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## Original Article

# Knowledge, attitude, practices, and behavior regarding COVID-19 among serving personnel of a large military garrison: a quick online cross-sectional survey



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## ABSTRACT

**Background:** There is a deluge of information available and circulated about COVID-19, during the ongoing course of the pandemic. This study was conducted to assess knowledge, attitudes, practices, and behavior regarding COVID-19 among serving soldiers.

**Methods:** A quick cross-sectional online survey was conducted using a web portal and social media platform, wherein a pretested questionnaire was uploaded. Responses were collected for 3 days. Data were analyzed using Epi Info software.

**Results:** A total of 1231 serving personnel participated in the survey, 133 (10.80%) officers, 144 (11.69%) Junior Commissioned Officers, and 954 (77.49%) Other Ranks. The prevalence of correct knowledge was more than 80% (range 81.47–88.13) except 29.97% regarding transmission by food and water. A statistically significant association (all *P* values < 0.05) was found with increasing age and education. Social distancing was an effective method as per 93.54%, and 81.38% thought that the response measures were adequate. Handwashing was the only practice which demonstrated a statistically significant association across change in all 3, i.e. age (*P* = 0.001), education (*P* = 0.005) and rank (*P* = 0.022). In the affective domain, increased perception of anxiousness, worriedness, and not feeling relaxed was found in the responses.

**Conclusion:** Levels of knowledge, positive attitude, and practice are high among serving soldiers, however feeling of anxiousness and worry prevail. Aggressive, continuous, relevant target population-oriented Information Education and Communication is the need of the hour, with structured and programmed interventions for positive mental health during course of the pandemic and this has been implemented in our area.

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## Introduction

There was an outbreak of a mysterious pneumonia reported in December 2019 at the Huanan Seafood Wholesale Market in Wuhan, Hubei Province, China. In the succeeding months, the outbreak spread to many provinces across China. Subsequently, the disease spread to other parts of the world causing thousands of cases and hundreds of deaths.<sup>1</sup> The outbreak was declared a Public Health Emergency of International Concern on 30 Jan 2020.<sup>2</sup> On 12 Mar 2020, the COVID-19 Coronavirus disease 2019 (COVID-19) was declared a pandemic by the World Health Organization.<sup>2</sup> The causative agent was a ribonucleic acid virus; severe acute respiratory syndrome coronavirus 2, and the disease was labeled as COVID-19.<sup>2</sup>

As on 24 June 2020, there are 9,110,186 confirmed cases of COVID-19 and 4,73,061 deaths, worldwide.<sup>3</sup> India too is facing the brunt of the pandemic with 4,56,184 confirmed cases, and 14,476 deaths attributed with COVID-19, as on 24 Jun 20.<sup>4</sup> Till date, the disease has no definitive cure or vaccine. Prevention remains the mainstay of halting the spread of infection with preventive and non-pharmacological interventions at national/community/individual level measures like lockdown, hotspot containment and buffer zones, quarantine, isolation, physical and social distancing, good personal hygiene, hand washing, wearing mask/homemade face covers, and observing cough etiquette. Wide publicity through directives and advisories are being promulgated by the Indian Central and State Governments on electronic, print, and social media platforms.<sup>5</sup> Aggressive Information Education and Communication (IEC) and Behavior Change Communication (BCC) modalities have been advocated for entire population by the Ministry of Health and Family Welfare as well as all State governments.<sup>6,7</sup>

The Armed Forces population is equally susceptible, and the Armed Forces Medical Services have implemented timely aggressive strategy with targeted primary, secondary, and tertiary prevention modalities.<sup>8</sup> In addition to hospital preparedness, IEC and BCC activities are being regularly carried out since the first week of February this year. Concurrent evaluation of all health care activities including preventive activities have been shown to be effective in providing valuable information for mid-course correction, if necessary. Thus, during the course of this evolving pandemic, it becomes vital to assess the key outcomes of primary prevention measures, i.e. knowledge and awareness in the general population, which are expected to translate into desirable practices and behavior.

Literature search revealed sparse international studies on assessment of Knowledge, Attitude, Practices, and Behavior (KAPB) on COVID-19.<sup>9-11</sup> There is only one study available online assessing KAPB among healthcare professionals in Mumbai.<sup>12</sup> However, no study was available regarding assessment of KAPB in general population in India and the Armed Forces. The available literature thus lacks information regarding the important aspects of KAPB among general population. Few studies on KAPB related to viral respiratory disease outbreaks with similar epidemiological features like Swine Flu (H1N1) and MER-CoV are available. Though the

causative organisms were different from the SARS-CoV2, the preventive and control mechanisms are essentially the same. These studies carried out in India and abroad offer a meaningful insight into the domain of KAPB of the population in response to viral respiratory pandemics.<sup>13-16</sup>

This study was thus conducted to estimate the prevalence of appropriate knowledge, desirable attitudes, practices, and behaviors regarding SARSnCoV-2 and COVID 19 and also to assess the affective component during the current pandemic, among serving personnel of a large military garrison.

## Material and methods

This quick, web-based cross-sectional survey was conducted in a large military cantonment. The sample size was estimated by assuming a prevalence of 50% appropriate knowledge, alpha at 5%, and absolute margin of error as 3%, single cluster. The calculated sample size was 996. To cater for loss of information in case of incomplete forms, 20% was added to the sample. The survey portal [www.surveymonkey.com/](http://www.surveymonkey.com/) was used to generate and upload the questionnaire url link. This link was sent randomly using a social media application to the respondents. Station and unit social media groups were utilized to disseminate the link. The response counter was open for 3 days as the authors anticipated good response to this topical survey and was closed at a count of 1231 responses. The questionnaire once attempted via the link sent on mobile could not be attempted again, thus preventing duplication. The inclusion criteria were only serving personnel of garrison. The cross-section of participants included all serving personnel (Officers, Junior Commissioned Officers [JCOs] and Other Ranks [ORs]) of the selected military garrison, who agreed to participate in the survey on their personal mobile phones.

An instrument with 28 questions encompassing domains of knowledge (07 questions), attitudes (04), practices (04), and affective component (04) was designed using WHO technical material, Ministry of Health and Family Welfare Government of India, Government of Rajasthan Department of Medical Health and Family welfare training and awareness material for detection, prevention, response, and control of COVID-19.<sup>6,7,15,17</sup> Annexure 1. This was done after detailed review of literature on the subject, as very few studies were available. Additionally, studies on similar outbreaks such as MERS and SARS, having similar epidemiological profile to COVID-19, were taken into consideration. Validity (face and content) and reliability were established by circulating to experts and a pilot study on a subgroup of 60 individuals from the same population.

Simple vernacular english was used as this was the only language available on the online survey site. Difficult words were removed during pretest of questionnaire in pilot study, based on responses received. The language used was such that a common soldier who has minimum academic qualification of passing class X would understand the questions asked. The survey was unlinked, anonymous. The submission of the form was taken as consent of the participant. Descriptive analysis by MS Excel and inferential by Epi-info ver 7.2.3.1™ was carried out. Appropriate measures of descriptive and

inferential statistics were used for statistical analysis. The study was approved by the Institutional Ethics Committee.

### Results

A total of 1231 respondents (serving personnel) participated in the survey. Their age ranged from 16 to 60 years of age, with mean as 32.68 years (SD 9.77; median 32.31 years). The mean years of service was 12.94 (SD 7.41; median 13.76). There were 133 (10.80%) officers, 144 (11.69%) JCOs, and 954 (77.49%) ORs. The details of respondents based on age, marital status, education status, rank, and years of service have been depicted in Table 1.

The results regarding the knowledge domain are presented in Table 2. Overall, the prevalence of appropriate knowledge was more than 80% (range 81.47-88.13), except 29.97% regarding transmission by food and water. A statistically significant association was found with increasing age, rank, and education and correctness of responses with a positive trend with higher age and education.

Fig. 1 depicts that majority of the respondents agreed (Strongly agreed + agreed) that effective ways to treat disease were not known (952, 77.33%), social distancing is an effective method (1,154, 93.54%), and the country is implementing adequate measures to combat COVID-19 (1002, 81.38%). A marginally more number (537 vs 455) of respondents were worried of getting infected in coming days.

In the responses to domain of practice, the answer of No/not decided/Not noticed/do not know were clubbed as 'No' while analyzing the associations with independent variables. Details have been provided in Table 3. Hand washing had a statistically significant association with change in age (p = 0.001), education (p = 0.005), and rank (p = 0.22), whereas cough etiquette and personal hygiene showed a significant association with increasing age (p = 0.003) and education (p = 0.007). Fig. 2 shows that a majority of respondents demonstrated increased stress during this period. Increased perception of anxiousness, worriedness, and not feeling relaxed was found in the responses. A majority of respondents also looked forward to normal life and enjoyment as before.

### Discussion

The literature review reveals this as the first study in India assessing the KAPB toward COVID-19 among the serving soldiers of the Indian Army, who form a subset of the general population. The group and education level of our population was comparable with the KAPB studies on COVID-19 conducted in China (Mean age 33 yrs, Education range: mid school-masters) and Iran (Mean age 34.37 years; Education range-illiterate-Academic).<sup>9,11</sup> The rank profiling of Officers, JCOs, and ORs is specific and unique to Armed Forces, and no comparable survey was available. The other variable of years of service is important in epidemiological concept as the number of years of service is directly proportional to increase in rank and educational qualification (Mean years of service: 12.94 years, SD: 7.41).

**Table 1 – Baseline characteristics of respondents in KAPB survey.**

Characteristic	Participants (n = 1231) No. (%)
<b>Age (Years)</b>	
16-19	61 (4.95)
20-29	404 (32.81)
30-39	482 (39.15)
40-49	235 (19.09)
50-60	49 (3.98)
<b>Mean = 32.68 years, SD = 9.77, Median = 32.81</b>	
<b>Marital status</b>	
Married	1010 (82.04)
Single	215 (17.46)
Divorce/Widowed	3 (0.20)
Others	2 (0.20)
<b>Education status</b>	
Upto Class X	249 (20.21)
Upto Class XII	582 (47.28)
Graduate	288 (23.39)
Postgraduate	105 (8.52)
Postdoctoral	1 (0.1)
<b>Rank</b>	
Officers	133 (10.80)
JCOs	144 (11.69)
OR	954 (77.49)
<b>Years of service</b>	
<5	252 (20.40)
5-10	226 (18.35)
11-15	199 (16.08)
16-20	262 (21.28)
>20	292 (23.72)
<b>Mean = 12.94 years, SD = 7.41, Median = 13.76</b>	
<b>Time spent per day reading/viewing about COVID-19?</b>	
<1 Hour	516 (41.91)
1-2 Hour	425 (34.52)
2-3 Hour	141 (11.45)
>3 Hour	121 (9.82)
<b>Attended any formal session on prevention of COVID-19?</b>	
Yes	770 (62.55)
No	338 (27.45)
I don't remember	77 (6.25)

KAPB, Knowledge, Attitude, Practices, and Behavior; JCOs, Junior Commissioned Officers; ORs, Other Ranks.

The high prevalence of appropriate knowledge among the Indian soldiers may be attributed to high volume of information being continuously disseminated by Indian Government, State and Armed Forces Medical Services, on the print and electronic media platform, including social media sites easily accessible to all. Our findings of correct knowledge regarding cause of COVID19 and effect of older age, 88.13% and 84.32%, respectively is similar to knowledge level among general population in an Iranian study (93.8% for both).<sup>11</sup> Four questions of the same Iranian study demonstrated a range of 67.8% to 97.8% for correct answers regarding symptomatology of COVID-19, which is similar to our finding of 84.32% respondents correctly identifying these.

Higher age groups and higher education translated to higher knowledge scores in our study as well as a study among general population in China, where knowledge scores significantly differed across age groups and education levels.<sup>9</sup>

**Table 2 – Association of knowledge about COVID-19 as compared with age, education, and rank<sup>a</sup>.**

Knowledge	Correct answer No (%) (95% CI)	P value		
		Age	Education	Rank
Cause of COVID-19	1085 (88.13) (86.20, 89.89)	0.001	0.001	0.734
Transmission of COVID-19 by Food & Water	369 (29.97) (27.43, 32.62)	0.001	0.001	0.001
Quarantine after contact with a COVID patient	1069 (86.83) (84.82, 88.68)	0.001	0.001	0.001
Main symptoms of COVID-19	1005 (81.64) (79.36, 83.77)	0.001	0.001	0.001
Prevention through use of mask/homemade face cover	1003 (81.47) (79.19, 83.61)	0.001	0.001	0.002
Proneness of old age/persons with chronic diseases	1038 (84.32) (82.17, 86.31)	0.001	0.001	0.001
Awareness regarding Command COVID Helpline Mobile Number	1022 (83.02) (80.81-85.08)	–	0.001	0.282

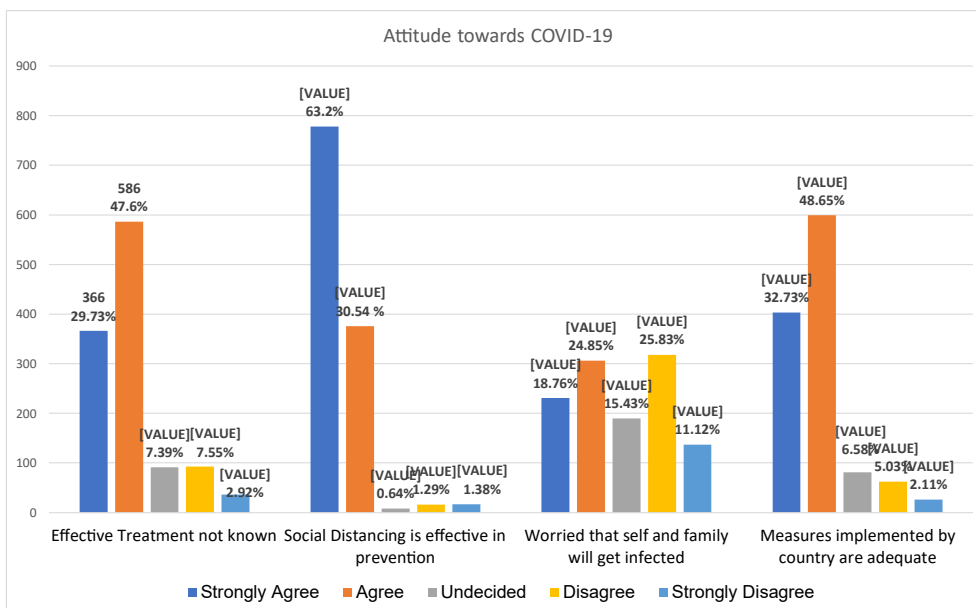
<sup>a</sup> Chi-square test for trend applied.

The prevalence of incorrect knowledge along with correct knowledge is a hallmark of all evolving epidemics as was seen in initial days of HIV and H1N1.<sup>17,18</sup> Thus, role of food and water in COVID-19 spread requires to be addressed in the context of infodemic.<sup>19</sup> In a KAPB study on Health Care Workers in UAE, only 36% had correct knowledge of mode of transmission.<sup>10</sup> 43.9% of people in the Iran study too thought that COVID-19 is transmitted by contaminated dairy and meat.<sup>11</sup> This points to the area of focus of health education activities which may specifically address the issue falling under the umbrella of Primary Prevention. The survey also provided an important information regarding the need to disseminate more information regarding the helplines.

Our study finding of 76.72% being aware about lack of effective treatment against COVID-19 is in consonance with similar proportion (67.7%) of Health Care Workers of UAE mentioning that supportive care was the only form of

treatment available.<sup>10</sup> However, in contrast, the Iranian study on Health Care Workers found 68% perceiving that COVID-19 was curable.<sup>11</sup> The Iranian KAP study showed 96% respondents agreeing to a lockdown and quarantine of whole city if cases increased, which was similar to our finding (93%) showing the social distancing as an effective tool.

The translation of correct knowledge and attitudes into appropriate practices has been shown to be delayed regarding the non-communicable diseases.<sup>20</sup> However, for infectious diseases, this translation is much quicker and may be due to the imminent perceived risk to self and others. This has been shown by our study with 96.18% following strict lockdown measures as advocated and a high proportion in Iran (85.13%).<sup>11</sup> Hand washing has also percolated down to the community, with 92.20% of our respondents, 98.6% in Iran and 85.6% in UAE washing hands more frequently than before.<sup>10,11</sup>



**Fig. 1 – Attitude toward COVID-19.**

**Table 3 – Association of practices concerning COVID-19 with age, education, and rank.**

Questions on practice	Age yrs (n-1231)				Education (n-1225)				Rank (n-1223)						
	<20 n (%)	20-29 n (%)	30-39 n (%)	40-49 n (%)	50-60 n (%)	P Value	Class X n (%)	Class XII n (%)	Grad n (%)	PG and above n (%)	P Value	Officers n (%)	JCO n (%)	OR n (%)	P value
<b>Wearing of mask</b>															
Yes.	57 (90.47)	355 (88.52)	441 (91.68)	201 (84.81)	40 (81.63)	0.097 <sup>a</sup>	228 (91.56)	507 (87.11)	261 (90.62)	88 (83.01)	0.173 <sup>a</sup>	98 (74.80)	129 (90.84)	855 (90)	0.001 <sup>a</sup>
No/Don't Know	6 (9.23)	46 (11.47)	40 (8.31)	36 (15.18)	9 (18.36)		21 (8.43)	75 (12.88)	27 (9.37)	18 (16.98)		33 (25.19)	13 (9.15)	95 (10)	
<b>Washing hands more than before</b>															
Yes	53 (81.53)	348 (86.78)	435 (90.43)	215 (90.71)	47 (95.91)	0.001 <sup>a</sup>	217 (87.14)	511 (87.80)	267 (92.70)	100 (94.33)	0.005 <sup>a</sup>	122 (93.12)	133 (93.66)	837 (88.10)	0.022 <sup>a</sup>
No/Not noticed	8 (12.30)	53 (13.21)	42 (8.73)	17 (7.17)	2 (4.08)		32 (12.85)	71 (12.19)	21 (7.29)	6 (5.66)		9 (6.87)	9 (6.33)	113 (11.89)	
<b>Observing strict LOCKDOWN</b>															
Yes	55 (84.61)	373 (93.01)	461 (95.84)	227 (95.78)	47 (95.91)	0.067 <sup>a</sup>	234 (93.97)	543 (93.29)	280 (97.22)	103 (97.16)	0.064 <sup>a</sup>	123 (93.89)	140 (98.59)	893 (94)	0.431 <sup>a</sup>
No/Not noticed	3 (4.61)	28 (6.98)	19 (3.95)	10 (4.21)	2 (4.08)		15 (6.02)	39 (6.70)	8 (2.77)	3 (2.83)		8 (6.10)	2 (1.40)	57 (6)	
<b>Observing cough etiquette + hygiene</b>															
Yes.	48 (73.84)	353 (88.02)	432 (89.81)	222 (93.67)	47 (95.91)	0.003 <sup>a</sup>	214 (85.94)	519 (89.17)	270 (93.75)	97 (91.50)	0.007 <sup>a</sup>	122 (93.12)	129 (90.84)	846 (89.05)	0.130 <sup>a</sup>
No/Don't Know	9 (13.84)	47 (11.72)	49 (10.18)	15 (6.32)	2 (4.08)		35 (14.05)	63 (10.82)	18 (6.25)	9 (8.49)		9 (6.87)	13 (9.15)	104 (10.94)	

<sup>a</sup>Chi-square test for trend applied. JCOs, Junior Commissioned Officers; ORs, Other Ranks.

Keeping in view the varying guidelines regarding mask usage by the general population with initial non-recommendation followed by recommending the universal mask usage,<sup>21</sup> it was heartening to find 81.47% responding affirmatively to mask usage. The correct practices in our study are much higher than the Iranian study wherein only 54.7% felt that face-masks are to be worn in public,<sup>11</sup> with 25% saying that they would not wear a mask. This is significantly different from the KAP in China, where 98% of respondents accepted that mask is protective in COVID-19.<sup>9</sup> It was also seen that advocacy for wearing masks is certainly more in the COVID 19 scenario as compared with earlier pandemics of H1N1, with very similar epidemiology to the present pandemic, where it was thought as necessary only by 58.5% males and 60% females in a survey in rural India in Jammu and 50% in a survey of school children in Kanpur.<sup>14,15</sup> This could be attributed to aggressive and overwhelming information being available to the general population, through social media, though further comment on this hypothesis would be beyond scope of this study.

The affective domain involving behaviors, emotions, and mental health showed that cumulatively more respondents felt anxious and worried either all the time or most of the time. More respondents also felt less relaxed and looked forward for normalcy and good times, as compared with individuals who rarely or never had these thoughts. This could be attributed to the overwhelming media and social access. An overload of information and misinformation regarding morbidity and mortality statistics, along with other disturbing news could be attributing causes.<sup>19</sup> As also with the knowledge that no definitive cure exists, along with an overstretched health infrastructure, the fears of the general population are not unfounded. No studies to compare results of awareness in the affective domain could be found.

### Strengths and limitations

The strength of this topical study is the action taken based on the findings, converting this cross-sectional survey into translational research. Action was initiated at each level of command and control with strengthening of individual stress coping strategies, along with identification of early signs of stress. Advisories were disseminated at the Station Medical Administrator to work closely with executive authorities in planning and implementing IEC and BCC activities, including creation of local mental helplines and hiring of Psychologist after conducting need analysis in the station.

At the unit level, action advised for Commanding Officers included establishment of open communication through rank and file by utilizing key appointments and Battle Field Nursing Assistants. Also, wide publicity in the environment about existing Mental helplines. Establishment of communication through Family Welfare Organizations like AWWA for women and children was encouraged. Paying attention to any changes noticed in the individual through the existing buddy-system was stressed. Maintenance of normal training activities in the unit with social distance norms was advised to ensure maintenance of a healthy body and mind. Stress was laid on strengthening family and individual knowledge about COVID, seeking information from reliable sources, keeping physically

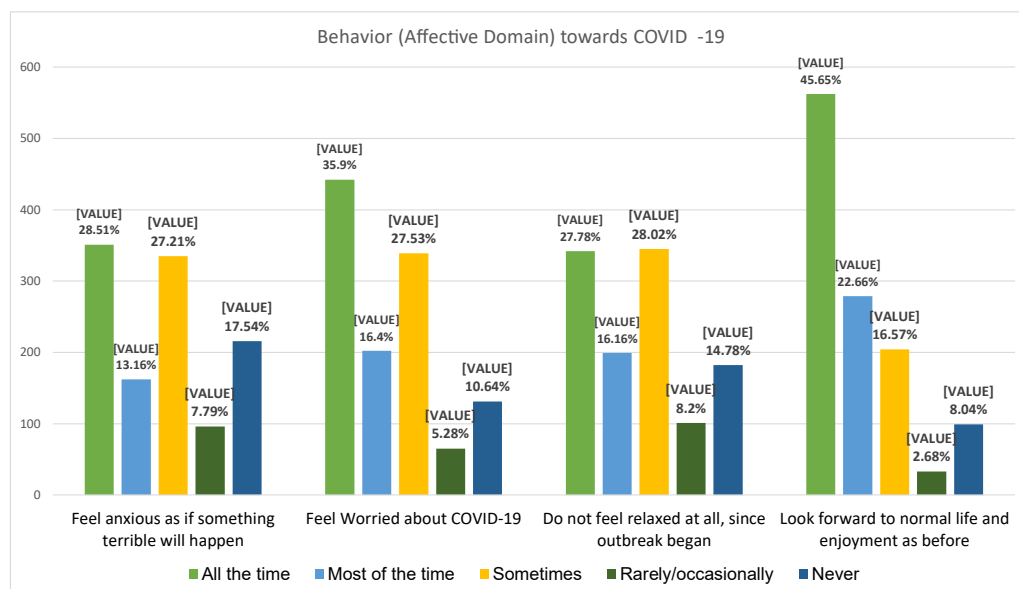


Fig. 2 – Behavior toward COVID-19.

and mentally fit at all times, following up or development of new hobbies.

Additionally, equally important in these stressful times is effective outreach for positive mental health, where personal interaction through social media and phones could be utilized. Another strength of the study is its generalizability to the entire Armed Forces.

There are a few limitations of the present study, being conducted in a well-defined subset of serving soldiers, who have a set and specified exposure to many variables including targeted IEC, which may differ from the exposure of the general population, hence generalization of this study to the whole population will be limited. However, the participants represent the general population to a large extent. Additionally, quick online surveys are inherently bound to create sampling bias and also limited set of questions per domain. However, these limitations may be overlooked, keeping in view that the study delivers meaningful insights into the KAPB of an evolving pandemic, and this information could be utilized for further refinements in public health measures.

## Conclusion and recommendations

To conclude, a high prevalence of correct knowledge, appropriate attitude and behavior was found among the population along with some gaps in these areas and also stress related to this evolving pandemic.

It is recommended that regular reinforcements of the IEC/BCC activities across various target populations in the country is the need of the hour. Stress has to be laid on timely, relevant, easy to comprehend and up-to-date IEC activities to address the correct and effective domain of knowledge, attitude, and practice regarding COVID-19. Additionally, equally important in these stressful times is effective outreach for

positive mental health, where personal interaction through social media and phones could be utilized.

## Disclosure of competing interest

All authors have none to declare.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.mjafi.2020.09.002>.

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