

Original Research Article

Knowledge, attitude, and practices in response to COVID-19 pandemic in Indian population

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ABSTRACT

Background: The World Health Organization (WHO) had reported COVID-19 disease as a pandemic in March 2020, following which India witnessed more than 29,451 cases on 29th April. Correct knowledge about the disease, the right attitude, and response to infection control recommendations among people is of utmost importance to limit the contagion.

Methods: A Cross-Sectional, web-based online study was conducted for five days. The responses (N= 1231) were collected across social networks using snowball sampling. The survey questionnaire assessed the knowledge, attitude, and practical aspects of participants for COVID-19. Knowledge items assessed the causative agent of COVID-19, its clinical symptoms, routes of transmission, preventive measures etc. Positive or negative attitudes towards mask usage and restriction compliance were assessed. Socio-demographic data and scores were de-identified and analyzed using appropriate statistical tests.

Results: The mean age of participants (N=1231) was 32.3±13.7 years and 60.9% were males. High knowledge years and 60.9% participants were males. High knowledge accuracy rate of 84.5% and a mean score of 10.19±1.6 out of 12 was observed. Mean attitude and practice scores were 2.33±0.66 (3) and 1.97±0.16 (2) respectively. A significantly higher knowledge status was observed among females, medical workers, students, and homemakers. Similarly, better attitudes were noticed in males, adults (30-60 years), graduates, and those in job/service. As for practices, no such difference was noticed as more than 98% of participants were compliant to lockdown restrictions and practiced proper distancing and personal hygiene measures.

Conclusions: Satisfactory awareness and response were observed owing to the public awareness campaign. Knowledge gaps, poor attitudes, and prevailing myths need to be addressed through targeted communication strategy.

Keywords: Awareness, Pandemic, COVID-19, Coronavirus, India, Health promotion

INTRODUCTION

On 31st December 2019, a Cluster of cases of pneumonia of unknown etiology were detected in Wuhan City, Hubei Province, China, and subsequently, the World Health Organization's (WHO) country office was alerted.^{1,2} The causative agent was confirmed as a Novel Corona Virus

and was officially named as SARS-CoV-2.^{3,4} The Director-general of world health organization (WHO) declared COVID-19 as a pandemic on 11th March 2020.⁵ SARS-CoV-2 is a member of the Coronavirus family and is primarily known to cause respiratory and sometimes gastrointestinal pathology with a spectrum ranging from asymptomatic state to severe fatal disease. A COVID-19

positive case generally presents with a mild disease and symptoms like fever, dry cough, and tiredness.⁶

In India, the very first case of COVID-19 was reported on 30th Jan 2020 and since then it has spread throughout the country.⁷ The virus is primarily spread through nasal and oral droplets either directly or through surfaces (fomites) contaminated by these secretions indirectly.⁸ In densely populated countries like India controlling person to person transmission of such a virus is a big challenge. As per WHO, one of the best preventive measure is physical distancing and strict avoidance of social gatherings.⁹ Indian government took a strict decision of a countrywide complete lockdown from 25th March 2020 to rigidly maintain social distancing which proved challenging for both authorities and the general population.¹⁰ Besides, people have also incurred financial losses which may lead to an economic slowdown thereby further complicating people's lives amidst the pandemic.¹¹ This social experiment of complete lockdown has so far proven to be effective in limiting the contagion. However, it does not eliminate the risk of infection spread once it is eased. As per WHO the mortality rate of COVID-19 is estimated to be 3-4%.¹² In such a grave situation, a population unaware of clinical symptoms and basic preventive measures can be the biggest threat. Therefore, it is very important to know the awareness, social behavior, and attitude of the general population regarding the ongoing COVID19 pandemic to ascertain and anticipate the much-needed community support in limiting the infection spread.

As per our knowledge, only a few studies have been conducted assessing knowledge, attitude, and practices regarding COVID-19 in India, most being locoregional surveys targeting healthcare professionals.¹³ The present study includes representative population across professions and geographical regions to study the factors that may influence behavior and practices in response to this looming pandemic among the Indian population.

METHODS

Study design

Cross-sectional study.

Sample size

To determine the sample size for this online survey, the proportion formula was used, assuming 50% awareness of COVID-19, 3% margin of error, and 95% confidence interval, which was calculated as 1068. A convenient sampling technique was used to catch the required sample for this survey.

Inclusion criteria

All participants currently residing in India of age group 12 and above were included. As the study was carried out

through an online platform, internet access was a prerequisite. All the people to whom the link was forwarded and who gave the consent to voluntarily participate were included.

Exclusion criteria

Responses from outside India were counted invalid and hence excluded. Incomplete forms and responses from participants below 12 years of age were also excluded.

Study setting and study population

Due to lockdown, non-feasibility, and limited outreach of conventional surveys an online survey was planned as it is easy to conduct, cost-effective, and enables the collection of diverse information efficiently. The survey was planned, designed, and conducted at Geetanjali Medical College & Hospital, Udaipur, Rajasthan. A web-designed questionnaire was distributed on social media like WhatsApp and Instagram as a community-based survey was not possible due to the lockdown.¹⁴ Google forms was used as the survey platform. The study population included the author's social networks as the first point of contact and all the people to whom the link of the questionnaire was forwarded through social media platforms to include population which was not directly related to the author. A total of 1240 entrants participated in this study. Study participants belonged to a wide geographical area where the majority represented from north-western Indian states of Delhi, Rajasthan, Gujarat, Uttar Pradesh etc (Fig).

Study duration

The study was completed in a total of 4 weeks (April 2020-May 2020). 2 weeks were dedicated to study planning and pilot testing. After which a 5-day online survey was carried out and data was collected. Data analysis and reporting was completed in 1 week.

Data collection

A pretested online questionnaire link (google form) was first randomly circulated among the author's social networks, later embedded link was carried forward across social media groups (snowball sampling) on request to maximize the outreach. Similarly, the study link was subsequently publicized across peer, professional, and family social groups inviting participation.¹⁵ This survey was carried out for five days starting from 19th March till 23rd March 2020. A total of 1240 people participated in this online survey and after data collection and cleaning 1231 responses were included in the study (5 incompletes, 4 invalid).

Study instrument and questionnaire design process

This cross-sectional survey was carried out through the instrument of a web-designed, pre-validated online

questionnaire which was prepared after referring to previous literature and the WHO website.^{6,16} Keeping in mind the situation of lockdown wherein the general population is highly vulnerable to anxiety, fear, and stress, this study instrument was kept fairly simple and user-friendly thereby encouraging maximum participation.¹⁷ The original study questionnaire was developed in English and was then translated and back-translated into Hindi and regional language for a wider outreach. The questionnaire was designed in the form of an educational quiz and scores were released at the end to peak interest of the participants.

The questionnaire collected information in two parts, socio-demographic profile and KAP. The section for demographic data included gender, age, occupation, education, residence, and e-mail (optional). In the second section, COVID-19 KAP related close-ended questions were incorporated with responses as yes/no/i don't know format keeping in mind the convenience of the respondents.^{16,18}

At the end of the quiz; scores out of 12 for the knowledge section were released and appropriate scientific explanations extracted from the WHO website for the correct and incorrect answers were also provided.

Knowledge items covered major aspects of the COVID-19 pandemic namely- causative agent, major clinical symptoms, mode of transmission, incubation period, and preventive measures. Image-based question was designed for the correct method of mask removal. Some pervasive myths regarding COVID-19 were included to assess their social penetration across different strata.¹⁹ According to the scores, knowledge was divided into three categories-good (>10 points), moderate (7-10 points), and low (0-6 points).

For attitude assessment, three questions were framed to elicit a positive or a negative attitude of the participating population towards the pandemic so far and in days to come. For eg: victimization of health care professionals as a source of infection.²⁰

Two items were framed to assess whether the participants were practicing preventive measures, be it personal sanitation or restriction compliance. The questionnaire was carefully drafted by a team of health experts and was incorporated after a pilot study on 30 people. Post pilot, necessary amendments were made for phrasing and comprehension. Translation was done after an expert review with Forward and reverse drafting of the questionnaire.

Informed consent was taken before submitting the form requiring the participants to submit the form only if they understood the questionnaire completely and voluntarily wanted to participate. To avoid duplication, only one form was made available to a unique email id. The

responses collected were kept confidential and anonymous at all stages of the study.

Statistical analysis

Responses collected were deidentified and reported as collective, combined data. Appropriate institutional ethics approval [GU/HREC/2020/1805] was taken before commencing the survey.

Data was collected, compiled and entered in MS Excel software and analyzed using SPSS Version 24 (SPSS Inc, Chicago IL, USA). All the categorical variables were presented as frequencies and percentages, and all the continuous variables were shown as mean±standard deviation. To compare KAP scores, chi-square test, independent t-test, and one-way ANOVA was used to know the level of significance of variables. P value<0.05 considered statistically significant.

RESULTS

A total of 1231 participant's responses were taken forward for data analysis. Responses were recorded from almost all parts of the country with a good sample distribution (Figure 1). Maximum responses were recorded from the North-western region of India, majority from Gujarat and Delhi while in other parts of India responses were sparsely distributed. The mean age of the participants was 32.3±13.7 years. The majority partakers belonged to the age group of below 30 years and 60.9% were males. Maximum participation of those in the job/service sector was noted (30.3%), followed by students (27.5%). About 45.3% of participants were graduates and 24.3% of participants had an education below higher secondary school level.

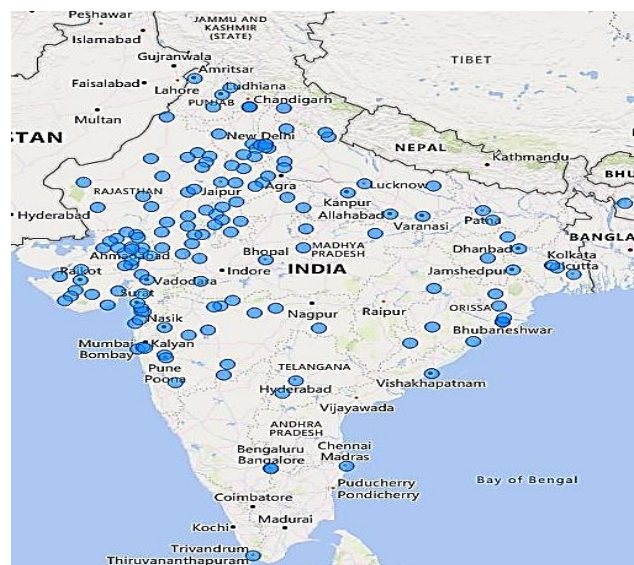


Figure 1: Geographical distribution of study participants across India.

Knowledge

The average knowledge score of participants was 10.19 ± 1.6 out of a scale of 12 as the majority had moderate (52.3%) and good (45.2%) scores. The overall knowledge response accuracy was 84.9% among the participants. A significantly higher knowledge status was observed in females (10.23 ± 1.49) as compared to males (10.03 ± 1.68). Out of all the age groups, participants below 30 years had the highest (10.19 ± 1.47) scores comparatively, though it wasn't found statistically significant ($p=0.083$). Similarly, those with post-graduate degrees had higher scores (10.23 ± 1.51) however the difference wasn't significant compared to other education

categories ($p=0.451$). As for occupation, Medical professionals had the highest (10.68 ± 1.32) score in the knowledge category with a significant difference ($p=0.001$). (Figure 2) A good proportion of people were aware of the novelty (89.2%), transmission (98.9%), and major symptoms (92.3%) of the virus and disease. Regarding transmission, most were aware of asymptomatic transmission ((89.0%), fomite potential (86.8%), and prevention potential of sanitizers (81.6%), masks (84.1%), and physical distancing (95.2%). However, some participants erroneously believed that hot temperature (35.5%), drinking warm water (20.9%) can stop the disease transmission, and antibiotics (8.6%) can effectively cure the symptomatic cases (Table 1).

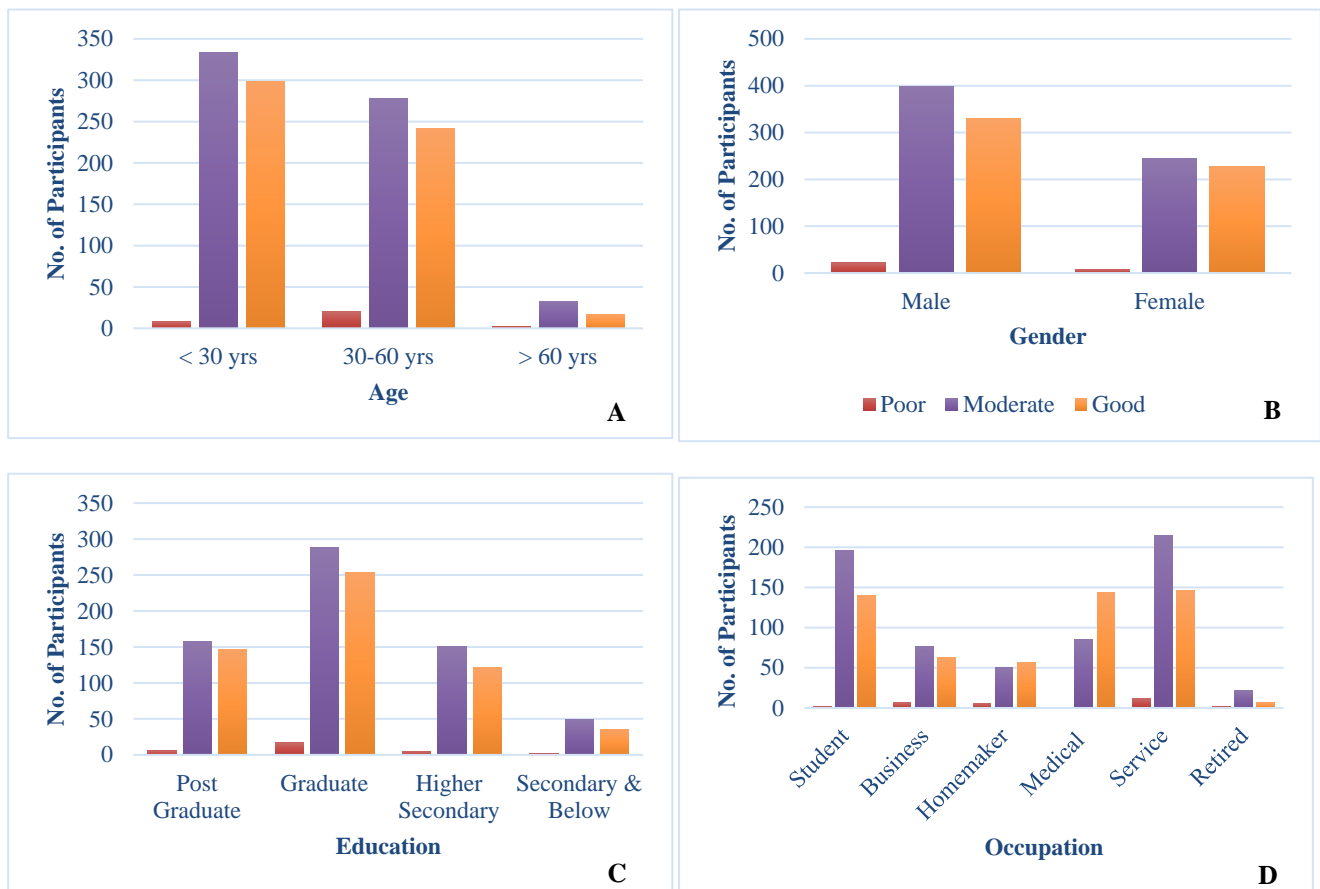


Figure 2: Descriptive bar chart depicting knowledge score categories and distribution among different demographic groups (A) age (B) gender (C) education (D) occupation.

Attitude

Average attitude scoring was 2.33 ± 0.66 out of a scale of 3. Significantly better attitudes ($p < 0.001$) were observed in males (2.40 ± 0.67) as compared to females (2.22 ± 0.63). Out of all the age groups, participants between 30-60 years had the highest (2.41 ± 0.63) scores compared to others with statistical significance ($p < 0.001$). Similarly, those with graduate degrees had significantly ($p = 0.001$) higher scores (2.39 ± 0.65). As for occupation, those in Job/Service had the highest (2.49 ± 0.61) score with a significant difference ($p < 0.001$) (Table 2). A majority of

(89.8%) people said that India's response against the virus was effective and (95.2%) were optimistic that India would successfully overcome the pandemic. However, more than half (52.0%) showed social resistance towards health workers believing infection can spread from them.

Practice

Average practice scoring was 1.97 ± 0.16 out of a scale of 2. Better practices were observed in females (1.98 ± 0.12) compared to males however the difference wasn't statistically significant ($p = 0.109$). Out of all the age

groups, participants above 60 years had the highest (2.00±0.00) score compared to others (p=0.493). Similarly, those with post-graduate degrees had higher scores (1.99±0.08) however the difference wasn't statistically significant (p=0.082). As for occupation,

homemakers and retirees had the highest (2.00±0.00) score though the difference was not significant (p=0.385). (Table 2) Almost every participant stated that they were strictly compliant (99.2%) to lockdown norms and practicing personal hygiene (98.2%).

Table 1: Knowledge, Attitudes and Practice responses of the participants.

| Question item | Response | Frequency (N=1231) | Percent (%) |
|---|--------------|--------------------|-------------|
| 1. SARS-CoV-2 - a newly discovered virus causing COVID-19. | Yes | 1098 | 89.2 |
| | No | 108 | 8.8 |
| | I Don't Know | 25 | 2.0 |
| 2. Covid transmission route | Yes | 1218 | 98.9 |
| | No | 6 | 0.5 |
| | I Don't Know | 7 | 0.6 |
| 3. Major symptoms of COVID-19 | Yes | 1136 | 92.3 |
| | No | 75 | 6.1 |
| | I Don't Know | 20 | 1.6 |
| 4. Asymptomatic spread | Yes | 1095 | 89.0 |
| | No | 96 | 7.8 |
| | I Don't Know | 40 | 3.3 |
| 5. Survival of the virus on fomites | Yes | 1068 | 86.8 |
| | No | 107 | 8.7 |
| | I Don't Know | 56 | 4.5 |
| 6. Hot water as a cure of COVID-19* | No | 691 | 56.1 |
| | Yes | 440 | 35.7 |
| | I Don't Know | 100 | 8.1 |
| 7. Summers/high temperature will kill the virus* | No | 800 | 65.0 |
| | Yes | 257 | 20.9 |
| | I Don't Know | 174 | 14.1 |
| 8. Only alcohol-based (>60% Ethanol) sanitizers effective | Yes | 1005 | 81.6 |
| | No | 157 | 12.8 |
| | I Don't Know | 69 | 5.6 |
| 9. Correct technique of mask handling | Yes | 1035 | 84.1 |
| | No | 117 | 9.5 |
| | I Don't Know | 79 | 6.5 |
| 10. Masks not be used more than 6-hours | Yes | 1077 | 87.5 |
| | No | 69 | 5.6 |
| | I Don't Know | 85 | 6.9 |
| 11. Physical distancing - minimum distance (1 meter) | Yes | 1172 | 95.2 |
| | No | 50 | 4.1 |
| | I Don't Know | 9 | 0.7 |
| 12. Self-medication by antibiotics as a cure of COVID-19* | No | 1051 | 85.4 |
| | Yes | 107 | 8.6 |
| | I Don't Know | 73 | 6.0 |
| 13. Victimisation of health care professionals as a source of infection * | No | 591 | 48.0 |
| | Yes | 640 | 52.0 |
| 14. Effective response to COVID-19 by India | Yes | 1105 | 89.8 |
| | No | 126 | 10.3 |
| 15. Victory against the pandemic | Yes | 1172 | 95.2 |
| | No | 59 | 4.8 |
| 16. Social lockdown compliance | Yes | 1221 | 99.2 |
| | No | 10 | 0.8 |
| 17. Compliance to preventive measures | Yes | 1209 | 98.2 |
| | No | 22 | 1.8 |

Table 2: Descriptive statistics showing the association between knowledge attitude and practices among various demographic strata.

| Variable | Category | Knowledge (12) | | Attitude (3) | | Practice (2) | |
|-----------------------|----------------------|----------------|--------------|---------------|--------------|---------------|--------------|
| | | Mean score±SD | T/F, p value | Mean score±SD | T/F, p value | Mean score±SD | T/F, p value |
| Gender | Male | 10.03±1.68 | -2.06, | 2.40±0.67 | 15.77, | 1.97±0.18 | 10.43, |
| | Female | 10.23±1.49 | 0.039* | 2.22±0.63 | <0.001* | 1.98±0.12 | 0.109 |
| Age (in years) | <30 | 10.19±1.47 | | 2.26±0.68 | | 1.97±0.16 | |
| | 30-60 | 10.06±1.76 | 2.50, | 2.41±0.63 | 7.38, | 1.97±0.17 | 0.70, |
| | >60 | 9.73±1.59 | 0.083 | 2.35±0.52 | 0.001* | 2.00±0.00 | 0.493 |
| Education | Postgraduate | 10.23±1.51 | | 2.35±0.68 | | 1.99±0.08 | |
| | Graduate | 10.05±1.67 | 0.87, | 2.39±0.65 | 5.55, | 1.97±0.16 | 2.25, |
| | H. Secondary | 10.09±1.63 | 0.45 | 2.24±0.63 | 0.001* | 1.96±0.21 | 0.08 |
| | Secondary & Below | 10.13±1.46 | | 2.15±0.65 | | 1.97±0.18 | |
| Occupation | Student | 10.12±1.40 | | 2.20±0.68 | | 1.98±0.15 | |
| | Business | 9.92±1.93 | | 2.14±0.75 | | 1.96±0.23 | |
| | Homemaker | 10.06±1.92 | 9.18, | 2.36±0.59 | 10.00, | 2.00±0.00 | 1.05, |
| | Medical Professional | 10.68±1.32 | 0.001* | 2.37±0.62 | <0.001* | 1.97±0.17 | 0.38 |
| | Job/Service | 9.91±1.62 | | 2.49±0.61 | | 1.97±0.16 | |
| | Retired | 9.32±1.62 | | 2.32±0.47 | | 2.00±0.00 | |

Student’s T-Test(unpaired), ANOVA (oneway), * P value less than 0.05

On applying pearson’s correlation test, a positive correlation was observed between knowledge and practice scores ($r=0.103$, <0.001). However, the attitude of the population remained independent of either score. There was a significantly better knowledge among females compared to a more positive attitude among males and no such difference observed in practices. Participants in the 30-60yrs age bracket had a significantly better attitude, but no such variation with age difference was observed in the knowledge and practices domains. Similarly, people with higher education (graduate, postgraduate) had significantly better attitudes in COVID-19 response, though no such observations in the knowledge and practice domain. A significant association was observed, where medical professionals and students had better knowledge scores and those in jobs/services had a better attitude in disease response (Table 2).

DISCUSSION

The present study is applied to a rapid social network study approach for gathering responses from a representative Indian population using an online Performa which is a respondent friendly aiding collection of 1240 responses in five days amidst lockdown conditions. In our best knowledge, this study is among one of the initial KAP studies on COVID-19 pandemic in India covering a population representing such a varied demography.

People’s response to a pandemic is gauged through popular knowledge, attitudes, and practices of the population. A favorable response is especially warranted

when governments contemplate easing of lockdown or stay at home orders. Poor health behavior, lack of proper information access, media babel, and prevailing myths negatively impacts the citizens’ response and community awareness is an important tool to contain panic and bring about desired behaviors.^{21,22}

Like the present study, various online platforms have been conducting online public quiz and courses to provide correct and updated information. Most people scored well to moderate in the knowledge category with females faring better than males, this observation was similar to that noted in a study carried out in China.¹⁶ It may be linked to better access to media channels, social and family concerns, and efforts to seek correct knowledge. Retired old age citizens were found to have the lowest knowledge scores which is concerning since they are susceptible to complications if contracted by the disease. A possible reason could be underrepresentation in popular discourse and low media and technology access. Medical professionals, students, and homemakers had high scores in all domains owing to better access and avidity to health information thereby guiding an intricate role they can have in educating other people.

An important red flag is that more than half of participants advocated cutting off all social relations with healthcare workers as they may transmit the disease to them is concerning, reflecting stigma and negative attitudes of the general population towards frontline workers which may impede their morale. No significant correlation was noticed between attitude and practices suggesting that attitude doesn’t necessarily promote good practices but knowledge does, as a positive correlation

was observed. It is pertinent to note that government should identify media broadcast channels for delivering accurate health information as it has the most potential platform to bring out good practices. Present media strategy largely focuses on expected behaviors rather than knowledge. A large majority of people accurately responded to knowledge items suggesting that persistent communication campaigns through television, FM radio, and caller tunes have been successful. Participants were provided COVID-19 related health education as a part of the study to successfully tap the lacunae in KAP among participants. The government must strive to educate such people since ignorance of few may prove a setback in pandemic control efforts for eg: In the present study, 14.2 % of participants weren't aware of fomite-linked transmission. Policy planners should, therefore, emphasize public education strategy which guides hygiene practices in our daily lives like cleaning household surfaces. A good proportion (89.0%) individuals were found aware of the asymptomatic spread of COVID-19 which has immensely improved in comparison with the previous SARS and H1N1 outbreak.^{23,24}

It is also important to curb false information over media and online platforms as it can be detrimental to prevention efforts. In the study, common myths and misconceptions related to COVID-19 were noted like hot water can cure the disease (35.7%), and summers and high temperatures would kill the virus (20.9%). Similarly, some participants (14.6%) believed antibiotics can be self-prescribed at home for cure if COVID-19 symptoms appear despite proper medical care served by the healthcare facilities. Loopholes in people's knowledge have led to panic which in turn has hyped up demands of consumable goods (PPE, sterilizers, etc) and drugs like: hydroxychloroquine, which has increased the cases of abuse linked to adverse effects and deaths.^{25,26} Hence, regular monitoring of social media channels is required so that more reliable, accurate and scientifically correct information is available to the general public. Almost all participants (>98%) were compliant with lockdown restrictions and practicing proper distancing and personal hygiene measures. Such behavior is indicative of the effectiveness of innovative public communication strategies through media, caller tunes, and applications like Aarogya Setu.²⁷

Poor attitudes among the public towards medical frontline workers (52%) in the study are reflected which may be accounted for the apathy and stigma translating in reported cases of violence, ignorance, and aggression against frontline workers or "corona warriors" across India. The government in response took strict cognizance with punitive action actions by amending the Epidemic Diseases Act, 1897.²⁸ However, further debate is needed to mitigate this looming challenge and foster genuine acknowledgment by the public to essential services rendered by such workers. The majority (>98%), participants believed that India is effectively responding

to the pandemic and would swiftly overcome the situation. Such a positive attitude is encouraging along with good compliance behavior suggesting positive resolve and response of people to overcome the situation.^{29,30}

This study reports an overall good response of people to the COVID-19 pandemic. However, there are few key concerning aspects related to knowledge and attitudes which should be amicably addressed through policy measures. The strength of this study lies in a good sample size and geographical representativeness. Responses were recorded from most of the states and union territories of India which adds up to the robustness of the study. As the study, was conducted in a scored quiz pattern coupled with health education, respondents have presumably benefitted considering a high referral and participation in the study. It is anticipated that further communication research will be taken up from this study to test media and educational interventions which can further improve community response to the pandemic.

Limitations

The self-administered questionnaire used was circulated via the internet and hence people who were illiterate with limited or no internet access must not have been represented. Also, there is a possibility of less representation of vulnerable and lower socio-economic groups due to the aforementioned reasons. Although efforts were made for nationwide dissemination of the study there was high participation from authors geolocation which remains a limitation of social network research. Only limited information was sought relating to knowledge, attitude, and practices to maintain user-friendliness. There is an inherent volunteer bias in such research design as people who have good health and information-seeking behavior have a high tendency to participate in the study. Since due to the lockdown situation a field-based survey was not possible and hence the cross verification of data could not be done.

CONCLUSION

To summarize, it can be stated that a moderately satisfactory level of awareness regarding the COVID-19 pandemic is seen in the Indian population. The knowledge accuracy rate of study participants was 84.5%, which can be attributed to tremendous efforts put by the Indian Government for raising awareness and encouraging the involvement of the people during lockdown. The results of this study suggest that health programs and protocols taken so far are effective and the Indian population is adhering to those protocols with an optimistic attitude in comparison to other countries. However, there are certain knowledge gaps, poor attitudes, and prevailing myths that need to be highlighted and redressed. There is a need to target communication strategy to those who have poor access to information most of which constitutes vulnerable sections

like retired citizens through proper policy planning. Due to study limitations, further research is encouraged to study various determinants and roadblocks causing an ineffective response to the COVID-19 pandemic.

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