



Covid-19 Preventive Behaviors in the Lifestyle of the Iranian Society, One Year after the Pandemic

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Citation: Ghalichi Zaveh, Barzanouni S, Akhlaghi Pirposhteh E, Babaei Pouya A, Hami M. Covid-19 Preventive Behaviors in the Lifestyle of the Iranian Society, One Year after the Pandemic. *J Occup Health Epidemiol* 2022; 11(1):10-22.

Article Info

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Article history

Received: Aug 2021

Accepted: Dec 2021

 10.52547/johe.11.1.10

Print ISSN: 2251-8096

Online ISSN: 2252-0902

Peer review under
responsibility of Journal of
Occupational Health and
Epidemiology

Abstract

Background: The World Health Organization (WHO) called for taking preventive measures to prevent the spread of the coronavirus. Preventive behaviors are required when the risk is perceived. The present study aimed to investigate individuals' preventative behaviors towards understanding and worrying about COVID-19 in the Iranian society.

Materials and Methods: This descriptive study was conducted on 342 respondents in the spring of 2021 using the convenience sampling method. The data collection tool was a researcher-made questionnaire consisting of three sections of demographic questions about awareness and basic issues. Descriptive statistical methods were used to analyze the data. In addition, the chi-square test and the Spearman's correlation coefficient were used to examine the association between questions and demographic variables.

Results: The findings showed that 209 (61.1%) respondents wore masks outdoors at a very high level. Only 40 (11.7%) respondents observed social distance requirements (at least more than 1.5 meters) at a very low level. Besides, 309 (90.4%) respondents washed their hands properly thoroughly at moderate to very high levels.

Conclusions: COVID-19 Preventive behaviors among respondents was associated to their perception of and concerns over COVID-19 contraction, raising their awareness of the disease as well as promoting concerns over it in the society.

Keywords: COVID-19, Pandemic, Prevention, Iran

Introduction

COVID-19 is an emerging infectious disease first reported in December 2019 in Wuhan, China [1]. COVID-19 is the name of the disease that was

originally known as SARS-CoV-2 [2]. The spread of this disease has led to quarantine and closure of many commercial and social activities, having caused great psychological, physical, and

economic damage [3]. The spread of this virus was rapid, so the World Health Organization (WHO) declared a pandemic in the world four months after it was confirmed in China [4].

An important feature of COVID-19 is its rapid spread through tiny droplets released into the air as well as contaminated surfaces and objects. The rapid spread of the virus among individuals has caused countries to face large numbers of infected people [5, 6]. In Iran, the first press release about deaths from COVID-19 was announced on February 19, 2020. Since the outbreak of COVID-19 in the world, the number of infected, recovered, and dead people has reached over 274.5 million, 246.3 million, and 5.3 million, respectively. According to a report published by the Ministry of Health and Medical Education of Iran on December 2021, 6.16 million Iranians were infected with the virus, a total of 131,000 people died, and 5.99 million individuals recovered [7]. According to a report, 12 countries of the United States, India, Brazil, France, Turkey, Russia, Britain, Italy, Argentina, Colombia, Spain, and Germany had over 3.5 million confirmed cases of COVID-19 [8].

The main symptoms of the disease are fever, cough, and shortness of breath. Other common symptoms, such as gastrointestinal disorders, decreased sense of smell and taste, muscle pain, diarrhea, and loss of appetite have been reported as well [9, 10]. The disease is transmitted through the inhalation of infected respiratory droplets (through coughing and sneezing), close contact (less than 6 steps or less than 2 meters) with the infected person, contact with a patient's secretions, and contact with infected surfaces. Regarding disease transmission modes, the major factor breaking the virus transmission chain is preventive behaviors of the general public against the infection and virus transmission [11, 12].

Due to the nature of the virus, the World Health Organization requires the adoption of preventive measures, such as proper social distancing, regular handwashing, hug avoidance, respiratory hygiene (wearing a mask), and restrictions on movement [13, 14]. Past studies on infectious diseases, such as influenza and SARS, have shown that factors such as the perceived risk of the disease, transmission severity, mortality rate, and perceived stress of the disease play a major role in controlling the disease and displaying preventive behaviors [15-17].

Preventive behaviors are effective in reducing the disease transmission rate. Exhibiting preventive behaviors is a function of individuals' attitude towards the subject, which includes their beliefs, values, and knowledge [18]. In this respect, health

policymakers are obliged to inform the public on preventive behaviors, such as not leaving home except in emergencies, social distancing, wearing a mask, hand sanitation, refraining from receiving cash, and refraining from holding parties [19].

Displaying such behaviors depends on people's understanding. A study by Wise et al showed that higher risk perceptions led to higher participation in preventative behaviors. Accordingly, evaluating perceived risk behavioral responses is very important [20].

Rogers states, in a theory, that people engage in health behaviors when their perceived sensitivity is high. Such sensitivity has two constituents, with one of which being the perception of risks, and the other being fear or worry [21]. Since fear of the disease causes one to display preventive behaviors, if the fear is long-term and uncontrollable, it will lead to the weakening of the immune system, depression, and anxiety [22].

Dowd et al showed in a study that demographic characteristics, such as age and gender, were effective in displaying preventive behaviors. COVID-19 mortality rates vary among young and middle-aged people, indicating the displaying of different behaviors at different ages. This indicates the need for examining demographic characteristics effective in exhibiting preventive behaviors [23]. Major demographic characteristics, including gender, age, education, marital status, employment status, and place of residence were examined in this study.

Zahirian Moghadam, in his study, tried to investigate the effects of work-based individual protective behaviors on COVID-19 mortality rates. Accordingly, the results showed that by teaching correct behaviors, including proper use of masks, use of disinfectants and gloves, as well as imposing more severe quarantine restrictions on crowds, the incidence and prevalence of COVID-19 could be reduced [24].

According to statistics, a large number of deaths and COVID-19 cases occur in people over the age of 50 and people with underlying diseases. However, there is a risk of the infection in the whole population. The importance of prevention measures increases with asymptomatic carriers because these people can transmit the disease to high-risk people, thereby increasing mortality rates [25]. Preparation and planning for the COVID-19 crisis is a national and international necessity, so governments must give consideration to community-based preventive measures to control the COVID-19 epidemic [26].

The World Health Organization (WHO) considers some behaviors, such as regular handwashing, respiratory hygiene, proper distancing, as well as

handshake and hug avoidance effective in preventing the disease [27]. Concurrent with the worsening of the situation of this pandemic in Iran and the Iranian government's concerns over the start of a new wave of the disease, authors of the present study decided to examine people's preventive behaviors in terms of understanding and showing concerns over COVID-19 in the Iranian society in the spring of 2021. We hope that by identifying the existing challenges in this study, an effective step be taken to plan for the promotion of preventive health behaviors towards COVID-19 in the society.

Materials and Methods

This descriptive study was conducted in the spring of 2021 to examine the level of preventive behaviors among Iranian people towards understanding and worrying about COVID-19 contraction. Overall, 342 respondents from different parts of the country were invited to help with the study. The target population was all Iranians, and the data collection tool was a researcher-made questionnaire.

Necessary ethical considerations, such as maintaining confidentiality of the participants' information, were taken into account. Further, anonymity of the questionnaires was observed, and the ethics code IR.THUMS.REC.1400.007 was received from the ethics committee of Torbat Heydariyeh University of Medical Sciences.

The questions were collected and extracted through interviews with a group of specialists in the fields of health education, epidemiology, biological statistics, occupational health, and environmental health (a total of 10 individuals), as well as ordinary people (30 people). Besides, the questionnaires were prepared online after their validity and reliability were established.

Next, the link to the questionnaires was placed on common social media in Iran, such as WhatsApp and Telegram. In addition, the questions were measured using a classification tool, with their validity and reliability assessed as well.

The people present in the social network groups were asked to complete the questionnaire and send it back to their friends and acquaintances. The inclusion criterion was all members of the community who virtually received the questionnaire and filled in the questionnaire by themselves or by a literate person. On the other hand, the exclusion criterion was incomplete filling of the questionnaires.

In this study, an easily accessible sampling method was used, and the sample size was estimated based on the Cochran's formula at 342.

Formula 1.

$$n = \frac{Z_{1-\alpha/2}^2 pq}{d^2} = \frac{1.96^2 \times 0.5 \times 0.5}{0.053^2} = 342$$

$$d = 0.053, p = q = 0.5, \alpha = 0.05$$

$$n = 342$$

The data collection tool was a researcher-made questionnaire consisting of three parts; accordingly, the first part included demographic variables (age, gender, marital status, level of education, occupation, and place of residence); the second part included questions about the knowledge of COVID-19, which included 3 questions (Table 1) with 'yes', 'no', and 'I do not know' answers; the third part contained 12 questions about people's preventive behaviors towards understanding and worrying about COVID-19. This part was scored on a 5-point Likert scale, with the options of very low = 1, low = 2, moderate = 3, high = 4, and very high = 5. The validity and reliability of the questionnaire were acceptable based on the Cronbach's alpha coefficient (0.71). The researcher-made questionnaire was designed electronically and made available to the public through virtual media (WhatsApp, Telegram, etc.). Data were collected within a month. Besides, the purpose and subject of the study were mentioned at the beginning of the questionnaire. It should be noted that the questionnaires were anonymous, and the individuals' information remained confidential.

To describe the quantitative data of the findings, the data were expressed as mean \pm SD. Accordingly, numbers (percentages) were used to describe qualitative data. Besides, the chi-squared test and the Spearman's correlation coefficient were used to examine the relationship between questions and demographic variables. In addition, data analysis was performed using SPSS Statistics 20.0.

Results

A questionnaire was distributed through the cyberspace to assess the level of preventive behaviors of people towards understanding and worrying about COVID-19, in the spring of 2021 for three months. A total of 98,000 individuals observed the questionnaire in virtual groups, and the completion rate was about 70%. In fact, there were 342 participants from different Iranian cities, who completed the questionnaire in the spring of 2021.

Table 1 shows the assessment results of the participants' demographic variables. Accordingly, the mean age of the subjects in this study was

33.32 ± 10.93. In addition, among 342 patients, 149 (43.6%) were male with the mean age of 34.89 ±10.86, and 193 (56.4%) were female with the mean age of 32.12 ±10.85.

The highest frequency of the education level was related to bachelor's degrees (108 (31.6%)) and master's degrees (74 (21.6%)). In addition, 233

(68.1%) participants were married and 105 (30.7) were single.

Besides, the highest frequency of employment status was related to employees (152 (44.4%)) and students (85 (24.9%)). Furthermore, 312 (91.2%) participants were living in the city, and 30 (8.8%) were living in the village.

Table 1. Demographic characteristics of the participants

Variable		Frequency	Percent
Gender	Male	149	43.6
	Female	193	56.4
Education level	Elementary school	5	1.5
	Middle school	4	1.2
	High school	14	4.1
	High school diploma	63	18.4
	Associate's degree	41	12
	Bachelor's degree	108	31.6
	Master's degree	74	21.6
	PhD	26	7.6
Marital status	PhD and higher	7	2
	Single	105	30.7
	Married	233	68.1
	Other	4	1.2
Job	Total	342	100
	Student	18	5.3
	University student	85	24.9
	Employee	152	44.4
	Factory worker	4	1.2
	Self-employed	19	5.6
	Housewife	30	8.8
	Retired	10	2.9
	Other	24	7.0
Place of residence	City	30	8.8
	Village	312	91.2

Table 2 shows the results of the investigation (numerical frequency) of the preliminary questions about COVID-19. A total of 74.9% of the

participants stated that they might not know they were COVID-19 positive or did not report its symptoms.

Table 2. Introductory questions about COVID-19

Row	Question	Option	Frequency	Percent
1	Do you think that a COVID-19 positive person may not know or report the symptoms?	Yes	256	74.9
		No	41	12
		Not know/not sure	45	13.2
2	Have you ever had COVID-19 and its symptoms?	Yes	111	32.5
		No	180	52.6
		Not know/not sure	51	14.9
3	Have you ever had a COVID-19 patient around you?	Yes	267	78.1
		No	66	19.3
		Not know/not sure	9	2.6

Table 3 shows the results of the investigation (numerical frequency) of the questions about the

people's level of preventive behaviors towards understanding and worrying about COVID-19.

Table 3. Questions about the people’s level of preventive behaviors towards understanding and worrying about coronavirus

Row	Question	Option	Frequency	Percent
1	How much attention did you pay to personal hygiene in the last year?	Very low	2	0.6
		Low	6	1.8
		Moderate	66	19.3
		High	181	52.9
		Very high	87	25.4
2	How much attention did you pay to public health (outside home) in the last year?	Very low	2	0.6
		Low	9	2.6
		Moderate	51	14.9
		High	170	49.7
		Very high	110	32.2
3	How many times have you visited banks and busy offices on these days?	Very low	137	40.1
		Low	117	34.2
		Moderate	59	17.3
		High	21	6.1
		Very high	8	2.3
4	How often have you been buying goods in cash from stores these days (last year)?	Very low	194	56.7
		Low	98	28.7
		Moderate	40	11.7
		High	8	2.3
		Very high	2	0.6
5	Did you visit a physician in the last year for having COVID-19 symptoms?	Very low	218	63.7
		Low	62	18.1
		Moderate	49	14.3
		High	11	3.2
		Very high	2	0.6
6	How much of the materials you purchased in the last year were disinfected?	Very low	21	6.1
		Low	30	8.8
		Moderate	103	30.1
		High	112	32.7
		Very high	76	22.2
7	How often did you attend mosques, shrines, or crowded places in the last year?	Very low	207	60.5
		Low	73	21.3
		Moderate	49	14.3
		High	7	2.0
		Very high	6	1.8
8	Have you been visiting relatives and acquaintances in parties during holidays and festivals?	Very low	150	43.9
		Low	96	28.1
		Moderate	76	22.2
		High	17	5.0
		Very high	3	0.9
9	How much do you wear masks outdoors?	Very low	2	0.6
		Low	2	0.6
		Moderate	35	10.2
		High	94	27.5
		Very high	209	61.1
10	How much do you meet social distancing requirements (at least one and a half meters) with people?	Very low	12	3.5
		Low	28	8.2
		Moderate	108	31.6
		High	117	34.2
		Very high	77	22.5
11	How often do you properly wash your hands in the daytime?	Very low	10	2.9
		Low	23	6.7
		Moderate	98	28.7
		High	137	40.1
		Very high	74	21.6
12	How much did you separate your personal belongings from others?	Very low	17	5.0
		Low	24	7.0
		Moderate	81	23.7
		High	130	38.0
		Very high	90	26.3

The results of the questions about examining the people's level of preventive behaviors towards understanding and worrying about COVID-19 are discussed below. According to the results, 78.3% of the participants had observed a high and very high levels of personal hygiene in the last year.

Besides, 81.9% of the participants paid a lot of attention to public health (outside home) in the last year. Table 4 shows the results of examining the relationship between the people's gender and level of preventive behaviors towards understanding and worrying about COVID-19 contraction.

Table 4. Assessment of the relationship between the people's gender and level of preventive behaviors towards understanding and worrying about COVID-19

Row	Question	Option	Male	Female	P-value
1	How much attention did you pay to personal hygiene in the last year?	Very low	1(0.7)	1(0.5)	0.263
		Low	3(2.0)	3(1.6)	
		Moderate	22(14.8)	44(22.8)	
		High	88(59.1)	93(48.2)	
		Very high	35(23.5)	52(26.9)	
2	How much attention did you pay to public health (outside home) in the last year?	Very low	0(0.0)	2(1.0)	0.171
		Low	3(2.0)	6(3.1)	
		Moderate	23(15.4)	28(14.5)	
		High	83(55.7)	87(45.1)	
		Very high	40(26.8)	70(36.3)	
3	How many times have you visited banks and busy offices on these days?	Very low	46(30.9)	91(47.2)	0.007*
		Low	52(34.9)	65(33.7)	
		Moderate	34(22.8)	25(13.0)	
		High	11(7.4)	10(5.2)	
		Very high	6(4.0)	2(1.0)	
4	How often have you been buying goods in cash from stores these days (last year)?	Very low	88(59.1)	106(54.9)	0.569
		Low	44(29.5)	54(28.0)	
		Moderate	14(9.4)	26(13.5)	
		High	3(2.0)	5(2.6)	
		Very high	0(0.0)	2(1.0)	
5	Did you visit a physician in the last year for having COVID-19 symptoms?	Very low	98(65.8)	120(62.2)	0.474
		Low	22(14.8)	40(20.7)	
		Moderate	21(14.1)	28(14.5)	
		High	7(4.7)	4(2.1)	
		Very high	1(0.7)	1(0.5)	
6	How much of the materials you purchased in the last year was disinfected?	Very low	11(7.4)	10(5.2)	0.071
		Low	14(9.4)	16(8.3)	
		Moderate	42(28.2)	61(31.6)	
		High	58(38.9)	54(28.0)	
		Very high	24(16.1)	52(26.9)	
7	How often did you attend mosques, shrines, or crowded places in the last year?	Very low	82(55.0)	125(64.8)	0.185
		Low	37(24.8)	36(18.7)	
		Moderate	25(16.8)	24(12.4)	
		High	4(2.7)	3(1.6)	
		Very high	1(0.7)	5(2.6)	
8	Have you been visiting relatives and acquaintances in parties during holidays and festivals?	Very low	70(47.0)	80(41.5)	0.798
		Low	42(28.2)	54(28.0)	
		Moderate	29(19.5)	47(24.4)	
		High	7(4.7)	10(5.2)	
		Very high	1(0.7)	2(1.0)	
9	How much do you wear masks outdoors?	Very low	1(0.7)	1(0.5)	0.422
		Low	1(0.7)	1(0.5)	
		Moderate	18(12.1)	17(8.8)	
		High	47(31.5)	47(24.4)	
		Very high	82(55.0)	127(65.8)	
10	How much do you meet social distancing requirements (at least one and a half meters) with people?	Very low	6(4.0)	6(3.1)	0.405
		Low	8(5.4)	20(10.4)	
		Moderate	45(30.2)	63(32.6)	
		High	52(34.9)	65(33.7)	
		Very high	38(25.5)	39(20.2)	
11	How much do you properly wash your hands in the daytime?	Very low	5(3.4)	5(2.6)	0.221
		Low	8(5.4)	15(7.8)	
		Moderate	41(27.5)	57(29.5)	
		High	69(46.3)	68(35.2)	
		Very high	26(17.4)	48(24.9)	

12	How much did you separate your personal belongings from others?	Very low	6(4.0)	11(5.7)	0.392
		Low	11(7.4)	13(6.7)	
		Moderate	31(20.8)	50(25.9)	
		High	65(43.6)	65(33.7)	
		Very high	36(24.2)	54(28.0)	

* The significance level was set at 0.05 (p < 0.05).

** A chi-squared test was used to investigate the relationship between the people's gender and level of preventive behaviors. In case of the non-fulfillment of the chi-squared test requirements, a fisher's exact test was administered.

Based on the test results, there was a significant relationship between the question of "How many times have you visited banks and busy offices on these days?" and gender. According to the frequency values obtained, the number of referrals was less in women than in men.

Table 5 shows the results of examining the

relationship between the people's age and level of preventive behaviors towards understanding and worrying about COVID-19 contraction. According to the results of the Spearman's correlation coefficient, there was only a significant relationship between the questions inserted in Table 5 and age.

Table 5. Assessment of the relationship between the people's age and level of preventive behaviors towards understanding and worrying about COVID-19 contraction

Row	Question	Correlation coefficient	P-value
1	How much attention did you pay to personal hygiene in the last year?	0.139	0.010*
2	How much attention did you pay to public health (outside home) in the last year?	0.093	0.087
3	How many times have you visited banks and busy offices on these days?	- 0.006	0.908
4	How often have you been buying goods in cash from stores these days (last year)?	0.255	0.010*
5	Did you visit a physician in the last year for having COVID-19 symptoms?	0.077	0.158
6	How much of the materials you purchased in the last year was disinfected?	0.029	0.597
7	How often did you attend mosques, shrines, or crowded places in the last year?	0.169	0.002*
8	Have you been visiting relatives and acquaintances in parties during holidays and festivals?	0.236	0.001*
9	How much do you wear masks outdoors?	0.043	0.424
10	How much do you meet social distancing requirements (at least one and a half meters) with people?	0.193	0.001*
11	How much do you properly wash your hands in the daytime?	0.113	0.037*
12	How much did you separate your personal belongings from others?	0.116	0.032*

* The significance level was set at 0.05 (p < 0.05).

** The Spearman's correlation coefficient was used to examine the significance of the relationship between the respondents' age and level of preventive behaviors.

Table 6 shows the results of examining the relationship between the people's marital status and level of preventive behaviors towards understanding and worrying about COVID-19 contraction. According to the assessment results, there was only a significant relationship between marital status and the questions of "How much attention did you pay to personal hygiene in the last year?" and "How often did you attend mosques, shrines, or crowded places in the last year?"

Table 7 shows the results of examining the relationship between the people's education level and level of preventive behaviors towards understanding and worrying about COVID-19

contraction. We used the Spearman's correlation coefficient to examine the relationship between the questions of preventive behaviors and the level of education among the respondents.

According to the results of the Spearman's correlation coefficient, there was no significant relationship only between the questions of "How many times have you visited banks and busy offices on these days?" (P = 0.168), "Did you visit a physician in the last year for having COVID-19 symptoms?" (P = 0.910), and "How much of the materials you purchased in the last year was disinfected?"(P = 0.276) with the level of education.

Table 6. Assessment of the relationship between the people's marital status and level of preventive behaviors towards understanding and worrying about coronavirus

Row	Question	Option	Single	Married	P-value
1	How much attention did you pay to personal hygiene in the last year?	Very low	1(0.9)	1(0.4)	0.037*
		Low	0(0.0)	6(2.6)	
		Moderate	23(21.5)	43(18.3)	
		High	65(60.7)	116(49.4)	
		Very high	18(16.8)	69(29.4)	
2	How much attention did you pay to public health (outside home) in the last year?	Very low	1(0.9)	1(0.4)	0.249
		Low	2(1.9)	7(3.0)	
		Moderate	19(17.8)	32(13.6)	
		High	59(55.1)	111(47.2)	
		Very high	26(24.3)	84(35.7)	
3	How many times have you visited banks and busy offices these days?	Very low	49(45.8)	88(37.4)	0.123
		Low	36(33.6)	81(34.5)	
		Moderate	19(17.8)	40(17.0)	
		High	2(1.9)	19(8.1)	
		Very high	1(0.9)	7(3.0)	
4	How often have you been buying goods in cash from stores these days (last year)?	Very low	50(46.7)	144(61.3)	0.084
		Low	37(34.6)	61(26.0)	
		Moderate	17(15.9)	23(9.8)	
		High	3(2.8)	5(2.1)	
		Very high	0(0.0)	2(0.9)	
5	Did you visit a physician in the last year for having COVID-19 symptoms?	Very low	66(61.7)	152(64.7)	0.970
		Low	21(19.6)	41(17.4)	
		Moderate	15(14.0)	34(14.5)	
		High	4(3.7)	7(3.0)	
		Very high	1(0.9)	1(0.4)	
6	How much of the materials you purchased in the last year was disinfected?	Very low	4(3.7)	17(7.2)	0.138
		Low	10(9.3)	20(8.5)	
		Moderate	31(29.0)	72(30.6)	
		High	44(41.1)	68(28.9)	
		Very high	18(16.8)	58(24.7)	
7	How often did you attend mosques, shrines, or crowded places in the last year?	Very low	51(47.7)	156(66.4)	0.012*
		Low	31(29.0)	42(17.9)	
		Moderate	21(19.6)	28(11.9)	
		High	3(2.8)	4(1.7)	
		Very high	1(0.9)	5(2.1)	
8	Have you been visiting relatives and acquaintances in parties during holidays and festivals?	Very low	41(38.3)	109(46.4)	0.574
		Low	34(31.8)	62(26.4)	
		Moderate	27(25.2)	49(20.9)	
		High	4(3.7)	13(5.5)	
		Very high	1(0.9)	2(0.9)	
9	How much do you wear masks outdoors?	Very low	0(0.0)	2(0.9)	0.529
		Low	1(0.9)	1(0.4)	
		Moderate	14(13.1)	21(8.9)	
		High	26(24.3)	68(28.9)	
		Very high	66(61.7)	143(60.9)	
10	How much do you meet social distancing requirements (at least one and a half meters) with people?	Very low	7(6.5)	5(2.1)	0.053
		Low	11(10.3)	17(7.2)	
		Moderate	37(34.6)	71(30.2)	
		High	36(33.6)	81(34.5)	
		Very high	16(15.0)	61(26.0)	
11	How much do you properly wash your hands in the daytime?	Very low	3(2.8)	7(3.0)	0.126
		Low	6(5.6)	17(7.2)	
		Moderate	38(35.5)	60(25.5)	
		High	45(42.1)	92(39.1)	
		Very high	15(14.0)	59(25.1)	
12	How much did you separate your personal belongings from others?	Very low	5(4.7)	12(5.1)	0.321
		Low	5(4.7)	19(8.1)	
		Moderate	32(29.9)	49(20.9)	
		High	41(38.3)	89(37.9)	
		Very high	24(22.4)	66(28.1)	

* The significance level was set at 0.05 ($p < 0.05$).

** A chi-squared test was used to evaluate the relationship between the respondents' marital status and level of preventive behaviors; in case of the non-fulfillment of the chi-squared test requirements, a fisher's exact test was used.

Table 7 . Assessment of the relationship between the people’s education level and level of preventive behaviors towards understanding and worrying about COVID-19 contraction

Question	Correlation coefficient	P-value
How much attention did you pay to personal hygiene in the last year?	0.207	0.001*
How much attention did you pay to public health (outside home) in the last year?	0.136	0.012*
How many times have you visited banks and busy offices on these days?	- 0.075	0.168
How often have you been buying goods in cash from stores these days (last year)?	0.238	0.001*
Did you visit a physician in the last year for having COVID-19 symptoms?	- 0.006	0.910
How much of the materials you purchased in the last year were disinfected?	0.059	0.276
How often did you attend mosques, shrines, or crowded places in the last year?	0.110	0.043*
Have you been visiting relatives and acquaintances in parties during holidays and festivals?	0.130	0.016*
How much do you wear masks outdoors?	0.108	0.046*
How much do you meet social distancing requirements (at least one and a half meters) with people?	0.181	0.001*
How much do you properly wash your hands in the daytime?	0.136	0.012*
How much did you separate your personal belongings from others?	0.160	0.003*

* The significant level was set at 0.05 (p < 0.05).

** The Spearman’s correlation coefficient was used to examine the significance of the relationship between the respondents’ education level and level of preventive behaviors.

Discussion

The COVID-19 pandemic is an emerging viral disease of the 21st century, which infected large populations of the world and caused many deaths [1]. Accordingly, this study examined people’s level of preventive behaviors towards understanding and worrying about COVID-19 contraction in the Iranian society.

According to the preliminary results of the questions about COVID-19, 74.9% of the participants in this study stated that a COVID-19 positive person may not show or report symptoms. According to Wise, one of the main strategies for reducing the severity of the disease is the awareness of the impact of psychological factors on preventive behaviors [20].

The results of the questions about people’s level of preventive behaviors towards understanding and worrying about COVID-19 contraction have been discussed below. According to the results, 78.36% of the participants had high and very high levels of the observance of personal hygiene requirements in the recent year. In addition, 81.87% of the participants paid a lot of attention to public health (outside home) in the last year.

In this study, 88.59% of the people wore masks at high and very high levels, which could be for a number of reasons; firstly, wearing a mask outside home has turned into a compulsory preventive behavior [28]; secondly, some people believe that wearing a mask is a cultural movement in communities; thirdly, people have increased their awareness of and adherence to the recommendations made by the CDC [29]. In a study on preventative behaviors, Sunhee Kim et al found that 98% of the people wore a mask [30].

In fact, 74.26% of the participants referred to banks and crowded offices at a low level. Besides, from among preventive behaviors in this study, 61.69% of the people frequently washed their hands and disinfected equipment at a high level.

In general, some preventive behaviors, such as social distancing, regular handwashing, and refraining from holding parties have decreased compared to the last year in Iran. The reason for this could be long-term stress, indifference to the pandemic, and the decrease in people’s reaction to various issues [31]. According to the results of the study by Aszari et al, among different occupations, medical staff and taxi drivers were the most exposed groups to COVID-19 contraction [32].

According to the results, 56.72% of the people observed social distancing requirements at high and very high levels. The observance of social distancing requirements had the lowest score, which was observed the least among other behaviors. This was in line with Kin Kin’s study that mentioned the difficulty of doing these activities and people being tired as the main factors for this situation [33].

Firoozbakht et al, in their study aimed at investigating preventive behaviors among Iranians, reported that about 62% of people washed their hands regularly, having been consistent with our study [34].

The results of this study showed that about 81.87% of the people attended crowded places and shrines at low and very low levels. In addition, 85.38% of the participants bought goods from the shopping centers in cash at low and very low levels in the last year. This is consistent with Najimi and Golshiri’s study stating that about 65% of Iranians avoid community attendance [35].

However, the results of another study conducted in Malaysia showed that about 80% of the people avoided community attendance. Accordingly, this issue shows that the importance of exhibiting preventive behaviors should be made clear to the general public in the Iranian society, and this issue must be taken into account seriously [36].

The results of examining the relationship between the people's gender and level of preventive behaviors towards understanding and worrying about COVID-19 contraction showed that there was a significant relationship only between the question of "How many times have you visited banks and busy offices on these days?" and gender ($P = 0.007$). According to the frequency values obtained, the number of referrals by women was less than that by men.

The results of the study by Nasirzadeh et al showed that women performed better than men in terms of exhibiting preventive behaviors towards COVID-19 [5]. In the same vein, the results of other studies, including Park et al [37] and Najimi et al [35] showed that women's level of preventive behaviors was higher than that of men. This could be due to the greater responsibility of women towards their own health and that of their family members.

There was a significant relationship between the people's age and level of preventive behaviors towards understanding and worrying about COVID-19 contraction in some questions. These questions included "How much attention did you pay to personal hygiene in the last year?" ($P = 0.007$), "How often have you been buying goods in cash from stores these days (last year)?" ($P = 0.001$), "How often did you attend mosques, shrines, or crowded places in the last year?" ($P = 0.002$), "Have you been visiting relatives and acquaintances in parties during holidays and festivals?" ($P = 0.001$), "How much do you meet social distancing requirements (at least one and a half meters) with people?" ($P = 0.037$), "How much do you properly wash your hands in the daytime?", and "How much did you separate your personal belongings from others?" ($P = 0.032$).

Research shows that better performance was observed in older people, which may be due to increased sensitivity to health issues at older ages [5]. A similar result was observed in the study of Lau et al [38].

The results of examining the relationship between marital status and the people's level of preventive behaviors towards understanding and worrying about COVID-19 showed a significant relationship between the two questions of "How much attention did you pay to personal hygiene in the last year?" ($P = 0.037$) and "How often did you attend

mosques, shrines, or crowded places in the last year?" ($P = 0.012$) with marital status. The results of the study by Nasirzadeh et al showed that single people performed better in displaying preventive behaviors, with one of the reasons for which probably being having fewer concerns over livelihood issues and their higher level of literacy [5].

The results of examining the relationship between the people's education level and their level of preventive behaviors towards understanding and worrying about COVID-19 showed a significant relationship between the education level and the questions in Table 7. In fact, out of the 12 questions in this table, there was a significant relationship between 9 questions and the education level. These questions, in the order of priority, include "How much attention did you pay to personal hygiene in the last year?" ($P = 0.001$), "How much attention did you pay to public health (outside home) in the last year?" ($P = 0.012$), "How often have you been buying goods in cash from stores these days (last year)?" ($P = 0.001$), "How often did you attend mosques, shrines, or crowded places in the last year?" ($P = 0.043$), "Have you been visiting relatives and acquaintances in parties during holidays and festivals?" ($P = 0.016$), "How much do you wear masks outdoors?" ($P = 0.046$), "How much do you meet social distancing requirements (at least one and a half meters) with people?" ($P = 0.001$), "How much do you properly wash your hands in the daytime?" ($P = 0.012$), and "How much did you separate your personal belongings from others?" ($P = 0.003$).

According to the results obtained, the education level was an important parameter affecting the people's level of preventive behaviors towards understanding and worrying about COVID-19 contraction.

Nasirzadeh et al conducted a study aimed at studying knowledge, attitude, and factors affecting Qom citizens' preventive behaviors towards COVID-19 in 2020. According to their data analysis results, there was a lack of sufficient knowledge of disinfection methods, home care, and disease symptoms. This issue could be justified by the inappropriately low amount of educational programs provided by various channels, including radio and educational campaigns [5].

In the study of Najimi et al on students' awareness of influenza, the level of awareness was low and moderate [35]. However, in the study of Taghrir et al, which was conducted on medical students' perspectives about COVID-19, the level of awareness was high [39]. This finding was confirmed by the study of Vatani et al Perceived knowledge, attitude, and threats are important

predictors of health behaviors [40]. The study by Barati et al showed a significant direct correlation between COVID-19 preventive behaviors and perceived severity and sensitivity [41].

Risk perception is a dynamic concept and one of the difficult and ambiguous categories of social vulnerability, which needs to be addressed more. Decisions made in the event of disasters are always determined by the extent to which the population is aware of risks [42]. Risk perception is a feeling that exists in all people of the world. This feeling varies from culture to culture, country to country, and person to person.

Today, risk perception is not only an individual issue, but it also includes social, cultural, and ideological factors, with the only way to reduce risks in a society being to increase the risk perception of the majority of the society [43]. Wearing a mask, avoiding unnecessary crowds, observing personal and social hygiene requirements, and observing social distancing requirements can be valuable strategies that if implemented properly, they will significantly reduce the incidence of this disease [44]. In the study by Poursadeghiyan et al, one of the simplest and most effective individual measures was to wear a mask to prevent the spread of respiratory droplets from carriers to healthy individuals and patients admitted to coronary wards and the staff [45].

It is suggested that the authorities use modern technologies to increase the understanding of risks among Iranians. In addition, emotional factors should be considered important. In case they are considered personal factors, they will be more effective in showing preventive behaviors and understanding people.

It is suggested that future studies examine the impact of religious, sociocultural, political, cognitive, and emotional factors on the people's level of preventive behaviors towards understanding and worrying about COVID-19 contraction.

Since the questionnaires were filled out online, which required the use of the Internet, the participation of the people who did not have access to the Internet was eliminated. In addition, since most of the people using the Internet are young and middle-aged, the elderly participated less than others, as expected.

Conclusion

COVID-19 is considered an unpredictable threat to public health. The results of this study showed that the people's level of preventive behaviors towards understanding and worrying about COVID-19 contraction in terms of issues, such as personal

hygiene requirements, low visits to banks and crowded offices, excessive use of masks, as well as regular handwashing and disinfection of equipment were at a high level. However, the people's lowest level of preventive behavior was related to social distancing that should be considered an important point. Since exhibiting preventive behaviors by people is related to understanding and worrying about COVID-19 contraction, raising their perception of and concerns over COVID-19 contraction in the society, especially during the COVID-19 pandemic, is of high significance. In addition, education of preventive health behaviors plays an important role in displaying healthy behaviors in the community.

Acknowledgement

The authors of this article express their gratitude to Torbat Heydariyeh University of Medical Sciences for financially supporting this study (Grant No.: 99000140).

Conflict of interest: None declared.

References

1. Zhu N, Zhang D, Wang W, Li X, Yang B, Song J, et al. A Novel Coronavirus from Patients with Pneumonia in China, 2019. *N Engl J Med* 2020; 382(8):727-33.
2. Feiz Arefi M, Babaei AP, Barzanouni S, Ebrahimi S, Salehi AR, Khajehnasiri F, et al. Risk Perception in the COVID-19 pandemic; a health promotion approach. *J Edu Health Promot* 2022;11:118.
3. Soltaninejad M, Babaei-Pouya A, Poursadeqiyani M, Feiz Arefi M. Ergonomics factors influencing school education during the COVID-19 pandemic: A literature review. *Work* 2021; 68(1):69-75.
4. Poursadeqiyani M, Bazrafshan E, Arefi MF. Review of environmental challenges and pandemic crisis of Covid-19. *J Educ Health Promot* 2020; 9:250.
5. 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):50-7.
6. Khajehnasiri F, Zaroushani V, Poursadeqiyani M. Macro ergonomics and health workers during the COVID-19 pandemic. *Work* 2021; 69(3):713-4.
7. Feiz Arefi M, Babaei-Pouya A, Poursadeghiyan M. The health effects of quarantine during the COVID-19 pandemic. *Work* 2020; 67(3):523-7.
8. Akhlaghi Pirposhteh E, Sheibani N, Beheshti A, Bakhshi N, Salehi Sahl Abadi A. Prevalence of

- Musculoskeletal Disorders and Occupational Stress among Workers of an Engineering Company in Iran during the Covid-19 Pandemic, 2021: A Cross-Sectional Study. *J Occup Health Epidemiol* 2021; 10(3):183-92.
9. Yang X, Yu Y, Xu J, Shu H, Liu H, Wu Y, et al. Clinical course and outcomes of critically ill patients with SARS-CoV-2 pneumonia in Wuhan, China: a single-centered, retrospective, observational study. *Lancet Respir Med* 2020; 8(5):475-81.
 10. Lauer SA, Grantz KH, Bi Q, Jones FK, Zheng Q, Meredith HR, et al. The Incubation Period of Coronavirus Disease 2019 (COVID-19) from Publicly Reported Confirmed Cases: Estimation and Application. *Ann Intern Med* 2020; 172(9):577-82.
 11. Wang J, Zhou M, Liu F. Reasons for healthcare workers becoming infected with novel coronavirus disease 2019 (COVID-19) in China. *J Hosp Infect* 2020; 105(1):100-1.
 12. Prem K, Zandvoort KV, Klepac P, Eggo RM, Davies NG, Centre for the Mathematical Modelling of Infectious Diseases COVID-19 Working Group, et al. Projecting contact matrices in 177 geographical regions: An update and comparison with empirical data for the COVID-19 era. *PLoS Comput Biol* 2021; 17(7):e1009098.
 13. Feiz Arefi M, Babaei-Pouya A, Poursadeqiyani M. The health effects of quarantine during the COVID-19 pandemic. *Work* 2020; 67(3):523-7.
 14. World Health Organization. Coronavirus disease 2019 (COVID-19): situation report, 73. Geneva, Switzerland: World Health Organization; 2020.
 15. Lau JTF, Kim JH, Tsui H, Griffiths S. Perceptions related to human avian influenza and their associations with anticipated psychological and behavioral responses at the onset of outbreak in the Hong Kong Chinese general population. *Am J Infect Control* 2007; 35(1):38-49.
 16. Lau JT, Yang X, Tsui H, Kim JH. Monitoring community responses to the SARS epidemic in Hong Kong: from day 10 to day 62. *J Epidemiol Community Health* 2003; 57(11):864-70.
 17. Lau JT, Tsui H, Kim JH, Griffiths S. Perceptions about status and modes of H5N1 transmission and associations with immediate behavioral responses in the Hong Kong general population. *Prev Med* 2006; 43(5):406-10.
 18. Chen X, Chen H. Differences in Preventive Behaviors of COVID-19 between Urban and Rural Residents: Lessons Learned from A Cross-Sectional Study in China. *Int J Environ Res Public Health* 2020; 17(12):4437.
 19. Mirzaei A, Kazembeigi F, Kakaei H, Jalilian M, Mazloomi S, Nourmoradi H. Application of health belief model to predict COVID-19-preventive behaviors among a sample of Iranian adult population. *J Educ Health Promot* 2021; 10:69.
 20. Wise T, Zbozinek TD, Michelini G, Hagan CC, Mobbs D. Changes in risk perception and self-reported protective behaviour during the first week of the COVID-19 pandemic in the United States. *R Soc Open Sci* 2020; 7(9):200742.
 21. Moser RP, McCaul K, Peters E, Nelson W, Marcus SE. Associations of perceived risk and worry with cancer health-protective actions: data from the Health Information National Trends Survey (HINTS). *J Health Psychol* 2007; 12(1):53-65.
 22. Mertens G, Gerritsen L, Duijndam S, Saleminck E, Engelhard IM. Fear of the coronavirus (COVID-19): Predictors in an online study conducted in March 2020. *J Anxiety Disord* 2020; 74:102258.
 23. Dowd JB, Andriano L, Brazel DM, Rotondi V, Block P, Ding X, et al. Demographic science aids in understanding the spread and fatality rates of COVID-19. *Proc Natl Acad Sci U S A* 2020; 117(18):9696-8.
 24. Zahirian Moghadam T, Pourfarzi F, Karami C, Rahimpouran S, Zandian H, Dargahi A. The Effect of Working-based Individual Protective Behaviors (WIPB) on COVID-19 Mortality in North-West of Iran: A Case-Control Study. *J Occup Health Epidemiol* 2021; 10(3):158-68.
 25. Rothan HA, Byrareddy SN. The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. *J Autoimmun* 2020; 109:102433.
 26. Wu Z, McGoogan JM. Characteristics of and Important Lessons From the Coronavirus Disease 2019 (COVID-19) Outbreak in China: Summary of a Report of 72 314 Cases From the Chinese Center for Disease Control and Prevention. *JAMA* 2020; 323(13):1239-42.
 27. World Health Organization. Coronavirus disease 2019 (COVID-19): Situation Report - 38. Geneva, Switzerland: World Health Organization; 2020.
 28. Zhong B-L, Luo W, Li HM, Zhang QQ, Liu XG, Li WT, et al. Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey. *Int J Biol Sci* 2020; 16(10):1745-52.
 29. Clements JM. Knowledge and Behaviors Toward COVID-19 among US Residents during the Early Days of the Pandemic: Cross-Sectional Online Questionnaire. *JMIR Public Health Surveill* 2020; 6(2):e19161.
 30. Kim S, Kim S. Analysis of the Impact of Health Beliefs and Resource Factors on Preventive Behaviors against the COVID-19 Pandemic. *Int J Environ Res Public Health* 2020; 17(22):8666.
 31. Brosschot JF, Gerin W, Thayer JF. The perseverative cognition hypothesis: a review of

- worry, prolonged stress-related physiological activation, and health. *J Psychosom Res* 2006; 60(2):113-24.
32. Sarailoo M, Matin S, Vosoughi M, Dargahi A, Gholizadeh H, Rajabi Damavandi MR, et al. Investigating the relationship between occupation and SARS-CoV2. *Work* 2021; 68(1):27-32.
 33. Kwok KO, Li KK, Chan HHH, Yi YY, Tang A, Wei WI, et al. Community Response during the Early Phase of COVID 19 Epidemic in Hong Kong. *Emerg Infect Dis* 2020; 26(7):1575-9.
 34. Firouzbakht M, Omidvar S, Firouzbakht S, Asadi-Amoli A. COVID-19 preventive behaviors and influencing factors in the Iranian population; a web-based survey. *BMC Public Health* 2021; 21(1):143.
 35. Najimi A, Golshiri P. Knowledge, beliefs and preventive behaviors regarding Influenza A in students: a test of the health belief model. *J Educ Health Promot* 2013; 2:23.
 36. Azlan AA, Hamzah MR, Sern TJ, Ayub SH, Mohamad E. Public knowledge, attitudes and practices towards COVID-19: A cross-sectional study in Malaysia. *PLoS One* 2020; 15(5):e0233668.
 37. Park JH, Cheong HK, Son DY, Kim SU, Ha CM. Perceptions and behaviors related to hand hygiene for the prevention of H1N1 influenza transmission among Korean university students during the peak pandemic period. *BMC Infect Dis* 2010; 10:222.
 38. Lau JT, Kim JH, Tsui HY, Griffiths S. Anticipated and current preventive behaviors in response to an anticipated human-to-human H5N1 epidemic in the Hong Kong Chinese general population. *BMC Infect Dis* 2007; 7:18.
 39. 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):249-54.
 40. Vatani J, Arami M, Khanikosarkhizi Z, Shahabi Rabori MA, Khandan M, Dehghan N, et al. Safety climate and related factors in rehabilitation nurses of hospitals in Iran. *Work* 2021; 68(1):189-96 .
 41. Bashirian S, Jenabi E, Khazaei S, Barati M, Karimi-Shahanjarini 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(3):430-3.
 42. Samadipour E, Ghardashi F. Factors Influencing Iranians' Risk Perception of Covid-19. *J Mil Med* 2020; 22(2):122-9.
 43. Zare H, Eisazadeh F. Relationship between Disease Control Perception and Risk Perception with Self-care Behaviors in Patients Discharged from Hospital Due to COVID-19: Path Analysis Study. *J Res Psychol Health* 2020; 14(1):102-14.
 44. Arefi MF, Poursadeqiyani M. A review of studies on the COVID-19 epidemic crisis disease with a preventive approach. *Work* 2020; 66(4):717-29.
 45. Poursadeghiyan M, Maleki Roveshti M, Barzanouni S, Hosseini J, Feyz Arefi M, Gelichi Z. Study and Comparison Iranian Preventive Behaviors of Covid-19 Outbreak: A Two-Year Experience (2020-2021). *J Res Environ Health* 2022. doi:10.22038/jreh.2022.62785.1473.