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Fear and rumor associated with COVID-19 among Iranian adults, 2020

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Abstract:

CONTEXT: At time of epidemics, fear and rumors in the community are the main obstacles to the success of prevention programs.

AIMS: The aim of the study was to investigate the fear and rumors of coronavirus disease 2019 (COVID-19) among the Iranian population.

SETTINGS AND DESIGN: This nationwide cross-sectional study was conducted on residents of six cities of Iran via street-based multistage sampling in March 2020.

SUBJECTS AND METHODS: The eligible participants completed a self-administered questionnaire about rumor and fear related to COVID-19 epidemic.

STATISTICAL ANALYSIS USED: Data were analyzed through linear regression and survey analysis using Stata (version 11).

RESULTS: A total of 2249 (49.3% women) were included. The main source of information was Iranian broadcasting (68.5%). The overall mean (standard deviation) score of fear and rumor among the Iranian population was 15.68 (0.46) and 39.24 (1.27), respectively. Educational level was associated with fear of COVID-19 ($P = 0.001$). Trusting to the rumors was affected by age (<0.0001), education level ($P < 0.0001$), underlying disease ($P = 0.017$), and workplace situation ($P < 0.001$).

CONCLUSIONS: The fear and rumor surrounding the epidemic of COVID-19 were common in society that could make an epidemic of COVID-19 difficult to control. Increasing public awareness via reliable mass media is recommended.

Keywords:

COVID-19, fear, Iran, rumor

Introduction

Coronaviruses are a large family of viruses which have caused serious problems for humans in the past two decades. Severe acute respiratory syndrome coronavirus, Middle East respiratory syndrome coronavirus, and coronavirus disease 2019 (COVID-19) are some known examples of coronaviruses which have caused devastating large-scale outbreaks in the world.^[1] COVID-19 was first discovered in Wuhan city in China in December 2019 and then became a pandemic around the world.^[2]

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The word "epidemic" is associated with unfavorable images, death, and despair.^[3,4] An epidemic of disease can cause substantial psychological effects such as fear, stress, and anxiety.^[5] When the main reason for an epidemic remains unclear, close-minded attitudes and rumors grow rapidly as well.^[6] Moreover, misinformation results in confusion and increasing fear, which could impede an effective response to the epidemic.^[7] Although in an epidemic situation a reasonable level of fear could be helpful in coping with an outbreak, overwhelming fear has reverse effects.^[8] COVID-19 is a new virus with a

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lot of uncertainties about its origins, nature, and course, which has been spreading rapidly and caused heavy fear more than seasonal influenza.^[9]

A study of Psychological Responses and Related Factors during (COVID-19) Epidemic in China has reported 16.5% moderate-to-severe depressive symptoms, 28.8% moderate-to-severe anxiety symptoms, and 8.1% moderate-to-severe stress levels among respondents.^[10] According to recent evidence of the corona-phobia survey in Canada, the psychological effects of COVID-19 have been considerable and the fear of COVID-19 was observed among at least one-third of the respondents. The fear is reported to be due to the virus novelty, misinformation received from the media, and uncertainty about how disastrous this epidemic could become.^[9] Moreover, in society, as a consequence of the COVID-19 epidemic, there would be a sense of loss which is related to the loss of loved ones, direct social contacts, freedoms, employment, educational opportunities, recreation, and supports which could have a serious effect on mental health of those most vulnerable.^[11]

Iran reported its first confirmed cases of COVID-19 on February 19, 2020, in Qom. At the time of writing (April 2, 2020), Iran has had 50,468 confirmed cases and 3160 deaths which is the seventh highest number of COVID-19 deaths after the USA, Italy, Spain, China, Germany, and France.^[12] According to our knowledge, no study has investigated the fear and rumor of COVID-19 in Iran.

Therefore, since changing human behavior is the best defense in tackling the virus and the best way of controlling disease outbreak, and on the other hand, the human behavior is greatly affected by fear and rumor believes, we need to control the pandemic of social media panic and public rumors in controlling disease outbreaks. Accordingly, we aimed to investigate the fear and rumors of COVID-19 among the general population and their possible causes to provide appropriate solutions to control psychological conditions in the general population and reducing the community panic and rumors in managing the outbreak.

Subjects and Methods

This cross-sectional study was approved by the Iran National Committee for Ethics in Biomedical Research under the code of IR.MUI.MED.REC.1398.649.

We recruited 2249 individuals over 18 years from the capital of six provinces of Iran using " $n = (Z^2 pq/d^2)$ " formula with considering of 95% confidence coefficient and 0.02 of error. Given the lack of accurate information about COVID-19-related fears, it was assumed that

50% of Iranians had a fear score <12 (median). Samples was allocated to cities according to the population above (Isfahan, Fars, and Kermanshah) and below (Kohgiluyeh and Boyer-Ahmad, Bushehr, and Markazi) one million [Table 1] in March 2020.

The sampling of cities was randomly stratified. The provincial capitals were divided into two classes with a population of less and over one million, and then, three provincial capitals were randomly selected on each stratum. Participants were chosen through street-based multistage sampling. The sampling was proportional to the population's age and sex structure of the latest census of Iran. First, each city was stratified into some districts based on municipality areas. Then, a list of more crowded streets and public places of each district was prepared and two of them were selected randomly. Finally, in each crowded place, passersby were selected by chance invited to participate in the study. After explaining the purpose of the study, the confidentiality of information as well as the independence of individuals in participating in the study, informed consent was received from all participants. Participants were provided with gloves and alcohol pad before filling self-administered questionnaire. Inclusion criteria were age over 18 years old, resident in the target city, and mental capable to answer questions. However, the unwillingness to participate was the exclusion criterion.

The study's questionnaire content was developed after exact detecting rumors in social media such as Instagram, WhatsApp and telegram, in-depth interviews with people, and judgments of infectious disease experts. The face validity of the questionnaire was confirmed by 30 members of the community and ten experts. The results of the face validity assessment led to some minor changes in questions. Furthermore, content validity was assessed by ten experts. The viewpoints of the expert panel were applied regarding the relevancy, clarity, simplicity, and necessity of questions; both content validity ratio and content validity index of the questionnaire were more than 0.80 for all items. In addition, reliability of this questionnaire was assessed by Cronbach's alpha ($\alpha = 0.78$ for rumor, $\alpha = 0.83$ for fear, and $\alpha = 0.76$ for whole of the questionnaire).

The questionnaire was composed of three sections: rumor, fear, and demographic information. In the first section, the rumor of the COVID-19 was measured by 17 items (including the most common rumors about COVID-19). The following question was asked at the first of all items, "Have you heard this news about COVID-19?" All items had six answers: (a) No, I have never heard this news, (b) Yes, but it is very unlikely to be true, (c) Yes, but it is unlikely to be true, (d) Yes, but I don't know if it's true or not, (e) Yes, that's probably true, and (f) Yes, that's true definitely. These questions were

answered on a 5-point Likert-type scale that ranged from 1 (it is very unlikely to be true) to 5 (it is true definitely),

and “No” answers were not counted. Thus, the score of rumor section was 17–85. The fear section included 5 items about the various aspects of fear caused by infected by a coronavirus. These items were designed as Likert scale based (not at all-very much) from 5 to 1, and the total score for the fear section was 4–20. Participants were also asked two questions about the extent of people’s fear (range: 0–100) and the cause of fear. In the last section, there were two questions about the source of information and the amount of trust in them, and 7 items about demographic information.

Table 1: Characteristics of participants

Variables	n=2249*
Age (year)	
Mean (SD)	37.14 (12.54)
Median (IQR)	35 (52)
Gender, n (%)	
Male	1140 (50.71)
Female	1108 (49.29)
Marital status, n (%)	
Single	811 (36.27)
Married	1325 (59.26)
Widow	54 (2.42)
Divorced	46 (2.06)
Educational level, n (%)	
Illiterate	23 (1.04)
Elementary	332 (15.08)
Diploma and under diploma	702 (31.88)
Graduated	1145 (52.00)
Have underlying diseases, n (%)	177 (7.87)
Workplace status, n (%)	
Indoors and lack of communication with others	437 (20.20)
Indoors and low contact with others	536 (24.78)
Indoors but high contact to others	384 (17.75)
Outdoors but lack of communication with others	249 (11.51)
Public and crowded places	475 (21.96)
Health centers	82 (3.79)

*There were missing data for gender (1), marital status (11) educational level (47) but all of them were <5%. SD=Standard deviation, IQR=Interquartile range

Data were analyzed in Stata software (version 11, StataCorp, 1985, USA) using the Chi-square test, one-way ANOVA, Scheffe, and linear regression, considering a significance level of 5%. The overall estimates were calculated through survey analysis regarding the weight of each participant in each city.

Results

A total of 2249 (49.3% women) participants were included in the study, with an average response rate of 81.3%. The mean (standard deviation [SD]) age of participants was 37.14 (12.54) years old. Approximately 7.9% of participants had at least one underlying disease, of whom 22.5% had diabetes, 21.7% had hypertension, 12.4% had cardiovascular disease, 10.7% had respiratory diseases, and the rest of them had cancer, kidney, mental, and autoimmune disease [Table 1].

Table 2: The Way of Information Accessibility and Trusted source*

	Arak N=531523 (n=200)	Isfahan N=2112767 (n=499)	Boushehr N=273577 (n=250)	Kermanshah N=1000285 (n=500)	Shiraz N=1712745 (n=550)	Yasouj N=157454 (n=250)	P (χ ²)
Ways to access COVID-19 information							
Radio and television inside country	167 (83.50)	321 (64.33)	157 (62.80)	289 (57.80)	363 (66.00)	243 (97.20)	<0.0001
Radio and television outside country	50 (25.00)	143 (28.66)	29 (11.60)	158 (31.60)	334 (60.73)	2 (0.80)	<0.0001
Social Networks (WhatsApp, Instagram, Telegram, etc.)	112 (56.00)	319 (63.93)	112 (44.80)	206 (41.20)	380 (69.09)	23 (9.20)	<0.0001
Other mass media (web sites, newspapers, etc.)	28 (14.00)	90 (18.04)	43 (17.20)	64 (12.80)	229 (41.64)	19 (7.60)	<0.0001
Ministry of Health phone message	71 (35.50)	179 (35.87)	108 (43.20)	142 (28.40)	427 (77.64)	46 (18.40)	<0.0001
Health workers	35 (17.50)	127 (25.45)	48 (19.20)	93 (18.60)	343 (62.36)	47 (18.80)	<0.0001
Friends	75 (37.50)	141 (28.26)	66 (26.40)	106 (21.20)	500 (90.91)	34 (13.60)	<0.0001
Family	37 (18.50)	119 (23.85)	29 (11.60)	94 (18.80)	517 (94.00)	82 (32.80)	<0.0001
Trusted information source							
Radio and television inside country	126 (63.00)	190 (38.08)	121 (48.40)	206 (41.20)	218 (39.64)	238 (95.20)	<0.0001
Radio and television outside country	33 (16.50)	113 (22.65)	14 (5.60)	122 (24.40)	258 (46.91)	3 (1.20)	<0.0001
Social Networks (WhatsApp, Instagram, Telegram, etc.)	75 (37.50)	122 (24.45)	39 (15.60)	117 (23.40)	171 (31.09)	18 (7.20)	<0.0001
Other mass media (web sites, electronic newspaperese, ect.)	14 (7.00)	55 (11.02)	27 (10.80)	56 (11.20)	89 (16.18)	21 (8.40)	0.003
Ministry of Health phone message	49 (24.50)	105 (21.04)	88 (35.20)	114 (22.80)	216 (39.27)	66 (26.40)	<0.0001
Health workers	29 (14.50)	146 (29.26)	61 (24.40)	145 (28.00)	154 (29.00)	132 (52.80)	<0.0001
Friends	43 (21.50)	44 (8.82)	29 (5.80)	29 (11.60)	200 (36.36)	55 (22.00)	<0.0001
Family	13 (6.50)	55 (11.02)	11 (4.40)	94 (18.80)	212 (38.55)	139 (55.60)	<0.0001
Nothings	11 (5.50)	25 (5.01)	5 (2.00)	1 (0.20)	0 (0)	0 (0)	<0.0001

COVID-19=Coronavirus disease 2019. *N=Population size, n=Sample size

Obtaining information on COVID-19 from internal radio and television was about 68.5% versus 31.8% from Persian media outside the country. Of participants, 51.2% sought information in electronic social networks, about 21% used websites, and 1% visited the WHO website and read related scientific papers. About 43.4% and 30.8% of the participants declared receiving information through the Ministry of Health phone messages and health workers, respectively. However, the way of information accessibility was different significantly between cities. In view of participants, the most trusted information sources were Iranian radio and television (48.9%), health workers (29.7%), and Ministry of Health messages (28.4%), while electronic social networks ranked fifth (24.10%). However, about 1.9% of the participants acknowledged that there was no confident information source. The ways of getting information and the level of trust in information resources were significantly different between cities ($P < 0.05$). For example, in Yasuj, radio and television were more popular to acquire information, while the percentages of other ways in Shiraz were higher than in other cities. However, residents of Shiraz said that they trust the Ministry of Health’s messages the most. The highest percentage of trust in social networks was in the people of Arak although the highest percentage of distrust in the existing information resources in this city [Table 2].

From the participant’s point of view, 73.3% of the Iranian population have been dreaded of spreading COVID-19 in the country. They believed that the main causes of fear from epidemic among the Iranian population are

untreatable nature and high spread and mortality of COVID-19 as well as spreading rumors and cyber news about this disease in the community [Figure 1].

However, about 90.5% of the participants were afraid of being infected with COVID-19 themselves, while 97.1% of them were worried about their family members. By the survey analysis, the weighted mean (SD) score of fear among the Iranian population was 15.68 (0.46), which is more than median (4–20). In addition, the weighted mean (SD) score of rumor believes was 39.24 (1.27), which is also more than the median (17–85). Fear and rumor scores were significantly different between cities. Apart from Bushehr with Arak ($P = 0.999$), Isfahan with Bushehr ($P = 0.078$), and Kermanshah with Bushehr and Arak ($P = 0.065$, $P = 0.447$), the other differences in the rumor score of cities were significant. Regarding fear score, except for Shiraz with Yasuj ($P = 0.543$), Isfahan with Bushehr and Arak ($P = 0.726$, $P = 0.998$), and Arak with Bushehr ($P = 0.974$), the differences between the other cities were significant [Table 3].

By increasing educational level, significantly fear of COVID-19 was increasing (0.001) although trusting the rumors was decreasing (<0.0001). In addition, trusting the rumors decreased by increasing age (<0.0001). As well, believing in rumors was significantly affected by having underlying disease (0.017) and workplace situation (<0.0001) [Table 4].

The results of the regression model showed that fear of COVID-19 and trusting the rumors were significantly

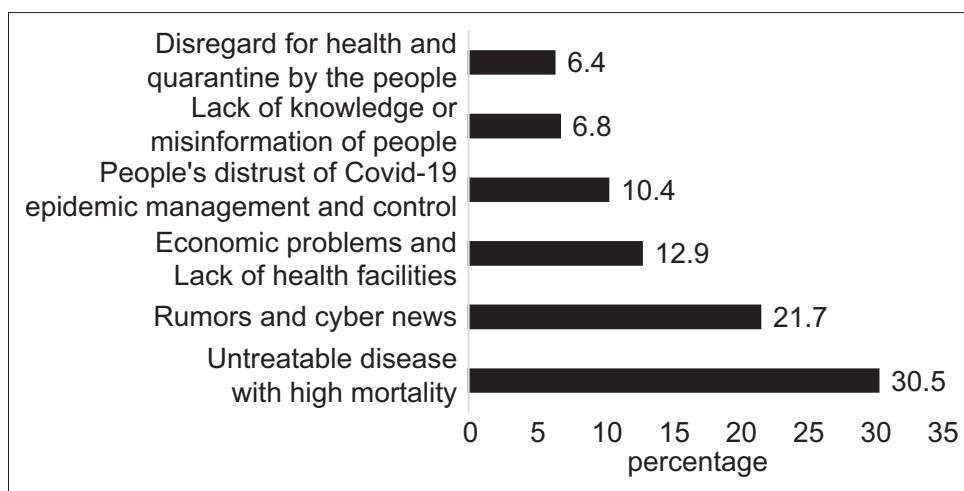


Figure 1: Causes of fear of the COVID-19 epidemic among Iranian population

Table 3: Fear and rumor scores about Coronavirus disease 2019 based on city

Score (minimum-maximum)	Mean (SD) Score						P*	Total mean (SD) score
	Arak	Isfahan	Boushehr	Kermanshah	Shiraz	Yasouj		
Rumor (17-85)	41.54 (9.11)	39.63 (10.56)	41.93 (11.25)	43.27 (11.43)	32.16 (4.61)	63.92 (8.40)	<0.0001	39.24 (1.27)
Fear (4-20)	15.24 (3.94)	15.39 (3.72)	14.93 (3.71)	13.8 (4.51)	17.64 (2.04)	17.10 (3.05)	<0.0001	15.68 (0.46)

*One-Way ANOVA. SD=Standard deviation

Table 4: Factor associated with Fear and rumor scores

	Fear score			Rumor score		
	Mean (SD)	β^*	P	Mean (SD)	β^*	P
Age, mean (SD)	-	0.013	0.194	-	-0.195	<0.0001
Gender, n (%)						
Male	15.92 (0.83)	0.511	0.573	38.8 (1.80)	-0.594	0.798
Female	15.44 (0.33)			39.6 (1.77)		
Marital status, n (%)						
Single	15.55 (0.42)	0.026	0.771	40.24 (1.22)	0.554	0.335
Married	15.93 (0.47)			38.42 (1.34)		
Widow	13.70 (0.58)			42.73 (0.67)		
Divorced	13.94 (0.42)			41.93 (1.48)		
Educational level, n (%)						
Illiterate	15.50 (0.94)	0.937	0.001	38.51 (2.28)	-3.57	<0.0001
Elementary	14.55 (0.22)			42.6 (1.28)		
Diploma and under diploma	15.30 (0.40)			40.79 (1.07)		
Educated	16.27 (0.50)			37.51 (1.32)		
Have underlying diseases, n (%)	15.51 (0.33)	0.036	0.338	40.49 (0.95)	1.88	0.017
Workplace situation						
Indoors and lack of communication with others	15.58 (0.58)	0.030	0.540	40.37 (1.72)	-0.363	<0.0001
Indoors and low contact with others	15.52 (0.44)			40.01 (1.18)		
Indoors but high contact to others	15.40 (0.53)			38.55 (1.28)		
Outdoors with no social connection	16.19 (0.69)			37.56 (1.78)		
Public and crowded places	15.87 (0.40)			39.81 (1.43)		
Health centers	15.59 (0.39)			36.54 (0.78)		

*Linear regression adjusted based on age, gender, marital status, educational level, underlying disease, workplace situation. SD=Standard deviation

correlated with the source of information and the amount of trust in those information sources ($0 < 0001$). Participants who received their information through Persian radio and television outside the country or social media had, respectively, 0.7 (0.02) and 0.8 (0.008) score more fear than others. Trusting the rumors in those who received their information through the Ministry of Health phone message and Health workers were, respectively, 4.6 (0.001) and 3.6 (0.001) score less than others. In addition, those who trusted none of the information sources had 7.4 (<0.0001) score more rumor believes than others.

Discussion

The COVID-19 pandemic has been one of the most health challenges in Iran and all around the world which has caused a lot of fear and anxiety among the communities. This study determined a large amount of fear and rumors surrounding COVID-19 in Iran. Based on the survey analysis, the weighted mean score of fear and rumor believes among the Iranian population was much more than the median. The psychological effects of COVID-19 have been considerable in the corona-phobia survey in Canada, and at least one-third of the respondents were anxious about COVID-19 and 7% were "very concerned" despite that study was conducted in early February 2020 when it had not developed yet into a full-blown pandemic. According to the result of one study conducted on February 1, 2020, in the U. S., most

respondents (66%) considered COVID-19 as a real threat and were so concerned about arriving this virus to the U. S. Moreover, about one-quarter of them had no trust in the government in preventing the spread of infection.^[9] In the study conducting in China on February 2, 2020, about 75.2% of respondents were worried about their family members becoming infected by COVID-19 and also 50.9% of respondents about their children becoming infected.^[10]

Untreatable nature and high spread and mortality of COVID-19 as well as spreading rumors and cyber news around this disease in the community were the most important causes of fear among participants. In other countries, the fear of COVID-19 outbreak has been reported due to its novelty, rapidly spreading, misinformation received from the media, and the uncertainties about this outbreak outcome.^[9]

Fear and rumor scores were significantly different between cities. According to the results, by increasing the educational level, fear was increasing, but the rumors were decreasing. Therefore, the high level of rumor believes in Yasouj may be due to the low educational level in this city with the most proportion of illiterate and low-literate participants compared with other cities in our study that requires further study in the future, while the lowest score of rumor believes and the highest score of fear were seen in Shiraz with the highest level of education. However, further studies on the effects of

cultural, ethnic, and geographical factors on the level of fear and rumor are recommended.

Participants with underlying disease trusted more rumors than others which could be due to their underlying health conditions that put them more at risk. As well, believing in rumors was low among health workers regarding their higher knowledge of this disease. This matter emphasizes educating the general population about the proper prevention approaches to reduce rumors in the community.^[13]

Behavioral change is the most important issue in controlling this epidemic which itself could be affected by fear and rumors. Uncertainty and fear can be fuelled anxiety. On the other hand, growing concern experienced by the public could increase distress, which might decrease adherence of people and worsen the mental health issues.^[11]

In the present study, social network media was the main cause of fear and rumors. Therefore, to controlling epidemic, in addition to implementation of public health measures, we should attempt to overcome the pandemic of social media panic and detect and reply to public rumors.^[7] For example, phone messages from the Ministry of Health help to decrease rumors, as shown in our study. Excessive fear and rumor surrounding the outbreak of COVID-19 could make this outbreak difficult to control. Governments should design programs to elevate the public's knowledge and eliminate the rumors and misperceptions. Providing transparent information about epidemics to the public could reduce the fear, stress, and anxiety.^[6,10] Moreover, by sending supportive and positive messages, planning the targeted radio and television programs and providing mental health support should try to increase social vitality and help community members managing the outbreak fear and anxiety and overcoming the psychological effects of being quarantine and social distancing, which could include alcohol and substance misuse, suicide and self-harm, domestic and child abuse, and psychosocial risks (such as relationship breakdown, social disconnection, financial stress unemployment, homelessness, lack of meaning or anomie, entrapment, and bereavement). Surveillance of the loneliness and social isolation should be considered as important priorities to protect against the emotional problem, self-harm, and suicide.^[11]

In addition, implementing studies on COVID-19 mental health issues using the appropriate methodology is recommended which is better to design for specific groups like health-care staff, children, older people, and people who lose their loved ones in addition to the whole population.

The main limitation of the present study was that the samples were selected from street and crowded places where the people who were more afraid of COVID-19 were less likely to be present. However, we performed a survey analysis as we could overcome the problem of non-generalizability to some extent. However, the present study was innovative because there was no study to assessing fear and rumor related to COVID-19 at the national level in Iran from several different cities with different cultures. In addition, we assessed fear and rumor in person by questionnaire while the generalizability of online surveys in Iran is in question due to the low participation of Iranian people in online surveys.

Conclusions

Simultaneously with the COVID-19 pandemic, fear and rumors about the disease have become epidemics, which can be an obstacle to controlling the disease, and of course, Iran has not been an exception. In addition to the programs of the WHO, local planning programs to reduce fear and rumor in the country based on the psychological and cultural conditions, as well as the type of rumors and level of fear, are recommended.

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Conflicts of interest

There are no conflicts of interest.

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