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Prevalence and Associated Factors of Personal Protective Measures Among the Southeastern Iranian Population During the COVID-19 Pandemic

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ARTICLE INFO	ABSTRACT
	Introduction: The main focus of our study was on prevalence and potential explanatory factors related to personal protective measures (e.g., face mask wearing and physical distancing) in the southeastern Iranian population during the coronavirus disease 2019 (COVID-19) pandemic. **Methods:** A total of 351 participants in southeastern Iran were examined in this cross-sectional study using self-report scales of personality traits, COVID-19 risk perception, face mask wearing, physical distancing, and public trust. The data were analyzed by SPSS v25 software at the significance level of p<0.05. **Results:** Descriptive statistics showed that the prevalence rates of COVID-19 risk perception and face mask wearing among participants were 76.4% and 77.8%, respectively. In addition, 59.6% of participants reported that they maintained an adequate distance when communicating with others; 41.9% acknowledged that they did not allow relatives and friends to visit them at home; 46.8% said they preferred to stay at home and not go outside unless necessary. Furthermore, multiple regression analysis revealed that older age, being female, lower levels of neuroticism and higher levels of extraversion, agreeableness, conscientiousness, COVID-19 risk perception, and public trust were associated with higher adherence to personal protective measures. **Conclusions:** These results emphasized the importance of individual differences in reacting to the COVID-19 pandemic and provided essential information about related factors of personal protective measures. However, further investigations should be carried out due to inconsistent findings concerning the roles of age, gender, education, income, and neuroticism in adopting personal protective measures. **Keywords:** COVID-19, face mask, pandemics, physical distancing

INTRODUCTION

Despite the efforts over the two recent years after the initiation of the coronavirus disease 2019 (COVID-19) pandemic, no promising therapeutic strategy has been developed to control this disease [1]. Since person-to-person transmission of COVID-19 mainly occurs through expelled respiratory droplets, many governments have implemented the required measures to prevent virus transmission and reduce mortality (such as lockdown, mandatory face mask usage, and maintaining physical distancing) [2]. Although the speedup in the vaccination process over the recent few months has highly reduced the spread and mortality of COVID-19, this pandemic still takes the lives of people worldwide [3,4].

Recently, a study developed a dynamic compartmental model of COVID-19 transmission in four severely affected states of the US (including California, Texas, New York, and Florida), showing that suppressing the pandemic in the absence of personal protective measures (such as face mask wearing and maintaining physical distancing) requires a strong vaccine (100% effective) with 33-58% coverage or a moderate vaccine (80% effective) with coverage of 48-78% [5]. They also implied that for non-adherence to COVID-19 preventive measures, using a weak vaccine (50% effective) not only is unable to suppress the pandemic but also leads to further major outbreaks. Accordingly, implementing face mask and physical distancing seem to be still the most effective approach to controlling the current pandemic until vaccination coverage against COVID-19 infection [3,6].

Despite the special emphasis on independent protective effects of face mask wearing and maintaining physical distancing, as well as the importance of adherence to these personal protective measures to prevent COVID-19 infection [3,6], some people still do not take them seriously and put their life and other people's lives at risk of infection [7]. In 2020, about 14,000 people from 13 countries in three continents participated in an international study in the UK supported by

the Institute of Global Health Innovation to investigate their behavioral measures for preventing COVID-19 infection. This study showed that regular use of face mask had the highest rate in China and Italy and the lowest rate in the UK and the US. Also, the UK and Sweden reported the maximum (84%) and minimum (34%) avoidance of small social gatherings [8]. Accordingly, a basic question is arisen "why do only some people participate in methods associated with the prevention of disease spread during the COVID-19 crisis?"

Few studies have been conducted so far on the factors associated with adopting protective behaviors to avoid COVID-19 infection, which have mostly relied on individual factors. The results of these studies revealed that factors such as age, gender, personality traits (particularly neuroticism and conscientiousness), and COVID-19 risk perception can relate to adherence to personal protective measures [2, 9, 10]. Trust is one of the other factors that can help form an accurate risk perception of COVID-19 disease [11-13].

According to the trust and confidence model, trust plays a key role in the management of threats by affecting public's judgments on risks and benefits so that it can indirectly impact the adoption of the recommended measures. Since trust is the core of listening, interpreting, and responding to public health messages, political and public trust seem to be able to play an essential role in combating the COVID-19 pandemic [14].

Despite the proven importance of preventive measures to control the COVID-19 pandemic, a recent study in Iran reported the overall spread of adopting personal protective measures to be less than 50%. Based on a dynamic compartmental model of COVID-19 transmission, this result shows that the 55-94% vaccination coverage with two doses of a weak vaccine (e.g., Sinopharm) would be required to control the epidemic in Iran [5, 9]. Hence, reaching the significant herd immunity for epidemic control at a faster pace entails higher adherence to personal protective measures, namely face mask wearing and maintaining physical distancing. All in all, the present study was performed among the southeastern Iranian population with two objectives: (i) determining the rates of COVID-19 risk perception and adopting personal protective measures, e.g., face mask wearing and physical distancing, to avoid COVID-19 infection and (ii) assessing the effects of socio-demographic characteristics, personality traits, COVID-19 risk perception, and public trust on complying with the above personal protective measures.

METHODS

Study Design, Participants, and Procedure

The present cross-sectional study was conducted between August and October 2021 among the southeastern Iranian population. According to G*power software version 3.1.9.4, the sample size for 80% power (regarding α error probability of 0.05, a small effect size of 0.055, 13 predictor variables, and 10% risk of attrition) was estimated at 370 people [15]. The inclusion criteria were: (i) aged over 18; (ii) minimum literacy; and (iii) access to the Internet services and social networks. After obtaining the research approval by the Ethics Committee (REC) of Islamic Azad University-Tehran Medical Sciences (IR.IAU.TMU.REC.1400.127), a total of 370 participants were selected using the snowball sampling method from among the southeastern Iranian population. As per the highly contagious

Table 1. Socio-demographic characteristics of participants

Parameter	M±SD	n (%)
Age (years)	29.22±9.69	
Gender		
Male		118 (33.6)
Female		233 (66.4)
Education level		
Non-degree		19 (5.4)
High school diploma		51 (14.5)
Academic degree		281 (80.1)
Income (monthly, IRR)		
<20,000,000		154 (43.9)
20,000,000-40,000,000		68 (19.4)
40,000,000-60,000,000		104 (29.6)
60,000,000-80,000,000		0 (0.0)
80,000,000-100,000,000		13 (3.7)
>100,000,000		12 (3.4)

Note. IRR: Iranian Rial

COVID-19 pneumonia, the online questionnaire link was sent to the participants through email, Telegram, WhatsApp, and Instagram. The targeted subjects were also encouraged to distribute the questionnaire among their contacts living in the south-east region of Iran.

Further, before completing the survey, a general overview of the study was given to the participants, and written informed consent was obtained from them. To abide by the Helsinki declaration [16], the subjects were told that their participation was voluntary and they could withdraw from the research for any given reason. It is worth noting that the questionnaires were anonymous to keep the participants' personal information confidential.

Finally, 351 of the participants correctly filled out the questionnaires; 66.4% of them were women. The participants were aged 18-59 (M±SD=29.22±9.69), and 81.1% of them had an academic degree. Further details of socio-demographic information are listed in **Table 1**.

Research Instruments

Big five personality traits

The 10-item big five inventory was used to investigate personality traits. This short scale comprises two items for each dimension (i.e., extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience), which is scored on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). In addition, questions 1, 4, 5, 7, and 9 are inversely scored [17]. In Iran, the reliability and validity of this questionnaire were reported in [17] to be suitable. In our study, Cronbach's alpha coefficients for extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience were obtained of 0.87, 0.89, 0.80, 0.90, and 0.85, respectively.

COVID-19 risk perception

To assess the COVID-19 risk perception, participants responded to a single item (i.e., "how do you rate the danger of COVID-19 disease?") on a 5-point Likert scale ranging from 1 (not dangerous at all) to 5 (very dangerous). The response rates corresponding to "dangerous" and "very dangerous" were summed to calculate the percentage of participants who perceived COVID-19 as dangerous [10]. In this study, Cronbach's alpha coefficient was reported to be 0.88 for this item.

Table 2. Percentage distributions of COVID-19 risk perception, face mask wearing, and physical distancing

Items	Response	%
How do you rate the danger of COVID-19 disease?	Not dangerous at all	3.1
	Not dangerous	9.7
	Neutral	10.8
	Dangerous	32.2
	Very dangerous	44.2
I wear a face mask	Never	5.1
	Rare	6.8
	Sometimes	10.3
	Mostly	21.7
	Always	56.1
I maintain an adequate distance when communicating with others	Never	7.1
	Rare	7.7
	Sometimes	25.6
	Mostly	27.1
	Always	32.5
I do not allow relatives and friends to visit me at home	Never	11.7
	Rare	15.1
	Sometimes	31.3
	Mostly	23.4
	Always	18.5
I stay at home and do not go outside unless necessary	Never	11.1
	Rare	14.8
	Sometimes	27.3
	Mostly	29.1
	Always	17.7

Face mask wearing

This factor was evaluated by a single item (i.e., "I wear a face mask") on a 5-point Likert scale ranging from 1 (never) to 5 (always). To calculate the percentage of participants who wore a face mask, response rates corresponding to "mostly" and "always" were summed [10]. In this study, Cronbach's alpha coefficient was reported to be 0.87 for this item.

Physical distancing

Three items, including (i) "I keep adequate distance when I communicate with others"; (ii) "I do not allow relatives and friends to visit me at home"; (iii) "I stay at home and don't go outside unless necessary", were used to assess physical distancing. Each item was scored on a 5-point Likert scale ranging from 1 (never) to 5 (always). To calculate the percentage of participants who practiced each form of physical distancing, response rates related to "mostly" and "always" were considered [10]. In our study, the Cronbach's alpha coefficient for these three physical distancing practices was obtained of 0.82.

Public trust

The questionnaire developed in [18] was employed to evaluate public trust. This 12-item questionnaire is scored on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), which has suitable reliability and validity (Cronbach's alpha coefficient of 0.90) [18].

Statistical Analysis

The data were analyzed using SPSS v25 software. Descriptive statistics (including mean and standard deviation and frequency distribution) were used to describe individual characteristics. Also, to ascertain the correlation among the study variables, the point-biserial correlation coefficient, Pearson correlation coefficient, and Spearman's rank correlation coefficient were applied. Further, multiple linear regression analysis was employed to investigate the linear relationship between response variables (i.e., face mask wearing and physical distancing) and explanatory variables (i.e., socio-demographic characteristics, personality traits, COVID-19 risk perception, and public trust). The significance level was set at p<0.05.

RESULTS

Table 2 presents the percentages of COVID-19 risk perception, face mask wearing, and physical distancing practices among the participants. The descriptive statistics showed that the spread of COVID-19 risk perception and face mask wearing was 76.4% and 77.8% among the participants, respectively. Also, 59.6% of the participants reported that they maintained an adequate distance when communicating with others; 49.1% stated that they did not allow relatives and friends to visit them at home; 46.8% posited that they preferred to stay at home and not go outside unless necessary.

Based on the results of the correlation matrix, both face mask wearing and physical distancing were positively correlated with age, gender, extraversion, agreeableness, conscientiousness, COVID-19 risk perception, and public trust, whereas there was a significant negative correlation between neuroticism and both face mask wearing and physical distancing. However, there was no significant correlation observed among education level, income, and personal protective measures (see **Table 3**).

Furthermore, the obtained results from the multiple regression analysis revealed that older age, being female, lower levels of neuroticism, and higher levels of extraversion, agreeableness, conscientiousness, COVID-19 risk perception, and public trust were associated with higher adherence to personal protective measures such as face mask wearing and maintaining physical distancing (see **Table 4** and **Table 5**).

Table 3. Correlation matrix of study variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Age	-												
2. Gender	-0.09	-											
3. Education level	0.06	0.04	-										
4. Income	0.48***	0.23**	0.24***	-									
5. Extraversion	0.18***	0.15**	0.02	0.10*	-								
6. Agreeableness	0.10*	0.14**	0.13*	0.05	0.16**	-							
7. Conscientiousness	0.24***	0.15**	0.11*	0.17**	0.32***	0.73***	-						
8. Neuroticism	-0.14**	-0.00	-0.00	-0.07	-0.56***	-0.08	-0.18***	-					
9. Openness to experience	-0.03	0.00	0.02	-0.09	0.11*	0.13*	0.14**	-0.08	-				
10. COVID-19 risk perception	0.06	0.07	0.04	0.03	0.20***	0.12*	0.11*	-0.13*	0.14**	-			
11. Public trust	-0.00	0.10	-0.11*	-0.04	0.24***	0.13*	0.20***	-0.22***	0.06	0.27***	-		
12. Face mask wearing	0.22***	0.19***	0.01	0.04	0.36***	0.43***	0.49***	-0.28***	0.05	0.24***	0.30***	-	
13. Physical distancing	0.24***	0.22***	0.05	0.07	0.62***	0.36***	0.47***	-0.50***	0.07	0.31***	0.34***	0.62***	-

Note. Point-biserial correlation coefficient, Pearson's r, Spearman's ρ, and Cramer's V were used to examine the correlations between study variables; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

Table 4. Factors associated with face mask wearing

Independent variables	B	SE	β	t	LBCI	UBCI
Age	0.01	0.00	0.11	2.55*	0.00	0.02
Gender (Female)	0.26	0.11	0.10	2.37*	0.04	0.47
Extraversion	0.06	0.03	0.11	2.06*	0.00	0.11
Agreeableness	0.11	0.03	0.18	2.96**	0.03	0.19
Conscientiousness	0.12	0.04	0.21	3.11**	0.04	0.20
Neuroticism	-0.05	0.02	-0.10	-1.97*	-0.10	0.00
COVID-19 risk perception	0.11	0.04	0.10	2.29*	0.01	0.20
Public trust	0.01	0.00	0.14	3.05**	0.00	0.02
R	0.61					
R²	0.37					
Adjusted R²	0.35					
F (df1, df2)	25.36 (8, 342)***					

Note. LBCI: Lower bound confidence interval; COVID-19: The coronavirus disease 2019; SE: Standard error; UBCI: Upper bound confidence interval; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

Table 5. Factors associated with physical distancing

Independent variables	B	SE	β	t	LBCI	UBCI
Age	0.03	0.01	0.10	2.85**	0.01	0.05
Gender (Female)	0.76	0.22	0.12	3.33**	0.31	1.21
Extraversion	0.44	0.61	0.33	7.32***	0.32	0.57
Agreeableness	0.19	0.08	0.12	2.37*	0.03	0.34
Conscientiousness	0.21	0.08	0.14	2.55*	0.05	0.38
Neuroticism	-0.26	0.05	-0.21	-4.86***	-0.37	-0.15
COVID-19 risk perception	0.35	0.09	0.13	3.56***	0.15	0.55
Public trust	0.03	0.01	0.12	3.21**	0.01	0.05
R	0.75					
R²	0.57					
Adjusted R²	0.56					
F (df1, df2)	56.77 (8, 342)***					

Note. LBCI: Lower bound confidence interval; COVID-19: The coronavirus disease 2019; SE: Standard error; UBCI: Upper bound confidence interval; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

DISCUSSION

In the context of the COVID-19 pandemic, barrier gestures such as face mask wearing and physical distancing have been highly recommended. However, individuals' reactions to the COVID-19 pandemic to avoid infection may be associated with various variables [19,20]. The present study aimed to ascertain the rates of COVID-19 risk perception and personal protective measures adoption, e.g., face mask wearing and physical distancing, among the south-east residents in Iran to avoid infection with the COVID-19 and determine the main decisive relevant factors.

In our study, the results of descriptive statistics showed moderate risk perception of COVID-19 and insufficient participation of the south-east residents in Iran to adopt preventive measures, especially physical distancing. In this respect, recent evidence has demonstrated that when stranger characters' wear face masks, interpersonal distance is significantly reduced since they were assumed to be more trustworthy [19-21].

As another important point, interpersonal distance among the participants who are infected with the COVID-19 or live in low-risk areas is even further reduced [19]. These findings further explain the psychological factors motivating interpersonal distance adjustments, particularly once

encountering a collective threat. These findings are also important to health policy-makers, showing that in addition to the indisputable value of face mask wearing in the current pandemic crisis, physical distancing should be focused to prevent detrimental health consequences [19].

Our results also revealed that older age and being female are more associated with higher rates of wearing face mask and practicing physical distancing. These results are consistent with those of prior studies [10,22-25]. In actual fact, men are less likely, compared to women, to believe that they are severely affected by the COVID-19 disease. Also, more strongly compared to women, men perceive wearing face mask to be shameful, a sign of weakness, and a stigma [26]. These reasons partly mediate the gender differences in intentions to wear face mask and practice physical distancing. At the same time, older individuals are at a higher risk of dying from the COVID-19 disease. Therefore, it will not be surprising that age will be positively associated with complying with the COVID-19 measures [24]. However, it was shown that engaging in protective behaviors decreases by increasing age, and older adults, compared to middle-aged, exhibit a tendency towards lower perceived risk [27]. Nevertheless, some recent evidence has supported the lack of age-related differences in compliance behaviors [28-30]. These contradictions might be attributed to the variations in the underlying personality factors, COVID-19 risk perception, and public trust among participants. These individual differences might be true in explaining the lack of correlation among education level, income, and personal protective measures since previous studies implied higher adherence to personal protective measures among more educated people with lower levels of income [23].

In this study, relationships were established between personality factors and COVID-19-related behaviors. Generally, lower scores of neuroticism and higher scores of extraversion, agreeableness, and conscientiousness were associated with higher adherence to personal protective measures such as wearing face mask and maintaining physical distancing. As a rule, people with high neuroticism perceive the world as a threat, easily get nervous, and have difficulty coping with stressful situations. This argument has been supported by the studies on neuroticism mechanisms, which highlighted the critical role of affective reactivity and preoccupation processes. Accordingly, the odds are that people with higher neuroticism are more worried about the COVID19-related information and pandemic consequences and thus experience more inappropriate effects during this preoccupation [31].

Being consistent with these results, the studies [10,32] have indicated that neuroticism personality trait has a positive relationship with adopting physical distancing to avoid COVID-19 infection. However, it was concluded that higher levels of anxiety are associated with lower adherence to personal protective measures [33]. This behavioral contradiction in the people with high neuroticism when facing a pandemic is probably due to their neuroticism levels. For instance, people with higher levels of anxiety and fear are more likely to accept denial as a psychological defense mechanism to lower fear. In other words, they have high-risk behaviors such as substance/medication use disorders or risky sexual practices to meet the feeling of psychological security [31]. However, higher levels of extraversion, agreeableness, and conscientiousness seem to be associated with anxieties, concerns, fears, negative effects less related to COVID-19, and higher acceptance rates of COVID-19 containment measures.

In addition to the findings on personality traits, our results illustrated that higher scores of COVID-19 risk perception and public trust are related to higher adherence to personal protective measures such as wearing face mask and maintaining physical distancing. In detail, people who perceive COVID-19 as a serious threat have a greater tendency towards adopting preventive measures to avoid COVID-19 infection. Moreover, when a person is at a risk of health problem, they attempt to avoid it by trying out different ways, which is regarded as an avoidance behavior adopted for surviving an infectious disease [10]. Another factor that contributes to adopting personal protective measures is trust [7].

As already stated, trust has a critical part in the management of a threat by influencing the public judgments on the risks and the relevant benefits. This has caused the crisis communication and effective risk to be more dependent on how to receive information and the level of trust in the government within the pandemic crisis. Thus, complete information should be provided by governments about the pandemic to preserve public trust, even if very limited information is available [34,35].

Strengths and Limitations of the Study

The present findings contribute to a better understanding of how individuals respond to the pandemic according to personality traits and demonstrating the significance of both personal hygiene practices and COVID-19 risk perception. If the information about the individual's personality traits is available during the pandemic, their behavior would be predictable. This way, health care providers are able to develop apt interventions to raise awareness among individuals in the community.

This study helps to identify the key role of personal protective measures, which should be well addressed in national campaigns. In addition, the relation among COVID-19 risk perception, public trust, and adopting preventive measures can be helpful in reducing infection rates, assisting in controlling the pandemic spread. Moreover, concerning age and gender differences in precautionary behaviors for contagion avoidance, our findings could be used to encourage media platforms to present persuasive messages targeted on young people (particularly young men), as it is less probable that they adopt protective behaviors.

Above all, this study suffered some limitations. First, the sample size was relatively small and mainly included Baluch ethnic group; therefore, our findings cannot be generalized easily and should be replicated in a more diverse and larger sample. As the second limitation, a definite causality for a correlation cannot be often specified by cross-sectional studies. This restriction might prohibit a profound understanding of the most basic principles of the causal relationship between the study variables. Finally, self-report measures were used to collect data, which cannot be fully trusted. Accordingly, it is suggested that future studies should focus on methodological limitations, including sole reliance on self-report scales due to memory bias and demand characteristics, lack of prospective data, and disregarding ethnic differences.

CONCLUSIONS

The public tendency plays an essential and decisive role in successfully adopting personal protective measures recommended by public health authorities. However, encouraging people to unconditionally adopt these recommended preventive measures is still considered a serious health problem. The present study aimed to assess factors related to face mask wearing and physical distancing in the southeastern Iranian population during the COVID-19 pandemic. The results of the present study illuminated the factors related to the adoption of preventive measures to avoid COVID-19 infection. These potential associated factors were age, gender, personality traits, COVID-19 risk perception, and public trust. However, we suggest further studies on the role of neuroticism in predicting personal protective measures since there have been inconsistent findings about how individuals with high neuroticism respond to the pandemic. Further research is also recommended to investigate the impact of age, gender, education, and income differences on adopting preventive measures.

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