

## Assessment of knowledge about home quarantine for COVID-19 in Bangladesh: A survey in Rajshahi district

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## **ABSTRACT**

**Background:** COVID-19 has rapidly become widespread, resulting in an epidemic throughout China, followed by a pandemic, and increasing number of cases in various countries throughout the world. The aim of this study was to see the knowledge on home quarantine for the prevention of corona virus among the people in Rajshahi district, Bangladesh.

**Methods:** It was a community based cross sectional study. A total of 436 people who were living in Rajshahi District, Bangladesh collected data during March 01, 2020 to April 08, 2020. Descriptive analysis, chi-square test and logistic regression model were utilized in this study.

**Results:** The prevalence of knowledge on home quarantine is only 32.6% among the people in Rajshahi district, Bangladesh. From the analyses, people of aged  $\geq 26$  years were (adjusted odds ratio (AOR) = 0.537, 95% CI: 0.330-0.874;  $p < 0.012$ ) times less likely to have knowledge on home quarantine compared to the counterpart. Minority people were (AOR=0.414, 95% CI: 0.205-0.838;  $p < 0.014$ ) times less likely to have knowledge on home quarantine compared to Muslim people. Service holders and others occupational people were (AOR=2.072, 95% CI: 1.373-3.127;  $p < 0.001$ ) and (AOR=1.951, 95% CI: 1.303-2.921,  $p < 0.001$ ) times more likely to have knowledge on home quarantine than that of business community population. Joint family members subjects were (AOR=5.980, 95% CI: 2.623-13.635;  $p < 0.001$ ) times more likely to have knowledge on home quarantine than that of their counterpart.

**Conclusions:** This study found huge gap in home quarantine knowledge among people and Muslim people have more knowledge on home quarantine in Rajshahi district, Bangladesh. This study observed some modifiable factors that were influencing home quarantine knowledge. This study also suggested that awareness raising program could play a significant role to boost the knowledge about home quarantine among the people in Rajshahi district, Bangladesh. If home quarantine is established, corona virus infection will lessen in Bangladesh.

**Key words:** Home quarantine, COVID-19 disease, Chi-square test, Logistic regression model, Rajshahi district, Bangladesh

## INTRODUCTION

Quarantine is the separation and restriction of movement or activities of persons who are not ill but who are believed to have been exposed to infection, for the purpose of preventing transmission of diseases. Persons are usually quarantined in their homes (WHO, 2020). With an increasing number of governments hardening nationwide quarantine, or considering various forms of lockdown in attempts to hinder the spread of the novel corona virus disease 2019 (COVID-19), (Lancet, T, 2020). A major problem emerges concerning the potential deleterious effects of physical inactivity due to personal restrictions. According to the regulations recently set by the Italian government, for example, it is mandated that all citizens must remain at home unless required to move for valid reasons, such as work, health or for other unavoidable issues such as assisting those who are sick or disabled, or purchasing groceries and medications. Many companies and organizations have mandated telecommunication. All sporting events and competitions have been suspended or cancelled. However, one important exception has been made to allow people practicing sports and outdoor physical activity, provided that an interpersonal distance of at least 1 m could be maintained. This seems a reasonable compromise between the unfavorable health consequences associated with physical inactivity and the compelling need to contain the COVID-19 outbreak by avoiding social gatherings and other forms of personal contact. The World Health Organization (WHO) has established clear guidelines on the minimal amount of physical activity necessary to maintain adequate health and fitness. For example, it is recommended that adults aged between 18 and 64 years, the age group most affected by COVID-19 according to recent statistics (i.e., accounting for over 70% of all severe cases) (Wu et al., 2020) should engage in weekly training of at least 150 min of moderate-intensity physical activity or 75 min of vigorous-intensity physical activity, or a corresponding combination of moderate- and vigorous-intensity activity (Lippi et al., 2020). Recent evidences also demonstrate the benefits of regular physical activity on survival (Tiberi & Piepoli, 2019; Cheng et al., 2018; Engeseth et al., 2018). Family of corona virus has significant human and animal pathogens. In the end of December 2019, a new corona virus was recognized as the reason of a group of pneumonia cases of unidentified etiology in Wuhan, Huanan Seafood Wholesale Market, the preliminary site to which cases of corona virus disease 2019 (COVID-19) were related, a city in the Hubei Province of China (Ozdemir, 2020). It has quickly become extensive, resulting in an epidemic throughout China, followed by a pandemic, and rising number of cases in various countries throughout the world (Read et al., 2020). Since the first reports of COVID-19, infection has stretched to contain more than 81,552 cases in China and growing cases (>14,00,000) worldwide, prompting the World Health Organization

(WHO) to announce a public health emergency in late January 2020 and describe it as a pandemic in March 2020 (WHO, 2020). A number of studies investigating the segregation experience for individual individuals by Toronto storks include understanding, understanding of stork segregation experience, consent and psychological effects, quarantine experience of intimate contact of COVID-19 patients in China, lessons learned from home quarantine in Shenzhen, China. In the Anser-Stork quarantine experience, the incidence of the novel coronavirus (2019-nCoV) infection (Cava et al., 2005; Reynolds et al., 2008; Chen et al., 2020; Lin et al., 2010; Wang et al., 2020). Currently, as epidemics have developed in different nations, escalating numbers of cases have also been described in other countries from all continents excluding Antarctica. The velocity of new cases outside of China, including USA, Italy and Spain, has overcome the rate in China. In February 2020, the WHO named the disease as COVID-19. The virus that causes COVID-19 is identified as severe acute respiratory syndrome corona virus 2 (SARS-CoV-2); it was formerly described as 2019nCoV (the novel corona virus) (Ozdemir, 2020). As per different international organizations like WHO, UNICEF, or ICDDRB's prescription for corona virus infection control, home quarantine is the best way for the avoidance of corona virus. The purpose of this study was to investigate the knowledge on home quarantine for prevention of COVID-19 among the people in Rajshahi district, Bangladesh.

## Methods

**Design and study population:** It was a cross-sectional study conducted in Rajshahi district, Bangladesh. The total population of this district is 1,3,09,890 male, and 1,2,85,307 female accordingly (BSS, 2013).

**Sample size determination:** A statistical formula was used for identifying sample size:  $n = \frac{N}{1 + Nd^2}$ , where  $n$  = required sample size,  $N$  = population size (25, 95, 197),  $d$  = marginal error (0.05) (Rana et al., 2015)). The formula provided that the minimum sample size was estimated to be 400 for this study. But, since we had adequate time to collect the data and also in order to provide a more exact assessment of the population value, finally this study collected data of sample size 436.

**Data collection procedure:** A multi stage random sampling method was utilized to select the sample population from Rajshahi district in Bangladesh. In the first step, selection was made of 09 upazilas and 01 city. In second stage, this study selected 03 upazila and 01 city selected randomly. In the third step, 400 people were selected samples. For considering pandemic period this study, additional 36 sample selected the more correct results.

**Data collection:** The following type of information was collected for the study: (i) socio-demographic characteristics and (ii) knowledge on home quarantine for corona virus infection control. All data were collected from March 01, 2020 to April 08, 2020 using a semi-structured questionnaire. The questionnaires were drafted in Bengali, the mother language of Bangladesh. Eight fully trained and experienced field researchers were conducted the interview.

**Outcome variable**

The dependent variable in the present study is knowledge about home quarantine, which was assessed through the question, namely: Did you know about home quarantine? Quarantine, which means that those who may be exposed to the virus are restricted or separated from the rest of the population for the purpose of their symptoms monitor and ensure early detection of cases is called known and otherwise called unknown.

**Measured home quarantine:** Allocate a separate room with adequate ventilation at home if possible. Household members should stay in another room or should be separated from the returnee. Maintain at least one meter distance from family members. Other household members should use a separate bathroom. If sharing the same bathroom, cleaning of taps, doorknobs and utensils with soap and water are a requirement. Minimize visitors to the house, the returnee should not interact with any visitors. Frequent hand washing with soap and water for at least 20 seconds at a time and maintain alcohol based hand hygiene in instances where hand washing facilities are inadequate. Avoid touching eyes, nose and mouth with unwashed hand. The home quarantined person is expected to monitor body temperature using a thermometer twice a day. If he/she develops fever, cough, difficulty in breathing, sore throat, body aches and pain, including flu like symptoms, immediately inform MOH / PHI of the area. After use, disposable facemasks and gloves should be properly discarded without reuse, preferably in a closed container. Assign separate dishes, drinking glasses, cups, eating utensils, towels, bedding, and other items for the quarantined person considered as =1 and wrong question=0 (Meng et al., 2020).

**Independent variables:** We included theoretically pertinent socioeconomic and demographic factors as independent variables. In this study, subject's age was classified into two groups such as  $\leq 25$  years and  $\geq 26$  years. We classified gender into two groups: male and female. Religion was categorized as Muslim and Non-Muslim. Marital status was categorized as married and unmarried. Occupational group were categorized into three groups such as business, service and others. Education was classified based on the formal education system in Bangladesh: primary education, secondary and higher education. Place of residence was categorized as rural

or urban. Subject's family type was divided into two categories such as single and joint. Respondents monthly income was categorized as  $<15000$  BDT or  $\geq 15001$  BDT.

### Statistical analyses

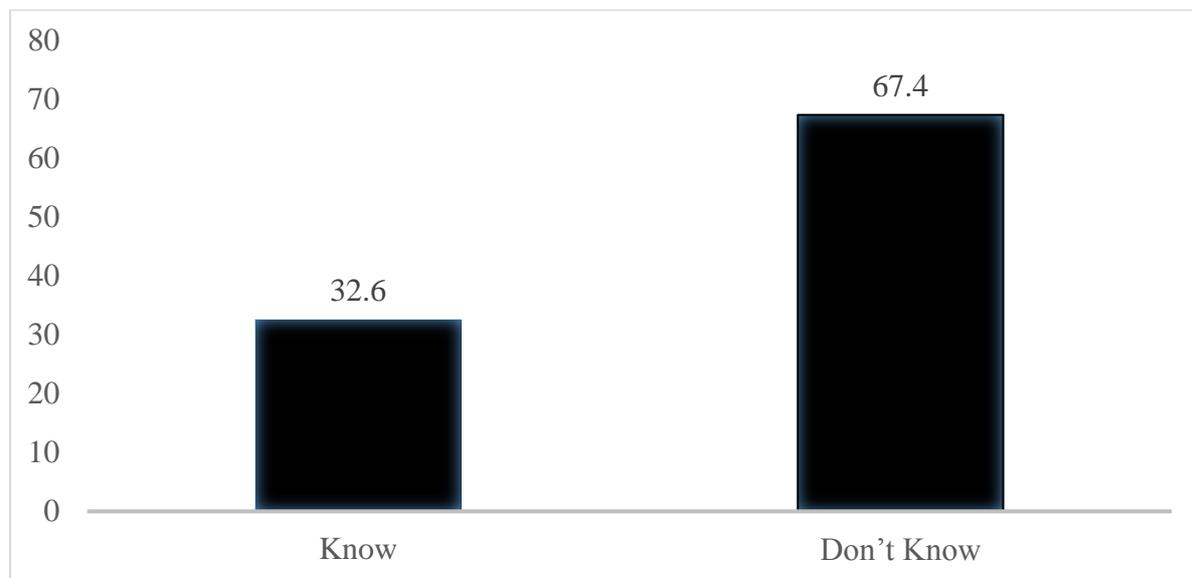
Descriptive analysis and Chi-square test were used to find the association between two factors. Binary logistic regression model was used to find out the effect of the explanatory variables on dependent variable, i. e., in this case, knowledge on home quarantine regarding COVID-19.

### Ethical Approval

The ethical approval was received from Institute of Biological Science (IBSc) memo no: 64/320IAMEBBC/IBSC, University of Rajshahi, Bangladesh. We also received written consent from the subjects.

### RESULTS

The frequency distribution revealed that the home quarantine knowledge among the people in Rajshahi district, Bangladesh was 142 (32.6%), and 294 (67.4 %) respectively.



**Figure.1:** Knowledge about home quarantine

Table 1 shows the socio-economic and demographic factors on knowledge about home quarantine related characteristics of the respondents. A total of 436 individuals were included in this study. From the total sample population, it was found that the prevalence of knowledge on home quarantine is only 32.6% among the people of Rajshahi district in Bangladesh. Moreover, the subjects of aged  $\leq 25$  years (28.9%) and  $\geq 26$  years (40.6%) had knowledge on home quarantine and  $\chi^2$ -test demonstrated that the association between subjects age in years and knowledge about home quarantine was statically significant ( $p < 0.05$ ). In case of religion, 89.71% were Muslim of which only 29.2% were knowledgeable but their counter parts

minorities subjects had more knowledge (55.6%) and  $\chi^2$ -test demonstrated that the association between type of religion and knowledge about home quarantine was statistically significant ( $p < 0.01$ ). Near about 41% subjects were others occupations. Others occupations subjects (40%) were more knowledgeable than their counterparts and  $\chi^2$ -test demonstrated that the association between type of occupation and knowledge about home quarantine was statistically significant ( $p < 0.01$ ). More than 87% subjects were single family member of them 35.2% members were knowledgeable than their counterparts and  $\chi^2$ -test demonstrated that the association between type of family and knowledge about home quarantine was statistically significant ( $p < 0.05$ ) in Rajshahi district, Bangladesh.

**Table 1.** Association between home quarantine knowledge of COVID-19 and socio economic and demographic factors

| Socio-economic and demographic characteristics | Did you know about home quarantine of covid-19? |            |           | P-value |
|--|---|------------|-----------|---------|
|  | N (%)   | Don't Know | Know      |         |
| <b>Age in years</b>                            |   |            |           | 0.015   |
| ≤25  | 298(68.3)                                       | 212(71.1)  | 86(28.9)  |         |
| ≥26  | 138(31.7)                                       | 82(59.4)   | 56(40.6)  |         |
| <b>Gender</b>                                  |   |            |           | 0.650   |
| Male   | 295(67.7)                                       | 201(68.1)  | 94(31.9)  |         |
| Female   | 141(32.3)                                       | 93(66.0)   | 48(34.0)  |         |
| <b>Religion</b>                                |   |            |           | 0.001   |
| Muslim   | 391(89.7)                                       | 274(70.1)  | 117(29.9) |         |
| Non-Muslim                                     | 45(10.3)  | 20(44.4)   | 25(55.6)  |         |
| <b>Marital status</b>                          |   |            |           | 0.545   |
| Ever married                                   | 151(34.6)                                       | 99(65.6)   | 52(34.4)  |         |
| Unmarried                                      | 285(65.4)                                       | 195(68.4)  | 90(31.6)  |         |
| <b>Occupation</b>                              |   |            |           | 0.001   |
| Business                                       | 103(23.6)                                       | 88(85.4)   | 15(14.6)  |         |
| Service  | 156(35.8)                                       | 99 (63.5)  | 57 (36.5) |         |
| Others   | 177(40.6)                                       | 107(60.5)  | 70(39.5)  |         |
| <b>Education</b>                               |   |            |           | 0.561   |
| Primary  | 212(48.6)                                       | 144(67.9)  | 68(32.1)  |         |
| Secondary                                      | 105(24.1)                                       | 74(70.5)   | 31(29.5)  |         |

|                                     |           |           |           |       |
|-------------------------------------|-----------|-----------|-----------|-------|
| Higher                              | 119(27.3) | 76(63.9)  | 43(36.1)  |       |
| <b>Residence</b>                    |           |           |           | 0.624 |
| Urban                               | 294(67.4) | 196(66.7) | 98(33.3)  |       |
| Rural                               | 142(32.6) | 98(69.0)  | 44(31.0)  |       |
| <b>Type of family</b>               |           |           |           | 0.002 |
| Single                              | 381(87.4) | 247(64.8) | 134(35.2) |       |
| Joint                               | 55(12.6)  | 47(85.5)  | 08(14.5)  |       |
| <b>Monthly family income in BDT</b> |           |           |           | 0.834 |
| ≤15,000                             | 221(50.7) | 148(67.0) | 73(33.0)  |       |
| ≥15,001                             | 215(49.3) | 146(67.9) | 69(32.1)  |       |

In the binary logistic regression analysis, we considered only the factors which were statistically significant in chi-square test. Table 2 represents the binary logistic regression analysis of the factors associated with the knowledge on home quarantine for corona virus infection control. From the analyses, people of aged  $\geq 26$  years were (adjusted odds ratio (AOR) = 0.537, 95% CI: 0.330-0.874;  $p < 0.012$ ) times less likely to have knowledge on home quarantine compared to the people of aged  $\leq 25$  years which was statically significant ( $p < 0.05$ ). Non-Muslim people were (AOR=0.414, 95% CI: 0.205-0.838;  $p < 0.014$ ) times less likely to have knowledge on home quarantine compared to Muslim people. It was statically significant ( $p < 0.05$ ). Service holders and others occupational people were (AOR=2.072, 95% CI: 1.373-3.127;  $p < 0.001$ ) and (AOR=1.951, 95% CI: 1.303-2.921,  $p < 0.001$ ) times more likely to have knowledge on home quarantine than that of business occupation people as well as it was statically significant ( $p < 0.01$ ). Joint family members subjects were (AOR=5.980, 95% CI: 2.623-13.635;  $p < 0.001$ ) times more likely to have knowledge on home quarantine than that of the single family members subjects and it is found that it was statically significant ( $p < 0.01$ ).

**Table 2:** Effects on home quarantine knowledge about COVID-19 and socio economic and demographic factors

| Socio-economic and demographic variables | B      | S.E.  | p-value | Adjusted odds ratio (AOR) | 95% C.I. for AOR |       |
|--|--------|-------|---------|---------------------------|------------------|-------|
|  |        |       |         |                           | Lower            | Upper |
| <b>Age in years</b>                      |        |       |         |                           |                  |       |
| ≤25 <sup>R</sup> vs ≥26                  | -0.622 | 0.249 | 0.012   | 0.537                     | 0.330            | 0.874 |

| <b>Religion</b>                   |        |       |       |       |       |        |  |
|-----------------------------------|--------|-------|-------|-------|-------|--------|--|
| Muslim <sup>R</sup> vs Non-Muslim | -0.881 | 0.359 | 0.014 | 0.414 | 0.205 | 0.838  |  |
| <b>Occupation</b>                 |        |       |       |       |       |        |  |
| Business <sup>R</sup> VS Service  | 0.728  | 0.210 | 0.001 | 2.072 | 1.373 | 3.127  |  |
| Business <sup>R</sup> VS Others   | 0.668  | 0.206 | 0.001 | 1.951 | 1.303 | 2.921  |  |
| <b>Type of family</b>             |        |       |       |       |       |        |  |
| Single <sup>R</sup> vs Joint      | 1.788  | 0.421 | 0.001 | 5.980 | 2.623 | 13.635 |  |

## DISCUSSION

This survey showed the initial stage of the COVID-19 pandemic in Bangladesh. It was noted that, by this time, the pandemic has already been a hot cake for all kinds of broadcasting as well as the general people in the country. The United Nation, World Health Organization, Government of Bangladesh and many non-government organizations started huge campaigns on home quarantine of COVID-19. Electronic, print and social media were giving all up-to-date information regarding the pandemic in home and abroad. Rajshahi is the divisional head quarter, city and district, famous as educational, silk and clean city in Bangladesh. So this study assumed that the population would be knowledgeable but our study found very poor knowledge on home quarantine due to COVID-19. The home quarantine knowledge among people who were living at different upazilas (sub-district) and city in Rajshahi district, Bangladesh has been discussed here. This study assumed that, as the area was situated at very near of divisional and educational city and that most of the people were living in this area, maximum respondents were knowledgeable on home quarantine regarding COVID-19, but this study also demonstrated the lacking of knowledge on home quarantine. Most of the people have knowledge on home quarantine for prevention of corona virus infection. In this study, for the observation about home quarantine for prevention of corona virus infection, it was found that electronic, print media, internet access played an important role for making people aware. Similar study was found in other field as well where it was shown that electronic media were influencing important role to make community people conscious (Rana et al., 2015). In this study, it was assumed that the most of the younger people were aware about home quarantine for prevention of corona virus through social media such as Facebook, messenger, WhatsApp's, viber etc. This study's additional observation was that Muslim community people were knowledgeable about home quarantine than that of the minority population. In this regards religious prayer center like mosque could played a vital role to make the conscious among the

Muslim community people. But it was found that business occupation people were less knowledgeable about home quarantine because of their more involvement in business. Almost all joint family members were more knowledgeable about home quarantine. Each family member was influencing their family members to be mindful about home quarantine and its advantages for safety their lives. In the observation of this study, it was evident that other occupations watched Bangladesh television (BTV). BTV is the Bangladesh government media so they frequently broad cast news about home quarantine messages and its advantage to people.

The main strength of this study is that it is analyzed the knowledge of home quarantine among the people of Rajshahi district in Bangladesh. The data contained information on potential confounding factors with a low proportion of missing information. The study can be comprehensive to other area in Bangladesh, because people's characteristics are almost similar all over the country.

Limitations of this study are that, firstly the cross-sectional study did not allow to establish any definitive associations for identifying relation between knowledge of home quarantine and various socio-economic and demographic factors. Further longitudinal research is needed to fully understand this complex relationship and comprehend the underlying mechanisms. Secondly, this study used only quantitative survey to people knowledge about home quarantine. For development of culture-sensitive communication strategies, qualitative studies are necessary. However, these approaches could not be done due to time and resource constraints. Research should consider this point in our future studies.

**Conclusions:** This study found huge gap in home quarantine knowledge and minority people have very poor knowledge on home quarantine in Rajshahi district, Bangladesh. Muslim community people have more knowledge about home quarantine. Furthermore, this study observed some amendable factors that were influencing home quarantine knowledge. This study indicated that awareness raising program could play an important role to increase knowledge about home quarantine among people. If home quarantine is established, corona virus infection will decrease in Bangladesh. This study strongly recommended social safety net work program and others measures like advocacy, communication and social mobilization program could play an imperative part to implement home quarantine properly. Government of Bangladesh and donor agency should take proper initiative regarding this issue.

**Contributors:** MRI and MRI designed the study. MMR collected data and conducted the data analysis, and wrote the manuscript. CR, MMA, MAW, MRC and PB made critical revisions of the manuscript. All authors read and approved the final version of the manuscript.

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### **Declaration of Interest**

The authors declare that they have no competing interest

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