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Behavioral analysis and evolution of coronavirus encountering in Iranians' from common beliefs to people's performance

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Abstract:

BACKGROUND: In amid COVID-19 widespread adapting methodologies that incorporate recognizing states of mind, behaviors, and convictions of society will gotten to be vital. the aim of analyzing the evolutionary behavior of people regarding this disease, including common beliefs, attitudes, and performance in the years 2020 to 2021.

MATERIALS AND METHODS: This study is a mix of methods (quality and quantity) conducted in Iran during the years 2020–2021, and was carried out in four phases: Popular beliefs exploring Examining true and false beliefs, risk perception, Making a behavioral performance measuring tool, Behavioral measurement before overall vaccination. At the end compare prevention behavior in two years by SPSS statistical analysis.

RESULTS: The results demonstrate that 77% of the participants provided the correct response to the first question, which pertained to the higher danger posed by COVID-19 compared to the flu. Additionally, the participants' agreement level with statements 2 and 4 was 61.5%, and for statement 3, it was 41.5%. The percentage and quantity of responses for the remaining questions are also indicated in the corresponding table. The results indicated that the alpha coefficients for these three areas are 0.81, 0.86, and 0.71, respectively. The factor loading of item 26 in this questionnaire was greater than 0.4.

CONCLUSION: It was observed that, initially, both false and accurate beliefs about the epidemic were prevalent, leading to a high awareness of the risk among the public. However, after a year, there was a notable decline in the practice of preventive behaviors, necessitating nationwide vaccination as a crucial health-promoting measure.

Keywords:

Attitude, awareness, belief, COVID-19, performance

Introduction

The 2019 novel COVID-19 has had a profound impact on the well-being and overall quality of life of individuals, particularly those who are suspected of carrying the infection.[1,2] Behavioral researchers accept that the spread of exact and logical data to the open with respect to the transmission, anticipation, and treatment of COVID-19 played a vital part in effectively combating the infection. However, the presence of numerous information sources hindered individuals from accessing the correct information, leading to doubt and the formation of erroneous beliefs about the disease.[3,4] Awareness of the people regarding COVID-19 and adherence to health protocols are the most important factors that could reduce or even stop the

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spread of this disease in our country. If the community followed health guidelines, the chain of transmission of infection would be effectively broken.[5] Precise knowledge is developed when people are provided with dependable and accurate information from credible sources, resulting in a thorough comprehension. Consequently, misinformation from untrustworthy outlets has caused certain individuals in society to harbor inaccurate beliefs regarding the virus.[6] Beliefs are fundamental components of attitudes.[7] A belief represents a consistent structure of subjective understanding and knowledge regarding a specific element of an individual's environment.[8] Beliefs are categorized as positive and negative. Positive beliefs provide energy and motivation, while negative beliefs create obstacles. Positive beliefs increase self-confidence and inner energy, while negative beliefs limit success. Beliefs play a crucial role in decision-making and performance. It is important to reduce negative beliefs to achieve long-term goals.[9-11] Accurate beliefs support beneficial actions, while inaccurate beliefs lead to unproductive actions. Amid the COVID-19 crisis, certain individuals have been concentrating on the possible impact of conspiracy theories.[12] The review of Persian news sources found a mix of true and false beliefs about COVID-19. For example, the Young Journalists Club (YJC) debunked several rumors, including the belief that COVID-19 is the most dangerous virus that masks protect against the disease and that the virus can be transmitted through postal packages. They also clarified that COVID-19 is different from the SARS virus and that antibiotics cannot protect against the virus. Additionally, they dismissed the idea that patients with COVID-19 do not get sick again, that pets transmit the virus, and that it is deliberately produced and spread [https://www.yjc.ir/fa/science, March 10, 2020]. The Iranian Students News Agency (ISNA) reported on July 15, 2020, that the World Health Organization (WHO) identified several "wrong beliefs about COVID-19." These include misconceptions such as wearing masks during exercise, the spread of COVID-19 through shoes, drinking alcohol to protect against COVID-19, and measuring body temperature to diagnose COVID-19. Other misconceptions mentioned by WHO include treating COVID-19 with hydroxychloroquine, and the belief that eating spicy foods or using disinfectants on the body can prevent the virus. WHO also clarified that COVID-19 does not spread in hot areas and that several other beliefs, such as the use of UV lamps for disinfection and the effect of the influenza vaccine on COVID-19, are incorrect [https://www.isna.ir/June 14, 2020]. In general, no specific study has been conducted on conspiracy theory to examine all aspects of the subject, but in the study by Krishna *et al*.,[13] conspiracy beliefs about the coronavirus have been confirmed. The purpose of raising this issue is the importance of access to accurate and inaccurate information about a specific topic and its impact on beliefs, and ultimately the behavior and performance of society. For example, despite the efforts of various government and private organizations to educate the public, misconceptions about the transmission, prevention, and treatment of COVID-19 still exist among the Indian population.[12] In a cross-sectional web-based study led by Czeisler *et al*.,[14] a 17-item questionnaire was developed to assess knowledge of COVID-19 among participants using social and media apps. The results revealed that while participants demonstrated good awareness of various aspects of COVID-19, a significant number held misconceptions about new modes of transmission, prevention, and treatment. The researchers emphasized the need for targeted education to correct these misconceptions, particularly among the elderly, illiterate, and individuals not involved in healthcare. In summary, as a pandemic continues, it will be essential to develop coping mechanisms that involve acknowledging the attitudes, behaviors, and beliefs of the community.[15]

Therefore, the present study was conducted to analyze the evolutionary behavior of people regarding this disease, including common beliefs, attitudes, and performance in the years 2020 to 2021. The results of this study, in addition to providing tools for understanding COVID-19, can better focus on the dynamics of decision-making and the future consequences of the pandemic.

Materials and Methods

Study design and setting

This study is a mix of methods (quality and quantity) conducted in Iran during the years 2020 to 2021, and was carried out in four phases based on Figure 1. A key component of this research involves examining preventive behaviors beyond just vaccination.

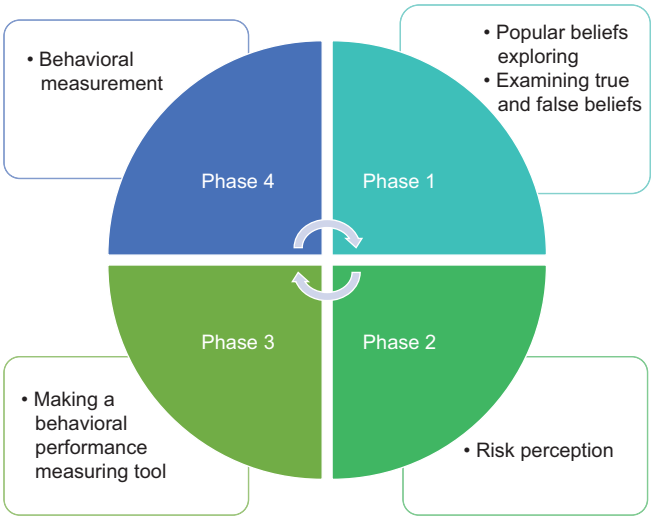

Figure 1: Phase of study

Phase 1: During this phase to explore misconceptions held by individuals as referenced in the introduction a recap of the information shared on beliefs from reputable news outlets along with widely used social platforms among Persian-speaking communities such as social media was examined. In this step, based on the researchers' opinions, a questionnaire with 43 items was prepared, in which the researchers also identified the correctness and incorrectness of the examined beliefs [Table 1 – Attachments].

Phase 2: In this step, around the end of spring, after the first peak of Corona, 41 questions [Table 2 – Attachments] were prepared based on the experts' opinion, previous phase questions and reclassified based on a KAP study in the areas of Knowledge, Attitude, and Performance, considering the risk perception of coronavirus infection.[16] The questions were submitted by 16 experts with at least 10 years of experience in the health system, including fields of occupational health, public health, environmental health, epidemiology, and biostatistics. This step is performed to assess the risk perception of coronavirus infection.

Phase 3: In this phase, after a year and a half of the epidemic in 2021 (before overlay vaccination), since our focus was on preventive behaviors, 16 questions related to the performance domain, rooted in public beliefs, were identified as the main questions. The questions were identified based on the levels of knowledge, attitude, and behavior, considering overlaps and exclusions in the risk perception assessment.

Phase 4: In the final stage, participants' performance in the study was evaluated using the prepared and modified questionnaire. Among the optimized questions, three questions[1-3] were asked to the participants as a pre-test, and then, the rest of the questions were shared with the participants to measure performance.

Study participants and sampling

Participants who live in Iran connected through social media with the study. According to power calculations, 384 samples would be sufficient for the representation of a population of 100,000 people. However, despite concerted efforts, overall, 293 individuals observed the questionnaire and only 130 participants (less than 45% of the observers) fully completed it. But based on this third sampling participants varied in at one.

Data collection tool and technique

Statistical analysis: The performance of the test participants was assessed using SPSS version 22 software. The Pearson correlation coefficient and Chi-square were used between the results of 2 years for each question.

Ethical consideration

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Results

1.1. Phase 1: Based on the findings presented in Table 1 (Appendix), the initial six statements of the questionnaire were deemed accurate, while items 7 to 11 were inverted in their questioning format, and others were wrong beliefs. The results demonstrate that 77% of the participants provided the correct response to the first question, which pertained to the higher danger posed by COVID-19 compared to the flu. Additionally, the participants' agreement level with statements 2 and 4 was 61.5%, and for statement 3, it was 41.5%. The percentage and quantity of responses for the remaining questions are also indicated in the corresponding table.

1.2. Phase 2: According to Table 2, the internal consistency and correlation between the questionnaire statements were assessed using the Cronbach's alpha test in three areas: knowledge, attitude, and performance measurement. The results indicated that the alpha coefficients for these three areas are 0.81, 0.86, and 0.71, respectively. Furthermore, in accordance with Table 2, the factor loading of item 26 in this questionnaire was greater than 0.4. In addition, the mean scores for awareness, attitude, and performance were about 11.7 ± 2.1, 65.2 ± 7.09, and 25.88 ± 3.8, respectively [Table 2].

1.3. Phase 3: Based on the results [Table 3: Attachments] presented by 16 experts, the face validity of all questions was more than 1.5 and confirmed. Questions 2, 11, 12, 13, and 21 were removed based on the CVI values. Furthermore, questions 2, 11, 13, and 21 were re-confirmed for removal based on the CVR index. At this stage, the questionnaire was made available to 30 participants, and an internal consistency reliability coefficient of 0.71 was obtained using Cronbach's alpha coefficient.

1.4. Phase 4: The results of the pre-test and performance review are shown in Tables 4 and 5, respectively.

The correlation coefficient of 0.60 indicates a moderate positive correlation between the results of 2021 and 2022. However, the *P* value of 0.087 is slightly above the conventional threshold of 0.05, suggesting that this correlation is not statistically significant at the 5% level. As a result, there are significant differences in the responses between 2021 and 2022 for all three questions. In addition, there is a moderate positive correlation between the results of 2021 and 2022, but this correlation is not statistically significant.

Questions 4-14 have *P* values less than 0.001, indicating significant differences in responses between the years

Table 1: Beliefs Questionnaire and Participants' Answers about the COVID-19

Row	Common beliefs about the virus and the disease of COVID-19	I agree		I disagree		I have no idea	
		Number	Percent	Number	Percent	Number	Percent
1	Coronavirus is more dangerous than winter flu	100	77	18	13.8	12	9.2
2	In order to contract the coronavirus, it is enough to contact an infected person for at least 20–30 minutes	80	61.5	20	15.4	30	23.1
3	Rubbing or sprinkling alcohol on the surface of the body kills the coronavirus	54	38.5	36	25.8	50	35.7
4	Coronavirus enters people's bodies only through respiratory channels	80	61.5	30	23.1	20	15.4
5	Hot water baths does not prevent coronavirus disease	6	4.6	90	69.2	34	26.2
6	Drinking hot water and chewing gum does not help to prevent coronavirus	72	55.6	40	30.7	18	13.7
7	The air inside buses and wagons in trains and subways cannot spread the coronavirus	8	6.2	114	87.6	8	6.2
8	Those whose body is strong or whose immunity is high will not get infected with coronavirus	20	15.4	84	64.6	26	20
9	If someone has the symptoms of covid-19, he should not report it	8	4.4	106	81.7	18	13.7
10	Kissing and hugging each other cannot transmit the coronavirus	10	7.6	120	92.4	0	0
11	Those who are admitted to the ICU due to corona will not survive	8	6.15	110	84.62	12	9.23
12	Contact with pets such as dogs and cats can easily transmit the coronavirus	44	33.8	38	29.2	48	37
13	Covering the mouth and nose when sneezing and coughing does not affect other people's infection with the coronavirus	8	6.2	114	87.6	8	6.2
14	Contact with raw chicken and poultry increases a person's risk of contracting the coronavirus	56	43	28	21.50	46	35.50
15	It is nothing more than a claim that maintaining a social distance of at least one meter with others prevents a person from contracting the coronavirus	26	20	84	64.4	20	15.6
16	Coronavirus can survive in the body of infected people for several months	70	53.80	20	15.6	40	30.60
17	Coronavirus can be transmitted through mosquito bites	10	8.00	112	86.00	8	6.00
18	Using disinfectant solutions to kill corona is enough	42	32.2	72	55.5	16	12.3
19	Consumption of red seaweed cures covid-19 disease	4	3.0	36	27.7	90	69.30
20	Staying at home doesn't protect you much from the coronavirus	40	30.78	70	53.84	20	15.38
21	Oral consumption of alcoholic products can protect a person from coronavirus	10	7.7	96	73.84	24	18.46
22	There are different medicines to prevent corona disease	20	15.50	80	61.5	30	23.10
23	Taking antibiotics can be effective in treating corona disease	24	18.5	62	47.6	44	33.9
24	Using a hair dryer kills the coronavirus and prevents a person from contracting the coronavirus	14	10.78	70	53.84	46	35.38
25	Using ultraviolet disinfection lamps can kill and prevent the coronavirus	18	13.8	42	32.4	70	53.8
26	The existing coronavirus is the same mutated SARS and MERS virus	36	27.7	46	35.4	48	36.9
27	Using a mask to cover the mouth and nose is the only way to prevent a person from being infected with the coronavirus	44	33.8	74	57	12	9.2
28	Children and teenagers are safe from the effects of the coronavirus	4	3	116	89	10	8
29	Frequent gargling of the mouth and nose with salt water prevents a person from contracting the coronavirus	24	18.5	76	58.5	30	24
30	Not going to medical centers is the main way to protect a person against the coronavirus	22	16.9	94	72.2	14	10.9
31	Rubbing sesame oil on the body or consuming sesame oil protects against the coronavirus	8	6.2	80	61.5	42	32.3
32	Eating garlic daily is a way to protect a person from contracting the coronavirus	20	15.4	58	44.6	52	40
33	Pneumonia (influenza) vaccine injection can protect against coronavirus	20	15.4	60	46.2	50	38.4
34	Rain water kills the coronavirus and prevents a person from being exposed to the disease of covid-19	4	3.1	90	69.2	36	27.7
35	The only way to protect yourself from the coronavirus is to get correct information about the coronavirus	6	4.6	106	81.6	18	13.8
36	It is exceptionally improbable that the insights declared by the Ministry of Health with respect to the contaminated and passing caused by the infection are correct	72	55.4	34	26.15	24	18.5
37	There are many viruses in the world, but the coronavirus is the most dangerous	80	61.5	20	15.4	30	23.1
38	Getting infected with the coronavirus gives constant immunity	52	40	48	36.9	30	23.1
39	Pregnant and lactating women and their babies are safe from coronavirus	12	9.23	100	76.92	18	13.58

Contd...

Table 1: Contd...

Row	Common beliefs about the virus and the disease of COVID-19	I agree		I disagree		I have no idea	
		Number	Percent	Number	Percent	Number	Percent
40	Coronavirus isn't a broad infection that can spread rapidly and taint a wide extend of individuals in a brief period of time	8	6.2	110	84.6	12	9.2
41	The coronavirus has adjusted to the conditions of our nation and most likely, it'll vanish before long	14	10.8	100	76.9	16	12.3
42	Official goods and packages sent from China transmit the coronavirus	72	55.4	24	18.4	34	26.2
43	Pneumonia (influenza) vaccine injection can protect against coronavirus	36	27.7	26	20	68	52.3

Correct belief (true) negative correct belief (-*-) (false) incorrect belief

2021 and 2022 for these questions, except for Question 15 where the *P* value is slightly above the conventional threshold of 0.05.

The correlation coefficient of 0.78 indicates a strong positive correlation between the results of 2021 and 2022 for all questions combined. The *P* value is extremely small, indicating that this correlation is statistically significant.

Discussions

The study aimed to investigate public beliefs and behaviors regarding COVID-19 in Iran. It revealed that many individuals hold factually incorrect beliefs about the transmission, protection, and development of the virus. Factors contributing to these beliefs include lack of scientific knowledge, inconsistent information from unreliable sources, and limited access to healthcare, lack of in-person training, economic and cultural poverty, and geographic location. Inappropriate and negative beliefs about the disease contribute to non-compliance with health protocols. The first step to correcting these beliefs is to provide accurate, evidence-based information through all communication channels in society.[17] In analyzing the findings, it becomes evident that the prevalence of irrational beliefs and non-compliance with COVID-19 protocols stems from the widespread reliance on unofficial and unreliable sources of information, particularly through social media platforms. Despite the availability of credible sources, the abundance of misleading information on social media contributes to a lack of awareness and disregard for safety guidelines. This has led to a concerning acceptance of factually incorrect and irrational information regarding COVID-19, prompting an urgent need for enhanced public awareness and education.[18] The first phase of the study reviewed current national beliefs and emphasized the need to use this information for more effective public health messaging and intervention. The study's results [Table 1] align with global anecdotal reports. Some study also found a correlation between understanding COVID-19 and improved general health, suggesting the need to combat misinformation and promote fact-driven information on COVID-19.[19,20] In the second phase of the current study aimed at understanding the perception of coronavirus risk in different cultures, a questionnaire with 41 items and three subscales was designed to measure coronavirus risk perception (CRP). The results showed that the questionnaire was a valid tool, supported by the consistency of the measurements. Samadipour *et al*.[21] Study results confirmed current investigation outcomes in the mentioned phase, while they provided sustenance for the reliability of the researcher-developed instrument, which assesses the perception of COVID-19 risk among Iranians. Taghrir *et al*.[22] examined how Iranian medical students perceive the risk of COVID-19 by utilizing a tool created by researchers. This tool consisted of three subscales: knowledge, preventive behavior, and risk perception. The findings indicated that the internal consistency of the awareness, attitude, and performance subscales was 0.81, 0.86, and 0.71, respectively, demonstrating acceptable internal consistency. During Phase 3 of this study, it was determined that one of the key methods in preventing the spread of the virus among individuals is to engage in preventive behaviors and increase awareness or knowledge. Considering the variable nature of people's behavior in response to the evolving pandemic, a questionnaire consisting of 21 items was developed in order to create an appropriate tool based on Table 2. The reliability of this questionnaire was confirmed with alpha coefficients of 0.71. The the practical propitiations (part of prevention behaviors) developed for the questionnaire in this phase of the study [Table 3] are in line with the research conducted by other scholars.[23-25] In the final phase, we examined the performance of the people during the years 2020 and 2021. The results, according to Tables 4 and 5, indicate that a significant difference (P value < 0.001) in the performance of people has occurred with an increase in awareness levels and a change in their attitudes. The findings of the research carried out by Tajvar *et al*.,[26] along with the study conducted by Mousavifard *et al*.,[27] validate the outcomes of the current study. These studies establish a notable correlation between education levels as a measure of awareness. Given that is an attitude rooted in awareness and has influences on performance, it can be inferred that as individuals' awareness increased over the two years examined, their attitude and ultimately their level of performance underwent significant transformations.

Conclusions

During the spread of COVID-19, people initially held both accurate and inaccurate beliefs. While misconceptions

Table 2: Rotation matrix of factor loads regarding exploratory analysis

Question	Awareness (knowledge)	Attitude (perspective)	Behavior (performance)
What is your level of understanding regarding the transmission cycle of the Coronavirus disease?	0.64	0.36	0.05
How familiar are you with the health protocols for preventing the spread of the Coronavirus disease in various settings, such as shopping?	0.59	0.34	−0.03
How well-versed are you in recognizing the symptoms of the Coronavirus disease?	0.64	0.35	−0.09
How effective do you consider public health is in preventing Coronavirus disease?	0.27	0.41	−0.08
How effective do you consider personal hygiene is in preventing Coronavirus disease?	0.22	0.42	−0.13
How effective do you consider travel evading is in preventing Coronavirus disease?	0.06	0.52	−0.07
How effective do you think staying at home is in preventing Coronavirus disease?	0.07	0.46	−0.03
How long do you have to stay out of home to work?	−0.19	−0.01	0.60
How much do you increase your consciousness and knowledge about the Coronavirus disease prevention during the day?	0.25	0.54	−0.13
Do you think praying and trusting in God is effective in preventing the Coronavirus disease or curing patients?	−0.38	0.21	−0.09
Do you think exercise is effective in avoiding coronavirus disease?	−0.37	0.26	−0.08
Do you think fresh fruits and vegetables are effective in preventing Coronavirus disease?	−0.39	0.32	−0.21
How much have you been to meetings and ceremonies (weddings, mourning, etc.) in the last month?	0.12	0.04	0.31
How much do you adhere to the social customs of parties during this period?	0.34	0.03	0.26
To what extent have you prioritized staying at home (quarantined) over the past month?	−0.02	0.43	0.38
Which frequency did you utilize communal personal resources at home throughout the course of this month?	−0.07	0.34	0.22
How much personal hygiene have you observed in the last month?	0.04	0.63	0.06
How much have you paid attention to environmental health (outside the home) in the last month?	−0.00	0.65	0.07
How much has your in-person shopping been in these days (the recent month)?	−0.12	0.18	0.61
Has your online shopping enlarged in recent months due to the Coronavirus disease outbreak?	0.021	0.243	0.141
Have you visited the bank frequently in the past month?	0.148	0.138	0.548
How much are you utilizing the ATM these days (one month)?	−0.069	0.169	0.579
How much have you been making cash buy these days (later month)?	0.310	0.041	0.579
How much are you utilizing the bank card these days for shopping?	−0.258	0.09	0.430
How frequently have you gone by a specialist for side effects of Coronavirus illness within the past month?	−0.041	0.041	−0.242
Has the episode of Coronavirus illness caused you to maintain a strategic distance from contact with creatures?	−0.032	0.270	−0.090
How much have you disinfected the obtained merchandise within the final month?	0.012	0.621	0.111
How much have you disinfected your domestic, dress, and other supplies within the final month?	−0.121	0.652	0.832
How much have you been to mosques or devout destinations within the final month?	0.233	−0.022	0.157
Have you gone to relatives and colleagues amid occasions?	0.181	0.169	0.288
How much do you utilize veils and gloves outside?	−0.028	0.641	0.052
How much social distance (at least one meter and greatest two meters) do you watch with individuals?	−0.071	0.652	0.162
How long do you consider staying home How long do you consider remaining domestic amid the time of Coronavirus malady episode?	−0.041	0.312	0.456
How committed are you to changing your life fashion amid the Coronavirus illness flare-up?	0.052	0.678	0.188
How plausible is that an individual with Coronavirus illness would recoup?	0.162	0.032	−0.021
How much do you wash your hands appropriately and completely during the day?	−0.162	0.562	−0.042
How much did you partition your individual supplies from others?	0.000	0.547	0.032
How much have you watched shopping conventions within the final month?	0.037	0.707	0.191
How much do you utilize personal transportation during this period?	0.142	0.112	0.023
How much do you employ open transportation (taxis, buses, trans, etc.) during this period?	0.074	−0.065	0.252
Do you think cash and non-cash fines (for individuals, who don't comply with isolate) are viable in controlling Coronavirus illness?	0.031	0.291	0.012

Table 3: Face and Content Validity of Prevention Behavior

Row	Questions	Face validity	CVI	CVR	Question status
1	Do you think that someone with Coronavirus disease may not show or report symptoms?	3.40	0.80	0.80	Main
2	Do you know a contact number to report suspected cases of Coronavirus or questions about the disease?	3.10	0.60	0.20	Delete
3	Have you ever had Coronavirus disease and its symptoms?	3.20	0.80	0.80	Main
4	Has anyone around you ever been infected with Coronavirus?	3.30	0.80	0.80	Main
5	How often did you use shared personal stuff at home during this year?	3.50	0.80	0.80	Main
6	Have you been mindful of your personal hygiene (while away from home) over the last year?	3.10	0.80	0.80	Main
7	How much have you gone in-person shopping in the past year?	3.50	0.80	0.80	Main
8	How many times have you visited banks and busy offices these days?	3.80	0.90	0.80	Main
9	How much have you been buying from the shopping center these days (one year)?	3.80	0.80	0.80	Main
10	Have you consulted a physician about the symptoms of Coronavirus within the past year?	3.40	0.80	0.80	Main
11	Are you taking precautions with pets because of the coronavirus pandemic?	3.00	0.50	0.20	Delete
12	How much did you disinfect the purchased goods and home, (in the past year)?	3.90	0.70	0.60	Delete
13	How much have you disinfected your home, clothing, and other possessions in the past year?	3.40	0.60	0.20	Delete
14	How much have you been to mosques and shrines or crowded places in the past year?	3.90	0.80	0.80	Main
15	Have you been visiting relatives, acquaintances, and parties during holidays?	4.10	0.90	0.80	Main
16	How often do you use masks and disinfectants outdoors?	4.10	0.80	0.80	Main
17	How much social distance (at least 1.5 meters) do you observe with people?	4.30	1	1	Main
18	How dedicated are you to altering your behavior during the Coronavirus pandemic?	3.80	0.79	0.80	Main
19	What is the frequency at which you properly and thoroughly wash your hands throughout the day?	4.10	0.90	1	Main
20	How much of your personal belongings have you separated from others?	3.50	0.80	0.20	Main
21	Do you believe that both monetary and non-monetary penalties are efficient in deterring individuals who fail to adhere to safety and health regulations, disregard home quarantine measures, and contribute to the transmission and fatality rates of the disease?	3.20	0.60	0	Delete

Table 4: Pre-test from Iranian users about COVID-19

Row	Questions	Options	2020	2021	*P*	*P*	*r*
1	In your opinion, it is possible that someone who is suffering from corona disease does not recognize or report its symptoms?	Yes	352 (88%)	256 (74.9%)	<0.001	0.087	0.6
		No	26 (6.5%)	41 (12%)			
		No idea	22 (5.5%)	45 (13.2%)			
2	Have you ever been infected with corona disease and had its symptoms?	Yes	28 (7%)	111 (32.5%)	<0.001		
		No	371 (93.2%)	180 (52.6%)			
		No idea	3 (0.7%)	51 (14.9%)			
3	Have you ever had anyone around you with corona disease?	Yes	107 (26.7%)	267 (78.1%)	<0.001		
		No	278 (69.3%)	66 (74.9%)			
		No idea	16 (0.4%)	9 (2.6%)			

prevailed, increased awareness of the risks associated with the virus led to better adherence to preventive measures in the first year. However, compliance decreased in the second year due to pandemic fatigue and the approach of widespread vaccination. Therefore, promoting overall health during this period is crucial, making universal vaccination a significant behavior for improvement.

Limitations and recommendation

In the initial phases of the study, the study population was extensive and uncontrollable. Given the public call in the virtual space, all users had the opportunity to randomly complete questionnaires. However, it should be noted that the specific statistical population was not identified, and the number of samples under study may not be sufficient.

In case of new pandemics, it is recommended to use extensive communication and reliable resources to prevent the spread of rumors and misinformation among the public. Emphasizing scientific advancements, promoting behaviors such as vaccination are essential.

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Table 5: Iranian performance about COVID-19

Row	Questions	Options	2020 Frequency (%)	2021 Frequency (%)	*P*
4	How much individual hygiene have you watched within the last year?	Very low	2 (0.5%)	2 (0.6%)	<0.001
		Low	1 (0.2%)	6 (1.8%)	
		Moderate	33 (8.2%)	66 (19.3%)	
		High	154 (38.3%)	181 (38.3%)	
		Very high	211 (52.5%)	87 (25.4%)	
5	In the last year, how much have you paid attention to public health (outside the home)?	Very low	2 (0.5%)	2 (0.6%)	<0.001
		Low	4 (1%)	9 (2.6%)	
		Moderate	48 (11.9%)	51 (14.9%)	
		High	158 (39.3%)	170 (49.7%)	
		Very high	189 (47%)	110 (32.2%)	
6	How much have you visited the bank and busy offices these days?	Very low	280 (69.7%)	137 (40.1%)	<0.001
		Low	85 (21.1%)	117 (34.2%)	
		Moderate	26 (6.5%)	59 (17.3%)	
		High	5 (1.2%)	21 (6.1%)	
		Very high	4 (1%)	8 (2.3%)	
7	How much have you purchased from shopping malls with cash these days?	Very low	292 (72.6%)	194 (56.7%)	<0.001
		Low	70 (17.4%)	98 (28.7%)	
		Moderate	26 (6.5%)	40 (11.7%)	
		High	7 (1.7%)	8 (2.3%)	
		Very high	4 (1%)	2 (0.6%)	
8	In the last month/year, how many times have you visited a doctor regarding the symptoms of being infected with the coronavirus?	Very low	339 (84.3%)	218 (63.7%)	<0.001
		Low	42 (10.4%)	62.(18.1%)	
		Moderate	11 (2.7%)	49.(14.3%)	
		High	1 (0.%)	11 (3.2%)	
		Very high	4 (1%)	2 (0.6%)	
9	In the last month/year, how many items have you bought and disinfected the surfaces of your home?	Very low	4 (1%)	21 (6.1%)	<0.001
		Low	10 (2.5%)	30 (8.8%)	
		Moderate	38 (9.5%)	10`3 (30.1%)	
		High	85 (21.1%)	112 (32.7%)	
		Very high	265 (65.9%)	76 (22.2%)	
10	In the last month/year, how many times have you been to mosques and shrines or crowded places?	Very low	375 (93.3%)	207 (60.5%)	<0.001
		Low	16 (4%)	73 (21.3%)	
		Moderate	4 (1%)	49 (14.3%)	
		High	0.0 (0.0%)	7 (2%)	
		Very high	2 (0.5%)	6 (1.8%)	
11	Have you visited relatives and acquaintances and parties during the holidays?	Very low	349 (86.8%)	150 (43.9%)	<0.001
		Low	33 (8.2%)	96 (28.1%)	
		Moderate	11 (2.7%)	76 (22.2%)	
		High	3 (0.7%)	17 (5%)	
		Very high	1 (0.2%)	3 (0.9%)	
12	How often do you use a mask outdoors?	Very low	12 (3%)	2 (0.6%)	<0.001
		Low	16 (4%)	2 (0.6%)	
		Moderate	66 (16.4%)	35 (10.2%)	
		High	187 (46.5%)	206 (61.1%)	
		Very high	11 (2.7%)	12 (3.5%)	
13	How much social distance (at least more than 1.5 meters) do you observe with people?	Very low	11 (2.7%)	12 (3.5%)	<0.001
		Low	9 (2.3%)	28 (8.2%)	
		Moderate	91 (22.6%)	108 (31.6%)	
		High	135 (33.6%)	117 (34.2%)	
		Very high	156 (38.8%)	77 (22.5%)	
14	How often do you wash your hands correctly and completely during the day?	Very low	5 (1.2%)	10 (2.9%)	<0.001
		Low	3 (0.7%)	23 (6.7%)	
		Moderate	72 (17.9%)	98 (28.7%)	
		High	165 (41%)	137 (40.1%)	
		Very high	156 (38.8%)	74 (21.6%)	

Contd...

Table 5: Contd...

Row	Questions	Options	2020 Frequency (%)	2021 Frequency (%)	*P*
15	How much have you separated your personal belongings from others?	Very low	9 (2.2%)	17 (5%)	0.0346
		Low	24 (6%)	24 (7%)	
		Moderate	102 (25.4%)	81 (%23.7)	
		High	128 (31.8%)	130 (38%)	
		Very high	138 (34.3%)	90 (26.3%)	

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Conflicts of interest

There are no conflicts of interest.

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