

# The Compliance with Health Protocols to Prevent COVID-19 Based on Demographic Characteristics of Population in Isfahan Metropolitan, Iran

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## Original Article

### Abstract

**Introduction:** Prevention is the best way to effectively deal with COVID-19. Planning to prevent COVID-19 depends on information such as the extent to which health protocols are respected. For this purpose, the present study aimed to assess the extent of compliance with health protocols to prevent COVID-19 incidence given the demographic characteristics of population in Isfahan metropolitan, Iran.

**Materials and Methods:** A questionnaire was designed by the researcher, and its validity and reliability were confirmed. The questionnaire was distributed through social media, and filled in by 380 Isfahani citizens. Data were analyzed using independent t, Mann-Whitney, and Kruskal-Wallis tests.

**Results:** Women complied with the health protocols significantly more than men ( $P < 0.001$ ), but the extent of compliance with health protocols showed no significant difference between individuals at different ages ( $P = 0.473$ ), with different levels of income ( $P = 0.725$ ), different education levels ( $P=0.284$ ), and the presence or absence of underlying diseases ( $P = 0.987$ ). Moreover, in complying with health protocols, less attention was paid to timely replacement of masks.

**Conclusion:** Findings from this study show that how people comply with health protocols depends on factors such as gender. Moreover, the participants attached different levels of importance to different health guidelines.

**Keywords:** COVID-19; Prevention; Demographic

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### Introduction

Given empirical evidence, since late 2019, a new virus from the family of coronaviruses called severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has been spreading. Concerns about coronavirus disease 2019 (COVID-19) are due to the fact that in less than two decades, it is the third time that coronavirus viruses have led to a deadly epidemic (1). Prior to 2002, coronaviruses were not thought to cause acute problems, but with the spread of SARS and the death of more than 800 people, researchers found that coronaviruses could cause more severe illnesses than the common cold (2). For the second time in 2012, a new corona virus affected the world. This coronavirus was called Middle East respiratory syndrome (MERS) and this time in December 2019, another coronavirus broke out, which has become a concern for the international

community today. The virus causes severe and fatal respiratory problems (3) and has spread rapidly throughout the world, infecting almost every country in a short period of less than four months (4). According to Worldometer data (5), on October 6, 2020, the number of confirmed cases of the disease in the world reached more than 36 million people (36704216 people) and 1548738 deaths were reported due to Covid 19 in the world. At the same time, 479825 confirmed cases of the disease along with 27419 deaths due to Covid 19 were reported in Iran, and Iran was the thirteenth country in terms of the highest number of confirmed cases of Covid 19 on this date (5). Six months later, on March 5, 2021, this rate reached more than 20 million people (116723279 infected and 2592912 deaths), including 1681682 infected and 60512 deaths due to this disease in Iran.

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One of the unique features of Covid 19 is its high transmission power compared to SARS and MERS and its long incubation period (up to 14 days), which increases the rate of virus infection and makes it more difficult to prevent and control (3). Following the increase in the incidence of the virus worldwide, the World Health Organization (WHO) on January 31, 2020, issued a statement announcing the outbreak of the new coronavirus as the sixth public health emergency worldwide (6).

Due to the lack of standard treatment and definitive vaccines to date, the best way to deal effectively with Covid 19 is prevention (7). Accordingly, many countries around the world, including Iran, have taken unprecedented steps to reduce the spread of the deadly Covid 19 virus, including closing schools, shops, restaurants, cafes, banning public events, and inciting or imposing teleworking (8,9). These measures had adverse economic consequences and reduced employment and increased unemployment (10). The costs of illness and subsequent rehabilitation on the one hand, and social isolation and economic pressures on the other hand, have had several psychological consequences (11-13). With the prolongation of the prevalence of Covid 19 and its psychological (14,15) and economic consequences (16,17), the emphasis on the observance of the health protocols became more on the agenda than the closures.

The results of previous studies have shown that adherence to health protocols during an epidemic is associated with demographic characteristics (18). A newly published study suggests that demographic characteristics, such as age and gender, are associated with Covid 19 mortality (19). Moreover, the results of some studies indicate that the death rate due to Covid 19 is higher in people with the underlying diseases (20,21). Due to the fact that planning for prevention of Covid 19 depends on information such as compliance with health protocols by different segments of society, the purpose of this study was to describe the observance of health protocols for prevention of Covid 19 based on demographic characteristics in the metropolis of Isfahan, Iran.

### Materials and Methods

This was a descriptive and causal-comparative study in which the data were collected as cross-sectional in the summer of 2020. Equation 1 was employed to determine the required sample size, in which  $\epsilon$  and  $\alpha$  represent the accuracy and error level, respectively.

$$\text{Sample size} = \frac{(Z_{\alpha/2} \times X_{\sigma})}{\epsilon}^2 \quad \text{Equation 1}$$

Estimation of standard deviation (SD) using a preliminary sample of 50 people from the study population was 4.72, which considering this value and accuracy of 0.5 and error of 5%, the required sample size was estimated to be 343 people. The study participants consisted of 380 people (285 women, 95 men) from Isfahan. All participants expressed their consent to participate in the study and the research plan was approved by the Research Committee of Shahid Ashrafi Isfahani University of Isfahan.

**Measurement tool:** The measurement tool was a two-part researcher-made questionnaire. The first part consisted of items about demographic information including gender, age, income, level of education, and the presence of underlying disease in the person or those around them and the second part included six items with answers in the form of a five-point Likert scale with very few options (1 point) to very high (5 points) on the subject compliance with health protocols regarding Covid 19. Achieving a higher score in the second part showed more compliance with the health protocols related to Covid 19. The possible range for the scores of individuals in the second part of the questionnaire was between 6 and 30 and were classified as 6-11, 12-17, 18-23, and 24-30 as unfavorable, relatively unfavorable, relatively favorable, and favorable, respectively. The content validity of the questionnaire was assessed using expert opinion and the reliability was measured using Cronbach's alpha coefficient.

**Methods:** Data were collected through virtual networks using the virtual questionnaire given the epidemic of Covid 19 disease and the high infection of this disease. Since data collection was performed in the form of virtual social media, the sampling was conducted by the convenience and non-probabilistic method. The items were given to the administrators of the virtual media channels and then the people were asked to share the questionnaire with others by snowball method. In order to ensure that people from different educational and economic backgrounds participated in the study, the administrators of some channels were selected purposefully. One channel belonged to university professors and the other to workers of an industry. To share the questionnaire, a text was prepared in which the necessary explanations regarding the voluntary answering of the items and the purpose of data collection were provided and at the same time with the sharing of the questionnaire, it was provided to the participants so that they enter the study with satisfaction and complete the questionnaire. In the present study, Cronbach's alpha coefficient was used to determine the reliability.

Analysis was performed at descriptive and inferential levels. At the descriptive level, the frequency distribution tables, statistical graphs, and the mean and SD indices were used. In addition, at the inferential level after checking the assumption of normality of data distribution by Kolmogorov-Smirnov (KS) test, if this assumption was true, the independent t-test and otherwise, the Mann-Whitney, Kruskal-Wallis, and Friedman tests were used. The tests were analyzed at 5% error level in SPSS software (version 23, IBM Corporation, Armonk, NY, USA).

### Results

The content validity of the questionnaire was confirmed by 5 specialists in health education and health promotion and the content validity ratio (CVR) was 0.99. The Cronbach's alpha coefficient for the questionnaire was 0.832. In the present study, 380 people including 95 (25%) men and 285 (75%) women were present. Most participants were in the age group of 30 to 40 years (36.8%) and with associate or bachelor's degree (44.2%). In terms of income level, most people had incomes less than two million tomans (39.5%). Incidence of underlying diseases was observed in 44 (11.6%) patients and care of the elderly or people with underlying diseases was observed in 113 (29.7%) patients. The demographic characteristics of the samples are presented in table 1.

Details of the individuals' responses to each of the questionnaire items are provided in table 2.

The frequency distribution of the participants' answers to the questions related to the observance of health protocols is presented in figure 1.

The results showed that most people followed the protocols to a great extent.

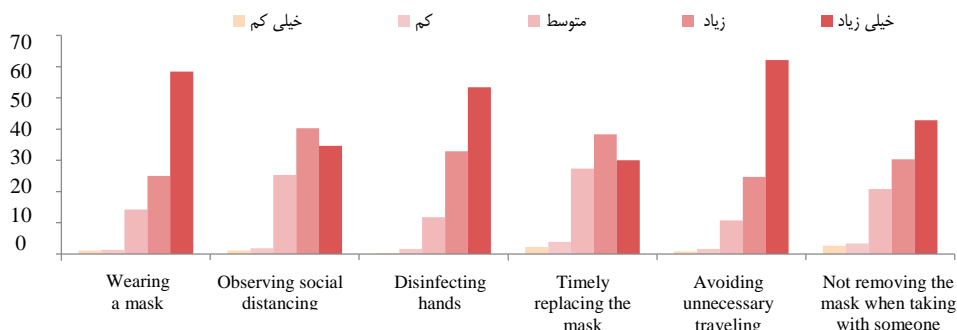
The level of compliance with health protocols during the Covid 19 is presented in table 3. The mean

score of individuals from the Health Protocols Questionnaire was  $25.16 \pm 3.90$  (Table 3).

**Table 1.** Frequency distribution of participants based on individual characteristics

Variable	Category	n (%)
Gender	Female	285 (75.00)
	Male	95 (25.00)
Age (years)	15-20	17 (4.50)
	20-30	102 (27.10)
	30-40	140 (36.80)
	40-50	100 (26.30)
	Above 50	20 (5.30)
Income (Tomans)	Less than 2 million	150 (39.50)
	2-3 million	75 (19.70)
	3-4 million	54 (14.20)
	More than 2 million	101 (26.60)
Education	Below diploma	10 (2.60)
	Diploma	52 (13.70)
	Associate/Bachelor	168 (44.20)
	Master	117 (30.80)
Having an underlying disease	No	336 (88.40)
	Yes	44 (11.60)
Taking care of an elderly or a sick	No	267 (70.30)
	Yes	113 (29.70)

Comparing the observance of health protocols based on the demographic characteristics, it was found that the observance of health protocols in women was significantly higher than in men ( $P < 0.001$ ), but the observance of health protocols was not different in people of different ages ( $P = 0.473$ ) with different incomes ( $P = 0.725$ ) and different levels of education ( $P = 0.284$ ). Additionally, the degree of compliance with health protocols did not show a significant difference between individuals with and without underlying disease ( $P = 0.987$ ) and between people who had taken care of the elderly or a person with underlying disease ( $P = 0.401$ ) (Table 4).



**Figure 1.** Frequency distribution of participants' responses to the extent to which health behaviors are observed in the prevention of the Covid 19 disease

**Table 2.** Frequency distribution of participants based on the answers to the items related to the degree of compliance with health protocols

Item	Very low	Low	Moderate	High	Very high
How much do you care about wearing a mask?	4 (1.10)	5 (1.30)	54 (14.20)	95 (25.00)	222 (58.40)
How much do you observe social distancing?	4 (1.10)	7 (1.80)	96 (25.30)	153 (40.30)	120 (34.60)
How much do you care about disinfecting your hands to prevent the Covid 19 disease?	1 (0.30)	6 (1.60)	45 (11.80)	125 (32.90)	203 (53.40)
How much do you care about changing the mask on time?	9 (2.40)	15 (3.90)	104 (27.40)	138 (38.30)	114 (30.00)
How much do you avoid going on unnecessary trips?	3 (0.80)	6 (1.60)	41 (10.80)	94 (24.70)	236 (62.10)
How much do you care about not removing the mask from your face when talking to someone?	10 (2.60)	13 (3.40)	79 (20.80)	115 (30.30)	163 (42.90)

Data are reported as n (%).

**Table 3.** Frequency distribution and mean score of compliance with health protocols among participants

Variable	Category	n (%)	Mean ± SD
Rate of adherence to health protocols	Unfavorable	3 (0.8)	8.67 ± 2.08
	Relatively unfavorable	9 (2.4)	15.11 ± 1.96
	Relatively favorable	105 (27.6)	21.29 ± 1.53
	Favorable	263 (69.2)	21.24 ± 1.99
	Total	380 (100)	25.16 ± 3.90

SD: Standard deviation

In order to rank six health behaviors based on the degree of observance of those behaviors by individuals, Friedman test was used. Based on the results of this test, the assumption that the rank of the six behaviors studied were the same in terms of compliance by individuals was rejected at an error level of 5% ( $P < 0.001$ ). The highest rank (highest observance) was related to avoiding unnecessary trips

and the lowest rank (lowest observance) was related to timely replacement of the mask. The results of post hoc test in pairwise comparisons between health behaviors showed that the level of observance of health behaviors “avoiding unnecessary trips, using a mask, and disinfecting hands” were not significantly different from each other and observing these three health behaviors was significantly more than not removing the mask when talking to someone, social distancing, and timely replacement of the mask (Table 5).

### Discussion

The extent of compliance with health protocols is directly related to the prevalence of Covid 19. In order to better plan education and encourage the observance of health protocols, the authorities need to know the extent to which the protocols are observed by different sections of society.

**Table 4.** Comparison of the observance of health protocols based on demographic characteristics

Variable	Category	n	Questionnaire scores (mean ± SD)	Test statistic	P
Gender	Female	285	25.79 ± 3.54	5.636*	< 0.001
	Male	95	23.28 ± 4.32		
Age (years)	15-20	17	25.41 ± 2.94	3.529**	0.473
	20-30	103	24.90 ± 4.31		
	30-40	140	25.57 ± 3.90		
	40-50	100	24.87 ± 3.76		
	Above 50	20	24.90 ± 3.08		
Income (Tomans)	Less than 2 million	150	25.46 ± 3.67	1.318**	0.725
	2-3 million	75	25.27 ± 3.74		
	3-4 million	54	24.61 ± 4.45		
	More than 2 million	101	24.94 ± 4.06		
Education	Below diploma	10	25.70 ± 3.16	5.029**	0.284
	Diploma	52	25.19 ± 3.84		
	Associate/Bachelor	168	24.86 ± 3.89		
	Master	117	25.20 ± 4.10		
	PhD	33	36.26 ± 3.46		
Having an underlying disease	No	336	25.15 ± 3.95	-0.016***	0.987
	Yes	44	25.27 ± 3.55		
Taking care of an elderly or a sick	No	267	25.01 ± 4.05	-0.841***	0.401
	Yes	113	25.52 ± 3.51		

SD: Standard deviation

\*Independent t test, \*\*Kruskal-Wallis test, \*\*\*Mann-Whitney test

**Table 5.** Results of Friedman test in ranking the observance of health behaviors by individuals

Health behavior	Mean rank	Rank	Test statistic	df	P
Wearing a mask	3.92	2	257.31	5	< 0.001
Observing social distancing	2.99	5			
Disinfecting hands	3.89	3			
Timely replacing the mask	2.82	6			
Avoiding unnecessary traveling	4.06	1			
Not removing the mask when taking with someone	3.31	4			

df: Degree of freedom

Accordingly, the present study was conducted to investigate the observance of health protocols given the demographic characteristics. The findings suggested that among the various demographic characteristics such as gender, age, education, income, people with underlying disease and without underlying disease, and people who care for people with underlying disease with people who do not have this task, gender was the only factor that affected the observance of health protocols, with women following the health protocols more than men. This outcome was consistent with the results of previous studies (22-26) which showed that women had more preventive behaviors during the respiratory disease epidemics. This difference may be due to women becoming more aware of preventive behaviors (27), gender differences in valuing social-desirability, or women's sense of responsibility to maintain the health of the family and children as a definite duty at home (28,29).

Other findings of the study showed that some preventive behaviors, such as avoiding unnecessary travel, wearing a mask, and disinfecting hands, were given more importance, but less attention was paid to timely mask replacement and social distancing. One possible reason for this difference may be media advertisements and their emphasis on certain preventive behaviors. Another possible reason is people's different perceptions of the usefulness of preventive behaviors (30). Another possible cause of the difference is the extent of restrictions imposed by the preventive behavior. Replacing the mask on time may be financially constrained, or social distancing may be less possible for those who use public transportation or work in some busy jobs.

### Limitations

Due to the prevalence of Covid 19, sampling was performed as the convenience method and through an online platform. In this sample, the number of individuals under 20 and over 50 was small. In addition, the number of men was lower than women. The education level of about 40% of the subjects was

above the master's degree, which can affect the compliance with the protocols. Ideally, sampling should be performed randomly and with a distribution appropriate to the statistical population. Moreover, although social-desirability bias is less common in anonymous online surveys than in telephone or face-to-face surveys (31), some response biases in the present study data were likely. For example, previous studies have indicated that women are more socially inclined than men in responding to surveys (29).

### Recommendations

The findings indicate the need to identify strategies to increase self-care behaviors in men. Furthermore, it is necessary to mention in the public media the importance of observing all health protocols (such as timely replacement of masks and observance of social distancing). The officials should also think of appropriate solutions to observe the social distancing. By further identifying the virus and offering different solutions at any given time, the results of the present study may change in terms of the extent to which a variety of preventative behaviors are observed that need to be measured in future investigations.

### Conclusion

Overall, the results of the present study revealed that women follow the health protocols more than men and among the various preventive behaviors, the severity of timely change of the mask and observing social distancing was less than wearing a mask and washing hands.

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The present study was extracted from an MSc thesis with the code 14085932, approved by Shahid Ashrafi Isfahani University. We would like to appreciate all the participants for their efforts.

### Authors' Contribution

Hamid Reza Jamali: study design and ideation, attracting financial resources for the study, providing study equipment and samples, data collection,



analysis and interpretation of results, specialized statistical services, manuscript preparation, specialized evaluation of manuscript in terms of scientific concepts, approval of the final manuscript to be submitted to the journal office, the responsibility for maintaining the integrity of the study process from the beginning to the publication, and responding to the referees' comments; Reza Salehzadeh: study support, executive, and scientific services, analysis and interpretation of results, specialized statistical services, manuscript preparation, specialized evaluation of the manuscript in terms of scientific concepts, approval of the final manuscript to be submitted to the journal office, the responsibility for maintaining the integrity of the study process from the beginning to the publication, and responding to the referees' comments.

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### Conflict of Interest

The authors do not have a conflict of interest. Dr. Reza Salehzadeh is an assistant professor at Shahid Ashrafi Isfahani University and Hamid Reza Jamali is a graduate student at Shahid Ashrafi Isfahani University.

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