

## Public knowledge, Attitude and Practices towards COVID-19: A cross-sectional study in India

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### Abstract:

**Background:** In December 2019, a pathogenic human corona virus SARS- CoV-2, corona virus disease 2019 (COVID-19), was recognized and has caused serious illness and numerous deaths. In an effort to mitigate the outbreak of COVID-19, many countries have imposed drastic lockdown and movement control on their residents. The effectiveness of these mitigation measures is highly dependent on cooperation and compliance of all members of society. The knowledge, attitudes and practices people hold toward the disease play an important role in determining a country's readiness to accept behavioral change measures from health authorities. The aim of this study was to determine the knowledge levels, attitudes and practices toward COVID-19 among the Indian public.

**Materials and Methods:** A cross-sectional online survey of Indian residents was conducted between 9th July and 18th July 2020. The survey questionnaire consisted of demographic characteristics, 13 items on knowledge, 5 items on attitudes and 8 items on practices, modified from a previously published questionnaire on COVID-19. Descriptive statistics, chi-square tests, t-tests and one-way analysis of variance (ANOVA) were conducted.

**Results:** Results obtained after statistical analysis of responses of the questionnaire shows that mean knowledge score of the participants was 10.921 (out of 13), while mean scores of attitude and practices were 2.930 (out of 5) and 7.42 (out of 8) respectively. Significant difference of knowledge (p value <0.05) was found when comparison between area of residence (urban > rural), level of education (PG/Professional > UG, 12th std.) and occupation (HCW > non HCW) was done. Significant difference in attitude was seen only when occupation was compared. Non Health care workers (non HCW) showing more positivity in attitude than the HCWs. As far as practices are concerned, there was no significant difference found in any of the socio-demographic variable. All the section of the society were found to follow healthy practices relevant to prevention of COVID-19.

**Conclusion:** The present study provides a comprehensive examination of the knowledge, attitudes and practices of Indian population towards COVID-19. The findings suggest that people of our country have an acceptable level of knowledge on COVID-19 and are generally positive in their outlook on overcoming the pandemic and most of the participants follows healthy practices. Government should conduct similar studies at national level to include large number of participants. Analysis of KAP in country's public will help government in formulating policies for handling COVID-19 health crisis in a much better way.

**Key Word:** COVID-19; Novel corona virus; Knowledge; Attitude; Practice; Social distancing; Lockdown.

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### I. Introduction

In December 2019, a pathogenic human corona virus SARS- CoV-2, causing corona virus disease 2019 (COVID-19), was recognized and has caused serious illness and numerous deaths<sup>(1)</sup>. The disease causes respiratory illness (Influenza like illness) with main clinical symptoms such as a dry cough, fever, and in more severe cases, difficulty in breathing. COVID- 19 is highly contagious with a certain mortality rate, and it was classified as a class B infectious disease and managed as a class A infectious disease in China in January 2020<sup>(2)</sup>. The epidemics of COVID-19 have been recorded over 200 countries, with more than 17 Million confirmed cases and around 6.7 Lakh death cases worldwide ,while approx 17 lakhs confirmed cases and 36 thousand deaths in India till date<sup>(3)</sup>. On 11 March 2020, WHO changed the status of the COVID-19 emergency from public health international emergency (30th January 2020) to a pandemic.

In India, a confirmed case of COVID-19 was reported on 30th January 2020, who was a student traveled from Wuhan, China, and has successfully recovered from the infection on 14th February 2020<sup>(4,5,6)</sup>. complete lockdown for 21 d (*i.e.* up to 14th April 2020), which was further extended in phases upto 31<sup>st</sup> May 2020, which only allowed essential services to operate over the entire 130 million population of India<sup>(7)</sup>. After a 14-hour voluntary public curfew named as 'Janta Curfew', India immediately announced the implementation of a nation-wide. The battle against COVID-19 is still unending in India.

Lockdown measures were perceived as necessary to curb the spread of the virus as rapid human-to-human transmission occurred and much about the virus remained unknown<sup>(8)</sup>. Due to the obscurity of this novel virus, there has been a lot of confusion and misunderstanding about the virus itself, how it can spread and the necessary precautions that should be taken to prevent infection. This becomes increasingly challenging with the vast amount of misinformation and disinformation shared on social media that is clouding people's understanding of COVID-19<sup>(8)</sup>. When the initial lockdown announcement was made, country's public reacted in panic and confusion. Aside from panic buying, people crowded public transportation hubs to travel back to their hometowns, potentially increasing the risk of infection to other parts of the country. While this reaction was not unexpected, it raises questions regarding the level of understanding and attitudes toward COVID-19 among Indian.

The knowledge, attitudes and practices (KAP) toward COVID-19 play an integral role in determining a society's readiness to accept behavioral change measures from health authorities. KAP studies provide baseline information to determine the type of intervention that may be required to change misconceptions about the virus. Assessing the KAP related to COVID-19 among the general public would be helpful to provide better insight to address poor knowledge about the disease and the development of preventive strategies and health promotion programs.

Among the lessons learned from the SARS outbreak is that knowledge and attitudes are associated with levels of panic and emotion which could further complicate measures to contain the spread of the disease<sup>(9,10)</sup>.

Therefore we conducted a survey to investigate the KAP towards COVID-19 among the general population of India.

## **II. Material & Methods**

**Study Design:** A quantitative approach was utilised to achieve the objectives of this study. A survey is most appropriate as it allows large populations to be assessed with relative ease<sup>(11)</sup>.

**Study Duration:** 9<sup>th</sup> July 2020 to 18<sup>th</sup> July 2020 (10 days).

**Sample size:** 670 online participants who filled the Google survey form.

**Subjects & selection method :** A cross-sectional survey was chosen as the most appropriate way to gather information on COVID-19 for KAP among common public as social distancing had to be maintained. Online survey using Google forms was the only way to reach among the people living all over the country. The link of Google form was posted and circulated using various social media platforms like Whatsapp Groups, facebook and instagram. The study participants were informed about the details of the study objectives for filling the questionnaire and confidentiality at the beginning of the survey, and informed consent was obtained from each participant. It has been disclosed to all the participants that their identity will keep confidential and the results will be used only for research purposes. 670 complete responses were submitted during the study duration.

### **Questionnaire:**

A self-designed questionnaire was prepared, which comprised two parts to collect demographic details of the participants along with KAP towards COVID-19. The questions were established on the basis of some published literature<sup>(12,13)</sup> and the authors' experience of KAP.

The questionnaire consisted of four main themes: 1) Demographics, which surveyed participants' socio-demographic information, including gender, age, area of residence, education status and occupation 2) Knowledge about COVID-19; 3) Attitude towards COVID 19 pandemic and 4) Practices relevant to COVID-19. The survey was offered in the English language.

To measure knowledge about COVID-19, 13 items were adapted from previous research<sup>(14)</sup>. Participants were given "true", "false" or "not sure" response options to these items. A correct response to an item was assigned 1 point, while an incorrect/not sure response was assigned 0 points. The maximum total score ranged from 0–13, with a higher score indicating better knowledge about COVID -19.

To measure attitude towards COVID-19, surveyed participants were asked whether they agreed, disagreed or were not sure that the pandemic would be successfully controlled. They were also asked about their confidence towards the government in winning the battle against COVID-19 (yes or no) and about the ability of the government in handling the COVID-19 crisis (agree, disagree, or not

sure). People were also asked whether they think lockdown was successfully implemented in our country (agree, disagree, or not sure) and whether they think that social media is the correct platform for spreading knowledge about COVID -19 (Agree , Disagree , or not sure). To measure practices , participants were asked yes/no questions.

Similarly, for analyzing about practices relevant to COVID-19 , 8 questions were asked and responses were collected in form of “Yes/No” options.

**Statistical analysis:**

Statistical analyses were performed using Microsoft excel sheet and various statistical softwares. Knowledge, attitude, and practice scores were tested for normality of distribution . Measured data were expressed as mean±SD and categorical data were expressed as frequency and percentage. Parametric tests (*t* and ANOVA) were used for comparison between different subgroups of the participants. Comparison of KAP scores among the participants with respect to gender, age-category , area of residence, occupation and education status was done using independent samples *t*-test and one-way analysis of variance (ANOVA), as appropriate. The statistical significance level of the test was then calculated.

**III. Results**

**Demographic characteristics:**

A total of 670 participants participated in our study. Frequency and percentage of all the demographic characteristics like gender, age, educational status and occupation are represented below in tabular format.

**Table -1 : GENDER**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid M	359	53.6	53.6	53.6
F	311	46.4	46.4	100.0
Total	670	100.0	100.0	

Out of the 670 participants, 53.6% were males while rest were female ( 46.4%).

**Table -2 : AGE CATEGORY ( in years)**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 18-24	98	14.6	14.6	14.6
25-40	418	62.4	62.4	77.0
41-60	141	21.1	21.1	98.1
>60	13	1.9	1.9	100.0
Total	670	100.0	100.0	

In our study, most of the participants belongs to the age group 25-40 years (~62%); followed by 41-60 years (~21%) , 18-24 years (~15%) and >60 years (~2%).

**Table -3 :RESIDENTIAL AREA**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Urban	577	86.1	86.1	86.1
Rural	93	13.9	13.9	100.0
Total	670	100.0	100.0	

Most of the participants of this study belongs to Urban area (~86%) while only around 14% belongs to rural area.

**Table -4 : EDUCATIONAL STATUS**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Up to 12 <sup>th</sup> std.	30	4.5	4.5	4.5
Graduation	192	28.6	28.6	33.1
PG/ professional	448	66.9	66.9	100.0
Total	670	100.0	100.0	

Educational level of participants in this study is quite high as around 67% of them are post graduate or belongs to any professional education background.

**Table -5 : OCCUPATION**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	HCW	254	37.9	37.9	37.9
	Non- HCW	416	62.1	62.1	100.0
	Total	670	100.0	100.0	

Health care workers (HCW) comprises around 38% of the study population while 62% were non health care workers.

**Table -6 : Knowledge , Attitude and Practice Score (Mean, N=670)**

In the questionnaire , one point was allotted to every correct answer in knowledge section (K-1,2,3,4,7,9,11,12,13 : ‘True’ is the correct answer. K-5,6,10: ‘False’ is the correct answer.

K-8 : ‘I’m not sure ‘is the correct answer).

In Attitude section, one point is given to every answer indicating positive attitude ( “Agree” as the marked option).

In Practice section one point is given to every answer indicating healthy practices

(In P - 1,2,3,4,5,7,8: Yes & in P-6 :No ,indicating healthy practices)

	N	Mean	Std. Deviation
K-1 ) The main clinical symptoms of COVID-19 are fever, fatigue, dry cough,and body aches.	670	.942	.2343
K-2) Unlike the common cold; stuffy nose, runny nose, and sneezing are less common in persons infected with the COVID-19 virus.	670	.618	.4863
K-3) There currently is no effective cure for COVID-19, but early symptomatic and supportive treatment can help most patients recover from the infection	670	.961	.1933
K-4) Not all persons with COVID-19 will develop to severe cases. Only those who are elderly and have chronic illnesses are more likely to be severe cases	670	.872	.3347
K-5) Eating or touching wild animals would result in the infection by the COVID-19 virus.	670	.693	.4618
K-6) Persons with COVID-19 cannot transmit the virus to others if they do not have a fever	670	.891	.3118
K-7) The COVID-19 virus spreads via respiratory droplets of infected individuals	670	.930	.2556
K-8) The COVID-19 virus is airborne.	670	.252	.4346
K-9) Ordinary residents can wear face masks to prevent the infection by the COVID-19 virus	670	.931	.2531
K-10) It is not necessary for children and young adults to take measures to prevent the infection by the COVID-19 virus.	670	.901	.2982
K-11) To prevent the infection by COVID-19, individuals should avoid going to crowded places and avoid taking public transportations	670	.985	.1213
K-12) Isolation and treatment of people who are infected with the COVID-19 virus are effective ways to reduce the spread of the virus	670	.972	.1661
K-13) People who have contact with someone infected with the COVID-19 virus should be immediately isolated in a proper place. In general, the isolation period is 14 days.	670	.973	.1618
<b>Knowledge_total</b>	<b>670</b>	<b>10.921</b>	<b>1.4878</b>
A-1) Do you agree that COVID-19 will be successfully controlled?	670	.570	.4954
A-2) Do you have confidence that India can win battle against the COVID 19	670	.710	.4539
A-3) The Government of India is handling the COVID-19 health crisis very well	670	.557	.4971
A-4) Lockdown was properly and successfully implemented in our country	670	.496	.5004
A-5) Social media (like Whatsapp, Facebook) is the appropriate platform for spreading knowledge about COVID 19 disease	670	.597	.4909
<b>Attitude_total</b>	<b>670</b>	<b>2.930</b>	<b>1.5598</b>

P-1) Were you avoiding going to the crowded places, started wearing mask and were washing hands frequently even before lockdown was forced?	670	.745	.4363
P-2) Did the outbreak of the COVID-19 virus make you increase the frequency of washing hands?	670	.973	.1618
P-3) Did the outbreak of the COVID-19 virus make you use hand sanitizer more frequently?	670	.966	.1822
P-4) If you find someone not following measures to control spread of COVID-19 (eg; not wearing face mask, not maintaining social distancing, travelling without any necessary purpose) then will you try to make him/her aware about importance of following these measures?	670	.951	.2166
P-5) Do you carry hand sanitizer with you everytime you step out of your house?	670	.884	.3210
P-6) Have you travelled without any important reason since the outbreak of Covid-19 in India?	670	.906	.2921
P-7) Have you downloaded Arogya Setu app in your mobile phone?	670	1.000	.0000
P-8) Are you maintaining social distancing ? (Indoor and outdoor both)	670	1.000	.0000
<b>Practice_total</b>	<b>670</b>	<b>7.42</b>	<b>.823</b>
<b>Valid N</b>	<b>670</b>		

### Assessment of knowledge

A total of thirteen questions were used to measure knowledge on the COVID-19 virus. The difference of knowledge among various socio-demographic characteristics is presented below in tabular manner.

Variable		N	Mean score (out of 13)	SD	p- value
Gender	M	359	10.916	1.5851	0.934
	F	311	10.926	1.3694	
Residence	U	577	11.028	1.3369	0.000
	R	93	10.258	2.0950	
Occupation	HCW	254	11.264	1.2595	0.000
	Non- HCW	416	10.712	1.5765	
Age	18- 24	98	10.673	1.5045	0.189
	25- 40	418	10.916	1.4838	
	41- 60	141	11.099	1.4895	
	>60	13	11.000	1.3540	
Education	Up to 12	30	10.200	1.6692	0.000
	Graduation	192	10.656	1.8381	
	PG/ Prof.	448	11.083	1.2638	

**Table 7:** Difference of Knowledge among socio-demographic characteristics

As far as our study is concerned, the mean knowledge score was higher in females as compared to males, but result were insignificant ( $p$  values  $>0.05$ ). Knowledge score of urban population and health care workers were higher as compared to rural population and non health care workers respectively and the results were significant ( $p$  value  $<0.05$ ). This is acceptable due to higher educational status and technological exposure of the people in urban area. Similarly the health care worker were expected to have better practical knowledge and information about the illness.

When compared between different age groups, highest knowledge score is seen in 41-60 years age group and minimum in 18-24 years age group with no significant difference ( $p$  value  $>0.05$ ). Participants with post graduate or professional educational background have highest mean knowledge score ( $p$  value  $<0.05$ ).

### Assessment of Attitude

Participants were asked five questions in assessment of attitudes. COVID-19 can be successfully controlled, Answers such as India can win battle against COVID -19, Government of India is handling this health crisis well, lockdown was successful in India and social media should be used appropriately for spread of awareness for COVID-19 were considered as "Positive attitude".

**Table 8:** Difference of Attitude among socio demographic characteristics

Variable		N	Mean	SD	p- value
Gender	M	359	7.42	.765	0.853
	F	311	7.41	.886	
Residence	U	577	7.42	.840	0.985
	R	93	7.42	.712	
Occupation	HCW	254	7.44	.812	0.508
	Non- HCW	416	7.40	.830	
Age	18- 24	98	7.48	.763	0.546
	25- 40	418	7.42	.795	
	41- 60	141	7.35	.957	
	>60	13	7.62	.506	
Education	Up to 12	30	7.57	.626	0.268
	G	192	7.47	.745	
	PG/ Prof.	448	7.38	.864	

In our study males, urban population and non health care workers were found to have more positive attitude as compared to females, rural population and health care workers respectively. Among different age groups, those above 60 years of age show most positivity in their attitudes. As far as education status is concerned, those educated only up to 12<sup>th</sup> standard were most positive in their attitude towards COVID 19 health crisis.

These differences were not statistically significant. Only non health care workers showed significantly more positive attitude than health care workers (p value <0.05) which is the most important finding of our study. This “less positive” attitude from the health care workers might be due to the fact that health care workers are more aware of the exact scenario of the pandemic and are also aware of the possible consequences in future due to lack of highly efficient healthcare facilities in our country as compared to developed countries.

#### Assessment of Practices

Practices toward COVID-19 were measured using eight questions enquiring on healthy practices to prevent themselves and community from COVID – 19. Avoiding going to crowded places even before lockdown, washing hands frequently, always keeping sanitizer when going outside, using hand sanitizer frequently, making people aware about preventive measures, not travelling without important reasons, downloading Arogya Setu app and maintaining social distancing were considered as “Healthy practices”.

**Table 9:** Difference of Practices among sociodemographic characteristics

Variable		N	Mean	SD	p- value
Gender	M	359	3.014	1.5775	0.934
	F	311	2.833	1.5359	
Residence	U	577	2.934	1.5487	0.859
	R	93	2.903	1.6356	
Occupation	HCW	254	2.689	1.6496	0.002
	Non- HCW	416	3.077	1.4853	
Age	18- 24	98	2.857	1.5860	0.348
	25- 40	418	2.873	1.5734	
	41- 60	141	3.128	1.4969	
	>60	13	3.154	1.5730	
Education	Up to 12	30	3.267	1.5298	0.127
	G	192	2.760	1.6452	
	PG/ Prof.	448	2.980	1.5201	

In our study it was seen that participants belonging to any gender, residential area, occupation, age group or educational status were following “Healthy practices” and no significant difference in practices were found among them (p value >0.05).

#### IV. Discussion

COVID-19 is a relatively new virus that has had devastating effects within the short period of time since it was first detected in December 2019 in Wuhan, China. There has been limited published data on population knowledge, attitudes and practices toward COVID-19, in India or any other part of world. The novelty and uncertainty of this disease, make it critical for health authorities to plan appropriate strategies to prepare and manage the public of a large country like India. It is therefore very much important that the knowledge, attitudes and practices of the population is to be studied to guide these efforts.

The mean knowledge score of the 670 participants in our study was 10.921 (out of 13). Significant difference in knowledge score ( $p$  value  $<0.05$ ) was found when variables such as residential area (urban  $>$  rural), occupation (HCW  $>$  Non HCW) and educational status (highest in Post graduates or professionals) were compared. These findings are consistent with studies in other countries [12,13,15]. This good score is justifiable as the study sample mostly included the urban classes who were well-educated. Moreover, the media health education campaign during the outbreak would have contributed to the knowledge about disease. The early initiation of public awareness campaigns by the Government of India at all levels has contributed in enhancing the knowledge and awareness of the masses and has also controlled the rumours and misinformation.

The mean "Positive attitude" score in the study was 2.93 (out of 5.0). Significant results were found ( $p$  value  $<0.05$ ) only when occupation was compared. It showed that non health care workers showed significantly more positive attitude towards COVID 19 health crisis as compared to health care workers. This finding is not consistent with other studies as they showed greater positive attitude in HCWs. This significantly lesser probability of positive attitude among HCW could be justified due to their concerns about contracting the virus and infecting their families. The better positive attitude among non health care workers can again be contributed to the mass media health awareness campaigns which could have enhanced the optimistic attitude.

When practices were evaluated in our study, it was found that most of the participants were following "Healthy practices" with mean healthy practices score of 7.42 (out of 8.0). None of the socio-demographic variables, when compared, showed significant differences in practices. ( $p$  value  $>$ ). This finding suggests that health awareness campaigns had a definite beneficial effect in enhancing the public's understanding of the disease and brought about positive behavioural change, thus bridging the gap of all the socio-demographic variables.

#### **Limitations of our Study:**

- 1) Our study population was over representative of Urban, well educated people, therefore we may have overestimated the knowledge and attitude towards COVID 19. Moreover, as the study was conducted through online questionnaire, the sample was not representative of the vulnerable population such as elderly, low socioeconomic population and rural population who are more likely to have poor knowledge, attitude and practices.
- 2) Due to shortage of time, our questionnaire was un-standardised and in single language. A questionnaire which involves in-depth interview and multi-dimensional responses should have been better for the assessment of attitude and practices towards COVID 19.

#### **V. Conclusion**

The present study provides a comprehensive examination of the knowledge, attitudes and practices of a sample Indian population towards COVID-19. The findings suggest that people of our country have an acceptable level of knowledge on COVID-19 and are generally positive in their outlook on overcoming the pandemic. The best thing to be noted was that healthy practices for preventing the spread of COVID 19 were being adopted by all segments of the society.

Consistent messaging from the government and health authorities, proper use of social media by responsible citizens are key to enhance public knowledge and understanding of COVID-19. Some categories of the population may benefit from specific health education programs to raise COVID-19 knowledge and improve practices. Government should look after the safety and needs of the healthcare workers involved in combating the health crisis in the country so that they may develop and maintain positive attitude for handling this pandemic.

It is our opinion and suggestion that more such KAP studies should be conducted in near future at a broad level as it can help the policy makers in identifying the target population in the different demographic group and conduct specially designed awareness programs. We can further study the effect of these behavioural changes on the control of the disease in our country.

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