population of this descriptive-analytical study. Clients were selected by multi-stage cluster random sampling from 21 comprehensive health service centers and health bases and then entered the study through simple random sampling. Data collection was online and based on a questionnaire. The questionnaire consisted of two parts: demographic information and HBM structure. The analysis was performed using SPSS24 software after data collection. The mean age of the subjects was 48.80 years and the income of the majority of the subjects was low (86.5%). People who washed their hands frequently kept a social distance, avoided losing others, used masks and gloves were 54.2%, 72.5%, 79.8%, 53.9%, 7.9% respectively. The results showed that with one unit increase in self-efficacy score and practice guide, the average behavior score increased by 0.27 and 0.31. The results show that the importance of prevention of Covid-19 infection among the population is necessary due to the high prevalence of infection and mortality. It seems that in intervention and prevention programs, the factors of prevention of Covid-19 transmission should be fully identified and proper interventions should be planned and implemented based on affective factors.

KEYWORDS: COVID-19, People, Preventive behaviors, Health Belief Model, Iran.

Introduction

Emerging pathogens are challenging the general health of the world [1].

Over the previous two decades, the prevalence of acute respiratory infections has been seen as one of the most severe health risks in the world.

Due to the high incidence and widespread distribution of COVID 19, the high genetic diversity, and the growth in human-animal communication activities, the new coronaviruses are likely to be due to recurrent cross-species infections and occasional sometimes they appear periodically in humans [2].

Both transient coronaviruses, 2002SARS-CoV and 2012MERS-CoV, significantly affected human health, causing 8422 and 1600 infections, as well as 916 and 574 deaths [3,4].

In early December 2019, several cases of pneumonia of unknown cause came to medical centers in Wuhan City.

Most patients at work or lived nearby the wholesale seafood market [5].

Determining the results of lower respiratory tract samples revealed a new coronavirus called New Coronavirus 2019 (2019-nCoV) [1].

Coronaviruses cause multiple system infections such as Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS) [6-8].

Common symptoms include fever, fatigue, and dry cough, followed by anorexia, muscle aches, shortness of breath, and so on [9,10].

Most patients have mild symptoms and a good prognosis [10].

Typical laboratory findings show lymphopenia and mild aminotransferase levels.

Death may be due to progressive respiratory failure due to alveolar injury [7].

Coronavirus is controlled in a community by identifying, treating infected cases and isolating infected cases, tracking, and quarantining cases by close contact with patients.

In the meantime, promoting preventive behaviors of the general population is important [11].

Preventive measures by people to protect individuals against this disease are one of the most important strategies of the program for the prevention and control of respiratory viral diseases [12].

To identify preventive measures against the prevention and control of viral diseases, determinants and factors affecting the preventive behaviors of respiratory viral diseases must be identified [12].

To identify the most effective and accurate determinants and protective measures, it is necessary to use the theory and models of health education [13].

The first step in the planning process of any health education program is to choose a model for health education and the appropriate model keeps the program in the right direction and the right direction [13].

The HBM is one of the educational theories that help to identify important and affective determinants.

This model emphasizes how an individual's perception motivates and moves and reasons behavior in him.

In general, this model focuses on changing beliefs, and change in beliefs leads to change in behavior and has the structures of the perceived sensitivity, perceived severity, perceived threat, perceived benefits, perceived barriers, guidance for action, and self-efficacy [14,15].

Therefore, it is necessary to pay attention to disease protection behaviors in this group.

Despite the effectiveness of protective behaviors in preventing the disease, unfortunately, many people at risk do not pay attention to the observance and implementation of protective behaviors.

However, the question arises as to why, despite the emphasis on health care systems and public information centers, most people are reluctant to engage in protective behaviors.

Therefore, considering the role of the health belief model in the analysis of beliefs related to protective behaviors against viral diseases, including coronavirus, as well as reviewing the literature in databases, it was found that few

studies are effective determinants of preventive behaviors.

Respiratory diseases were performed.

Therefore, the present study was conducted to determine the factors associated with Covid-19 protective behaviors among patients referred to comprehensive health service centers in Tuyserkan city using the HBM.

Methods

Study Design/Setting

In this cross-sectional study, 800 people living in Twiserkan (Toyserkan) County in Hamadan province in western Iran, were studied from October to November 2020.

Study Population and Sampling Method

A two-stage sampling procedure was followed to select the people of comprehensive health service center and health base.

By random cluster sampling method, people were selected from those covered by 21 comprehensive health service center and health base in Iran.

In this way, in each of the four regions of Twiserkan city (north, west, east and south), two clusters (two health bases of each cluster) and four clusters from the whole city were randomly selected.

In addition, four clusters (2 comprehensive health service center of each cluster) and eight clusters were randomly selected from the three rural areas.

In the second step, samples were certain based on simple random sampling.

We carefully chosen our participants from lists of the integrated health system in comprehensive health service center and health base.

We considered the default to be 50% because the rate of COVID-19 prevention behaviors in the population due to the onset of the infection has not been studied in studies.

Therefore, the number of samples required for this study was estimated at 385 people.

On the other hand, considering that cluster sampling has also been used in the sampling stages, so the design effect was also considered two and included in the sample size estimation and the sample size was 770 people.

The researchers looked at 800 potentially distorted questionnaires.

Considering the cluster size of 66.6 people, the number of studied clusters was 12 clusters.

People covered by comprehensive health services and health centers were the inclusion

criteria for the study and the exclusion criteria were dissatisfaction with research cooperation and not having an Android or iPhone phone.

The method of data collection was by sending a questionnaire link to eligible individuals and completing it online by individuals.

A questionnaire consisting of two general sections of demographic information and health belief model structure was considered as a data collection tool that was completed online by the participants in the study.

The questionnaire of health belief model structure regarding behaviors protecting against Covid-19 has been reviewed and approved by modeling the questionnaire of Rezaei Pendari et al. Study design and its validity and reliability index [16].

The first part of the questionnaire included age, gender, level of education, marital status, occupation, income, and most sources of information about Corona.

The second part included all the health belief model structure as follows.

The perceived sensitivity structure to the possibility of Covid-19 had two questions with a 5-point Likert scale including strongly agree to strongly disagree, which was scored 1 to 5.

The range of achievable scores was between 2 and 10.

The perceived severity structure of the consequences of Covid-19 had three questions on a 5-point Likert scale, including strongly agree to strongly disagree, which was scored 1 to 5.

The range of achievable scores was between 3 and 15.

The perceived barriers structure to performing protective behaviors against Covid-19 has two questions with a 5-point Likert scale including strongly agree to strongly disagree, which was scored on a scale of 1 to 5.

The range of achievable scores was between 2 and 10.

The self-efficacy structure of Covid-19 infection prevention behaviors has five questions with a 5-point Likert scale including strongly agree to strongly disagree, which was scored 1 to 5.

The range of achievable scores was between 5 and 25.

Guide structure for action with one question on a 5-point Likert scale, including strongly agrees to strongly disagree, which was scored on a scale of 1 to 5.

The range of achievable scores was between 1 and 5.

The perceived benefits structure of performing behaviors protecting against Covid-19 with five questions on a 5-item scale consisted of strongly agree to strongly disagree, which was scored on a scale of 1 to 5.

The range of achievable scores was between 5 and 25. Covid-19 protection behaviors with five questions on a 3-item scale include never, sometimes, and always, which were scored from 0 to 2.

The range of achievable scores was between 0 and 10.

After stating the objectives of the study and obtaining informed consent from people to participate in the study by phone and in person, for those who wished to participate in the study, a questionnaire link was sent to complete.

The ID code of ethics of Hamadan University of Medical Sciences for the study was IR.UMSHA.REC.1399.163.

Data analysis was performed using SPSS24 software after data collection. Independent t-test, ANOVA, chi-square, Fisher's exact test, Pearson correlation, and linear regression with a significance level of less than 0.05 were used.

Results

Our survey obtained 800 valid questionnaires, yielding an overall response rate of 100%.

Often of the participants were female (59.7%) and they were married (81.7%).

Mean age of the participants was 48.80 years, with a tendency towards the 20-29 years category (36.1%).

Regarding education, about half of the participants had a moderate education level (45.4%).

The participant's income was low income (86.5%).

The majority of participants (53.8%) were the housewife.

The study also showed that the most common method of source of information about Covid-19 was social network (49.6%) (Table 1).

Table 1. Demographic characteristics of the samples (n=800).

Characteristics	Number	Percent
Sex		
Male	322	40.3
Female	478	59.7
Age		
<20	48	6.0
20-29	289	36.1
30-39	256	32.0
40-49	156	19.5
>50	51	6.4
Education level		
Elementary school	59	7.4
Middle school	103	12.9
High school	52	6.5
Diploma	311	38.9
College	275	34.4
Marital status		
Married	654	81.7
Single	107	13.4
Divorced or widowed	39	4.9
Individuals job		
Housewife	429	53.8
Working	86	10.8
Farmer & dairy	61	7.6
Free	147	18.4
Retired	33	4.2
Others	44	5.5
Income		
Very Good	37	4.6
Good	71	8.9
Moderate	446	55.8
Bad	246	30.7
Most common source of information about Covid-19		
Social networks	396	49.6
Poster & Pamphlet	41	5.1
Websites	38	4.7
Health worker	109	13.7
Radio & TV	146	18.3
Family & Friends	70	8.7

Of these 800 participants, 149 (52.1%) had access to the mask.

Among those reporting access to protective equipment, 54.5% of participants reported they were using gloves. 5.2% of participants used the shield and 86.9% had access to disinfectants (Data not shown).

The results indicated a positive correlation between perceived susceptibility and perceived severity of getting Covid-19 ($r=0.156$, $P<0.05$).

Moreover, perceived susceptibility of getting Covid-19 had a positive correlation with self-efficacy ($r=0.163$, $P<0.01$).

Furthermore, the perceived severity of getting Covid-19 had a positive correlation with benefits perceived ($r=0.328$, $P<0.01$), self-efficacy ($r=0.395$, $P<0.01$), cues to action

($r=0.262$, $P<0.01$), and prevention behavior ($r=0.300$, $P<0.01$).

There was a positive correlation between benefits perceived with cues to action ($r=0.313$, $P<0.01$) and prevention behavior ($r=0.396$, $P<0.01$).

In addition, the barriers perceived had a negative correlation with perceived severity ($r=-0.315$, $P<0.01$), benefits perceived ($r=-0.575$, $P<0.01$), and self-efficacy to adopt prevention behavior of Covid-19 ($r=-0.148$, $P<0.05$).

Finally, there was a positive correlation between self-efficacy with cues to action (0.383, $P<0.01$) and to adopt prevention behavior ($r=0.483$, $P<0.01$) (Table 2).

Farmer & dairy	5.63	0.25	1.63	5.23	6.15
Free	7.56	0.27	1.71	7.00	8.11
Retired	8.12	0.49	1.99	70.6	9.18
Others					
Income	-	-	-	-	0.045
Very Good	7.87	0.74	2.10	6.11	9.63
Good	7.90	0.26	1.47	7.35	8.44
Moderate	7.94	0.15	1.82	7.62	8.25
Bad	6.82	0.47	2.53	5.83	7.80
Most common source of information about Covid-19	-	-	-	-	0.001
Social networks	7.72	0.22	1.81	7.28	8.17
Poster & Pamphlet	6.20	1.06	2.38	3.23	9.16
Websites	7.78	0.36	1.93	7.03	8.53
Health worker	8.30	0.22	1.32	7.85	8.75
Radio & TV	8.14	0.25	1.75	7.63	8.65
Family & Friends	6.50	1.55	3.10	1.55	11.44

Note: SD=Standard Deviation and SE=Standard Error

The results indicated that with a one unit of increase in the self-efficacy score was associated with the mean score behavior increased by 0.27.

In addition, with one unit of increase in the score of cues to action, the mean score of prevention behavior increased by 0.31 (Table 5).

Table 5. Predicting covid-19 prevention behavior using Linear Regression Analyses (n=800) (Adjusted R²=0.337).

Variables	β	B	SE	95% CI		P-value
				Lower	Upper	
Perceived susceptibility	-0.03	-0.06	0.09	-0.24	0.12	0.533
Perceived severity	0.10	0.09	0.06	-0.33	0.22	0.144
Benefits perceived	0.11	0.06	0.07	-0.14	0.09	0.462
Barriers perceived	-0.06	-0.05	0.04	-0.15	0.04	0.270
Self-efficacy	-0.10	-0.10	0.05	-0.21	0.00	0.068
Cues to action	0.27	0.17	0.04	0.08	0.27	0.001
Prevention behaviors	0.31	1.32	0.26	0.80	1.85	0.001
Constant	--	1.98	1.02	-1.86	2.37	0.723

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

Discussion

This research was done to define the factors related with Covid-19 protection behaviors among patients referred to comprehensive health centers in Tuyserkan city using the health belief model.

The most obvious result of this study was the predictor of self-efficacy and a guide to action in adopting preventive behaviors from Covid 19.

Also, most people were good at washing their hands frequently, observing socio-distance, avoiding getting lost with others, and wearing a mask.

The mean scores of HBM structure including perceived sensitivity, perceived severity, perceived barriers, perceived barriers, self-efficacy, practice guide, and behavior were desirable in this study.

Due to the time of this study, which was almost 9 months after the onset of the disease in Iran and the large volume of educational

programs implemented through various channels, this result was expected, including radio and television, cyberspace, health care workers, and training campaigns, as well as daily reports of cases and deaths in the country.

The general public is also aware of the danger of the disease and considers themselves exposed to it; therefore, if people accept that they are susceptible to the disease and may be harmed by it, they are more likely to take preventative behaviors.

Taghrir et al. conducted a study on medical students and showed the level of awareness about Covid-19 was high [17].

It was also consistent with Nasirzadeh and Gol's study of the citizens of Qom about the preventive behaviors of Covid-19 [18].

People performed better in preventing Covid-19 by increasing their economic level, which may be due to increased purchasing power of personal protective equipment than other economic groups.

The results of this research were consistent with the results of the study of Guan et al. [19].

People in government jobs were significantly more proactive than other occupations.

Mastery of the personal work environment seems to be one of the reasons for this finding and that in office environments it is necessary to observe Covid-19 preventive behaviors.

The results of the present study were not consistent with the study of Nasirzadeh and Gol on the citizens of Qom about the preventive behaviors of Covid 19 [18].

This discrepancy may be due to cultural differences between the two cities studied.

Also, there was a statistically significant relationship with the sources of information about the Covid-19 disease.

People who received information from health workers were more likely to engage in preventative behavior.

This is probably because clients are confident in the credibility and validity of the training provided by caregivers at comprehensive health service centers and health centers, and they do it well.

In one study, the results showed that the dissemination of incorrect information, opportunistic, and sometimes even expired misinformation could potentially threaten the health of society [20].

Among the preventive behaviors, frequent hand washing, observing social distance, avoiding losing with others, and using a mask were the most common.

The results of the present study were consistent with the results of studies by Barati et al., Nasirzadeh, and Gol [18,21].

This is probably due to the high level of other determinants in the path of behavior such as perceived sensitivity, perceived severity, perceived barriers, perceived barriers, self-efficacy, and guidance to action that lead to appropriate and desirable behavior in society. In the present study, behavioral determinants were able to predict 37% of Covid 19 disease prevention behaviors, of which the strongest predictor was self-efficacy and an action guide.

These results were consistent with another study conducted by Rezaei Pendari et al. on influenza [16].

People adopt appropriate health behaviors if they can perform those behaviors and also have a guide to appropriate action to perform preventive behaviors.

The use of the online questionnaire, in addition to the many benefits it has, especially

during the outbreak of Covid 19 disease, as well as being a self-reporting study were among the limitations of the research.

Conclusion

The results show that the importance of prevention of Covid-19 infection among the population is essential due to the high prevalence of morbidity and mortality.

It seems that in intervention and prevention programs, the determinants of prevention of Covid-19 transmission should be fully identified and appropriate interventions should be planned and implemented based on affective factors.

Acknowledgments

The Research and Technology Deputy of Hamadan University of Medical Sciences have approved this project.

Funding

Hamadan University of Medical Sciences supported this work [reference number: 990223979].

Competing interests

None declared

References

1. Zhu N, Zhang D, Wang W, Li X, Yang B, Song J, Zhao X, Huang B, Shi W, Lu R, Niu P. A Novel Coronavirus from Patients with Pneumonia in China, 2019. *N Engl J Med*, 2020, 382:727-733.
2. Cui J, Li F, Shi ZL. Origin and evolution of pathogenic coronaviruses. *Nat Rev Microbiol*, 2019, 17(3):181-192.
3. Chan KS, Zheng JP, Mok YW, Li YM, Liu YN, Chu CM, Ip MS. SARS: prognosis, outcome and sequelae. *Respirology*, 2003, 8:S36-S40.
4. Badawi A, Ryoo SG. Prevalence of diabetes in the 2009 influenza A (H1N1) and the Middle East respiratory syndrome coronavirus: a systematic review and meta-analysis. *J Public Health Res*, 2016, 5(3): 773.
5. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, Zhang L, Fan G, Xu J, Gu X, Cheng Z. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet*, 2020, 395(10223):497-506.
6. Yin Y, Wunderink RG. MERS, SARS and other coronaviruses as causes of pneumonia. *Respirology*, 2018, 23(2):130-137.
7. Drosten C, Günther S, Preiser W, Van Der Werf S, Brodt HR, Becker S, Rabenau H, Panning M, Kolesnikova L, Fouchier RA, Berger A. Identification of a novel coronavirus in patients with severe acute respiratory syndrome. *New England journal of medicine*, 2003, 348(20):1967-1976.
8. Zaki AM, Van Boheemen S, Bestebroer TM, Osterhaus AD, Fouchier RA. Isolation of a novel coronavirus from a man with pneumonia in Saudi Arabia. *N Engl J Med*, 2012, 367(19):1814-1820.

9. Wang D, Hu B, Hu C, Zhu F, Liu X, Zhang J, Wang B, Xiang H, Cheng Z, Xiong Y, Zhao Y. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus–infected pneumonia in Wuhan, China. *Jama*, 2020, 323(11):1061-1069.
10. Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y, Qiu Y, Wang J, Liu Y, Wei Y, Yu T. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *Lancet*, 2020, 395(10223):507-513.
11. Qian M, Wu Q, Wu P, Hou Z, Liang Y, Cowling BJ, Yu H. Psychological responses, behavioral changes and public perceptions during the early phase of the COVID-19 outbreak in China: a population based cross-sectional survey. *medRxiv*, 2020, 18: 20024448.
12. Xiang YT, Yang Y, Li W, Zhang L, Zhang Q, Cheung T, Ng CH. Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. *Lancet Psychiatry*, 2020, 7(3):228-229.
13. McEachan RR, Lawton RJ, Jackson C, Conner M, Lunt J. Evidence, theory and context: using intervention mapping to develop a worksite physical activity intervention. *BMC Public Health*, 2008, 8(1):1-2.
14. Becker MH. The health belief model and personal health behavior. *Health Educ Monogr*, 1974, 2:324-473.
15. Rosenstock IM. The health belief model and preventive health behavior. *Health Educ Monogr*, 1974, 2(4):354-386.
16. Rezaeipandari H, Mirkhaili SM, Morowati SM, Ayatollahi J, Fallahzadeh H. Investigation of predictors of preventive behaviors of influenza A (H1N1) based on health belief model among people of Jiroft city, (Iran). *Qom Univ Med Sci J*, 2018, 12(3):76-86.
17. Taghrir 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(4):249-254.
18. Nasirzadeh M, Aligol M. Assessment of Knowledge, Attitude, and Factors Associated with the Preventive Behaviors of Covid-19 in Qom, Iran, in 2020. *Qom Univ Med Sci J*, 2020, 14(7):50-57.
19. Guan H, Okely AD, Aguilar-Farias N, del Pozo Cruz B, Draper CE, El Hamdouchi A, Florindo AA, Jáuregui A, Katzmarzyk PT, Kontsevaya A, Löf M. Promoting healthy movement behaviours among children during the COVID-19 pandemic. *Lancet Child Adolesc Health*, 2020, 4(6):416-418.
20. Zhang J, Shuai L, Yu H, Wang Z, Qiu M, Lu L, Cao X, Xia W, Wang Y, Chen R. Acute stress, behavioural symptoms and mood states among school-age children with attention-deficit/hyperactive disorder during the COVID-19 outbreak. *Asian J Psychiatr*, 2020, 51:102077.
21. Bashirian S, Jenabi E, Khazaei S, Barati M, Karimi-Shahanjarini A, Zareian S, Rezapur-Shahkolai F, Moeini B. 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(3):430-433.

Corresponding Author: Maryam Afshari, Department of Public Health, School of Public Health, Hamadan University of Medical Sciences, Shahid Fahmideh Ave. Hamadan, Iran, e-mail: afshari_m20@yahoo.com, m.afshari@umsha.ac.ir