International Journal of Community Medicine and Public Health
Salam H et al. Int J Community Med Public Health. 2020 Nov;7(11):4414-4423
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20204738

Original Research Article

Assessment of knowledge, attitude and practice towards COVID-19 and its' psychological impact among the public of a metropolitan city of South India

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Received: 10 August 2020
Accepted: 25 September 2020

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ABSTRACT

Background: Our study assessed the knowledge, attitude and practice towards COVID-19 and its' psychological impact during the rise in COVID-19 cases and the subsequent implementation of lockdown in India.
Methods: We distributed an online questionnaire to 500 people between March 2020 to April 2020. We measured knowledge about COVID-19, attitude regarding the virus, practices, preventive measures and psychological responses.
Results: Out of the 500 responses, 64.6% (323) were women and 35.4% (177) were males and all the participants had completed high school. 95% (475) of the respondents had ≥75% knowledge, 86.8% (434) had positive attitudes, 98.2% (491) followed adequate preventive measures, 14.2% (71) reported moderate to extremely severe depression, 13.6% (68) reported moderate to extremely severe anxiety and 6.6% (33) reported moderate to extremely severe stress.
Conclusions: Knowledge, attitude and practice scores varied across age, sex, level of education and occupation ($p<0.001$). Higher knowledge was found to be associated with better attitudes and practices ($p=0.08$). The rise in COVID-19 cases and deaths in India and the subsequent implementation of lockdown had an impact on the psychological health of the respondents. Better knowledge scores indicated better psychological health in terms of anxiety and stress but yielded higher depressive symptoms which were not statistically significant.

Keywords: COVID-19, Knowledge, Severe acute respiratory syndrome, Coronavirus 2

INTRODUCTION

The 2019 coronavirus disease (COVID-19) pandemic, one of the deadly pandemics that the world has seen, has shook the entire world in terror and fear, and has claimed thousands of lives so far. It was declared a public health emergency of international concern and has had a huge psychological impact on the lives of millions of people.[1]

COVID-19 is an emerging respiratory infectious disease that is caused by the novel coronavirus and was first detected in a seafood market in Wuhan, China in December 2019, which then exponentially spread beyond Wuhan and China to affect over 200 countries globally, thereby posing a threat to the health and lives of millions of people worldwide.[1,2] The ongoing COVID-19 pandemic has spread very rapidly and by 21 May 2020, the virus reached almost 212 countries, with 4,893,186 cases and 323,256 deaths so far.[3] India is one of the worst affected countries with 112,359 cases and 3435 deaths as of 21 May 2020.[4]

The COVID-19 is most commonly characterized by dry cough, fever, dyspnea, chills, muscle pain, sore throat, new loss of sense of smell or taste, nausea, vomiting and diarrhea.[2,5] It may be complicated by Adult respiratory distress syndrome, septic shock, metabolic acidosis, bleeding and coagulation disorders, and death.[2] The case mortality rate of COVID-19 by WHO is around 3-4% as of 6 March, 2020.[6]

This disease which spreads primarily via airborne route and direct contact can be prevented by maintaining hand hygiene, social distancing, and covering mouth and nose while coughing or sneezing.[7] The assessment of knowledge regarding COVID-19 is highly essential to initiate awareness regarding COVID-19, thereby reducing transmission, the number of COVID-19 cases and mortality, for adoption of better attitude and adequate preventive practices and also to ensure the success of various preventive and quarantine measures adopted by the government.[2] The assessment of psychological impact of COVID-19 is important as previous studies have shown that it is inducing stress, anxiety, depression and stigma against infected patients.[1]

This study is important in the current scenario as there is no effective therapeutics or vaccine for COVID-19, nor a robust infrastructure which makes it highly essential to assess the knowledge, attitude, practices and psychological impact of COVID-19 among the public of a metropolitan city in South India.[8] However, as knowledge is evolving, all stakeholders are trying their best to address the pandemic in best possible ways.

METHODS

Study design

We conducted our cross-sectional study from March 2020 to April 2020 when a lockdown was implemented in the whole of India. We distributed an online questionnaire, consisting of a validated, previously used questionnaire (with permission) for knowledge, attitude and practice regarding COVID-19 (with a Cronbach's alpha coefficient of 0.71) and DASS-21 (with Cronbach's alpha values of 0.76, 0.73 and 0.71 for the depression, anxiety and stress sub-scales respectively) for assessment of psychological impact of COVID-19.[2,9,10] The idea was to get 500 responses from people residing in Bangalore, Karnataka, through various online platforms such as whatsapp, email and text messaging.[2] Ethical clearance was obtained from Vydehi institutional ethical committee. The questionnaire was forwarded with a message containing an introduction to the study, the voluntary nature of participation, declarations of anonymity and confidentiality, assurance that they could withdraw from the study at any time and that the information that they would be providing would be used solely for the purpose of the study as well as the link to the online questionnaires.[2]

Inclusion criteria

Criteria for inclusion in current study were; people residing in Bangalore city, people with age of 18 years or more, people who can understand the content of the message, and agreed to participate in the study. People were instructed to complete the questionnaire by clicking the link directing them to a Google document form, where they could begin filling the questionnaires. Informed consent was obtained from all the participants.

Exclusion criteria

Criteria for exclusion were people who did not fill the consent form, age below 18 years, residents of other regions and people who submitted an incomplete form.

Following variables were measured; knowledge about COVID-19, attitude regarding the virus, practices and preventive measures (hand washing, avoidance of crowded places) and psychological responses (worry about infection, anxiety, depression and stress associated with lockdown and emotional distress).

Details of questionnaires used

The first questionnaire used was a validated, previously used questionnaire (with permission) with a Cronbach's alpha coefficient of 0.71. It was used to assess knowledge, attitude and practice (KAP) regarding COVID-19 and consisted of two parts: demographics and KAP. Demographic variables included age, sex, level of education and occupational status. We used a previously used and validated questionnaire. The questionnaire had 12 questions; 4 regarding clinical presentations (K1-K4), 3 regarding transmission routes (K5-K7), and 5 regarding prevention and control (K8-K12) of COVID-19. These questions were answered on a true/false basis with an additional "I don't know" option. A correct answer was assigned 1 point and an incorrect/unknown answer was assigned 0 points. The total knowledge score ranged from 0 to 12, with a higher score denoting a better knowledge of COVID-19.[2]

For second questionnaire, to assess the psychological impact of COVID-19, we used DASS-21 (depression, anxiety, stress scale; 21 items) which has Cronbach's alpha values of 0.76, 0.73 and 0.71 for the depression, anxiety and stress subscales respectively.[9,10] It consisted of 21 questions with 7 questions each for depression, anxiety and stress.[1,9] Its scores were then calculated. The response scores were tabulated and analyzed using SPSS software.

RESULTS

Demographic profile

The questionnaire was sent to 550 people out of which a total of 510 participants completed the online survey and

40 people did not respond. Out of those, 10 responses were incomplete and hence were excluded from the study; hence there was a 90.91% response rate. A total of 500 responses were evaluated. Out of 500 participants, 64.6 % (323) were females and 35.4% (177) were males. 65.8% (323) of the respondents belonged to the age group 21-30 years. All the respondents had completed high school. 57.2% (286) of the respondents are medical students and 7.8% (39) are health care professionals.

Assessment of mean knowledge score and its' correlation with demographic variables

The correct answer rates of the 12 questions on the COVID-19 knowledge questionnaire were 60.4-99.6% (Figure 1). The mean COVID-19 knowledge score was 10.53±1.13 suggesting an overall 87.8% correct rate on this knowledge test. Knowledge scores differed across sexes, age-group, education levels and occupations (Table 1).

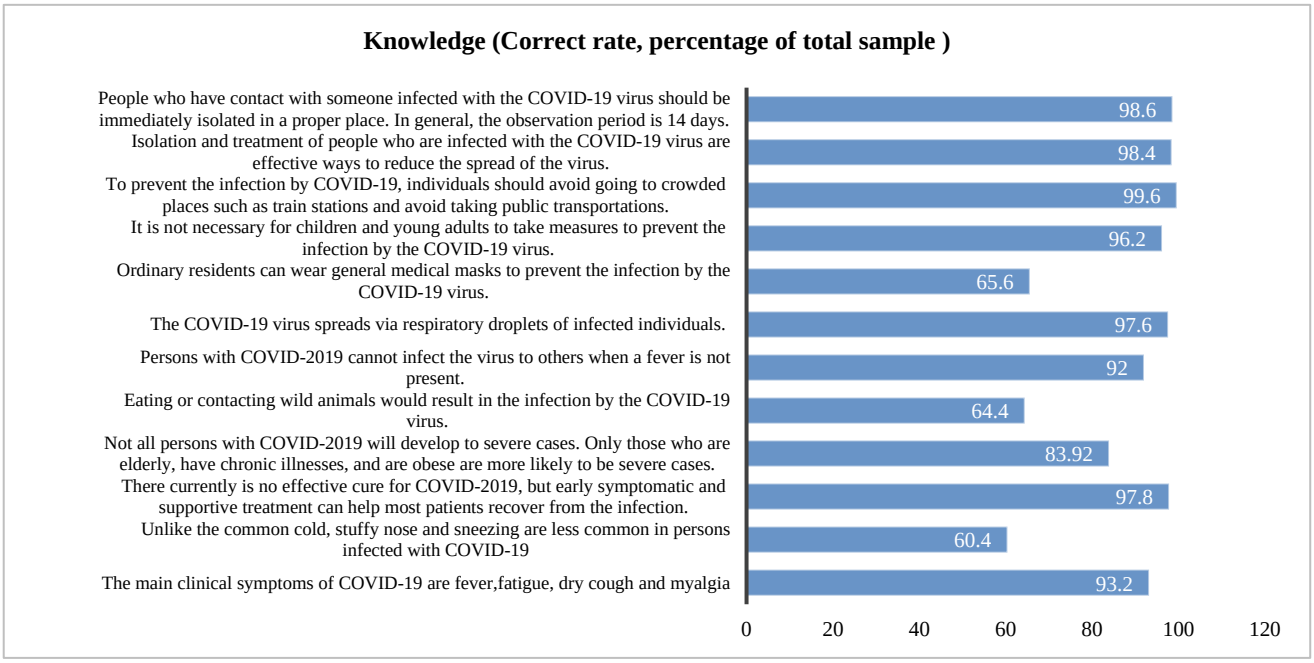

Figure 1: Knowledge (correct rate, percentage of total sample).

Table 1: Mean Knowledge scores of various demographic variables.

Characteristics		N (%)	Knowledge score (mean)
Gender	Male	177 (35.4)	10.4972
	Female	323 (64.6)	10.5573
Age (in years)	</=20	110 (22)	10.5727
	21-30	329 (65.8)	10.5258
	31-40	13 (2.6)	10.3846
	41-50	28 (5.6)	10.6071
	51-60	15 (3)	10.8
	≥61	5 (1)	9.6
Education level	High School	15 (3)	10.067
	Undergraduate	356 (71.2)	10.567
	Graduate	93 (18.6)	10.46
	Postgraduate	33 (6.6)	10.5776
	Doctorate	3 (0.6)	10.3333
Occupation	Unemployed/Retired	19 (3.8)	10.7368
	Medical Student	286 (57.2)	10.689
	Engineering Student	19 (3.8)	9.9474
	Other Student	76 (15.2)	10.3243
	Healthcare Professional	39 (7.8)	10.538
	Engineer	27 (5.4)	10.3333
	Other professional	34 (6.8)	10.4286

Correlation of knowledge with sex

Females (10.55) had a higher mean knowledge score than the males (10.49).

Correlation of knowledge with age

The age group of 51-60 years (10.8) had a higher mean knowledge score than age-groups of ≤20 years (10.57), 21-30 years (10.52), 31-40 years (10.38), 41-50 years (10.61) and ≥61 years (9.6). It was not statistically significant (p=0.46). This could be because of the carefree nature among the younger age groups probably because of the higher prevalence of comorbidities among the elderly age group and due to the higher COVID-19 death rates among elderly age groups and among those with comorbidities.

Correlation of knowledge with level of education

Better knowledge was associated with postgraduate education (10.57) than high school (10.06), undergraduate (10.56), graduate (10.46) and doctorate (10.33). It was not statistically significant (p=0.07). Thus, higher level of education was associated with better knowledge.

Correlation of knowledge with occupation

The mean knowledge scores were significantly related to the occupation (p<0.001). Better knowledge was associated with unemployed/retired (10.73) individuals than medical students (10.68), engineering students (9.94), other students (10.32), health care professionals (10.53), engineers (10.33) and other professional (10.42) (Table 1). Better knowledge among the unemployed/ retired could be attributed to their elderly age, making them more careful, probably due to the prevalence of comorbidities among them and due to the prevalence of higher mortality rates among COVID-19 patients with comorbidities. It could also be because of their higher exposure to social media like TV, internet due to their abundant free time as compared to the working population. This is probably a limitation of the study as we didn't exclude study participants with comorbidities in our study population.

Correlation between percentage knowledge of COVID-19 and demographic variables

A knowledge score of ≥9 indicates correct response to ≥75% of the questions. Majority of the participants (95%) had a knowledge score of ≥9 that is, ≥75% correct responses. Males (95.48%), age group of 51-60 years (100%), education of postgraduate (100%) and doctorate (100%) and occupation of medical students (98.25%) were associated with a knowledge score of ≥9 (Table 2).

Table 2: Demographic characteristics of participants and percentage knowledge of COVID-19 by demographic variables.

Characteristics		N (%)	
		<75% knowledge score	≥75% knowledge score
Age (years)	≤20	3 (7.31)	38 (92.68)
	21-30	19 (4.77)	379 (95.22)
	31-40	1 (7.69)	12 (92.30)
	41-50	1 (4.16)	23 (95.83)
	51-60	0 (0)	17 (100)
	≥61	1 (14.28)	7 (85.71)
Gender	Male	8 (4.51)	169 (95.48)
	Female	17 (5.26)	306 (94.73)
Education	School	3 (20)	12 (80)
	Undergraduate	16 (4.49)	340 (95.5)
	Graduate	6 (6.45)	87 (93.54)
	Postgraduate	0 (0)	33 (100)
	Doctorate	0 (0)	3 (100)
Occupation	Unemployed	1 (5.26)	18 (94.73)
	Medical student	5 (1.74)	281 (98.25)
	Engineering student	6 (31.75)	13 (68.42)
	Other student	9 (11.84)	67 (88.15)
	Healthcare professional	1 (2.56)	38 (97.43)
	Engineer	2 (7.40)	25 (92.59)
	Other professional	1 (2.94)	33 (97.05)

Assessment of attitude and its' correlation with demographic variables

Attitude varied across sex (p<0.05), age, occupation and education. 68% (340) of the respondents agreed that COVID-19 will finally be successfully controlled. Rates of reporting "disagree" and "I don't know" were 7.8% (39) and 12% (60), respectively. The attitude towards the final success in controlling COVID-19 significantly differed across genders, education levels, occupation categories, and residence places (Table 3).

Table 3: Attitude towards COVID-19 by demographic variables.

Characteristic	Attitude towards COVID-19, N (%)				
	Final success in controlling COVID-19			Confidence of winning	
	Agree	Disagree	Don't know	Yes	No
Age(years)					
≤20	30 (73.17)	3 (7.31)	8 (19.51)	38 (92.68)	3 (7.31)
21-30	310 (77.88)	36 (9.04)	52 (13.06)	345 (86.68)	53 (13.31)
31-40	12 (92.3)	0 (0)	1 (7.69)	12 (92.30)	1 (7.6)
41-50	17 (70.83)	0 (0)	7 (29.16)	18 (75)	6 (25)
51-60	16 (94.11)	0 (0)	1 (5.88)	16 (94.11)	1 (5.88)
≥61	4 (57.14)	0 (0)	3 (42.85)	5 (71.42)	2 (28.57)
Gender					
Male	144 (81.35)	19 (10.73)	14 (7.9)	153 (86.44)	24 (13.55)
Female	246 (76.16)	20 (6.19)	57 (17.64)	281 (86.99)	42 (13)
Education					
High School	9 (60)	0 (0)	6 (40)	10 (66.66)	5 (33.33)
Under Graduate	276 (77.52)	34 (9.55)	46 (12.92)	324 (88.2)	42 (11.79)
Graduate	73 (78.49)	4 (4.3)	16 (17.2)	76 (81.72)	17 (18.27)
Post Graduate	30 (90.9)	0 (0)	3 (9.09)	31 (93.93)	2 (6.06)
Doctorate	3 (100)	0 (0)	0 (0)	3 (100)	0 (0)
Occupation					
Unemployed	13 (68.42)	0 (0)	6 (31.57)	14 (73.68)	5 (26.31)
Medical Student	222 (68.42)	27 (9.44)	37 (12.93)	253 (88.46)	33 (11.53)
Engineering student	17 (89.47)	2 (10.52)	0 (0)	17 (89.47)	2 (10.52)
Other student	56 (73.68)	5 (6.57)	15 (19.73)	65 (85.52)	11 (14.47)
Healthcare professional	28 (71.79)	5 (12.82)	6 (15.38)	29 (74.35)	10 (25.64)
Engineer	25 (92.59)	0 (0)	2 (7.40)	24 (88.88)	3 (11.11)
Other professional	29 (85.29)	0 (0)	5 (14.7)	32 (94.11)	2 (5.88)
Knowledge Score (mean)	10.582	10.359	10.3802	10.562	10.36

Males (81.35%) had a significant association (p<0.05) with the answer of "agree" on A1 indicating positive attitude, age-group of 50-60 years (94.11%), education level of doctorate (100%), occupation of engineering professionals (92.59%) and a mean knowledge score of 10.582 were associated with the answer of "agree" on A1 indicating positive attitude (Table 3). 86.8% (434) of the survey completers had the confidence that India would defeat COVID-19. Females (86.99%), age group 51-60 years (94.11%), education of doctorate (100%), occupation of other professional (94.11%) and a mean knowledge score of 10.56 were associated with the answer of "yes" on A2 indicating positive attitude (Table 3).

Assessment of correlation of practices with demographic variables

99% (495) of the participants had not visited any crowded place and 98.2% (491) wore masks when going out in recent days. Males (1.69%), age group 21-30 years (1.25%), education of undergraduate (0.84%) and graduate (2.15%), occupations of medical student (0.69%), other student (1.31%) and health care professional (5.12%) were associated with going to any crowded place. Males (3.38%) a small percentage of females (0.92%), education of undergraduate (2.52%) and occupations of medical student (2.09%) and another student (3.94%) were associated with not wearing a mask outside which were not statistically significant (Table 4).

Table 4: Practice towards COVID-19 by demographic variables.

Characteristics	Practice of participants			
	Going to a crowded place N (%)		Wearing a mask N (%)	
Age(years)	**Yes**	**No**	**Yes**	**No**
≤20	0 (0)	41 (100)	40 (97.56)	1 (2.43)
21-30	5 (1.25)	393 (98.74)	390 (97.98)	8 (2.01)
31-40	0 (0)	13 (100)	13 (100)	0 (0)
41-50	0 (0)	24 (100)	24 (100)	0 (0)
51-60	0 (0)	17 (100)	17 (100)	0 (0)
≥61	0 (0)	7 (100)	7 (100)	0 (0)
Gender				
Male	3 (1.69)	174 (98.3)	171(96.61)	6 (3.38)
Female	2 (0.6)	321 (99.38)	320(99.07)	3 (0.92)
Education				
School	0 (0)	15 (100)	15(100)	0 (0)
Undergraduate	3 (0.84)	353 (99.15)	347(97.47)	9 (2.52)
Graduate	2 (2.15)	91 (97.84)	93(100)	0 (100)
Postgraduate	0 (0)	33 (100)	33(100)	0 (0)
Doctorate	0 (0)	3 (100)	3(100)	0 (0)
Occupation				
Unemployed	0 (0)	19 (100)	19(100)	0 (0)
Medical student	2 (0.69)	284 (99.3)	280(97.9)	6(2.09)
Engineering student	0 (0)	19 (100)	19(100)	0 (0)
Other student	1 (1.31)	75 (98.68)	73(96.05)	3 (3.94)
Health care professional	2 (5.12)	37 (94.87)	39(100)	0 (0)
Engineer	0 (0)	27 (100)	27(100)	0 (0)
Other professional	0 (0)	34 (100)	34(100)	0 (0)

Table 5: Depression scores and percentages in various demographic variables.

Characteristic		Depression, N (%)				
		Normal	**Mild**	**Moderate**	**Severe**	**Extremely severe**
Gender	Male	134 (75.7)	17 (9.6)	18 (10.2)	5 (2.8)	3 (1.7)
	Female	245 (75.9)	33 (10.2)	25 (7.7)	11 (3.4)	9 (2.8)
Age (in years)	≤20	78 (70.9)	11 (10)	14 (12.7)	6 (5.5)	1 (0.9)
	21-30	246 (74.8)	34 (10.3)	28 (8.5)	10 (3.1)	11 (3.3)
	31-40	11 (84.6)	2 (15.4)	0 (0)	0 (0)	0 (0)
	41-50	25 (89.3)	2 (7.1)	1 (3.6)	0 (0)	0 (0)
	51-60	14 (93.3)	1 (6.7)	0 (0)	0 (0)	0 (0)
	≥61	5 (100)	0 (0)	0 (0)	0 (0)	0 (0)
Education	High School	13 (86.7)	2 (13.3)	0 (0)	0 (0)	0 (0)
	Undergraduate	265 (74.4)	31 (8.7)	34 (9.6)	16 (4.5)	10 (2.8)
	Graduate	71 (76.3)	15 (16.1)	6 (6.5)	0 (0)	1 (1.1)
	Postgraduate	27 (81.8)	2 (6.1)	3 (9.1)	0 (0)	1 (3)
	Doctorate	3 (100)	0 (0)	0 (0)	0 (0)	0 (0)
Occupation	Unemployed/Retired	18 (94.7)	1 (5.3)	0 (0)	0 (0)	0 (0)
	Medical student	217 (75.9)	23 (8)	26 (9.1)	12 (4.2)	8 (2.8)
	Engineering student	10 (52.6)	4 (2.1)	4 (2.1)	1 (5.2)	0 (0)
	Other student	54 (71.1)	10 (13.2)	7 (9.2)	3 (3.9)	2 (2.6)
	Healthcare professional	27 (69.2)	7 (17.9)	4 (10.3)	0 (0)	1 (2.6)
	Engineer	22 (81.5)	3 (11.1)	1 (3.7)	0 (0)	1 (3.7)
	Other professional	31 (91.2)	2 (5.9)	1 (2.9)	0 (0)	0 (0)

Assessment of depression and its' correlation with demographic variables

14.2% (71) of the respondents reported moderate, severe and extremely severe depressive symptoms. Males (14.7%), age group of ≤20 years (19.1%), education of undergraduate (16.9%) and occupation of medical student (16.1%) were associated with moderate, severe and extremely severe depression as shown above in (Table 5).

Assessment of anxiety and its' correlation with demographic variables

13.6% (68) of the respondents reported moderate, severe and extremely severe anxiety symptoms. Males (17.5%), age group of ≥61 years (40%), education of postgraduate (15.2%) and occupation of engineering student (53.3%) were associated with moderate, severe and extremely severe anxiety (Table 6).

Table 6: Anxiety scores and percentages in various demographic variables.

Characteristic		Anxiety, N (%)				
		Normal	Mild	Moderate	Severe	Extremely severe
Gender	Male	137 (77.4)	9 (5.1)	18 (10.2)	5 (2.8)	8 (4.5)
	Female	268 (83)	18 (5.6)	26 (8)	4 (1.2)	7 (2.2)
Age (in years)	</=20	85 (77.3)	10 (9.1)	9 (8.2)	2 (1.8)	4 (3.6)
	21-30	268 (81.5)	14 (4.3)	30 (9.1)	7 (2.1)	10 (3)
	31-40	12 (92.3)	1 (7.7)	0 (0)	0 (0)	0 (0)
	41-50	25 (89.2)	1 (3.6)	1 (3.6)	0 (0)	1 (3.6)
	51-60	13 (86.7)	0 (0)	2 (13.3)	0 (0)	0 (0)
	≥61	2 (40)	1 (20)	2 (40)	0 (0)	0 (0)
Education	High School	11 (73.3)	3 (20)	1 (0.7)	0 (0)	0 (0)
	Undergraduate	289 (81.2)	19 (5.3)	29 (8.1)	8 (2.3)	11 (3.1)
	Graduate	75 (80.6)	4 (4.3)	11 (11.8)	1 (1.1)	2 (2.2)
	Postgraduate	27 (81.8)	1 (3)	3 (9.1)	0 (0)	2 (6.1)
	Doctorate	3 (100)	0 (0)	0 (0)	0 (0)	0 (0)
Occupation	Unemployed/retired	14 (73.7)	2 (10.5)	2 (10.5)	1 (5.3)	0 (0)
	Medical student	238 (83.2)	15 (5.3)	21 (7.4)	5 (1.7)	7 (2.4)
	Engineering student	10 (66.7)	0 (0)	5 (33.3)	1 (6.7)	2 (13.3)
	Other student	58 (76.4)	7 (9.2)	7 (9.2)	2 (2.6)	2 (2.6)
	Healthcare professional	31 (79.5)	1 (2.6)	5 (12.8)	0 (0)	2 (5.1)
	Engineer	23 (82.1)	1 (3.6)	3 (10.7)	0 (0)	1 (3.6)
	Other professional	31 (91.1)	1 (0.03)	1 (0.03)	0 (0)	1 (0.03)

Assessment of stress and its' correlation with demographic variables

6.6% (33) of the respondents reported moderate, severe and extremely severe stress symptoms. Males (7.9%), age group of 21-30 years (8%), education of undergraduate (7.3%) and occupation of engineering student (15.8%) were associated with moderate, severe and extremely severe stress (Table 7).

Correlation between knowledge and depression

Out of the respondents with ≥75% knowledge score, 14.3% (68) reported moderate, severe and extremely severe depressive symptoms and out of those respondents with <75% knowledge score, 12% (3) reported moderate, severe and extremely severe depressive symptoms (Table 8). A better knowledge score (≥75%) was surprisingly yielding an association with a higher percentage of depressive symptoms. It was not statistically significant (p=0.9). This could be due to better knowledge of the transmission, death rates and infection rates resulting in increased dread towards the virus resulting in an increase in depression and it could be also due to the implementation of lockdown.

Correlation between knowledge and anxiety

Out of the respondents with ≥75% knowledge score, 13.46% (66) reported moderate, severe and extremely severe anxiety symptoms and out of those respondents with <75% knowledge score, 16% (4) reported moderate, severe and extremely severe anxiety symptoms (Table 9). It was not statistically significant (p=0.07). This indicated that people with higher knowledge about the disease were less likely to develop moderate to extremely severe symptoms of anxiety which could be due to adequate knowledge of safety precautions and methods to prevent transmission of disease which alleviated anxiety.

Correlation between knowledge and stress

Out of the respondents with ≥75% knowledge score, 6.51% (31) reported moderate, severe and extremely

severe stress symptoms and out of those respondents with <75% knowledge score, 8% (2) reported moderate, severe and extremely severe stress symptoms (Table 10). It was not statistically significant (p=0.5). People with a higher knowledge score about the disease were less likely to develop moderate to extremely severe symptoms of stress which could be due to adequate knowledge and practice of preventive measures that helped in avoiding stress related symptoms.

Table 7: Stress scores and percentages by various demographic variables.

Characteristic		Stress, N (%)				
		Normal	Mild	Moderate	Severe	Extremely severe
Gender	Male	155 (87.6)	8 (4.5)	6 (3.4)	6 (3.4)	2 (1.1)
	Female	291 (90.1)	13 (4)	12 (3.7)	5 (1.5)	2 (0.7)
Age (in years)	≤20	96 (87.3)	8 (7.3)	1 (0.9)	4 (3.6)	1 (0.9)
	21-30	291 (88.4)	12 (3.6)	17 (5.2)	6 (1.8)	3 (1)
	31-40	13 (100)	0 (0)	0 (0)	0 (0)	0 (0)
	41-50	26 (92.8)	1 (3.6)	0 (0)	1 (3.6)	0 (0)
	51-60	15 (100)	0 (0)	0 (0)	0 (0)	0 (0)
	>/=61	5 (100)	0 (0)	0 (0)	0 (0)	0 (0)
Education	High School	14 (93.3)	1 (6.7)	0 (0)	0 (0)	0 (0)
	Undergraduate	314 (88.2)	16 (4.5)	15 (4.2)	8 (2.3)	3 (0.8)
	Graduate	85 (91.4)	3 (3.2)	3 (3.2)	2 (2.2)	0 (0)
	Postgraduate	30 (91)	1 (3)	0 (0)	1 (3)	1 (3)
	Doctorate	3 (100)	0 (0)	0 (0)	0 (0)	0 (0)
Occupation	Unemployed/retired	19 (100)	0 (0)	0 (0)	0 (0)	0 (0)
	Medical student	255 (89.2)	11 (3.8)	11 (3.8)	6 (2.1)	3 (1.1)
	Engineering student	13 (68.4)	3 (15.8)	2 (10.5)	1 (5.3)	0 (0)
	Other student	68 (89.5)	4 (5.3)	3 (3.9)	1 (1.3)	0 (0)
	Healthcare professional	34 (87.2)	1 (2.6)	2 (5.1)	2 (5.1)	0 (0)
	Engineer	24 (88.9)	2 (74.1)	0 (0)	0 (0)	1 (37)
	Other professional	33 (97.1)	0 (0)	0 (0)	1 (2.9)	0 (0)

Table 8: Association between knowledge of COVID-19 and depression.

Depression grade	<75% COVID-19 knowledge, N (%)	≥75% COVID-19 knowledge, N (%)
Normal	19 (76)	360 (75.78)
Mild	3 (12)	47 (9.89)
Moderate	2 (8)	41 (8.63)
Severe	1 (4)	15 (3.15)
Extremely severe	0 (0)	12 (2.52)

Table 9: Association between knowledge of COVID-19 and anxiety

Depression grade	<75% COVID-19 knowledge, N (%)	≥75% COVID-19 knowledge, N (%)
Normal	17 (68)	388 (81.68)
Mild	4 (16)	23 (4.84)
Moderate	3 (12)	41 (8.63)
Severe	1 (4)	8 (1.68)
Extremely severe	0 (0)	15 (3.15)

Table 10: Association between knowledge of COVID-19 and stress.

Depression grade	<75% COVID-19 knowledge, N (%)	≥75% COVID-19 knowledge, N (%)
Normal	22 (88)	424 (89.26)
Mild	1 (4)	20 (4.21)
Moderate	2 (8)	16 (3.36)
Severe	0 (0)	11 (2.31)
Extremely severe	0 (0)	4 (0.84)

DISCUSSION

COVID-19 has endangered and claimed the lives of a huge number of people within a fairly short time. It is crucial for the government and health authorities to plan proper strategies and measures to prevent and manage COVID-19 infection, hence making it very important to assess the knowledge, attitude and practice towards COVID-19 and its' psychological impact.[11]

Out of the 500 participants' responses that were evaluated, 64.6% (323) were females and 35.4% (177)

were males, 65.8% (323) belonged to the age group 21-30 years, all the respondents had completed high school, 57.2% (286) were medical students and 7.8% (39) were Health care professionals. A study conducted in China to assess the psychological impact of COVID-19 had a similar response rate, while a study conducted in China to assess the knowledge, attitude and practices towards COVID-19 had almost the same sex distribution with 65.7% females and 34.3% males.[1,2] Another study conducted in China to assess the psychological distress regarding COVID-19 had a similar sex distribution with 64.73% females and 35.27% males.[12]

The mean knowledge score of the respondents to our study was 10.53±1.13 with an overall 87.8% correct rate. Majority of the respondents had a positive attitude and had good practices, wherein 99% (495) hadn't gone to a crowded place and 98.2% (491) had worn masks. The minority who hadn't worn mask would probably be due to the huge demand of mask, lack of knowledge, and wearing of mask not being a norm in the country.[11] The section of population who had gone to crowded places may be attributed to the lack of knowledge regarding COVID-19 among them.

Our study coincides with a previous study carried out in China where the mean knowledge score was 10.8. It was a knowledge, attitude and practice study towards COVID-19 where 90% of the participants were found to have adequate knowledge, and majority had a positive attitude and followed healthy practices, wherein 96.4% of the respondents hadn't visited any crowded places and 98% had worn masks while going out.[2]

In a similar study conducted in Malaysia, the mean knowledge score was 10.5±1.4, suggesting an overall correct rate of 80.5%. 95.1% participants agreed that COVID-19 would be successfully controlled. 89.9% of the participants were confident that Malaysia would be able to win its battle against the virus. This high percentage of positive attitudes was attributed to the swift action of the Malaysian Government in enforcing measures to contain the virus. 83.4% of the respondents hadn't visited any crowded places but only 51.2% had worn masks while going out. The lack of supply and the confusion caused by the mixed messages was thought to have led to the divided response on the wearing of face masks when out in public. [11]

Another study conducted in Egypt, had a mean knowledge score of 16.39±2.63 and majority of the participants had good knowledge about the disease, its' methods of spread, and its' prevention. Majority of the participants showed a positive attitude towards measures that could be followed to prevent the transmission of the disease.[13]

Our study showed that 34.4% of the respondents had a psychological impact of COVID-19, wherein 14.2%, 13.6%, 6.6% reported of moderate-severe-extremely severe depression, anxiety and stress respectively.

A study conducted in China to assess the psychological distress among the Chinese people in the COVID-19 period reported that 35% of the respondents experienced psychological distress, wherein 29.29% of the respondents reported mild-moderate psychological distress and 5.14% of the respondents reported severe psychological distress.[12]

Another study conducted in China reported that 53.8% of the participants had moderate to severe psychological impact, wherein, 16.5%, 28.8%, 8.1% reported of moderate to severe depression, anxiety and stress respectively.[1]A similar study conducted in India reported that 5.5% of the participants had moderate psychological impact and 12.1% had severe psychological impact.[14]

There are a couple of studies conducted in China and Italy which stress on the importance of mental health services during COVID-19.[15,16] Though the stakeholders have come forward with approaches to provide orientation on psychological well being of people, these need to be made available on a larger scale to reach both urban and rural population and also across all age groups.

Our study had certain limitations which were that, it was limited to a city in South India and the respondents were mostly from an urban setting. Another study including both urban and rural population and conducted throughout India can be conducted to get a better perspective on knowledge, attitudes, practices and psychological impact of COVID-19. Various measures like online counselling support and buddy groups can be more focused to support the general population.

CONCLUSION

Knowledge scores varied among age, sex, level of education and had a significant association with occupation ($p<0.001$). Higher knowledge was found to be associated with better attitudes and adequate preventive practices towards COVID-19 ($p=0.08$). The rise in COVID-19 cases and deaths in India and the subsequent implementation of lockdown had an impact on the psychological health of the respondents. Better knowledge scores indicated better psychological health in terms of anxiety and stress but yielded higher depressive symptoms which were not statistically significant. Despite various stakeholders having come forward with approaches to provide orientation on psychological well-being of people, they have to be done on a large scale to reach both urban and rural population, and also across all age groups.

ACKNOWLEDGEMENTS

We thank all the participants involved in this study for their time and cooperation.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Review Committee.

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Cite this article as: Salam H, Bhat N, Chakraborty A, Acharya S. Assessment of knowledge, attitude and practice towards COVID-19 and its' psychological impact among the public of a metropolitan city of South India. Int J Community Med Public Health 2020;7:4414-23.