Knowledge, attitude and practice of Sari Birth Cohort members during early weeks of COVID-19 outbreak in Iran

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Abstract

Background

It has been determined that the coronavirus disease 2019 (COVID-19) pandemic needs social distancing and proper measures to prevent its spreading. This study aimed to determine COVID-19 knowledge, attitude, and practice among Sari Birth Cohort (SBC) members.

Methods

In this cross-sectional study linked to the SBC in north of Iran, mothers living in Sari and its suburbs from March 28 to April 8, 2020 were evaluated. The measurement tool was an online researcher-made, self-reported knowledge, attitude, and practice questionnaire related to COVID-19.

Results

In total, 1449 mothers with a mean age of 31.51 ± 5.73 years participated. Of them, 82.4% had good knowledge (98.6% in healthcare workers and 79.2% in housewives, p = 0.000). Most of them were worried about spread of the disease in the country (97.4%) and agreed that COVID-19 will finally be successfully controlled around the world (72.2%). Sleep disturbance was reported in 42.7% of mothers. Eighty-eight percent of cases wore masks and gloves when leaving the house, 99.4% washed their hands frequently while 12.9% went to any crowded places. People with better knowledge followed safer practices (p = 0.000) and were more worried about the spread of the disease in the country and infection (among themselves and their first-degree relatives) (p = 0.000).

Conclusions

Most of the SBC members had a good level of knowledge about COVID-19 but were worried about a long-term pandemic period. They also had good practices regarding the prevention of the disease.

Background

Last decade witnessed the outbreak of many life-threatening infectious diseases including MERS (Middle East Respiratory Syndrome), Ebola, SARS (Severe Acute Respiratory Syndrome) and more recently, COVID-19 (Coronavirus Infectious Disease-19) which is associated with SARS-CoV2 [1]. COVID-19 infection was first reported in Wuhan, China in December 2019, and is spreading around the world with approximately 500,000 confirmed cases and over 21,000 deaths as of March 25, 2020 [2]. Hence, the World Health Organization (WHO) declared it a new pandemic [3].

The reported mortality rate varies in different countries and also in different regions within, but WHO data on the cumulative number of deaths to March 1, 2020 estimated globally a 15.2% mortality rate of COVID-19 infection [4]. Significant efforts have been made to develop therapeutic interventions against the coronavirus infection. The current approach to coronavirus disease management is unclear and sometimes disorganized, but mainly focuses on supportive care [5].

The COVID-19 infection, as an airborne high consequence of infectious disease, has an incubation period of 0 to 14 days [5]. The symptoms range from mild to severe complications including fever, cough, shortness of breath, pneumonia and respiratory, hepatic, gastrointestinal, renal, cutaneous and neurological complications and finally death occurs in severe cases [5–8]. The key principles for COVID-19 prevention are to identify potential cases as soon as possible, prevent transmission of the infection to other people and avoid direct contact with respiratory secretions and isolating the patients [9].

This novel pandemic needs global attention and coordinated response to the rapidly changing messages about public health and immediate actions to minimize the risk of infection and spread of the virus [10]. Since it is known that COVID-19 may be transmitted even from asymptomatic cases, the risk is multiplied [11]. Communicable disease control is a public health priority [12] and epidemiological studies are necessary for monitoring the public response to the emerging crisis, as well as prevention and control of the spread of the disease [13]. Identifying public health problems and related factors may also help decision-makers take appropriate measures to improve individual or community health and make the proper planning and public policies [14]. Since a better knowledge and understanding about this new human challenge may be presently insufficient, many guidelines are released through local governments and/or WHO, to help countries maintain essential health services during the COVID-19 pandemic. It is well-known that confused comprehension and negative attitudes may cause unnecessary worry and anxiety about emerging communicable diseases. Excessive panic would likely aggravate the epidemic [14]. Proper knowledge, attitudes, and practices can play an important role in the prevention and control of diseases [15, 16].
To our knowledge, no studies have yet assessed the general, public knowledge on this novel coronavirus and awareness of its prevention and management in the Iranian population. Therefore, this study aimed to assess the knowledge, attitudes and practices of Sari Birth Cohort (SBC) mothers in north of Iran, and its related factors, in the early weeks following the outbreak of the global epidemic. We focused on the role of health literacy and other psychosocial health determinants in understanding risks for COVID-19 and performing preventive behaviors.

**Methods**

2.1. Setting and Participants

The 2017 Sari Birth Cohort (SBC) is an ongoing, multidisciplinary, longitudinal study linked to multicenter Persian birth cohort running in 5 different provinces of Iran (Sari, Isfahan, Yazd, Semnan, and Rafsanjan cities). It takes its subjects from currently pregnant women living in Sari city and rural areas in Mazandaran province in north of Iran. The SBC aims to investigate the impact of socioeconomic status, lifestyle, diet, occupational and environmental exposures before and during pregnancy and also during early life, on some major health concerns in their ongoing child. By the end of the study, totally 3000 mother-child pairs are expected to be included, and the offspring would be followed up for at least 10 years of age. To date, 2800 mothers have been registered in the SBC.

2.2. Study design

In this cross-sectional survey, which was linked to the SBC study, knowledge, attitudes and practices (KAP) of SBC members were evaluated from March 28 to April 8, 2020, a few weeks after the COVID-19 pandemic began in Mazandaran province, in northern Iran and almost at the same time as the New Year holidays in Iran.

2.3. Measures

A self-administered researcher-made online questionnaire in Persian language was offered to the SBC members via a link to their WhatsApp and/or Telegram accounts. Within one week, follow up contact was performed, and a reminder message was sent to non-responders.

The questionnaire consisted of two demographic and KAP questions and was developed based on scientific articles and guidelines for clinical and community management of COVID-19 [10, 17, 18] with a total of 41 questions regarding COVID-19: 4 demographic, 3 disease history, 14 knowledge, 7 attitude and 13 practice questions (Accessory files).

In the knowledge questionnaire, the mothers’ source of information about COVID-19 and their knowledge about the disease transmission routes, prevention, symptoms and treatment options were asked on a true/false basis with an additional “I don't know” option. A correct answer was assigned one point and an incorrect/unknown answer was assigned zero point. The total knowledge score ranged from 0 to 13 scores and was categorized from poor (score 0-3), average (score 4-8) and good (score 9-13) levels.

Attitudes towards COVID-19 were measured by 7 questions concerning the prevalence of the disease throughout the world, the country, first-degree relatives, sleep disturbance and the perceived severity of the disease.

For the assessment of practices, questions had scores between -2 to +2 points, with higher points for more important protective behaviors and lower points for more risky actions. Poor practice referred to a total score of 0 to 8 and good practices were described as a total score of 1 to 12.

An expert panel consisting of an epidemiologist, an infectious disease subspecialist, a pediatrician and a biostatistics specialist approved the validity of the questionnaire. In a test-retest, the Cronbach's alpha coefficient was 0.71 in our sample, indicating acceptable internal consistency [19]. The ethics committee of Mazandaran University of Medical Sciences approved the study protocol (Ethical code: IR.MAZUMS.REC.1399.7354) and consent for publication was obtained from all participants.

2.4. Statistical analysis

Descriptive statistics (mean±SD, frequency and percentage) were used for all patient characteristics and survey responses. Frequency of correct knowledge, attitudes and practices were described. Chi-square test was used for knowledge scores, attitudes and practices according to demographic characteristics. Data was analyzed by SPSS software, version 16.0 and p values less than 0.05 were considered to be statistically significant. Missing data were not included in analysis.

**Results**
A total of 1708 questionnaires were sent to the mothers of SBC from March 28 to April 8, 2020, and 1449 members completed them (response rate = 84.8%). The mean age of the responders was 31.5±5.73 years (range: 18-90 years old). The majority of the mothers were aged between 27 to 36 years (867, 62.6%) and were housewives (967, 67.4%). None of the mothers were illiterate and 59.1% (850 mothers) held a Bachelor's degree or higher education (Table 1). Ninety-one percent (1298 mothers) of them lived in the urban areas. The baseline characteristics of the respondents are presented in table 1.

Two hundred mothers (13.8%) reported having COVID-19 infection themselves or in their first-degree relatives and about half of them (784, 54%) knew someone who died from COVID-19 while 956 (66%) knew someone who recovered from it. The overall KAP related to COVID-19 is reported in tables 1 and 2. The reported sources of information were television in 653(45.5%), social media in 515(35.9%), medical websites in 198(13.8%), and friends or family members in 69 cases (4.8%). Knowledge levels were good in 1189(82.4%), average in 241(16.6%) and poor in 13(0.9%) of the mothers (Table 2).

Knowledge of younger mothers was significantly lower; 73.5% of mothers between 17 to 26 years had good knowledge, but 84.4% of mothers above 27 years had good knowledge (p=0.001) (Table 1). Knowledge of mothers also differed according to their occupation: 98.6% of healthcare or health-related workers had good knowledge, while this level of knowledge was seen in 79.2% of homemakers (p=0.000) (Table 1). Mothers who lived in urban areas had better knowledge than rural areas (83.4% vs 75%, p=0.042). Good levels of knowledge were statistically higher among mothers with Bachelor's degree or above (87% vs 75.7%, p=0.000) (Table 1).

The frequency of good level of knowledge was significantly higher in mothers whose main source of information was social media or medical websites compared to television (86% vs 77.9%, p=0.005). Interestingly, mothers who knew someone who had died (86% vs 77.3%, p=0.000) or recovered from COVID-19 (83.6% vs 80%, p=0.003) had a higher frequency of good level of knowledge compared to others (Table 1).

Regarding attitudes, 1396(97.4%) mothers were worried about the spread of the disease in the country (A1), 1397(97.1%) were worried about becoming infected themselves and/or their first-degree relatives (A5). 1044(72.2%) agreed that COVID-19 will finally be successfully controlled around the world (A2), and sleep disturbance (A6) was reported in 613(42.7%) mothers. Participants’ sleep disturbance also varied according to the family history of infection (Table 1, 2).

The practice of mothers was good in 1317(90.9%) and poor in 132(9.1%) mothers. Regarding high-risk practices in recent days, only 184(12.9%) went to any crowded places (P1), 54(3.8) had visited their family members during the New Year holiday (P7), and 28(1.9%) had traveled to other cities during the New Year holiday (P8). Concerning protective actions, 1282(88.8%) mothers had worn a mask or gloves when leaving home (P2), 1421(99.4%) mothers washed their hands for 20 seconds when arriving home (P3), and 1367(95.3%) disinfected indoor surfaces and handles regularly (P4) (Table 2).

When asking “If you have symptoms of COVID-19, where do you go first to diagnose it?”, 466(32.6) responded going to the screening website of the university or the Ministry of Health, and others preferred referring to a physician in a public or private setting (Table 2). From a total of 470 employees, 333(70.9%) were able to work remotely at home, 96(89.7%) were teachers or held academic positions and 32(43.8%) were healthcare workers who could work remotely at home.

Fear of relatives’ infection was positive in 575(39.7%), and fear of my infection in 217(15%) mothers (Table 2). Table 2 summarized the practices participants performed for their protection. People who had better knowledge were more worried about the spread of the disease in the country (97.8% of average and good knowledge scores were worried, compared to 36.4% in the weak knowledge group, p=0.000). Further, mothers with average or good levels of knowledge were more worried about the infection of themselves and their first-degree relatives (97% vs 72.7%; p=0.000) (Table 1). People who had better knowledge, practiced better (p=0.000), while 53.8% of poor knowledge people, practiced good (84.6%) and 92.8% of mothers with moderate or good knowledge levels followed safer practices. No statistically significant association was found between attitudes and practices among the participants (p>0.05) (Table 1).

**Discussion**

This study was performed 6 weeks after the COVID-19 outbreak and critically affected the area in northern Iran. The current study reports the knowledge, attitudes, and practices (KAP) regarding the pandemic among the SBC members. COVID-19 has created a global pandemic. It is important to encourage the public to adopt precautionary behaviors, which are based on a correct understanding of the epidemic and the appropriate responses necessary among people [14]. Many studies have evaluated the various levels of KAP about the COVID-19 outbreak showing good levels of knowledge among participants [18, 20]. Social media and global networks have been used in various health applications and improve people's knowledge during pandemics [21].

In this study, most of the mothers had acceptable level of knowledge which may be affected by their age, occupation, location, educational status, and their main source of information. Zhong et al. [18] suggested that knowledge regarding COVID-19 was significantly lower in males, younger ages (16-29 y/o vs older), never married, bachelor's degree and below and unemployed people. In an Egyptian survey [17], no difference was found...
between knowledge of males and females, but those who were 50 years and younger, residents of urban areas, and university-educated participants had better knowledge scores. Since all of our participants were married and female, we were unable to compare marital status and gender regarding knowledge, but it can explain the good knowledge score in our study. Also, we found that the knowledge of mothers who were older than 27 years, had higher education levels, and employed mothers were better; perhaps because they use social media or search medical websites seeking the best available information about the disease. As was predictable, the information of healthcare worker mothers was higher than others. Also, Moro et al. found that knowledge of healthcare workers was better than other staff members of hospitals [20].

The present study showed that knowledge of mothers regarding some questions was better; they knew the main clinical symptoms of COVID-19, they agreed that taking measures to prevent the infection is necessary for children and infants, infections may be more severe in some comorbidities, avoided going to crowded places, agreed that isolation and treatment of COVID-19 infected people or quarantine of those who had contact with sick people are important to prevent spreading the virus. Other studies also showed similar good information among people [17, 18, 20].

In the present study, in some important measures, the mother’s knowledge was not satisfactory: their belief about possibility of transmission of COVID-19 infection through contact with domestic/wild animals and infection by smokers and addicted people was concerning. Also, the idea that COVID-19 is just transmitted in the febrile period of infection and the necessity of wearing masks to prevent infection were other blind spots of our participants. The reason for this may be due to an inconsistency about wearing masks and transmission of the disease by animals in the literature or social media [18, 20].

In this study, mothers older than 27 years, who were not healthcare workers, and those without any family history of infection were more hopeful about the eventual control of the disease in the world. Housewives were more hopeful about control of the disease in the country. In Wuhan, China, 90.8% of respondents agreed that this epidemic will be finally controlled, and this attitude was significantly different regarding the educational level and knowledge about COVID-19 [18].

A considerable number of mothers in this study experienced sleep disturbance and mothers with a family history of infection suffered from sleep problems more frequently. This may be due to concerns about the health of their family members. Rajkumar et al. reported that anxiety, depression and self-reported stress are common psychological problems during the COVID-19 pandemic, and may be associated with disturbed sleep [22].

The present study showed that the practices of mothers were good in 91%. They tried to pay attention to preventive measures heterogeneously, and only 13% of them went to crowded places. Most of them have stayed at home, kept social distancing, and avoided traveling, even during the New Year holiday. Although the government never locked down any city or province completely, all mothers practiced such preventive measures by themselves. In Zhong et al.’s study [18], during the lockdown of Hubei province, nearly 3.6% had gone to crowded places and 2% did not wear a mask when leaving home. In their study, adhering to different preventive measures of COVID-19 infection was worst in males and people with lower knowledge scores, single persons, and people who were not residents of Hubei were less possible to wear a mask when leaving home [18].

Our study had some limitations. First, it was a local survey in a city and suburbs. Therefore, the result cannot be generalized to the entire country. Since members of SBC were in specified fertility age groups and had access to social media, their knowledge might be higher than other people. We could not evaluate all aspects of KAP and only limited and some important aspects were studied. Evaluation of the psychosocial effects of a pandemic on people and relationships with such important factors on the KAP is recommended.

**Conclusion**

Most of the SBC members had a good level of knowledge about COVID-19, but were worried about a long-term pandemic period. They also demonstrated good practices regarding the prevention of the disease.

**Declarations**

6.1. Ethics approval and consent to participate

The ethics committee of Mazandaran University of Medical Sciences approved the study protocol (Ethical code: IR.MAZUMS.REC.1399.7354).

6.2. Consent to publish

Not applicable.
6.3. Availability of data and materials

The datasets generated and/or analysed during the current study are not publicly available but are some parts of it is available from the corresponding author on reasonable request.

6.4. Competing interest

None to be declared.

6.5. Funding

No funding information provided.

6.6. Authors' contributions

M A and FS M analysed the data. L S, and F H wrote the first draft of the manuscript and MR N and MS R, corrected the manuscript. SA F and Z SS edited the manuscript. All authors read and approved the final manuscript.

6.7. Acknowledgement

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Abbreviations

SBC
Sari Birth Cohort

KAP
Knowledge, attitudes, and practices

COVID-19
Coronavirus Infectious Disease-19.

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Table 1. General characteristics and KAP of participants regarding COVID-19
|                      | Frequency | Percent | Knowledge | p-value | Practice | p-value |
|----------------------|-----------|---------|-----------|---------|----------|---------|
|                      |           |         | Poor      | 13(0.9%)| 66(25.4%)| 191(73.5%)|               | Poor       | 32(12.3%) | 132(9.1%)| 0.001 | 0.055 |
|                      |           |         | Average   | 241(16.6%)|         | 729(44.4%)|               | Average    | 77(9.9%)  | 1317(90.9%)|         |         |
|                      |           |         | Good      | 1189(82.4%)|        | 220(85.9%)|               | Good       | 16(6.2%)  | 241(93.8%)|         |         |
| Age (n1385)          |           |         |           |         |          |         |               |            |           |           |        |
| 17-26 years          | 261       | 18.8    | 3         | (1.2%)  | 66       | (25.4%)  |               | 32         | 229       | (87.7%) |        |
| 27-36 years          | 867       | 62.6    | 6         | (0.7%)  | 129      | (14.9%)  |               | 77         | 790       | (91.1%) |        |
| 37-47 years          | 257       | 18.6    | 3         | (1.2%)  | 33       | (12.9%)  |               | 16         | 241       | (93.8%) |        |
| Occupation* (n1434)  |           |         |           |         |          |         |               |            |           |           |        |
| Housewife            | 967       | 67.4    | 11        | (1.1%)  | 189      | (19.6%)  |               | 103        | 864       | (89.3%) | 0.000 | 0.024 |
| Non-healthcare       | 393       | 27.4    | 1         | (0.3%)  | 47       | (12.0%)  |               | 24         | 369       | (93.9%) |        |
| Healthcare worker    | 74        | 5.2     | 0         |         | 1        | (1.4%)   |               | 5          | 69        | (93.2%) |        |
| Level of education** (n1439) |   |         |           |         |          |         |               |            |           |           |        |
| Associate degree & lower | 589     | 40.9    | 9         | (1.5%)  | 133      | (22.7%)  |               | 75         | 514       | (87.3%) | 0.000 |         |
| Bachelor's degree & higher | 850  | 59.1    | 4         | (0.5%)  | 106      | (12.5%)  |               | 57         | 793       | (93.3%) |        |
| Living place (n1430) |           |         |           |         |          |         |               |            |           |           |        |
| Urban                | 1298      | 90.8    | 12        | (0.9%)  | 203      | (15.7%)  |               | 121        | 1177      | (90.7%) | 0.042 | 0.508 |
| Rural                | 132       | 9.2     | 1         | (0.8%)  | 32       | (24.2%)  |               | 10         | 122       | (92.4%) |        |
| Knew someone who died from COVID-19 (n1378) |   |         |           |         |          |         |               |            |           |           |        |
| Yes                  | 784       | 56.9    | 5         | (0.6%)  | 104      | (13.3%)  |               | 54         | 730       | (93.1%) | 0.000 | 0.006 |
| No                   | 594       | 43.1    | 4         | (0.7%)  | 131      | (22.1%)  |               | 66         | 528       | (88.9%) |        |
| Knew someone who has been cured from COVID-19 (n1448) |   |         |           |         |          |         |               |            |           |           |        |
| Yes                  | 956       | 66.0    | 3         | (0.3%)  | 153      | (16.0%)  |               | 75         | 881       | (92.2%) | 0.003 | 0.019 |
| No                   | 492       | 34.0    | 10        | (2.0%)  | 87       | (17.8%)  |               | 57         | 435       | (88.4%) |        |
| COVID-19 in themselves and their first degree relatives (n1449) |   |         |           |         |          |         |               |            |           |           |        |
| Yes                  | 200       | 13.8    | 2         | (1.2%)  | 28       | (17.3%)  |               | 18         | 182       | (91.0%) | 0.869 | 0.954 |
| No                   | 1249      | 86.2    | 11        | (0.9%)  | 213      | (16.6%)  |               | 114        | 1135      | (90.9%) |        |
| Knowledge            |           |         |           |         |          |         |               |            |           |           |        |
| Poor                 | -         | -       | -         | -       | -        | -        |                 | 6          | -         | (46.2%) | 0.000 |         |
| Average              | -         | -       | -         | -       | -        | -        |                 | 37         | -         | (15.4%) |        |
| Good                 | -         | -       | -         | -       | -        | -        |                 | 86         | -         | (92.8%) |        |
| Age (n=138) | A1 | p-value | A2 | p-value | A3 | p-value | A4 | p-value |
|-------------|----|---------|----|---------|----|---------|----|---------|
| 17-26 years | Yes | 8 | 0.851 | No | | 26 | (13.3%) | | | 48 | (35.3%) | 0.816 |
| 27-36 years | Yes | 21 | 26 | (17.7%) | No | | 106 | | | 154 | (32.4%) | |
| 37-47 years | Yes | 7 | 0.156 | No | | 24 | (13.2%) | | | 44 | (33.6%) | |

| Occup M (n=143) | A1 | p-value | A2 | p-value | A3 | p-value | A4 | p-value |
|-----------------|----|---------|----|---------|----|---------|----|---------|
| House wife | Yes | 21 | 0.012 | No | | 9 | (7.9%) | | | 0.036 | |
| Non-healthcare worker | Yes | 13 | 222 | (21.8%) | No | | 62 | | | 70 | (30.3%) | |
| Healthcare worker | Yes | 3 | 47 | (20.3%) | No | | 12 | | | 17 | (31.5%) | |

| Level of education (n=143) | A1 | p-value | A2 | p-value | A3 | p-value | A4 | p-value |
|---------------------------|----|---------|----|---------|----|---------|----|---------|
| Associate degree & lower | Yes | 21 | 0.068 | No | | 9 | (8.1%) | | | 124 | (43.7%) | 0.000 |
| Bachelor’s degree & higher | Yes | 17 | 487 | (18.6%) | No | | 111 | | | 128 | (26.2%) | |

| Living place (n=143) | A1 | p-value | A2 | p-value | A3 | p-value | A4 | p-value |
|----------------------|----|---------|----|---------|----|---------|----|---------|
| Urban | Yes | 34 | 0.200 | No | | 157 | (17.6%) | | | 220 | (31.2%) | 0.001 |
| Rural | Yes | 3 | 92 | (13.2%) | No | | 14 | (51.6%) | | | 33 | (48.4%) | |

| Knew someone who died from COVID-19 (n=137) | A1 | p-value | A2 | p-value | A3 | p-value | A4 | p-value |
|-------------------------------------------|----|---------|----|---------|----|---------|----|---------|
| Yes | Yes | 20 | 0.957 | No | | 35 | (5.8%) | | | 103 | (18.6%) | 0.852 |
| No | Yes | 15 | 0.340 | No | | 51 | (81.4%) | | | 97 | (33.1%) | |

| Knew someone who has been cured from COVID-19 (n=144) | A1 | p-value | A2 | p-value | A3 | p-value | A4 | p-value |
|----------------------------------------------------|----|---------|----|---------|----|---------|----|---------|
| Yes | Yes | 21 | 0.159 | No | | 45 | (6.1%) | | | 116 | (17.1%) | 0.669 |
| No | Yes | 17 | 0.361 | No | | 28 | (7.5%) | | | 57 | (17.2%) | |

| COVI D-19 in themselves and their first degree relatives (n=144) | A1 | p-value | A2 | p-value | A3 | p-value | A4 | p-value |
|-----------------------------------------------------------------|----|---------|----|---------|----|---------|----|---------|
| Yes | Yes | 5 | 0.916 | No | | 17 | (11.0%) | | | 28 | (20.9%) | 0.981 |
| No | Yes | 33 | 0.016 | No | | 56 | (5.8%) | | | 145 | (16.6%) | |

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| Knowledge | Poor (36.4%) | 7 (63.6%) | 0.000 | 7 (87.5%) | 1 (12.5%) | 0.234 | 4 (80.0%) | 1 (20.0%) | 0.931 | 1 (20.0%) | 4 (80.0%) | 0.823 |
|-----------|--------------|-----------|-------|-----------|-----------|-------|-----------|-----------|-------|-----------|-----------|-------|
| Averages  | 230 (96.6%) | 8 (3.4%)  | 161   | 16 (91.0%)| 16 (9.0%) | 130   | 25 (83.9%)| 16 (16.1%)| 32    | 66 (32.7%)| 66 (67.3%)|       |
| Good      | 1161 (98.1%)| 23 (1.9%) | 876   | 55 (94.1%)| 55 (5.9%) | 701   | 146       | 224       | 453   | (33.1%)   | (66.9%)   |       |
| Practice  | Poor (95.2%)| 6 (4.8%)  | 98    | 9 (91.6%) | 9 (8.4%)  | 76    | 16 (82.6%)| 16 (17.4%)| 15    | 39 (27.8%)| 39 (72.2%)|       |
| Good      | 1276 (97.6%)| 32 (2.4%) | 946   | 64 (93.7%)| 64 (6.3%) | 759   | 157       | 242       | 484   | (33.3%)   | (66.7%)   |       |
| Age       | (n138 5) | Yes | No | p-value | Yes | No | p-value | A | B | C | D | p-value |
|-----------|----------|-----|----|---------|-----|----|---------|---|---|---|---|---------|
| 17-26 years old | 251      | 9   | 9   | 0.567   | 104 | 156 | 0.060   | 90 | 105 | 43 | 16 | 0.050   |
| 27-36 years old | 836      | 23  | 23  |         | 357 | 501 |         | 301 | 385 | 118| 43 |         |
| 37-47 years old | 252      | 5   | 5   |         | 126 | 130 |         | 113 | 103 | 23 | 13 |         |

| Occupation* (n143 4) | Yes | No | p-value | Yes | No | p-value | A | B | C | D | p-value |
|----------------------|-----|----|---------|-----|----|---------|---|---|---|---|---------|
| House keeper         | 934 | 27 | 0.710   | 399 | 560 | 0.443   | 341 | 402 | 134| 63 | 0.009   |
| Non-Healthcare worker | 377 | 12 |         | 177 | 213 |         | 159 | 160 | 50 | 16 |         |
| Healthcare worker    | 73  | 1  |         | 32  | 42  |         | 21  | 46  | 5  | 2  |         |

| Level of education** (n143 9) | Yes | No | p-value | Yes | No | p-value | A | B | C | D | p-value |
|--------------------------------|-----|----|---------|-----|----|---------|---|---|---|---|---------|
| Associate degree & lower      | 563 | 21 | 0.129   | 266 | 316 | 0.061   | 224 | 205 | 88 | 49 | 0.000   |
| Bachelor's degree & higher    | 826 | 19 |         | 344 | 501 |         | 301 | 404 | 101| 32 |         |

| Living place (n143 0) | Yes | No | p-value | Yes | No | p-value | A | B | C | D | p-value |
|-----------------------|-----|----|---------|-----|----|---------|---|---|---|---|---------|
| Urban                 | 1252| 36 | 0.876   | 559 | 727 | 0.161   | 469 | 558 | 166| 71 | 0.557   |
| Rural                 | 128 | 4  |         | 49  | 83  |         | 52  | 50  | 21 | 8  |         |

| Knew someone who died from COVID-19 (n137 8) | Yes | No | p-value | Yes | No | p-value | A | B | C | D | p-value |
|----------------------------------------------|-----|----|---------|-----|----|---------|---|---|---|---|---------|
| Yes                                          | 758 | 21 | 0.994   | 342 | 437 | 0.384   | 274 | 343 | 107| 42 | 0.310   |
| No                                           | 576 | 16 |         | 246 | 346 |         | 235 | 236 | 78 | 36 |         |

| Knew someone who has been cured from COVID-19 (n144 8) | Yes | No | p-value | Yes | No | p-value | A | B | C | D | p-value |
|--------------------------------------------------------|-----|----|---------|-----|----|---------|---|---|---|---|---------|
| Yes                                                     | 926 | 24 | 0.299   | 422 | 528 | 0.068   | 335 | 431 | 123| 47 | 0.037   |
| No                                                      | 470 | 17 |         | 246 | 294 |         | 191 | 183 | 67 | 34 |         |

| COVID-19 in themselves and their first degree relatives (n144 9) | Yes | No | p-value | Yes | No | p-value | A | B | C | D | p-value |
|-----------------------------------------------------------------|-----|----|---------|-----|----|---------|---|---|---|---|---------|
| Yes                                                             | 195 | 3  | 0.224   | 104 | 93  | 0.002   | 75  | 92  | 23 | 4  | 0.085   |
| No                                                              | 1202| 38 |         | 509 | 730 |         | 452 | 522 | 167| 77 |         |
### Knowledge

| Knowledge | Poor     | 3       | 4       | 5       | 0.933  | 2       | 4       | 3       | 0       | 0.000  |
|-----------|----------|---------|---------|---------|--------|---------|---------|---------|---------|--------|
| Poor      | 226 (94.6%) | 13 (5.4%) | 105 (43.8%) | 135 (56.3%) | 75 (32.5%) | 236 (42.0%) | 78 (14.7%) | 36 (10.8%) | 0.933  |
| Average   | 1162 (97.9%) | 25 (2.1%) | 504 (42.5%) | 682 (57.5%) | 235 (38.4%) | 236 (43.8%) | 78 (13.1%) | 36 (4.8%) | 0.000  |

### Practice

| Practice | Poor     | 3       | 4       | 5       | 0.990  | 2       | 4       | 3       | 0       | 0.040  |
|----------|----------|---------|---------|---------|--------|---------|---------|---------|---------|--------|
| Poor     | 120 (96.0%) | 5 (4.0%) | 53 (42.7%) | 71 (57.3%) | 58 (49.2%) | 39 (33.1%) | 14 (11.9%) | 7 (5.9%) | 0.040  |
| Good     | 1277 (97.3%) | 36 (2.7%) | 560 (42.7%) | 752 (57.3%) | 469 (36.2%) | 575 (44.4%) | 176 (13.6%) | 74 (5.7%) | 0.005  |

* Occupation: Non-Healthcare worker: Officer: 120(8.4%), teacher: 110(7.7%), other: 163(11.4%)
** Level of education: Associate degree & lower: Illiterate: 0(0.0%), elementary: 45(3.1%), High school: 388(27.0%), Associate degree: 156(10.8%); Bachelor's degree & higher: Bachelor's degree: 579(40.2%), Master's degree: 247(17.0%), PhD, MD or above: 24(1.7%)
*** "I don't Know" isn't in the analysis.
¥: P<0.05 considered being statistically significant

#### Attitude questions:
A1. Are you worried about the spread of the disease in the country?
A2. Do you agree that COVID-19 will finally be successfully controlled around the world?
A3. Do you have confidence that Iran can win the battle against the COVID-19 virus?
A4. Do you think Iran will develop drugs and vaccines sooner than other countries?
A5. Are you worried about getting infected in yourself and your first degree relatives?
A6. Is your sleep disturbed with worrying about COVID-19?
A7. In your opinion, which of the following options usually present with coronavirus disease?
### Questions

#### Knowledge

| Questions                                                                 | Options                                                                 | Frequency | Percent |
|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------|---------|
| K1. Which of the following is the main source of your information about the disease? | 1. Newspapers | 0 | 0.0 |
|                                                                         | 2. Television | 653 | 45.5 |
|                                                                         | 3. Medical web sites (WHO, etc.) | 198 | 13.8 |
|                                                                         | 4. Social media such as Telegram, WhatsApp and Instagram | 515 | 35.9 |
|                                                                         | 5. Family and friends, Colleagues, etc. | 69 | 4.8 |
| K2. The main clinical symptoms of COVID-19 are fever, fatigue, dry cough, and myalgia. | 1. True | 1345 | 93.7 |
|                                                                         | 2. False | 30 | 2.1 |
|                                                                         | 3. I don’t know | 61 | 4.2 |
| K3. Unlike the common cold, nasal congestion, runny nose, and sneezing are less common in the persons infected with the COVID-19 virus. | 1. True | 967 | 67.6 |
|                                                                         | 2. False | 106 | 7.4 |
|                                                                         | 3. I don’t know | 358 | 25.0 |
| K4. There is no effective cure for COVID-19, but early symptomatic and supportive treatment can help most patients recover from the infection. | 1. True | 1151 | 80.3 |
|                                                                         | 2. False | 21 | 1.5 |
|                                                                         | 3. I don’t know | 261 | 18.2 |
| K5. Not all persons with COVID-19 will develop severe disease. Only those who are elderly, have chronic illnesses, and are obese are more likely to be severe case. | 1. True | 1320 | 91.9 |
|                                                                         | 2. False | 32 | 2.2 |
|                                                                         | 3. I don’t know | 85 | 5.9 |
| K6. Contact with domestic/wild animals would result in an infection with the COVID-19 virus. | 1. True | 674 | 47.1 |
|                                                                         | 2. False | 339 | 23.7 |
|                                                                         | 3. I don’t know | 419 | 29.3 |
| K7. Persons with COVID-19 can be carriers when they just have fever. | 1. True | 108 | 7.5 |
|                                                                         | 2. False | 1024 | 71.2 |
|                                                                         | 3. I don’t know | 306 | 21.3 |
| K8. The COVID-19 virus spreads via the respiratory droplets of infected individuals. | 1. True | 1265 | 88.1 |
|                                                                         | 2. False | 62 | 4.3 |
|                                                                         | 3. I don’t know | 109 | 7.6 |
| K9. Ordinary persons can wear general medical masks to prevent infection by COVID-19. | 1. True | 984 | 67.2 |
|                                                                         | 2. False | 361 | 25.2 |
|                                                                         | 3. I don’t know | 109 | 7.6 |
| K10. It is necessary for children and infants to take measures to prevent infection by the COVID-19 virus. | 1. True | 1390 | 96.9 |
|                                                                         | 2. False | 13 | 0.9 |
|                                                                         | 3. I don’t know | 31 | 2.2 |
| K11. To prevent infection by COVID-19, individuals should avoid going to crowded places such as train stations and avoid taking public transportations. | 1. True | 1417 | 98.8 |
|                                                                         | 2. False | 6 | 0.4 |
|                                                                         | 3. I don’t know | 11 | 0.8 |
| K12. Isolation and treatment of COVID-19 infected people are effective ways to reduce the spread of the virus. | 1. True | 1407 | 97.9 |
|                                                                         | 2. False | 7 | 98.4 |
|                                                                         | 3. I don’t know | 23 | 1.6 |
| K13. People who have contact with someone infected with the COVID-19 virus should be immediately quarantined for 14 days. | 1. True | 1308 | 91.3 |
|                                                                         | 2. False | 41 | 2.9 |
|                                                                         | 3. I don’t know | 84 | 5.9 |
| K14. Smokers and addicted people can be infected with COVID-19. | 1. True | 802 | 55.9 |
|                                                                         | 2. False | 240 | 16.7 |
|                                                                         | 3. I don’t know | 392 | 27.3 |
|                                                                         | 1. I don’t know | 316 | 22.0 |

### Attitudes
| A1. Are you worried about the spread of the disease in the country? | 1. Agree | 1396 | 97.4 |
| | 2. Disagree | 38 | 2.6 |
| A2. Do you agree that COVID-19 will finally be successfully controlled around the world? | 1. Agree | 1044 | 72.7 |
| | 2. Disagree | 73 | 5.1 |
| | 3. I don’t know | 319 | 22.2 |
| A3. Do you have confidence that Iran can win the battle against the COVID-19 virus? | 1. Agree | 835 | 58.1 |
| | 2. Disagree | 173 | 12.0 |
| | 3. I don’t know | 429 | 29.9 |
| A4. Do you think Iran will develop drugs and vaccines sooner than other countries? | 1. Agree | 257 | 17.9 |
| | 2. Disagree | 522 | 36.3 |
| | 3. I don’t know | 658 | 45.8 |
| A5. Are you worried about getting infected yourself or your family? | 1. Agree | 1397 | 97.1 |
| | 2. Disagree | 41 | 2.9 |
| A6. Is your sleep disturbed by worrying about COVID-19? | 1. Agree | 613 | 42.7 |
| | 2. Disagree | 823 | 57.3 |
| A7. In your opinion, which of the following symptoms usually present with coronavirus disease? | 1. Mild or no symptoms | 527 | 37.3 |
| | 2. Moderate that requiring self-care and rest | 614 | 43.5 |
| | 3. Severe requiring hospitalization | 190 | 13.5 |
| | 4. Fatal disease | 81 | 5.7 |

### Practices

| Practices | Options: Points in parentheses |
| --- | --- |
| P1. In recent days, have you gone to any crowded places? | 1. Yes(-1) 184 12.9 |
| | 2. No(+1) 1245 87.1 |
| P2. In recent days, have you worn a face mask or gloves when leaving home? | 1. Yes(+1) 1282 89.8 |
| | 2. No(0) 145 10.2 |
| P3. Do you wash your hands with soap or liquid hand washing detergent for 20 seconds when you enter house? | 1. Yes(+1) 1421 99.4 |
| | 2. No(-1) 9 0.6 |
| P4. Do you disinfect indoor surfaces and handles? | 1. Yes(+1) 1367 95.3 |
| | 2. No(-1) 67 4.7 |
| P5. If yes, with what solution? | 1. chlorinated Bleaching liquids, 608 44.4 |
| | 2. Alcohol based surface disinfectant solution 620 45.3 |
| | 3. Ordinary alcohol 69 5.0 |
| | 4. Industrial alcohol 22 1.6 |
| | 5. handwashing or dishwashing liquids 51 3.7 |
| P6. If yes, how many times a day | 1. Once 602 44.3 |
| | 2. twice 358 26.3 |
| | 3. three times 151 11.1 |
| | 4. more than 3 times a day 248 18.2 |
| P7. Have you visited your family members during the New Year holidays? | 1. Yes(-1) 54 3.8 |
| | 2. No(+1) 1380 96.2 |
| P8. Have you traveled to other cities during the New Year holidays? | 1. Yes(-1) 28 1.9 |
| | 2. No(+1) 1408 98.1 |
| P9. Which of the following do you do to prevent contamination? | 1. Avoid sick people 1. Yes(+1) 964 67.1 |
| | 2. No(0) 472 32.9 |
| | 2. Covering sneeze and cough | 1. Yes(+1) 908 63.2 |
| | 2. No(-1) 528 36.8 |
| | 3. Not using public transportation | 1. Yes(+1) 1023 71.2 |
| | 2. No(0) 413 28.8 |
| | 4. Not going to work | 1. Yes(0) 542 37.7 |
| | 2. No(0) 894 62.3 |
| | 5. Not going to the hospital | 1. Yes(0) 830 57.8 |
| | 2. No(0) 606 42.2 |
| | 6. Not sending children to school | 1. Yes(0) 611 42.5 |
| | 2. No(0) 825 57.5 |
| | 7. Using traditional or herbal medication | 1. Yes(0) 312 21.7 |
| | 2. No(0) 1124 78.3 |
| P10. Regarding COVID-19, what’s bothering you most these days? | 1. Fear of my infection, 217 15.2 |
| | 2. Fear of relatives’ infection 575 40.2 |
| | 3. Frequent news about spread of the disease 264 18.5 |
| | 4. News of the death of other peoples or family 373 26.1 |
P11. If you have symptoms of Covid-19, where do you go first to diagnose it?

|     | members |
|-----|---------|
| 1.  | Screening website of the university or the Ministry of Health(+2) | 466 | 32.6 |
| 2.  | Family doctor or GP(+1) | 451 | 31.5 |
| 3.  | Emergency or specialized ward of hospital(+1) | 332 | 23.2 |
| 4.  | Private office of specialist (+1) | 181 | 12.7 |

P12. Would you agree to be quarantined at home for two weeks if your doctor or healthcare provider recommends it?

|     | members |
|-----|---------|
| 1.  | Yes (+1) | 1419 | 98.8 |
| 2.  | No (-2) | 17 | 1.2 |

P13. If you are employed, are you able to work remotely at home?

|     | members |
|-----|---------|
| 1.  | Yes | 333 | 70.9 |
| 2.  | No | 137 | 29.1 |

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- STROBEchecklistcrosssectional.doc
- Questionnaire.docx