

Original Research Article

Assessment of knowledge, attitude and practices regarding COVID-19 pandemic among general population in a suburban city of Western India: a cross sectional study

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ABSTRACT

Background: The aim of the present study was to assess the knowledge, attitude and practices (KAP) regarding COVID-19 pandemic among general population.

Methods: A cross sectional study was conducted among general population residing in Navi Mumbai, India, by distributing online based predesigned, prevalidated and semi-structured survey questionnaire through social media from 20 April to 27 April, 2020. The survey instrument consisted of questions based on demographic characteristics followed by knowledge (12 questions), attitude (11 questions) and practices (5 questions). Individuals above 18 years of age, able to understand English language and willing to voluntarily consent were included in the study.

Results: A total of 817 participants were included in the study. The mean knowledge score was 10.04 ± 1.52 with an overall accurate response rate of 83.70%. Most of the participants had positive attitude regarding COVID-19 pandemic. A positive correlation was found between level of education with mean knowledge scores as well as positive attitude towards COVID-19 using Kruskal-Wallis H test (non-parametric ANOVA) which was statistically significant ($p < 0.001$). Majority of participants followed infection prevention guidelines including the use of facemask (94.61%), appropriate hand hygiene practices (93.26%), maintaining social distancing (97.42%) and avoiding direct personal contact through hand shake/hugging (97.42%).

Conclusions: The study highlights the importance of level of education with correct knowledge, positive attitude and appropriate practices. The information can further assist policy makers to predict success or make necessary modifications with respect to infection mitigation measures based on knowledge, attitude and practices of targeted population.

Keywords: Attitude and practices, COVID-19, Knowledge, Pandemic, Survey

INTRODUCTION

The ongoing coronavirus (COVID-19) pandemic was first reported following an outbreak of respiratory tract illness in Wuhan, the capital city of Hubei province, within Central China on 29th December 2019.¹⁻³ As on 14 June 2020, there have been 7,860,524 confirmed cases of COVID-19 including 431,918 deaths in 213 countries and territories around the world.⁴ India reported its first case

of COVID19 pandemic in the state of Kerala on 30th January, 2020.⁵ Maharashtra is the worst affected state in India with 104,568 confirmed COVID-19 cases and 3,830 deaths reported as on 14 June, 2020.⁶

On 24 March, 2020 the Prime Minister of India announced a nationwide lockdown, the largest and one of the most stringent across the globe as a mitigation measure to prevent human-to-human transmission of

coronavirus infection.⁷ During this unprecedented crisis of the pandemic exaggerated information and non evidence based measures can create considerable panic and inappropriate actions among general masses leading to faulty decision making process.⁸ It is crucial to provide timely, consistent and reliable source of health information to the general public to avoid misconceptions and unscientific practices. Online sources and social media play a pivotal role in providing information related to the disease during such outbreaks. Several websites including the World Health Organization (WHO) and Center for Disease Control and Prevention (CDC) are providing myth busters to check false beliefs and misinformation spreading within the community.⁹ The government of India has also taken steps against unverified information about the pandemic circulating on social media which is bound to create misunderstanding and misconception in the minds of general population.¹⁰

Knowledge about the lesser known novel coronavirus is being constantly added to the existing pool of information regarding the very nature of this virus in the first place, the transmission routes and preventive measures. A cross-sectional study which can assess the knowledge, attitude and practices (KAP) of the masses can certainly help to understand the practical implementations of various measures and awareness that are being propagated by the government. These types of studies can also help in providing future insight in areas that needs more emphasis. Keeping these thoughts in mind, a decision to conduct a KAP study was made.

The aim of the present study was to assess the knowledge, attitude and practices (KAP) amongst general population with regards to COVID-19 pandemic.

METHODS

Study design and population

This cross sectional study was conducted among general population residing in Navi Mumbai, India.

Data measurement methods

A pre-designed, pre-validated, semi structured survey questionnaire was prepared in English language based on updated COVID-19 information provided by the WHO and CDC through their official website. Since community-based sampling survey was not feasible because of the country-wide lockdown, the survey questionnaire was distributed online using social media platform through Whatsapp for a duration of one week starting from 20th April to 27th April, 2020. Whatsapp is the most common online mobile messaging application used in India and hence was chosen for this study.¹¹ On clicking the online survey link participants were able to access the questionnaire and submit their responses which were recorded electronically. Individuals failing to

respond to the survey questionnaire in the first instance were resent the survey link after a gap of three days.

Sampling technique and sample size calculation

The method of snowball sampling technique was used in the present study. Assuming the expected population standard deviation to be ($\sigma=1.7$), and employing t-distribution to estimate sample size, the study would require a sample size of 771 to estimate a mean with 95% confidence and a precision of ($E=0.12$)

$$n = \left(\frac{Z * \sigma}{E} \right)^2$$

Where, $Z=1.96$ at 95% confidence level.

Considering 5% non-response rate, the required sample size of 810 ($771+39=810$) would have been sufficient. A total of 817 successfully responded and were thus included in the study.

Survey instrument

The survey questionnaire/data collection form consisted of a brief introduction regarding aims and objectives of the study at the very beginning followed by declaration of confidentiality and anonymity of the participant. Consent regarding voluntary participation was taken by asking the participants to answer a 'yes-no' question format. Participants willing to consent were then directed to complete rest of the survey questions. All participants above 18 years of age, able to understand English language and willing to voluntarily participate were included in the study.

The online survey questionnaire was forwarded to Nine-hundred and seventy-eight people, of which, eight-hundred and seventeen replied and were included in the study. The survey consisted of 25 questions that were divided into two different parts: demographics (4 questions including name, age, gender and level of education) and KAP (total 28 questions which included: Knowledge K1-K12; Attitude A1-A11 and Practices P1-P5).

It was mandatory to answer all questions for successful submission of questionnaire form. Knowledge was assessed using a 12 point scoring system with a higher score indicating better knowledge regarding COVID-19. Participants were offered 'true' or 'false' response options to choose from. Each correct response was awarded 1 point while no points were awarded for incorrect responses. These questions were based on participants' knowledge regarding COVID-19 disease characteristics, transmission routes, clinical presentation and prevention and treatment guidelines. Attitude was assessed using a 5 point Likert's scale (completely disagree, disagree, neutral, agree, and completely agree).¹²

Statistical analysis

The final results were expressed as mean with standard deviation and $p < 0.05$ was considered to be statistically significant. The final analysis was done using Epi Info software (version 3.4.3) and Microsoft Excel 2013 (Microsoft Office version 15.0).

RESULTS

Demographic characteristics

A total of 817 participants were included in the study. The mean age of participants was 36.80 ± 9.97 years. More than half of the population 439 (53.7%) were young adults between 18 and 35 years of age, whereas, only 50 (6.1%) participants were from elderly age group.

Table 1: Demographic characteristics of study participants (N=817).

Characteristics	N (817)	Percentage
Age (years)		
18-25	94	11.5
25-30	81	9.9
30-35	264	32.3
35-40	122	14.9
40-45	90	11.0
45-50	69	8.4
50-55	47	5.8
55-60	32	3.9
60-65	11	1.3
>65	7	0.9
Gender		
Male	421	51.5
Female	396	48.5
Level of education		
Up to 10+2	13	1.6
Undergraduate	105	12.9
Graduate	500	61.2
Postgraduate or above	199	24.4

There was a marginal male preponderance comprising of 421 (51.5%) participants in the present study. Nearly two-thirds (61.2%) of the population were graduates in the present study whereas only 1.6% of the participants had an education level upto junior college. The demographic characteristics of the study participants are shown in Table 1.

The normality of the dependent variables “total knowledge score” and “total attitude score” was tested using Kolmogorov-Smirnov test and Shapiro-Wilk test and the data was found to be non-normal and hence further analysis was carried out using non-parametric tests of significance.

Assessment of knowledge

The response from the participants for question based on the knowledge are summarized in Table 2.

While majority of the participants could answer most of the questions correctly with a mean knowledge score of 10.04 ± 1.52 and an average overall correct response rate of 83.70%, there were few responses with discrepancies. Almost all the participants (98.2%) in the survey knew the meaning of number ‘19’ in COVID-19 (question 1), which implies that majority of the people are aware about this pandemic. A strong agreement was seen in the knowledge regarding the host (question 2), environment (question 3), transmission (question 5), clinical symptoms (questions 6 and 7) and prevention (questions 4, 8 and 11) of coronavirus infection. More than two-thirds (67.2%) of the participants were of the opinion that a person who has been infected with coronavirus infection cannot get re-infected (question 12). Similarly, just less than one-fifth of the participants (18.24%) were of the opinion that spraying of alcohol or chlorine all over the body provides no protection from coronavirus infection (question 9). Nonetheless, more than three-quarters of the participants (83.6%) believed that specific drugs like hydroxy-chloroquine cannot cure coronavirus infection (question 10).

Table 2: Participants knowledge of COVID-19 (n=817).

S. no.	Question	Yes	No
1	In COVID-19, the number ‘19’ denotes the year it started spreading	786 (96.21)	31 (3.79)
2	Only elderly or immune deficient individuals can get infected and die of coronavirus infection	78 (9.55)	739 (90.45)
3	Corona virus cannot spread in hot and humid climate	56 (6.85)	761 (93.15)
4	Hand hygiene using soap and water is superior than using alcohol based sanitizer in case of visibly dirty or soiled hands.	745 (91.19)	72 (8.81)
5	Coronavirus transmission cannot occur through mosquito bites	743 (90.94)	74 (9.06)
6	The incubation period (time from catching the virus to developing symptoms of disease) ranges from 1 to 14 days	783 (95.84)	34 (4.16)
7	Any patient with only mild fever should be considered a suspected case of coronavirus infection	88 (10.77)	729 (89.23)
8	Consumption of alcohol protects from acquiring coronavirus infection	30 (3.67)	787 (96.33)

Continued.

S. no.	Question	Yes	No
9	Spraying of alcohol or chlorine all over the body offers no protection from coronavirus infection.	149 (18.24)	668 (81.76)
10	Specific drugs (like hydroxychloroquine) can cure coronavirus infection	134 (16.40)	683 (83.60)
11	Vaccines against seasonal flu can protect against coronavirus infection	65 (7.96)	752 (92.04)
12	A patient cured of coronavirus infection can get re-infected with the same virus	268 (32.80)	549 (67.20)

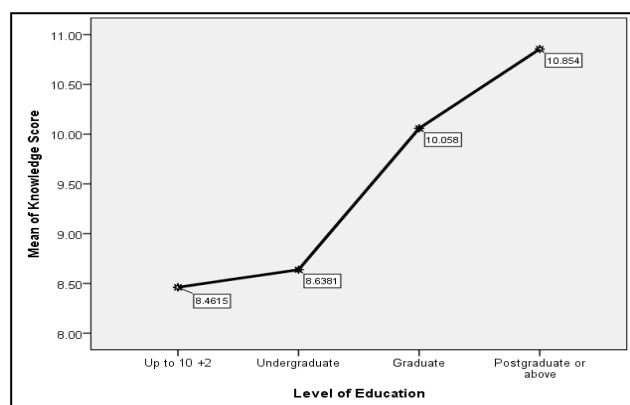


Figure 1: Correlation of mean knowledge scores and level of education.

The correlation between mean knowledge scores and level of education (Figure 1) was done using Kruskal-Wallis H test (non-parametric ANOVA) which was statistically significant ($p < 0.001$). The level of knowledge increased with the level of education.

Assessment of attitude

A high percentage of participants believed that COVID-19 infection cannot spread through pet dogs/ cats (83.35%), consumption of meat (90.70%), air conditioners (67.44%), Gaumutra 'cow urine' (72.1%) and vitamin rich citrus fruits (70.87%). Almost all participants (97.43%) believed that extended lockdown is an effective strategy to prevent spread of infection.

However, only 44.55% of participants were confident that a vaccine would be available by the end of this year. More than a quarter (26.19%) of participants were not sure if ayurvedic or homeopathy medicines can coronavirus infection. More than half of the participants (54.83%) believed that migrant workers should be allowed to return to their native places. The response from the participants for question based on attitude are summarized in Table 3.

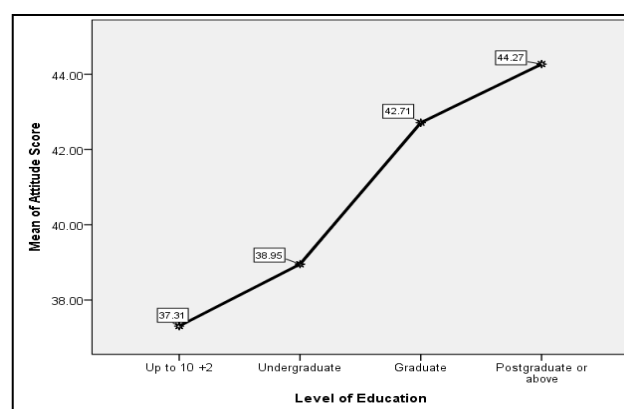


Figure 2: Correlation of mean attitude score with level of education.

The comparison of mean attitude score according to the level of education (Figure 2) was done using Kruskal-Wallis H test (non-parametric ANOVA). The average attitude score increases with higher level of education ($p < 0.001$).

Table 3: Participants attitude of COVID-19 (n=817).

S. no.	Attitude	Completely disagree	Disagree	Neutral	Agree	Completely agree
1	Coronavirus infection can spread through pet dogs/cats	475 (58.14)	206 (25.21)	74 (9.06)	57 (6.98)	5 (0.61)
2	Consumption of meat such as chicken/ mutton can transmit coronavirus infection	654 (80.05)	87 (10.65)	44 (5.39)	30 (3.67)	2 (0.24)
3	Air conditioners are associated with higher risk of coronavirus transmission	248 (30.35)	303 (37.09)	113 (13.83)	139 (17.01)	14 (1.71)
4	Consuming 'Gaumutra' (cow urine) has no role in avoiding the risk of contracting coronavirus infection	0 (0.00)	106 (13.00)	122 (14.9)	222 (27.2)	367 (44.9)
5	Ayurvedic, homeopathy and other herbal medicines can cure coronavirus infection	331 (40.51)	200 (24.48)	214 (26.19)	66 (8.08)	6 (0.73)
6	Consuming vitamin C (citrus fruits like lemon/ orange) will protect you from coronavirus infection	151 (18.48)	428 (52.39)	83 (10.16)	126 (15.42)	29 (3.55)
7	Extended 'lockdown' period is an effective strategy to prevent spread of corona virus infection?	0 (0.00)	13 (1.59)	8 (0.98)	83 (10.16)	713 (87.27)

Continued.

S. no.	Attitude	Completely disagree	Disagree	Neutral	Agree	Completely agree
8	The migrant workers should be allowed to return back to their respective home states during lockdown	150 (18.36)	298 (36.47)	83 (10.16)	257 (31.46)	29 (3.55)
9	The corona virus pandemic will have significant impact on the economic stability of the country	11 (1.35)	22 (2.69)	8 (0.98)	478 (58.51)	298 (36.47)
10	A vaccine against coronavirus would be available by the end of this year.	85 (10.40)	213 (26.07)	155 (18.97)	304 (37.21)	60 (7.34)
11	The media coverage is creating a sense of panic and confusion amongst general public.	75 (9.18)	234 (28.64)	154 (18.85)	295 (36.11)	59 (7.22)

Assessment of practices

Nearly all (94.6%) of the participants used some sort of protective measures to cover their face while stepping out of the house. Of these, 465 (56.91%) participants used a medical mask, 243 (29.74%) participants used a facecloth while 65 (7.95%) participants used an N95 mask or equivalent to cover their nose and mouth. Similarly, a significant proportion of participants used soap-water, hand sanitizer or whichever was available to them to maintain hand hygiene especially when entering their house from outside while a small proportion of 55 (6.73%) participants did not practice hand hygiene measures at all. Social distancing measures were followed by 660 (80.78%) participants, 136 (16.64%) followed it irregularly whereas 21 (2.57%) participants did not practice any measures. Likewise 694 (84.94%) participants strictly avoided social greeting by hand shaking/hugging, 102 (12.48%) refrained intermittently while 21 (2.57%) participants were non compliant. With respect to time spent on internet/ social media, only 52 (6.36%) individuals spent <2 hours while a significant proportion consisting of 665 (81.39%) participants spent time in excess of 4 hours.

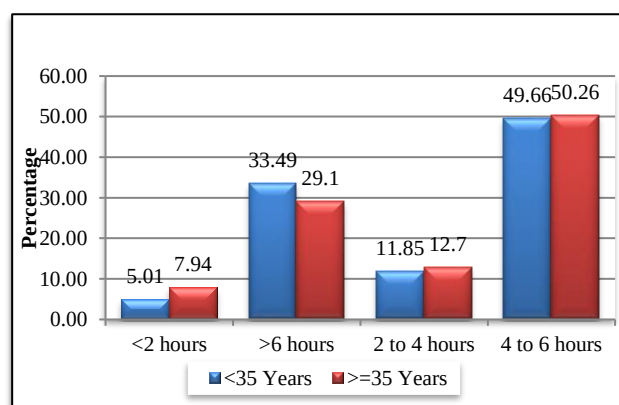


Figure 3: Association between age and average time spent on internet/social media during the lockdown.

The association between age and the time spent on internet/social media during lockdown were as per Figure 3. No statistically significant association was observed between age and the time spent on internet/social media during lockdown ($p=0.25$).

The comparison of mean knowledge scores according to the practices and mean attitude score according to practices was done using Kruskal-Wallis H test (non-parametric ANOVA) and the results obtained were highly statistically significant ($p<0.001$).

DISCUSSION

The Ministry of Health and Family Welfare, India, have confirmed a total of 320,922 cases and 9,195 deaths in the country as on 14 June, 2020.¹³ Navi Mumbai has been one of the worst affected cities in the country where 3357 cases and 86 deaths have been reported.

Inaccurate and misinformation circulating across social media is commonly seen during such sudden outbreaks leading to confusion, panic and stigmatization amongst general population.^{14,15} Behavioural change required during such times is largely dependent on their knowledge, attitude and practices as a guide for successful implementation of public health policies as seen in previous KAP conducted during SARS outbreak in 2003.^{16,17} In 2018, India had over 480 million internet users with majority of them accessing internet through their mobile phones.¹⁸

The mean knowledge score in the present study was 10.04 ± 1.52 with an overall accurate response rate of 83.70%. Similarly moderate knowledge scores were seen in other studies conducted in different parts of the world such as Azlan et al (80.5%), Erfani et al (87.5%) and Abdelhafiz et al.¹⁹⁻²¹ The overall moderate knowledge scores in the present study could be because of better awareness amongst the masses regarding this pandemic through various portals. The comparison between mean knowledge scores and level of education was statistically significant ($p<0.001$) in the present study. Almost all participants knew the meaning of number '19' within 'COVID-19' indicating that they were aware of the ongoing pandemic and its origin. Surprisingly only 18.24% participants in the present study believed that spraying alcohol or chlorine all over the body cannot prevent coronavirus infection. Incidences of spraying disinfectant on suspected infected travelers may have made some people to believe in such harmful practices.²² In spite of the initial promise and success believed with respect to hydroxy-chloroquine, significant proportion of

participants agreed that it cannot cure coronavirus infection.

Despite several incidences of misinformation being circulated through social media, in general the participants in the present study showed positive attitudes towards various myths and disbeliefs prevalent in the society regarding COVID-19. Statistically significant ($p < 0.001$) correlation was found between the level of knowledge and attitude of the participants. The nationwide lockdown involved imposing a ban on all non-essential services, border closures, transport services, educational institutions, industrial establishments, hospitality services, religious institutions etc.²³⁻²⁶ This led to panic buying initially across several states with public crowding at shops and supermarkets for stocking up essential supplies especially groceries, vegetables and dairy products.^{27,28} Despite the hardships faced by the public, a whopping 97.43% participants agreed that the nationwide lockdown was as essential and effective strategy for controlling the pandemic. This viewpoint might have been influenced by the success of lockdown implemented in other part of the world in flattening the epidemic curve and thereby enabling the existing health care system to cope with the rising number of infected cases. With industries and workplaces shut due to lockdown several migrant daily wage workers resorted to walk hundreds of kilometers to return back to their respective hometowns.²⁹ The plight of these migrant workers may have led slightly more than half (54.83%) of the participants to believe that they should be allowed to return back to their respective home states despite the lockdown. A high majority of participants (94.98%) were concerned that the pandemic situation will have a significant impact on economic stability of the country. The prevention of this life threatening pandemic by the use of vaccine has been topic of debate worldwide ever since its inception with most of the countries taking vigorous measures in inventing the same. Mixed attitude was seen among the participants regarding whether a vaccine against coronavirus would be available by the end of year 2020. While just less than half of the participants (44.5%) had a positive attitude that the vaccine for COVID-19 would be available by the end of year 2020, just more than one third of the people were skeptical regarding the same. Similar mixed response was observed regarding the sense of panic and confusion caused by the media regarding this pandemic. About 43.33% of the participants agreed with this notion and believed that media coverage could cause more harm than benefit.

Although the guidelines regarding the use of mask for general public varies in different countries to prevent discriminatory buying, widespread use of facemask to prevent community transmission of coronavirus at source level is recommended.³⁰ The effectiveness of hand hygiene practices has also been shown in previous studies to limit the spread of infection in home and community settings.³¹ Other non pharmaceutical interventions such as

social distancing has proved to be extremely important in preventing infection transmission.³² A high majority of participants in our study followed infection prevention guidelines including the use of facemask (94.61%), appropriate hand hygiene practices (93.26%), maintaining social distancing (97.42%) and avoiding direct personal contact through hand shake/ hugging (97.42%). Such positive behavioural changes adapted by the participants may be as a result of strict lockdown restrictions and public health awareness programs propagated by the government. There was a positive correlation between infection prevention practices and knowledge scores which was statistically significant ($p < 0.001$). Similarly, there existed a positive correlation between level of knowledge and appropriate practices with more qualified participants following rightful practices.

An excess internet usage was seen among our participants with more than fourth-fifth (81.39%) of the participants spending more than 4 hours on the internet daily. With the lockdown under effect such surge in internet usage may be to access pandemic related information, educational online learning, social contact as well as for recreational purposes. No significant correlation was found between age (< 35 years and ≥ 35 years) and mean knowledge scores in comparison with time spent on internet/social media indicating that the vast content available on internet was accessed by participants of all age groups and knowledge background.

The present study highlights the importance of level of education with correct knowledge, positive attitude and appropriate practices. In a vast country like India with high existing internet user population and an ever increasing internet penetration growth rate, both main stream media and social media can be an important medium for propagating public health education in the future.

The strength of the present study was that it was conducted in an area with high number of COVID-19 cases and thus the results of this present study can be applied to a larger group of population.

The present study is not without limitations. Firstly, participants tend to answer self-reported questionnaire which is socially acceptable and favourable. This may result in bias and provide false correlation and relationships between various variables used in the study.³³ Secondly, the survey questionnaire was initially distributed online among the social media contacts of the authors of this study who in turn were asked to forward the questionnaire link online further among their personal contacts. Thus systematic and inclusive community sampling method was not feasible in the present study as the entire country was under lockdown. Lastly, the survey was accessible to only those people who were smartphone users and had the ability to understand the English language.

CONCLUSION

The success of public health programs are largely dependent upon the existing knowledge, attitude and practices of the population being aimed at. Higher level of education helps to improve compliance of infection preventive measures formulated by policy makers among general population which translates into improved overall outcomes and to focus on targeted interventions.

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