



Knowledge, Performance, and Attitude Towards Mask Use to Prevent and Control COVID-19 Outbreak Among a Group of Iranian People: A Cross-sectional Study

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Abstract

Background: Due to the pandemic, COVID-19 cases and deaths are increasing unexpectedly and precipitately. More importantly, asymptomatic carriers could infect healthy people through sneezing, coughing, and talking. Therefore, mask usage is required to prevent and control COVID-19.

Objectives: This study was aimed at examining the knowledge, attitude, and performance levels (KAP) of the Iranian population regarding mask usage to prevent and control the COVID-19 outbreak during a one-month period from early April to early May 2020.

Methods: A researcher-made, validated, and reliable questionnaire consisting of 30 questions on knowledge, attitude, and performance regarding mask usage was utilized. Data collection was performed through the online method. To do so, the online questionnaire link was provided for the participants via social networks. The correct and wrong answers were scored 1 and 0 points, respectively. The final score of each dimension was calculated and classified as 0 - 50% (low), 51 - 75% (moderate), and 75% > (good).

Results: A total of 1581 participants took part in the study. Although the participants had good attitude (74%) and performance (70.80%), but only 13.70% of them had good knowledge regarding mask usage. Also, significant differences were found between the participants' knowledge and higher educational levels ($P < 0.001$). There were significant associations between the participants' age, gender, educational level, and job and their knowledge and attitude levels ($P < 0.05$). Besides, female participants had higher performance scores than did male participants ($P < 0.001$). The participants with governmental jobs had significantly higher performance than unemployed ones ($P < 0.001$).

Conclusions: The participants obtained low KAP scores; therefore, it is required to train and inform the society and enhance their KAP levels via social media regarding the importance of mask usage, including proper donning, doffing, cleaning, disinfection, and safely and hygienic disposal procedures of masks to prevent and control COVID-19.

Keywords: Knowledge, Attitude, Performance, Mask Use, COVID-19

1. Background

The outbreak of the coronavirus disease 2019 (COVID-19) pandemic was announced as a global emergency situation by the World Health Organization (WHO) on February 1, 2020 (1). Thus, great concern was raised regarding community members' general health all over the world. This disease has led to 102144932 cases and 2203261 deaths worldwide until 29 January 2021 (2). The severe outbreak of COVID-19, for which no drugs have been discovered until now, has caused adverse physical and psychological conse-

quences and massive crisis in global economy (3, 4).

To date, our knowledge about COVID-19 and its transmission modes has been increasing day by day. The clinical signs of the disease vary from very mild non-respiratory signs to severe acute respiratory syndrome (SARS), sepsis, multiple organ dysfunction, and death. Considerably, some COVID-19 cases have no clinical signs and are called asymptomatic carriers, who could infect numerous healthy people. Overall, there are two main modes of COVID-19 transmission, including direct contact

and respiratory droplets. The fine droplets generated by asymptomatic carriers' mouths or noses through sneezing, coughing, and even talking could spread COVID-19 via direct infection of other people or indirect contamination of environmental surfaces (5-9).

It is estimated that about 80% of COVID-19 cases are asymptomatic or have mild symptoms, 14% have severe symptoms, and only 6% of them have critical conditions. Also, control measures regarding the detection of the symptoms are mandatory for managing the -19 (10). Because the diagnosis of asymptomatic carriers in communities is not feasible, it seems that mask use could play an important role in reducing COVID-19 transmission from infected people to others and spreading the infection from infected people to environments and surroundings (11-14).

At the beginning of the pandemic, universal mask usage by the community members was a challenging issue. The WHO recommended using masks for the sick, those with clinical signs, and people who take care of them (15, 16). However, new information, comprehensive critics, and successful experiences were achieved over this time, such as the experience in China and Hong Kong where people were required to use masks in all public places (17, 18). After that, the WHO suggested governments to enforce mask usage among community members (6).

The use of masks is now considered as one of the effective strategies to decrease and control the COVID-19 outbreak. In numerous worldwide countries, such as Iran and the United States (US), people are required to use masks in public places and workplace settings.

The center for disease control and prevention (CDC) confirmed that the main reason for the mandatory usage of masks is to protect the community members' health (19). Various masks, including surgical masks, N95 respirators, N95 surgical masks, and filtering face-piece respirators (FFRs), are used to protect against COVID-19. If people do not use the mentioned masks or respirators according to the manufacturers' instructions or standard procedures, their efficiency will be reduced, even, in some cases, the risk of COVID-19 transmission increases (20, 21).

Depending on economic, social, cultural, and legal conditions, individuals have different knowledge, attitudes, and practices regarding the use of mask to combat COVID19 (Tadesse, 2020 #36). A study by Tan et al. found that almost all people in China use masks, and most of them know how to use masks properly (22). However, according to a study by Azlan et al., the rate of mask use among Malaysians was only 51.2% (9). Another study conducted by Tadesse et al. showed that knowledge, attitude,

and behavior of health care workers in Ethiopia about mask usage was reported to be quite poor (23). Therefore, it is crucial to inform community members sufficiently concerning the mask types, their performance, efficiencies, and proper usage. This is why it is required to assess the community members' knowledge, attitude, and performance levels and develop effective strategies for improving people's behaviors towards mask usage (24).

2. Objectives

This study was conducted to investigate the knowledge, attitude, and performance of Iranians towards mask usage to prevent and control COVID-19.

3. Methods

This cross-sectional study was conducted during the outbreak of COVID-19 in Iran. This study was approved by the Research Ethics Committee of Hormozgan University of Medical Sciences (approval code IR.HUMS.REC.1399.020), Hormozgan, Iran.

A researcher-developed questionnaire was used which consisted of 30 questions about the knowledge, attitude, and performance of Iranian people towards mask usage to prevent and control COVID-19. The study participants consisted of all people aged >15 years from all the provinces of Iran who have access to social networks. To assure the participants' health and safety, the data collection process was performed by the online questionnaire during a one-month period from April 4 to May 5, 2020. To do so, the online questionnaire link was provided for the participants via social networks. Then, they were asked to complete the questionnaire voluntarily. On the first page of the questionnaire, after describing the study objectives, a consent form was provided. Finally, the participants were asked to send the online questionnaire link for the people they know.

3.1. The Questionnaire Development Process

The researcher-developed questionnaire consisted of items about the basic demographic information, knowledge, attitude, and performance towards mask use to prevent and control COVID-19.

To ensure the researcher-developed questionnaire's validity, its content validity was assessed; therefore, the designed questionnaire was given to eight associate professors (three in the field of Occupational Health, one Environmental Health specialist, two Health Education specialists, one Epidemiologist, and one infectionologist), and

they were asked or their opinions for improving the questionnaire. The final questionnaire was approved by the specialist team.

The number of experts surveyed for tool validity was eight. After sending the questionnaire to them and receiving their responses, the questions whose CVR was above 0.8 were selected, and the final CVI of the questionnaire was found to be 0.85. To establish the reliability, the internal correlation method was utilized for the knowledge, attitude, and performance questions. According to the pilot study conducted among 30 participants, the Cronbach's alpha for the mentioned dimensions were 0.783, 0.811, and 0.907, respectively.

The demographic information form included items on age, gender, educational level, marital status, location, and job. We used the main information sources presented by the WHO and Iranian Ministry of Health (MOH) to design the questionnaire. The knowledge dimension consisted of 10 items rated as "correct", "wrong", and "I don't know". A score of 1 was considered for the correct option, and a score of 0 was applied for the "wrong" and "I don't know" options. The overall score for this dimension ranged from 0-10. The attitude dimension consisted of 10 questions rated as "strongly agree", "agree", "no opinion", "disagree", and "strongly disagree". The score of attitude question varied from 1 to 5. The overall score for this dimension ranged from 10-50. The performance dimension comprised of 10 questions, which were rated as "never", "very rarely", and "always". The score for each question varied from 0 - 40. The overall score for the performance dimension ranged from 0 - 40. The final score of each dimension was calculated and classified as 0 - 50 weak, 51 - 75 average, and 75% > good. The researcher-developed questionnaire is presented in [Table 1](#).

3.2. Statistical Analysis

Descriptive statistics were used to calculate the frequency, mean, and standard deviation. In order to examine the relationship between the knowledge, attitude, and performance levels and participants' demographic variables, Independent Samples *t*-test and one-way analysis of variance (ANOVA) were applied, and multiple linear regression (MLR) analysis was employed to control the possible confounders. Also, the Spearman's rank correlation test was utilized to determine the relationships between the study participant's knowledge, attitude, and performance levels. We utilized SPSS version 22.0 to conduct the data analysis. A *P*-value of less than 0.05 was considered significant.

4. Results

The relationship between the demographic information and the participants' KAP levels is presented in [Table 2](#). A total of 1581 Iranian people took part in the study and completed the questionnaire. The participants' age ranged from 15 to 80 years. Overall, 49.90% of the participants were female, and 28.90% were unmarried. The most proportions of the study participants by age, type of employment (job), and educational level were 30 - 39 years (44.20%), governmental organization (GOs) employment (32.70%), and associate degree and bachelor's degree (47.20%). Accordingly, knowledge level was significantly related to age ($P = 0.016$), educational level ($P < 0.001$), and job ($P < 0.001$).

Additionally, attitude level was significantly associated with age ($P = 0.017$), gender ($P = 0.010$), and educational level ($P < 0.001$). Also, performance was significantly linked with gender ($P < 0.001$) and job ($P < 0.001$).

4.1. Participants' Knowledge

The proportions and mean scores of the study participants' knowledge, attitude, and practice levels regarding the role of mask use in the prevention and control of the COVID-19 pandemic are given in [Table 3](#). As observed, despite the fact that most of the participants had good attitude and performance, they had poor knowledge. Significant positive correlation coefficients between the knowledge-attitude ($r = 0.292$, $P < 0.001$), knowledge-performance ($r = 0.128$, $P < 0.001$), and attitude-performance levels ($r = 0.223$, $P < 0.001$) were calculated.

The mean score of the study participants' knowledge was low (4.82 ± 2.30). As seen, the knowledge levels regarding mask use to prevent and control COVID-19 were low, and only 13.70% had good knowledge level. The mean score of attitude level was 39.65 ± 3.74 . As noted, 25.9% and 74% of the participants had moderate and good attitudes, respectively. The mean score of the participants' performance was 32.79 ± 5.08 , and only 27% and 70.80% of the study participants had moderate and good performance levels, respectively.

4.2. Participants' Knowledge

The proportions of participants' answers to the knowledge questions are illustrated in [Figure 1](#). As can be seen, most proportions of the correct answers (70.90%) were related to Q6, in which the question was "Is the main role of the cloth masks is to prevent transmission of the contaminants while sneezing, coughing, or speaking". The lowest

Table 1. Researcher-Developed Questionnaire

| No. | Knowledge | Attitude | Practice |
|-----|---|--|--|
| 1 | Surgical masks (3-layer medical masks) could not be used again after washing? | In my opinion, community members do not need to mask use and physical distance is sufficient to control the outbreak of the COVID-19? | Do you washed and disinfected your hands before using the mask based on the WHO recommendation? |
| 2 | Use of the surgical masks are appropriate for diseases or all COVID-19 disease patients including confirmed and doubtful cases? | In my opinion, it doesn't matter to reuse the disposable (single-use) masks after washing and disinfection? | Do you adjust/form the metal clip over your nose? |
| 3 | The cloth masks could be used again after washing? | In my opinion, we could use the disposable masks multiple times without washing and disinfection? | Does the mask use lead to not to observe all protective principles including the social distance? |
| 4 | The N95 respirator equipped with exhalation valve is appropriate for COVID-19 confirmed and doubtful patients? | In my opinion, there is no difference among the cloth, surgical, and N95 respirators? | Do you use the mask while going out the home? |
| 5 | The main role of the Surgical masks is to protect from transmission of the contamination? | In my opinion, the surgical mask could be protected the subjects from the COVID-19 in the crowded places? | When removing the mask, do you grab the mask straps and remove it and avoid hand contact with the front of the mask? |
| 6 | The main role of the cloth masks is to prevent from talking, coughing, or sneezing? | In my opinion, the mask use without the hand-washing (hand hygiene) could not be protected the subjects from the COVID-19? | Do you wash or disinfect your hands based on the WHO recommendation? |
| 7 | The role of the exhalation valve on the N95 respirator is to filter out the contaminants and fine particles such as COVID-19? | In my opinion, the N95 respirator had higher efficiency than cloth and surgical masks in prevention from and control of the COVID-19? | Do you throw out your used masks in the garbage bin? |
| 8 | The N95 respirator without exhalation valve is better than the one equipped with exhalation valve? | In my opinion, use of the cloth mask could be reduced the spread of the COVID-19 in the surroundings? | Do you use the masks in the crowded places? |
| 9 | The N95 respirator could not be used again after washing? | In my opinion, there does not need to use the masks during the short time exposure to /contact with confirmed COVID-19 disease patients? | Do you reuse your surgical mask after cleaning/washing and disinfection? |
| 10 | Use of the surgical masks for people caring the COVID-19 disease patients recommended by the WHO. | In my opinion, the confirmed COVID-19 disease patients or doubtful cases are required must inevitably use the mask? | Do you reuse your surgical mask without cleaning/washing and disinfection? |

proportion of correct answers was related to Q7, where it had been asked, "Is the role of the exhalation valves on the N95 respirators is to filter out the contaminants with very fine particles?"

The results obtained from the MLR model are demonstrated in Table 4. As noted, the mean scores of knowledge level by age groups against the 15-29 years (reference) significantly decreased. Also, the mean scores of female participants were higher than males. In addition, significant differences were found among the participants with diploma and lower degrees compared to those with bachelor and higher educational levels (master's degree to doctoral degree). The knowledge scores of the participants with master's and doctoral degrees were higher than those of participants with a diploma and lower degrees ($\beta=1.48$). Besides, the knowledge scores of the employees of governmental and private organizations were statistically higher than those of non-employees.

4.3. Participants' Attitude

The proportions of participants' answers to the attitude questions are illustrated in Figure 2. In this study,

38.70% of the participants believed that people do not need to use masks, and only social distancing is needed to control the COVID-19 outbreak. About 65.30% believed that the use of cloth masks could reduce the transmission of the COVID-19. Also, 7.50% stated that disposable masks could be used again after washing and disinfection. Only 3.30% agreed that disposable masks could be used extendedly without washing and disinfection.

The mean scores of the participants' attitude levels with associate degree, master's degree, and higher educational levels were significantly higher than those of participants with diploma and lower educational levels based on the proposed MLR model. The results obtained from the MLR model are demonstrated in Table 5.

4.4. Participants' Performance

The proportions of participants' answers to the performance questions regarding mask use are illustrated in Figure 3. As understood of them used masks 70.10% crowded places. About 73.30% washed and disinfected their hands according to the WHO's guidelines on hand hygiene. Also, 76.20% threw their masks away in garbage bins.

Table 2. The Correlation Between the Knowledge, Attitude, and Performance Concerning the Mask Use and Demographic Characteristics

| Demographic characteristics | Knowledge | | | Attitude | | Practice | |
|--|--------------|-----------------|---------|------------------|--------|------------------|---------|
| | No. (%) | Mean \pm SD | P | Mean \pm SD | P | Mean \pm SD | P |
| Age (y) | | | 0.016 | | 0.017 | | 0.551 |
| 15 - 29 | 381 (24.10) | 4.83 \pm 2.28 | | 38.51 \pm 4.17 | | 32.51 \pm 5.13 | |
| 30 - 39 | 699 (44.20) | 4.96 \pm 2.30 | | 39.87 \pm 3.54 | | 32.81 \pm 4.86 | |
| 40 - 49 | 349 (22.10) | 4.81 \pm 2.32 | | 39.66 \pm 3.72 | | 32.94 \pm 4.90 | |
| 50 - 80 | 151 (9.60) | 4.13 \pm 1.96 | | 38.86 \pm 3.72 | | 33.35 \pm 5.46 | |
| Gender | | | 0.058 | | 0.010 | | 0.001 |
| Male | 792 (50.10) | 5.00 \pm 2.39 | | 39.51 \pm 3.94 | | 31.84 \pm 5.26 | |
| Female | 788 (49.90) | 4.64 \pm 2.18 | | 39.79 \pm 3.53 | | 33.75 \pm 4.69 | |
| Marital status | | | 0.321 | | 0.504 | | 0.794 |
| Unmarried | 456 (28.90) | 4.71 \pm 2.36 | | 39.46 \pm 3.82 | | 32.87 \pm 5.12 | |
| Married | 1124 (71.10) | 4.87 \pm 2.26 | | 39.73 \pm 3.71 | | 32.76 \pm 5.06 | |
| Educational level | | | < 0.001 | | <0.001 | | 0.592 |
| Middle school degree & diploma | 307 (19.40) | 3.83 \pm 2.01 | | 38.61 \pm 3.59 | | 32.66 \pm 4.19 | |
| Associate degree & bachelor | 745 (47.20) | 4.74 \pm 2.25 | | 39.77 \pm 3.77 | | 32.72 \pm 5.17 | |
| Master degree & Doctor of Philosophy (Ph.D.) | 528 (33.40) | 5.25 \pm 2.28 | | 40.10 \pm 3.67 | | 32.98 \pm 5.03 | |
| Job | | | < 0.001 | | 0.006 | | < 0.001 |
| Private sector employment | 356 (22.50) | 5.11 \pm 2.37 | | 40.10 \pm 3.48 | | 32.03 \pm 5.18 | |
| Governmental employment | 517 (32.70) | 5.31 \pm 2.20 | | 39.93 \pm 3.70 | | 33.54 \pm 4.70 | |
| Self-employment | 205 (13.0) | 4.39 \pm 2.35 | | 39.00 \pm 3.99 | | 31.83 \pm 5.70 | |
| Unemployed | 502 (31.80) | 4.29 \pm 2.17 | | 39.32 \pm 3.80 | | 32.96 \pm 4.98 | |

Abbreviation: SD, standard deviation.

^aP, significant level**Table 3.** The Participants' Knowledge, Attitude, and Practice Levels Regarding the Mask Use to Prevent and Control the COVID-19.

| Variables | No. (%) | Mean \pm SD |
|--------------------|--------------|------------------|
| Knowledge | | 4.82 \pm 2.30 |
| Low | 718 (45.40) | |
| Moderate | 646 (40.90) | |
| High | 216 (13.70) | |
| Attitude | | 39.65 \pm 3.74 |
| Low | 2 (0.10) | |
| Moderate | 409 (25.90) | |
| Good | 1169 (74) | |
| Performance | | 32.79 \pm 5.08 |
| Low | 34 (2.20) | |
| Moderate | 427 (27) | |
| Good | 1119 (70.80) | |

Abbreviation: SD, standard deviation.

The MLR model demonstrated that males had lower performance than females. Meanwhile, the participants employed in GOs had higher performance regarding mask use compared to non-employed ones. The results obtained from the MLR model are demonstrated in [Table 6](#).

5. Discussion

This study was aimed at evaluating the knowledge, attitude, and performance of Iranian people towards mask use to prevent and control COVID-19. Although most of the participants' educational levels were middle school and bachelor's degrees and had appropriate attitude and performance levels towards mask use, their knowledge levels regarding mask usage were low. Kumar et al. (25) and Tadesse et al. (23) had the same conclusion in their studies about the knowledge of participants about mask usage.

In this study, there was a significant relationship between the participants' educational level and their knowledge level towards mask use. In detail, as educational level

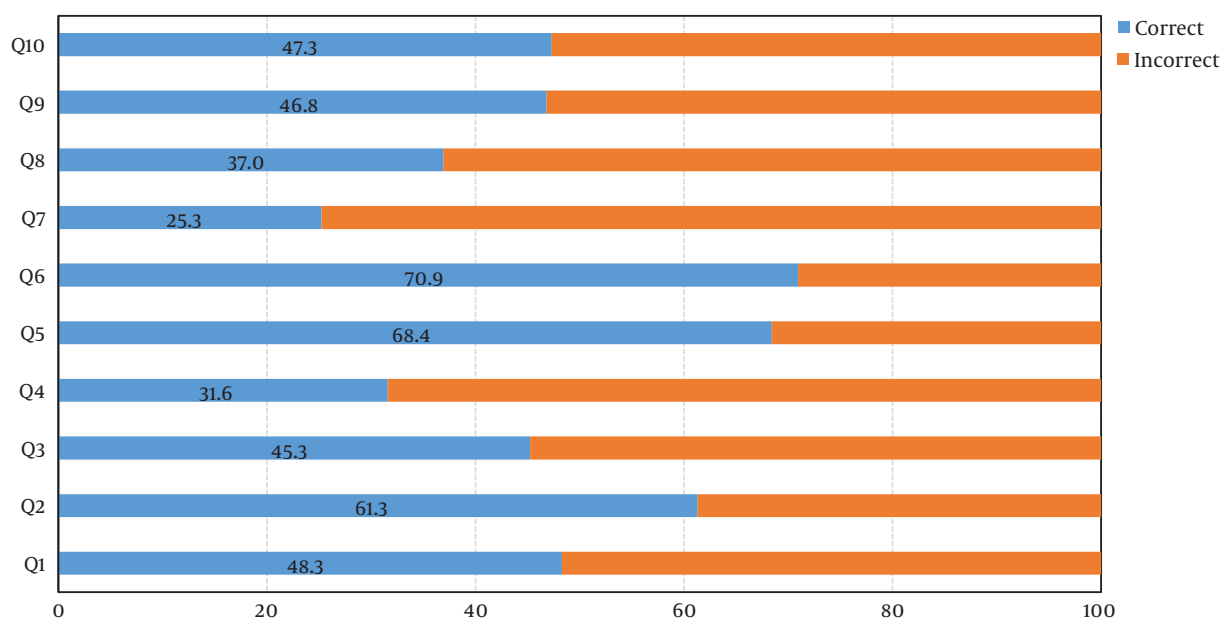


Figure 1. The proportions of participants' answers to the knowledge questions concerning mask use to prevent and control COVID-19 (Questions from Q1 to Q10 are presented in Table 1)

Table 4. The Comparison of the Study Participants' Knowledge Levels by Demographic Characteristics

| Variables | Unstandardized Coefficients | | Standardized Coefficients β | t | P |
|---|-----------------------------|-------|--------------------------------------|-------|----------|
| | B | SE | | | |
| (Constant) | 3.04 | 0.29 | | 10.55 | < 0.0001 |
| 30 - 39 vs. 15 - 29 | -0.33 | 0.15 | -0.07 | -2.18 | 0.03 |
| 40 - 49 vs. 15 - 29 | -0.41 | 0.18 | -0.07 | -2.24 | 0.025 |
| 50 - 80 vs. 15 - 29 | -0.68 | 0.23 | -0.087 | -3.01 | 0.003 |
| Gender (male vs. female) | 0.34 | 0.12 | 0.07 | 2.82 | 0.005 |
| Marital status (married vs. unmarried) | 0.23 | 0.13 | 0.046 | 1.75 | 0.08 |
| Associate degree & bachelor degree vs. middle school degree & diploma | 0.72 | 0.15 | 0.16 | 4.67 | < 0.0001 |
| Master degree & Ph.D. Vs. Middle school degree & diploma | 1.48 | 0.169 | 0.30 | 8.71 | < 0.0001 |
| Private sector employment vs. unemployed | 0.55 | 0.16 | 0.10 | 3.37 | 0.001 |
| Governmental employment vs. unemployed | 0.65 | 0.15 | 0.13 | 4.21 | < 0.0001 |
| Self-employment vs. unemployed | 0.06 | 0.19 | 0.008 | 0.29 | 0.77 |

Abbreviation: SE, standard error.

^aP, significant level.

increased, their knowledge levels improved, as well. This finding was consistent with the results of Yue et al. (26). Contrary to our study, Tan et al., in a study in China, con-

cluded that the behavior of people in relation to the use of masks does not depend on their level of education (22).

A significant relationship was noted between the par-

Table 5. The Comparison of the Study Participants' Attitude levels by Demographic Characteristics

| Variables | Unstandardized Coefficients | | Standardized Coefficients β | <i>t</i> | <i>p</i> ^a |
|---|-----------------------------|------|--------------------------------------|----------|-----------------------|
| | B | SE | | | |
| (Constant) | 38.40 | 0.49 | | 79.07 | < 0.0001 |
| 30 - 39 vs. 15 - 29 | 0.05 | 0.26 | 0.006 | 0.18 | 0.86 |
| 40 - 49 vs. 15 - 29 | -0.15 | 0.31 | -0.02 | -0.48 | 0.63 |
| 50 - 80 vs. 15 - 29 | -0.53 | 0.38 | -0.04 | -1.38 | 0.17 |
| Gender (male vs. female) | -0.32 | 0.20 | -0.04 | -1.58 | 0.11 |
| Marital status (married vs. unmarried) | 0.39 | 0.22 | 0.05 | 1.76 | 0.08 |
| Associate degree & bachelor degree vs. middle school degree & diploma | 0.95 | 0.26 | 0.13 | 3.65 | < 0.0001 |
| Master degree & Ph.D. vs. middle school degree & diploma | 1.29 | 0.29 | 0.16 | 4.54 | < 0.0001 |
| Private sector employment vs. unemployed | 0.62 | 0.27 | 0.07 | 2.25 | 0.02 |
| Governmental employment vs. unemployed | 0.34 | 0.26 | 0.04 | 1.31 | 0.19 |
| Self-employment vs. unemployed | -0.12 | 0.33 | -0.01 | -0.35 | 0.72 |

Abbreviation: SE, standard error.

^aP, significant level.**Table 6.** The Comparison of the Study Participants' Performance Levels by the Demographic Characteristics

| Variables | Unstandardized Coefficients | | Standardized Coefficients β | <i>t</i> | <i>p</i> ^a |
|---|-----------------------------|------|--------------------------------------|----------|-----------------------|
| | B | SE | | | |
| (Constant) | 35.53 | 0.65 | | 54.53 | < 0.0001 |
| 30 - 39 vs. 15 - 29 | 0.28 | 0.34 | 0.03 | 0.81 | 0.42 |
| 40 - 49 vs. 15 - 29 | 0.07 | 0.41 | 0.006 | 0.18 | 0.86 |
| 50 - 80 vs. 15 - 29 | 0.98 | 0.51 | 0.06 | 1.92 | 0.05 |
| Gender (male vs. female) | -1.98 | 0.27 | -0.19 | -7.27 | < 0.0001 |
| Marital status (married vs. unmarried) | -0.08 | 0.30 | -0.007 | -0.27 | 0.79 |
| Associate degree & bachelor degree vs. middle high school & diploma | -0.24 | 0.35 | -.023 | -0.68 | 0.50 |
| Master degree & Ph.D. vs. middle school degree & diploma | -0.19 | 0.38 | -0.02 | -0.49 | 0.63 |
| Private sector employment vs. unemployed | -0.18 | 0.37 | -0.01 | -0.48 | 0.63 |
| Governmental employment vs. unemployed | 1.13 | 0.35 | 0.1 | 3.26 | 0.001 |
| Self-employment vs. unemployed | -0.10 | 0.44 | -0.007 | -.02 | 0.81 |

Abbreviation: SE, standard error.

^aP, significant level.

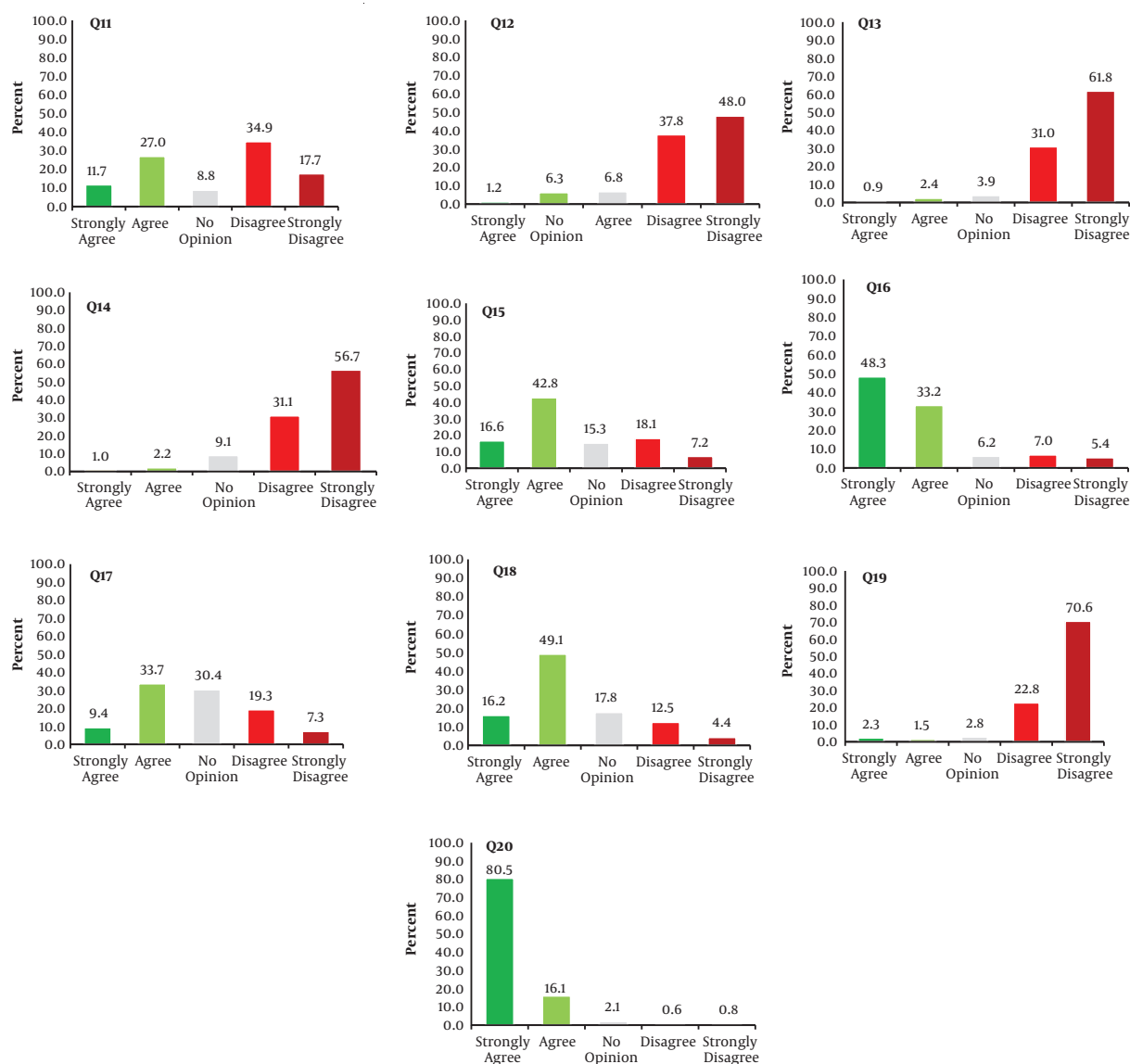


Figure 2. The proportions of participants' answers to the attitude questions towards mask use to prevent and control COVID-19 (Questions Q11 to Q20 are presented in Table 1).

participants' knowledge with attitude levels and their performance level. Therefore, it is recommended that health education programs are necessary to be planned with respect to the participants' educational levels. Proper training could promote the knowledge, attitude, and performance levels concerning the COVID-19 pandemic (27).

In the current study, 74.7% of the participants viewed that the role of the exhalation valve on N95 respirator is to filter out fine particles. While the aim of the exhalation valve is to help with easier exhalation by the users. The low

level of knowledge could cause problems and even might increase the transmission or dispersion of COVID-19 (24, 28). Recent findings confirmed that approximately 80% of COVID-19 patients are asymptomatic or have clinically mild signs. Therefore, when using the N95 respirator equipped with the exhalation valve, they were incognizant to the dispersion of the virus through the exhalation valve in the society, workplace, and house areas (10). Also, it is required to inform people of the respirator/masks types, their roles in the prevention and control of the COVID-19 outbreak,

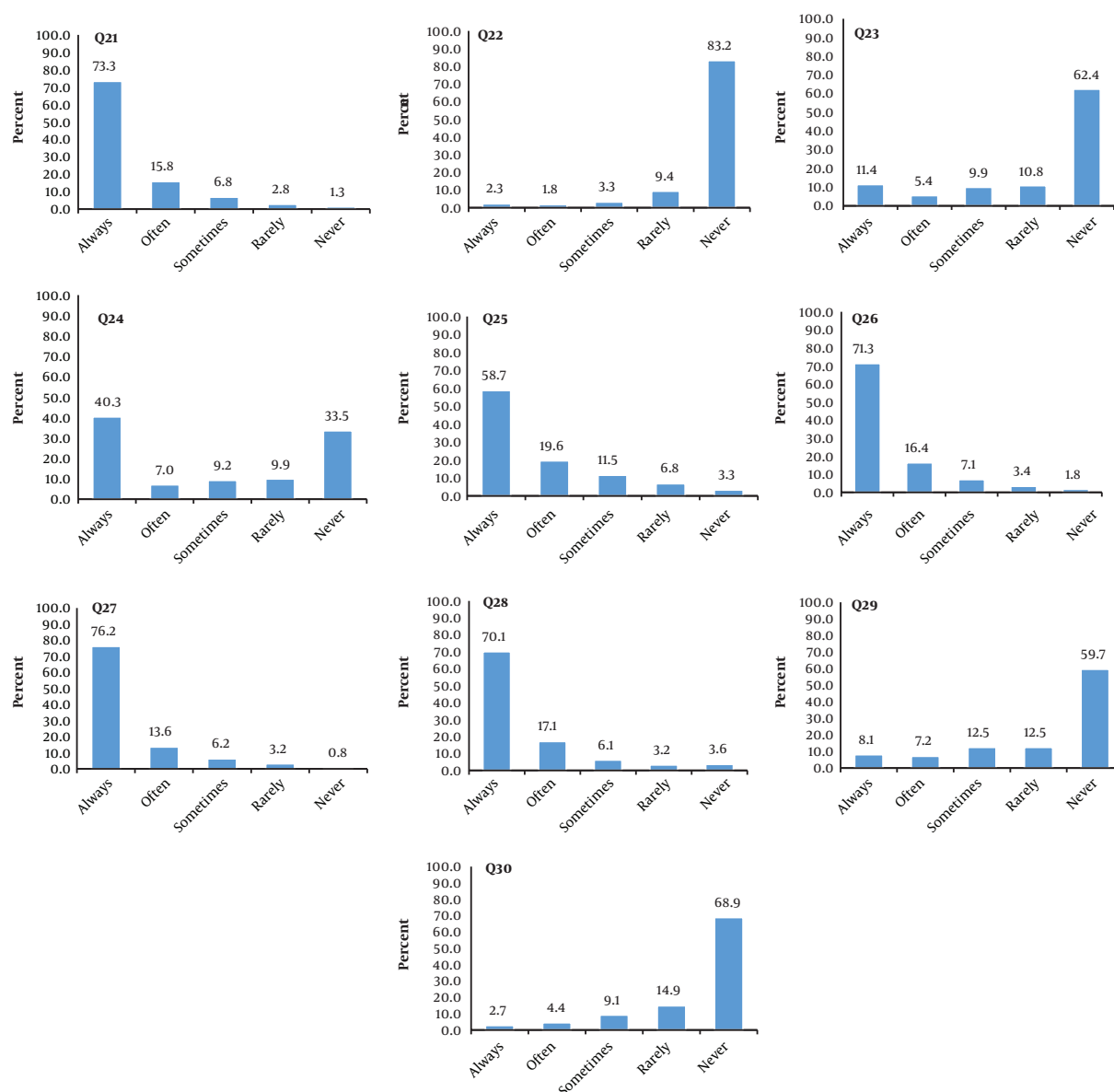


Figure 3. The proportions of participants' answers to the performance questions regarding mask use to prevent and control COVID-19 (Questions Q21 to Q30 are presented in Table 1).

proper donning and doffing, use, disinfection, and safely and hygienically disposal procedures via social media (i.e., television and radio, etc.) and social networks (26, 28).

In the current study, most of the participants had good attitude regarding mask use to prevent and control the COVID -19 pandemic. Overall, 59.40% of the participants believed that mask use could protect them from COVID-19. Similarly, 73.90% of Chinese and 76.70% of Malaysian people had the same attitude towards the importance of mask use

age during the COVID-19 pandemic (9, 27). In another study conducted by Alzoubi et al., 68.40% of medical and non-medical students considered that mask wearing could prevent viral infections (29). Furthermore, Geldsetzer noted that 37.8% of US participants and 29.7% of United Kingdom (UK) participants thought that surgical mask use could be highly effective in protecting against COVID (30).

In this study, 87.80% of the participants believed that the efficacy of cloth masks, surgical masks, and N95 respi-

rators is different. Most of them (43.10%) thought that N95 respirators have higher efficacy against the COVID-19 than the other two types, whilst the WHO recommended these masks only for healthcare (HCWs) personnel. But the tendency of the general population toward the N95 respirator usage resulted in fundamental limitations and short-ages for frontline HCWs who are at risk for COVID-19 (6, 15). The study conducted by Sadegh et al. determined that only 9% of Punjab (Pakistan) residents used N95/N99 respirators (28). Another study by Tan et al. found that more than one quarter of the Chinese use N95 masks (22).

In the present study, most of the participants (70.80%) displayed favorable practices towards mask usage. The employees of governmental organizations compared to private sector employees had higher performance. One possible reason for this finding might be the training courses for the employees in the GOs, provision of masks for the employees, and continuous monitoring on proper mask use by competent supervisors. In this study, women had better performance than men, which is consistent with previous studies' findings (27, 31).

In this study, 40.30% of the participants used masks while out of home. Additionally, the study by Zhong et al. showed that 2.0% of the Chinese did not wear masks when leaving their homes (27). Alahdal et al. expressed that 91.79% of people agreed that wearing masks in public places can decrease the spread of COVID-19 (32). Zeenny et al. confirmed that only 46.80% of the Lebanese hospital pharmacists always used masks during their work shifts (33). Ferdous et al. remarked that 87.20% of Bangladeshi residents used masks during the COVID-19 outbreak (31). All the mentioned findings represent the stronger adherence to mask usage than Iranian people.

The earlier studies showed higher performance regarding mask use. For example, a study by Azlan et al. and another study by Zhong et al. showed that 51.20% of Malaysian people and about 98% of Chinese people wore masks when their leaving homes, respectively (9, 27). There are several reasons for this discrepancy between Iranian and Chinese people regarding mask use, one reason could be due to high risk of exposure of the Chinese people to viral diseases and their positive experiences regarding mask use as one of the most vital preventive measures (34). Other reasons could be attributed to the lack of regulatory requirements at the beginning of the pandemic (the Iranian government notified "the asymptomatic subjects were not required to wear masks in the public places, as suggested by the WHO during the primary stage of this research), unavailability of certified masks, and financial problems of

the community members regarding the provision of high-cost masks (35, 36).

In this study, over half of the participants (62.40%) reported that mask use does not imply not complying with other health and safety considerations against the COVID-19. The study by Seres et al. supports this finding (37). In contrast, the WHO declared that one possible disadvantage of the mask use is related to the users' false sense of security and low adherence to observing all vital preventive actions (15). One of the WHO's most challenges was the unsuitable and unhygienic disposal and discarding of masks in the environment (6). Fortunately, Iranian people had fair and suitable performance in this regard, as 78.20% replied "always" to the question "Do you throw away the used mask in the garbage bin?", 13.60% answered "most of the time", and only 0.80% of them never disposed their masks in garbage bins. In this regard, the results of the study by Tan et al. are consistent with our results. In their study, 22.5% of participants said that they threw their used masks in garbage bins (22).

5.1. Limitations

The participants were recruited in the study based on the convenience sampling method via social media (WhatsApp and Telegram applications) because of the limitations caused by the COVID-19 outbreak; therefore, one possible bias could be due to the fact that people who did not access the social media, did not take part in this study. In addition, the cost of masks and access to them can affect the participants' behaviors regarding mask use, which were not addressed in this study.

5.2. Conclusions

This study showed that Iranians had poor knowledge concerning mask types, their uses, and roles in infection prevention and control of COVID-19. Nevertheless, they had good attitude and performance. This indicated that most of the community members desirably perceived the hazards regarding the current emergency situations and the importance of self-protection ("by protecting yourself, you protect others"). However, their poor knowledge levels may cause major problems.

In the first stage, it is required to provide appropriate training regarding proper respirator donning and doffing, use disinfection, and safely and hygienically disposal procedures via social media and social networks to improve community members' attitude and performance levels regarding COVID-19. In the second stage, governmental offices and private sector offices must provide certified

masks for the community members and make them accessible. Consequently, continuous monitoring of how masks are used by community members is required to be performed.

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Footnotes

Authors' Contribution: A. T., Supervised and designed the research and co-wrote the paper; T. A., Research design and questionnaire preparation; S. M., Research design and questionnaire preparation; A. F., Analyzed data and co-wrote the paper; Z. D., Data collection and co-wrote the paper; M. J., Research design and co-wrote the paper; H. R. G., Research design, questionnaire preparation, and co-wrote the paper.

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