



# Stay Home Stay Safe: General Public Knowledge, Attitude and Behavior Regarding Covid-19 During the Lockdown in Developing Countries

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**Abstract:** To date, there has been little work dedicated to investigating the general public knowledge, attitude, and behavior regarding novel coronavirus disease (COVID-19) in developing countries. This study aims to investigate the general public knowledge, attitude, and behavior regarding COVID-19. One thousand three hundred and eighty participants completed the study, one-third of them were female, and two-thirds were male. A cross-sectional online survey was conducted to collect responses from three developing countries (China, India, and Pakistan). The IBM SPSS version 23.0 was used for descriptive and regression analysis of the study. The study's findings include the intermediate knowledge and attitude of the general public compared to practices regarding COVID-19. Marital status is significantly linked with knowledge, whereas country and marital status are significantly linked with attitude, gender, and country significantly linked with behavior. Moreover, the correlation between knowledge, attitude, and general public behavior were significant (correlation coefficient = 0.322,  $p < 0.05$ ). The study's findings proposed that the general public should follow the instructions of government and health agencies to stay home stay safe. And future studies should focus on motivating factors for governments to impose lockdown.

**Keywords:** Knowledge, attitude, behavior, developing countries, general public, lockdown

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## INTRODUCTION

The COVID-19, has emerged from Wuhan city China and has currently afflicted almost the entire world (Lamba, 2020). The historical outbreaks of COVID-19 include Severe Acute Respiratory Syndrome-Coronavirus (SARS-Cov) and Middle East Respiratory Syndrome-Coronavirus (MERS-CoV) in 2003 and 2015, exhibited similarities to COVID-19 which was first reported at the end of December 2019 (Huynh, Nguyen, Vo, Pham, et al., 2020). At present, 12th May 2019 COVID-19 confirmed cases reached to 4,013,728 and deaths over 278,993. Europe and the Americas have reported most infected regions of the world with over 1,731,606 and 1,702,451 confirmed cases, respectively (WHO,

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2020b). The developed countries, especially the United States of America (1,271,645), Spain (224,390), Russian Federation (221,344), and United Kingdom (219,187) have had more confirmed cases as compare to developing countries China (84,450), India (67,152), and Pakistan (30,941). On 14th April 2020, world health organization published COVID-19 strategy report focused on what we have learnt from a pandemic. One of the important lessons and recommended strategies to faster the tracking of suspected cases of COVID-19 is isolation, and lockdown referred to restriction on the movement that has been used to suppress the spread of COVID-19 (WHO, 2020a).

COVID-19 is transmitted through inhalation of aerosols from an infected person (Bai et al., 2020). Mainly patients with pre-existing illnesses (such as hypertension, diabetes, lung disease, cancer, and cardiac disease), kids, and old age have been identified as potential risk determinants for severe disease and mortality (Tian et al., 2020). To date, there is no antiviral vaccine or treatment that has been proposed for COVID-19 (Sahin, 2020). Further information related to its transmission, distribution, prevention, treatment, and pathophysiology is being studied. The world health organization proposed prevention of person-to-person transmission by preventing close contacts and healthcare workers from being infected. The primary protection measures include social distancing, regular handwashing, using sanitizer, and respiratory hygiene (covering nose and mouth while sneezing or coughing) (Olum, Chekwech, Wekha, Nassozi, & Bongomin, 2020).

Globally, most of the government favors and imposed drastic lockdown at an early stage of COVID-19 because it is considered one of the best and recommended approaches to control the current pandemic; it could be more effective if executed with integrity (Hamzelou, 2020; Lamba, 2020). The governments of Pakistan and India initially announced two weeks and three weeks lockdown, respectively, which becomes decided to extend due to increasing cases. The extension of lockdown creates further challenges to an already distressed population (largely daily-wages workforce) and to ensure strict compliance with social distancing guidelines (Acharya et al., 2020; Mohamad, Azlan, Hamzah, Tham, & Ayub, 2020), concluded that the effectiveness of lockdown measures is largely based on the compliance and cooperation of all members of the society. Therefore, the knowledge, attitude, and practices people possess regarding COVID-19 play a key role in determining a society's readiness to accept behavioral change measure from the health authorities. Moreover, measuring the knowledge, attitudes and practices among public would be helpful to provide better understanding address poor knowledge about the COVID-19 and the establishment of health promotion advertising, preventive strategies. Besides, poor understanding of COVID-19 in general public can results in delayed identification and can be a key factor to rapid spread of disease.

The lessons learned from the previous outbreak are that knowledge and attitudes are linked with the level of emotions and panic, which may further complicate the parameters to contain the spread of COVID-19. This study survey provides a general picture of developing countries COVID-19 prevention practices, which may help governments to address future health crises comprising infectious diseases.

## RESEARCH METHODOLOGY

### *Study Design, Population, and Data Collection*

An online cross-sectional survey was employed from 9th April 2020 to 9th May 2020 among the general public of three developing countries. This study used an online survey due to the state of national lockdown during this period; therefore, it was not feasible to do a community-based survey (Abdelhafiz et al., 2020; Shi et al., 2020). An online survey created using Google form and link were shared using social media applications (i.e., WeChat, WhatsApp, Facebook, and emails) to reach a large number of valid participants in the general public (Olum et al., 2020). A total of 1,380 responses were collected. Keeping in view, the ethical concern respondents were assured that their participation would remain voluntary, confidential, and anonymous.

### *Survey Questionnaire*

The closed-ended questionnaire comprised four sections: the first section includes demographic, and second, third and fourth sections consisted of knowledge, attitudes, and behavior, respectively. Demographics include gender, age, education, employment, and marital status, and their habits during the lockdown.

The second section includes the six items to assess the knowledge of the general public related to COVID-19. Dichotomized "yes", "no" and "uncertain" options were used to assess six items. A cut-off value of  $\geq 6$  was taken as good knowledge, while between 3 and 5 were considered intermediate or moderate, and 2 was considered poor. The third section assessed the attitudes of the general public about COVID-19. Three items Likert scale "agree",

“disagree” and “uncertain” were used for the purpose of evaluating attitude using ten items. A cut-off value of 9 was taken as good attitude, while between 6 and 8 was considered intermediate and  $\leq 5$  was considered poor. The fourth section includes six items that evaluate practices and behaviors of the general public towards COVID-19 employing dichotomized “yes” and “no” options. Every appropriate answer added one mark to a participant’s total score, and zero given for inappropriate. A cut-off value of  $\geq 6$  was taken as good behavior, while between 2 and 5 were considered moderate, and  $\leq 1$  was considered poor behavior score. Knowledge, attitudes, and behavior were evaluated using 22 items [knowledge (six items), attitudes (ten items), and behavior (six items)] 18 items adopted from (Alhomoud & Alhomoud, 2017) and modified to suit the general public (Olum et al., 2020). 2020) and four items added by authors to assess the attitude of the general public towards government lockdown decision and role of media. The mean total score and mean score (mean score  $\pm$  standard deviation) for knowledge, attitudes, and behavior were compared based on respondent characteristics

### **Statistical Analysis**

IBM SPSS version 23.0 was employed for statistical analysis. Before analysis of the results, the Kolmogorov-Smirnov test used for the normality of data. In addition, we employed Harman’s single factor. Harman’s singly factor test showed a single factor explained only 12.184% of the total variance, i.e., which is far below 50.0%. And we used the KaiserMeyerOlkin (KMO) test to measure sampling adequacy and to ensure data suitability. The KMO value was 0.570 (over the acceptable 0.5 thresholds 0.50), hence, suitable for explanatory factor analysis (Çetinkaya & Karabulut, 2016; Chan, Chan, Chan, Lam, & Yeung, 2011).

Bartlett’s test results revealed the level of significance to be 0.000 (considered good as it is below 0.05). More profoundly, specific methods including descriptive statistics, *t*-test (for normal distribution of data), Kruskal-Wallis and Mann-Whitney test (for not-normally distributed data) and chi-square (for non-parametric data) data were employed to identify possible contributory factors linked with poor knowledge, attitudes, and behaviors related to COVID-19. For all of the tests conducted, *p*-value 0.05 was considered substantial. The descriptive statistics were shown in frequency and percentage. Moreover, the results presented in both tabular and graphic forms. After the drop-out of incomplete responses, data were analyzed. The linear regression analysis was utilized to determine the effects of knowledge and attitude related to COVID-19 can predict their behavior. The *t*-value  $> 1.96$ , and *p*-value  $< 0.05$ , the two-tail probability was considered to be statistically significant.

## **RESULTS**

### **Demographic Characteristics**

Thirteen hundred and eighty persons from 3 developing countries completed the survey. Table 1 demonstrates the full overview of the demographic characteristics of the participated individuals. Nearly two thirds ( $n = 866$ , 60.8%) were males and one third ( $n = 514$ , 37.2%) were females. A vast majority of participants were from China ( $n = 576$ , 41.7%). Around two-thirds of participants ( $n = 942$ , 68.3%) aged 30 years, whereas fewer than one third ( $n = 438$ , 31.7%) over 30 years. Of the 1380 respondents, 1181 (85.5%) had at least a bachelor’s degree, and (14.4%) had high school certificates. The majority of respondents were employed [584 (42.3%)], followed by students [556 (40.3%)]. Moreover, two-thirds of participants (55.7%) were single (34.3%) were married, and one hundred and thirty-six were divorced. Fig 1 shows the habits of participants during a lockdown, nearly one-third of participants use the cell phones to surf the internet or to chat with friends.

Table 1 Descriptive Statistics of the General Public

Characteristics	Frequency	%	Mean	SD
Gender			1.372	0.483
Male	866	62.8		
Female	514	37.2		
Country			1.843	0.808
China	576	41.7		
India	444	32.2		
Pakistan	360	26.1		
Age			1.317	0.465
30	942	68.3		
> 30	438	31.7		
Education			2.611	0.872
High school	199	14.4		
Bachelors	300	21.7		
Master	719	52.1		
Ph.D.	162	11.7		
Employment Status			1.853	0.896
Student	556	40.3		
Employed	584	42.3		
Unemployed	126	9.1		
Retired	114	8.3		
Marital Status			1.540	0.667
Single	770	65.7		
Married	474	34.3		
Divorced	136	9.9		

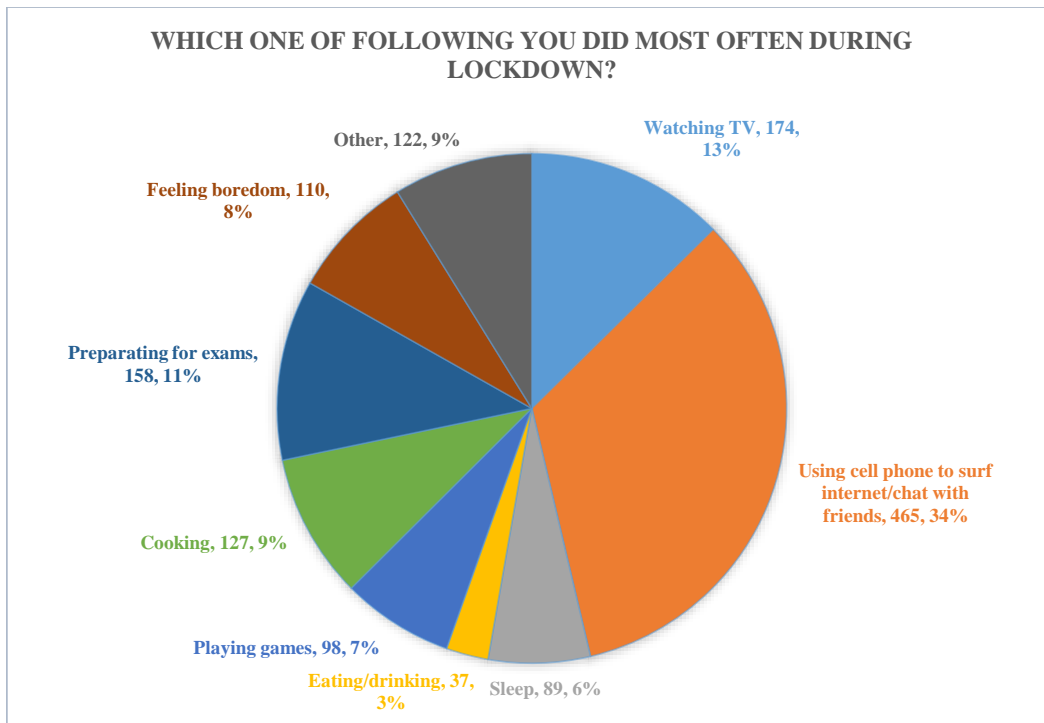


Figure 1 Participant's Responses Against Habits During the Lockdown

### **Knowledge**

A total of 6 questions were used to assess the knowledge of 1380 participants regarding the COVID-19. Table 2 demonstrates the responses to the knowledge question. Most of the participants (84.6%) know that runny nose, cough, and fever are symptoms of COVID-19, and (81.5%) responded that the minimum time period between exposure to COVID-19 infection and the appearance of the first symptom is 14 days. Nearly (24.0%) one-quarter of them did not know that COVID-19 is largely spread through close contact with infected persons. Over 60% (836/1380) incorrectly believed that hot water and steam is the first treatment for COVID-19, and more than two-third (30.4%) held misconception that hot water and stem is helpful for COVID-19 infected patient. Nearly 426/1380 (31.0%) did not know or uncertain that isolation of COVID-19 patients is critical to ensure effective implementation of control measures. In the knowledge section of the questionnaire, a mean score of 4 was obtained from a maximum of 6. This reflects that participants had intermediate knowledge related to COVID-19. The assessment of differences in the mean score based on demographic characteristics of participants demonstrated significant differences in terms of marital status, as shown in Table 3. Participants who were male, Pakistani, over 30 years, had a master level of education, unemployed and single had importantly better knowledge regarding COVID-19 than females and aged less than 30 years (Table 3).

### **Attitude**

The attitude assessment of the participants regarding the preventive measure to control the spread of COVID-19 and their responses are reflected in Table 2. Generally speaking, most of the participants correctly answer the questions. Nearly half ( $n = 698$ , 50.6%) of participants incorrectly believe that there is no risk of catching COVID-19 during the lockdown. Almost fifty-four percent ( $n = 744$ ) had a misconception that hot water and stem can treat COVID-19. The number of participants who declared that media is not playing a role to spread accurate information regarding COVID-19 was 673 (48.7%). And fewer than one third (31.8%) disagree and uncertain that avoiding contact with an infected person can prevent the spread of COVID-19. Table 3 illustrated that the mean score was 7 from a maximum of 10. This stated that participants had a good attitude towards the COVID-19. This exhibits intermediate beliefs related to COVID-19. The outcomes of the differences in a mean score based on participant's characteristics reflected that there were significant differences in terms of the country ( $p = 0.017$ ), and marital status ( $p = 0.016$ ). Participants who were male from India, over 30 years, had a high level of education (i.e., above basic schooling and bachelors), student and employed, and single had a more positive attitude regarding COVID-19 (Table 3).

### **Behavior**

Table 2 shows the responses to practices/behavior questions, six questions used to assess the behavior of participants regarding COVID-19. Nine hundred seventy-six (90.7%) participants reported they avoid contact with someone having symptoms of runny nose, cough, and fever. Ninety-two percent ( $n = 1281$ ) confirmed that they wear a mask while going outside, and (97.4%) reported that they avoid contact with other having symptoms of runny nose, cough, or fever. More than one third (36.4%) declared that they did not consult a doctor while having symptoms of runny nose, cough, or fever, and almost 34.9% (481/1380) of participants did not avoid direct contact with mouth, nose, and eyes. Of the 1380 respondents, 375 (27.2%) recorded they did not wear a prescribed surgical mask, and 26.5% ( $n = 366$ ) reported that they did not wash hands 5 times a day. The mean score of over 4 was obtained from a potential maximum of 6. Evaluating the differences mean score based on respondents' characteristics illustrated that there was only a significance difference in terms of gender and country ( $p < 0.05$ ). Moreover, participants who were male and from Pakistan, over 30 years, had a master's degree, and retired were more compliant with practices needed to prevent the spread of COVID-19 (Table 3).

### **Relationship between Public Knowledge, Attitudes, and Behaviors Related to COVID-19**

The participants of three different developing countries knowledge and attitude about COVID-19 correlate at a significant level ( $p \geq 0.05$ ) with their behaviors multiple correlation coefficient  $R = 0.322$ , ANOVA,  $F$ -value = 79.743,  $p$ -value = 0.001). By developing a linear regression model for the prediction of general public behavior, both knowledge ( $\beta = 0.072$ ,  $p = 0.007$ ) and attitude ( $\beta = 0.206$ ,  $p = 0.001$ ) was found to be a significant estimator. For each unit increase in knowledge score, the behavior of participants increase by 0.072 units, and for each unit increase in attitude scores, the behavior score increase by 0.206 units. This proposed that level of knowledge and attitude was translated into higher compliance with a preventive recommendation and to stop the spread of the COVID-19.

Table 2 Knowledge, Attitudes, and Behaviors of General Public COVID-19

Knowledge	Yes	No	Uncertain	Mean	SD
Do you know a minimum period of COVID-19 is 14 days?	1125(81.5)	213 (15.4)	42 (3.0)	1.215	0.476
Do you know COVID-19 mainly spread through close contact with an infected person?	1049(76.0)	275 (19.9)	56 (4.1)	1.280	0.532
Do you know runny nose, cough, and fever are symptoms of COVID-19?	1159(84.6)	174 (12.6)	47 (3.4)	1.194	0.474
Do you know hot water and stem is helpful for COVID-19 patient?	959(69.5)	245 (17.8)	176 (12.8)	1.432	0.707
Do you know hot water and stem are the first-line treatment for COVID-19?	836(60.6)	231 (16.7)	313 (22.7)	1.621	0.830
Do you know the isolation of COVID-19 patients is critical to ensure effective implementation of infection control measures?	954(69.1)	165 (12.0)	261 (18.9)	1.567	0.792
Attitudes	Agree	Disagree	Uncertain		
Do you agree with the government lockdown decision?	1107(80.2)	160 (11.6)	113 (8.2)	1.279	0.604
Do you agree with the support measures taken by the government?	784(81.0)	189 (13.7)	73 (5.3)	1.621	0.784
Do you agree that lockdown save lives?	972(70.4)	14 (1.0)	394 (28.6)	1.581	0.902
Do you agree that media is playing an important role in spreading accurate information related to COVID-19?	707(51.2)	395 (28.6)	278 (20.1)	1.689	0.785
Do you agree that there is no risk of catching coronavirus infection during a lockdown?	698(50.6)	289 (20.9)	393 (28.5)	1.779	0.861
Do you agree that hot water and stem can treat COVID-19?	744(53.9)	246 (17.8)	390 (28.3)	1.743	0.869
Do you agree that washing hands with soap and sanitizer can prevent transmission of COVID-19?	1304(94.5)	20 (1.4)	56 (4.1)	1.095	0.409
Do you agree that avoiding contact with ill people having symptoms of runny nose, cough, and fever can prevent the spread of COVID-19?	941(68.2)	116 (8.4)	323 (23.4)	1.552	0.846
Do you agree that the general public must aware of the necessary information about COVID-19?	1324(95.9)		56 (4.1)	1.081	0.394
Do you agree that reporting symptoms of runny nose, cough, and fever to local health authorities is essential to prevent further transmission of the COVID-19?	1181(85.6)	102 (7.4)	97 (7.0)	1.214	0.556
Behaviors	Yes	No			
Do you cover your mouth when coughing/sneezing?	958 (69.4)	422 (30.6)		1.305	0.460
Do you wash hands 5 times a day and before eating/making foods?	1014 (73.5)	366 (26.5)		1.265	0.441
Do you wear a prescribed surgical mask while going outside?	1005 (72.8)	375 (27.2)		1.271	0.450
Do you avoid contact with others while having symptoms of runny nose, cough, or fever?	976 (90.7)	404 (29.3)		1.292	0.465
Do you avoid direct contact with the mouth, nose, and eyes?	899 (65.1)	481 (34.9)		1.348	0.476
Do you consult Dr. While having symptoms of runny nose, cough, or fever?	878 (63.6)	502 (36.4)		1.363	0.481



Table 3 Mean Knowledge, Attitudes and Behavior Score of the General Public Towards COVID-19 Based on Participants Characteristics

Characteristics		Knowledge	<i>p</i>	Attitude Score	<i>p</i>	Behavior Score	<i>p</i>
Gender	Male	4.44±1.33	0.178	7.34±1.94	0.153	4.20±1.36	0.048
	Female	4.34±1.34		7.18±1.83		4.05±1.34	
Country	China	4.34±1.30	0.096	7.11±1.80	0.017	3.42±1.32	0.001
	India	4.40±1.38		7.41±1.96		4.22±1.37	
	Pakistan	4.52±1.34		7.40±2.02		4.32±1.35	
Age	30	4.40±1.34	0.875	7.27±1.92	0.804	4.14±1.34	0.560
	> 30	4.41±1.32		7.30±1.91		4.18±1.37	
Education	High school	4.42±1.25	0.345	7.28±1.87	0.959	4.28±1.34	0.549
	Bachelors	4.28±1.43		7.23±1.99		4.13±1.35	
	Master	4.45±1.32		7.30±1.90		4.12±1.37	
	Ph.D.	4.40±1.31		7.27±1.91		4.13±1.31	
Employment Status	Student	4.37±1.34	0.885	7.30±1.88	0.982	4.12±1.34	0.794
	Employed	4.42±1.29		7.28±1.92		4.16±1.38	
	Unemployed	4.45±1.46		7.25±2.01		4.13±1.35	
	Retired	4.42±1.40		7.22±2.01		4.25±1.26	
Marital Status	Single	4.46±1.34	0.001	7.36±1.88	0.016	4.18±1.37	0.135
	Married	4.45±1.30		7.27±2.00		4.16±1.36	
	Divorced	3.91±1.34		6.85±1.79		4.15±1.20	

## DISCUSSION

This descriptive, quantitative research is believed to be one of the limited studies focused on emerging countries (China, India, and Pakistan). To date, there has been little research that documents general public knowledge, attitudes, and behavior regarding COVID-19, more specifically in developing country's perspective. In the present study, we are able to illustrate that about 4 in 6 of participants had good knowledge regarding COVID-19. Among these participants, males having better knowledge than females.

The results study showed the overall intermediate level of knowledge and attitude of the general public regarding COVID-19 in developing countries. The results of the study consistent with the study of [Abdelhafiz et al. \(2020\)](#) in which participants with a lower level of education had less knowledge regarding COVID-19. Also consistent with [\(Alhomoud & Alhomoud, 2017\)](#) in which pilgrims had moderate knowledge related to MERS-CoV. These study findings significant since they may denote that more efforts should be inputted to deliver a message to less educated people, which may have financial difficulties getting access to accurate information.

When we asked participants about their attitude regarding governmental decisions towards lockdown, support measures, the role of media, and COVID-19, most participants 80.2% (1107/1307) supported the lock decision, and eighty-one percent ( $n = 784$ ) satisfied with the support measures taken by the government to prevent the spread of disease. Whereas, half of the participants, 48.8%, reported that media is not playing a satisfactory role convey the accurate information regarding COVID-19. The inaccuracy and exaggerating of information regarding pandemic disease also confirmed by [\(Mohamad et al., 2020\)](#). Furthermore, 28.6% of participants showed uncertainty that lockdown save lives were due to lack of knowledge and inaccurate information. These findings of the study consistent with [\(Shi et al., 2020\)](#), which concludes that higher knowledge leads to a higher level of confidence and a positive attitude.

The participants of this study revealed a positive attitude towards the practices that can be followed to prevent the spread of the disease. A vast majority of them believed in the value of avoiding contact with persons having symptoms of the disease and wash hands 5 times a day. Nearly one-third of respondents did not wear the prescribed surgical mask due to less availability (shortage), and financial difficulties (increased prices) not wearing a prescribed surgical mask does not mean that they are not wearing a mask; they are using substitute mask made up of cloth. Wearing any kind of mask (whether cloth made or surgical) is required to enter into the market for buying daily items during the lockdown

even though there is no consensus related to use of face mask in public places to protect the transmission of the disease.

### **Strengths and Limitations of the Study**

The strength of the study is that it speeches major health issues that affected over 200 countries. The limitation of the study includes the convenient sampling and distribution of online surveys in three developing countries through different social media applications. It allowed only those participants who have internet access, whereas potential respondents may not participate due to internet access.

### **CONCLUSION AND IMPLICATIONS**

In general, the general public of three developing countries had intermediate knowledge and attitude compared to their behavior regarding COVID-19. Specifically, male and more educated people were more knowledgeable about the disease. However, some false treatments were common, as reflected that only 54% of respondents recognized that hot water and stem did not treat the disease. And only half of the participants recognized that there is a risk of catching COVID-19 during the lockdown. Though the government has taken significant measures to prevent the transmission of the disease, still substantial effort is required to share accurate information and precautions regarding COVID-19. The results of this study provide more valuable insights to governments of developing countries when designing future interventions to promote a specific message to improve knowledge, attitude, and enhance behavior regarding COVID-19. In the case vaccine is approved, we suggested that more weightage should be given to developing countries. Moreover, future studies should focus on motivating factors for governments to impose lockdown. Finally, we recommend that the general public should follow the instructions of government and health agencies to stay home stay safe.

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