Knowledge, Attitude and Risk Perception on Infection Control of SARS-Co-2 in Indian Population

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ABSTRACT

Background: *During the year 2020 entire world has faced a challenging situation in managing and controlling a highly infectious disease called SARS-CoV-2. The entire world is fighting against this infectious disease to prevent transmission of nCOVI. To control the transmission, the government was continuously educating and creating awareness among the population. An attempt was made to access knowledge, attitude, and risk perception infection control of SARS-CoV-2 in the Indian population.* **Method:** *This study is an online-based descriptive cross-sectional carried out among 500 volunteers across India. A questionnaire was developed to access the knowledge, attitude, and risk perception of COVID19. The questionnaire was developed based on a literature review, in consultation with experts. The study was carried out using the Google Form and circulated via. Whatsapp and email. The responses were considered from the respondents who submitted the form within 30 minutes from the time they received it.* **Results:** *The level of infection control knowledge on COVID-19 was 64% whereas prevention attitude was calculated as 83.3% while risk perception was estimated as 79%. The significant difference emerges in infection knowledge and prevention attitude based on demographic details.* **Conclusion:** *Our findings suggest the need for effective and tailored health education programs aimed at improving COVID-19 knowledge, thereby leading to more favorable attitudes and implementation and maintenance of safe practice..*

Keywords: Covid-19, SARS CoV-2, Knowledge, Attitude, Risk perception

INTRODUCTION

The Coronavirus Disease-19 (COVID-19) is a highly transmittable and pathogenic viral infection caused by Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2). This COVID-19 was first reported in Wuhan, China in December 2019 and spread around the world causing a significant impact on people's health and lives. On March 11, 2020, the World Health Organization declared COVID-19 a pandemic as by then there are more than 118,000 cases in 114 countries [1]. Genomic analysis revealed that SARS-CoV-2 is phylogenetically related to Severe Acute Respiratory Syndrome (SARS) like bat virus, therefore bats could be the possible primary reservoir. The intermediary source of origin and transfer to humans is not known, however, the rapid transmission from human to human has been confirmed [2]. An acute viral infection is produced by SARS-CoV-2 in humans with an incubation period of 3 days which is similar to SARS-CoV with 2 to 10 days of incubation. The most common presenting features of COVID-19 which have been reported in 1099 patients by Guan, et al. are fever (87.9%), cough (67.7%), and fatigue (38.1%); diarrhea (3.7%), and vomiting (5.0%) are rarely identified. Some degrees of dyspnoea is also experienced by most of the patients [3]. The prevalence of comorbidities such as hypertension, diabetes, asthma, chronic kidney disease, and coronary artery disease has been reported in COVID-19 patients. The Diabetes prevalence is highest in COVID-19 patients in India compared to other countries [4].

The most common routes of transmission of this virus are infected patients' droplets and close contact with them. The spreading of this virus from human to human also occurs through aerosols and *via.* inhalation through the nose or mouth can enter into the lungs of the human body [2]. Transmission of SARS-CoV-2 has been documented from symptomatic, pre-symptomatic, and from asymptomatic. Researchers also detected the SARS-CoV-2 in the samples of infected patient's saliva, stool, gastrointestinal tract, and urine. Based on bioinformatics sources, evidence has been reported that the digestive tract may be a source of SARS CoV-2 infection [5]. The spreading of the virus from

the infected person without any symptoms is dangerous because the isolation of the infected person is not possible [6]. Out of the reported cases, males represent 59%-68% and elderly individuals have much high mortality rates [7]. Patients aged from 30 to 79 accounts for 86.6% of all COVID 19 cases. The patient's median age was 47 years [8]. Around 14% of COVID19 cases reported to WHO are among health workers [9].

The Coronavirus Disease 2019 outbreak is spreading globally. As of now, 112.2 million confirmed cases have been reported globally which includes 2.4 million confirmed deaths. In India 11.1 million confirmed cases of COVID-19 have been reported with an incidence rate of 28.6 new cases per 100000 people in June 2020 also has the highest prevalence of 11.23% cases of proportion to current global new cases as of July 2020 and 10.8 million patients have recovered from this disease [10,11]. India, being the 2nd most populous nation is pulling out all the stops to improve its health care system. A major portion of the Indian population lives in an unhygienic lifestyle and so they are frequently prone to epidemic diseases. This is the major cause of endemic and other outbreaks in a community. Therefore, India could be suspected as one of the finest homes for the outbreak of COVID-19 [12]. India stands distant in the list to provide the necessary equipment required in public hospitals, especially ventilators for the COVID-19 patients who experiencing breathing difficulties. Globally the funds were raised and Strategic Preparedness and Response Plan were set up to protect the states with poor health care systems. They aimed to prevent the transmission of this disease, provide better and early health care, and communicate key information, and reduce the social and economic impacts. The global economy has been affected brutally due to the state of lockdown in many parts of the world. This causes the halting of services and products which further leads to a break in the global supply chains [13].

To prevent the spread of infection caused by SARS-CoV-2 in highly populated countries like India, it is necessary to educate about the knowledge on SARS-CoV-2 infection control, risk perception, and their attitude towards it. It is important to implement sound prevention measures and to increase the level of awareness among the population. The objective of the study was to identify the infection control knowledge, attitude, risk perception of the SARS-CoV-2 and to identify the correlations among the related variables.

METHODS

Study Design

This descriptive study attempted to investigate knowledge, attitude, perceptions, control, and risk prevention regarding the SARS-CoV-2 virus among the public and to identify the correlation among study variables. Respondents were recruited through convenience sampling from the Public in South India were selected for the study. The data-collection period was June 2020. The number of respondents surveyed for the study was 500 and the required details were collected through Google forms.

Study Tools

The questionnaire has 4 domains (i) demographic, (ii) knowledge, (iii) attitude, and (iv) perception of control and prevention of SARS-CoV-2 virus. The questionnaire was prepared based on the literature and in consultation with the experts. The following information of respondents was collected in the demographic domain (7 items): (i) age, (ii) gender, (iii) educational qualification, (iv) profession, (v) experience, and (vi) name of the place living. In second and third domain knowledge (6 items) and attitude related to SARS-CoV-2 and nCOVID-19 respectively, information was included (9 items) such as: (A1) COVID-19 is spread throughout the world. (A2) There is an infected person in India who returned after traveling to COVID-19 infected countries. (A3) nCOVID-19 virus spreads *via.* contaminated food and/or mosquitoes. (A4) A man infected with the nCOVID-19 virus infects a woman during sexual intercourse. (A5) The common symptom of COVID-19 is fever, cough, and difficulty in breathing. (A6) COVID-19 symptoms will worsen with pre-existing diseases like diabetes, age factor, etc. (A7) has your daily life been disturbed by COVID-19 (A8) Does the impact of COVID-19 make you worry (A9) Using RT-PCR, nCOVID-19 virus can be detected in 5 hours.

The last, i.e. fourth domain contains information on the perception of control and prevention of SARS-CoV-2. The fourth domain contains 18 items such as: (P1) Is COVID-19 a very serious disease? (P2) Is COVID-19 slightly serious when you feel if you were to contact the diseases? (P3) Do you think that you can be contacted by COVID-19 if you do not take any preventive measures? (P4) Are you concerned about COVID-19? (P5) Do you think that social distancing and hand washing helps to prevent the spread of COVID-19? (P6) Do you think that you will manage to

carry out social distancing, if necessary? (P7) Will COVID-19 have a negative effect on health? (P8) Does an increase in temperature influence COVID-19? (P9) Does COVID-19 influence vector-borne diseases? (P10) Do you think COVID-19 influences pneumonia? (P11) nCOVID-19 virus causes problems to the fetus of a pregnant woman and causes artificial abortion (P12) Till now, whether any treatment available to treat COVID-19 (P13) Till now, there is no vaccine against the nCOVID-19 virus (P14) Hydroxychloroquine is used to treat the infected persons (P15) Disinfect the places wherever the infected person(s) visit (P16) Wear the mask and practice hand washing very frequently (P17) Prevention access to the non-infected persons is important when treating infected patients with the nCOVID-19 virus (P18) It is important to wear protective equipment if saliva droplets when sneeze or cough during treating COVID-19 patients.

Responses were measured based on 3-points Likert's scale ranging from 1-point for Disagree to 3- points for Agree. Higher scores indicated a higher perceived degree of COVID-19. The responses for knowledge, attitude, and perception of control and prevention were assessed on a 3-points Likert scale ranging from 1-point for disagreeing; 2-points for neutral, and; 3-points for Agree. Higher scores indicate a higher level of knowledge, preventive behavior and control, and prevention towards SARS-CoV-2 and nCOVID-19.

RESULTS

Among 500 respondents, 54% were male and 46% were female. Most respondents were between the age group of 21 and 30 years (61.8%). Among them, 72.8% of respondents were healthcare professionals and 27.2% were non-healthcare professionals. 48.6%, 27.2% and 24.4% of respondents were living in semi-rural, urban, and rural respectively. Among all the questions most of the respondents have good knowledge about clinical manifestation (99.2 points). Many respondents have to lack knowledge about virus survivability on the surface (35.5 points). Most of the respondents know the symptoms of COVID-19 (99 points) and very few only know about the method of diagnosis and practicing COVID-19 prevention whereas unfamiliar with the availability of vaccination to control COVID-19 (99 points). Similarly, 75.4% of respondents believed that nCOVID-19 is a new coronavirus that has not been previously identified in humans and 64.6% of respondents believe that coronavirus is commonly present among some animals which rarely affects humans. Further 57.8% of respondents thought that COVID-19 spread mainly from person to person through physical contact only (Table 1).

Table 1 Demographic characteristics of the respondents (N=500)

Characteristics	N (%)
Age group (Years)	
21 to 30	307 (61.4)
31 to 40	74 (14.8)
41 to 50	66 (13.2)
51 to 60	36 (7.2)
>60	17 (3.4)
Gender	
Female	230 (46)
Male	270 (54)
Profession	
Healthcare Professional	364 (72.8)
Non-Healthcare Professional	136 (27.2)
Experience	
<5 years	101 (20.2)
5 to 10 years	44 (8.8)
11 to 15 years	43 (8.6)
16 to 20 years	26 (5.2)

20 to 30 years	47(9.4)
>30 years	36 (7.2)
None	209 (41.8)
Place of living	
Semi Urban	242 (48.4)
Rural	136 (27.2)
Urban	122 (24.4)

Knowledge-related virus survivability on surfaces, 55.8% respondents believe that virus stays for a longer time on the surface in contrast with 8.4% respondents may or may not be sure about the survivability on the surface. Further, 99.2% of respondents believe that COVID-19 causes mild to severe respiratory illness with symptoms of fever, cough, and difficulty in breathing. Similarly, 91.2% respondents reported that patient with serious underlying medical illness tends to pose a higher risk to severe COVID-19 illness. The infection-prevention attitude among the respondents shows that 90% of respondent believes travel history from COVID-19 infected countries are one of the sources of infection in India and quarantine of those are one of way to control transmission. Similarly, precaution attitude reported among 89.6% respondents that pre-existing medical conditions such diabetes, hypertension is a higher risk to COVID-19 illness and need to be cautious. Further, 89.4% of respondents believe that their daily life is affected due to COVID-19 pandemic. Among the respondents, 59% believe that using RT-PCR, the virus can be detected in 4-6 hours in contrast with 41% are may not be sure about the time duration.

Table 2 Eating habits among respondents (n=156)

Items	Agree N (%)	Neutral N (%)	Disagree N (%)
nCOVID-19 is a new coronavirus that has not been previously identified	377 (75.4)	23 (4.6)	100 (20)
COVID-19 is not the same as the coronaviruses that commonly circulate among humans which cause mild illness, like the common cold	328 (65.6)	18 (3.6)	154 (30.8)
Diagnosis with coronavirus 22E, NL63, OC43, or HKU1 is not the same as COVID-19 diagnosis.	220 (44)	197 (39.4)	83 (16.6)
Chinese Government announced an official name for the disease that is causing the 2019 novel coronavirus outbreak, first identified in Wuhan China.	435 (87)	14 (2.8)	51 (10.2)
In COVID-19, 'CO' stands for 'corona' and 'VID' for 'virus'	377 (75.4)	26 (5.2)	97 (19.4)
COVID-19 is a new disease, caused by a novel coronavirus that has previously affected humans.	218 (43.6)	34 (6.8)	248 (49.6)
COVID-19 is caused by a corona virus called SARS-CoV-2	299 (59.8)	91 (18.2)	110 (22)
Coronaviruses are a large family of viruses that are common in humans and many different species of animals	323 (64.6)	46 (9.2)	131 (26.2)
Rarely, animal coronaviruses can infect people and then spread between people.	372 (74.4)	54 (10.8)	74 (14.8)
COVID-19 is thought to spread mainly from person to person, mainly through physical contact only.	289 (57.8)	6 (1.2)	205 (41)
For COVID-19, the period of quarantine is 21 days from the last date of exposure because the incubation period for this virus is 2 to 21 days.	359 (71.8)	16 (3.2)	125 (25)
COVID-19 be spread through food including hotel, refrigerated or frozen packed foods.	233 (46.6)	47 (9.4)	220 (44)
COVID-19 has poor survivability on surfaces.	179 (35.8)	42 (8.4)	279 (55.8)
Weather and temperature affect the spread of COVID-19.	228 (45.6)	45 (9)	227 (45.4)
Generally, coronaviruses survive for shorter periods at higher temperatures and humidity than in cooler or dryer environments.	293 (58.6)	64 (12.8)	143 (28.6)

COVID-19 causes mild to severe respiratory illness with fever, cough, and difficulty in breathing as signs and symptoms.	496 (99.2)	3 (0.6)	1 (0.2)
Invariable of age, gender, and people having serious underlying medical conditions might be at higher risk for severe illness from COVID-19.	457 (91.2)	16 (3.2)	28 (5.6)

In the study risk perception toward COVID-19 was estimated as 79%. Among respondents, 85.6% perceive that COVID-19 is a very serious disease and 81.2% of respondents believe they will get infected if not taking any preventive measures (Figure 1). Similarly, 98.4% of respondents observed that infection can be controlled by proper social distancing, hand washing, and also 80.2% believes that COVID-19 has a negative effect on health. Further 46.2% of respondents perceive that COVID-19 will not affect the fetus of pregnant women and cause abortion. In addition, 69.2% of respondents are aware that currently, no specific treatment is available for COVID-19. Further, 98% of respondents perceive that it's important to prevent non-infected persons than treating an infected person, and also 99% of respondents believe that it's important to wear personal protective equipment while treating patients to prevent droplets (Figure 2).
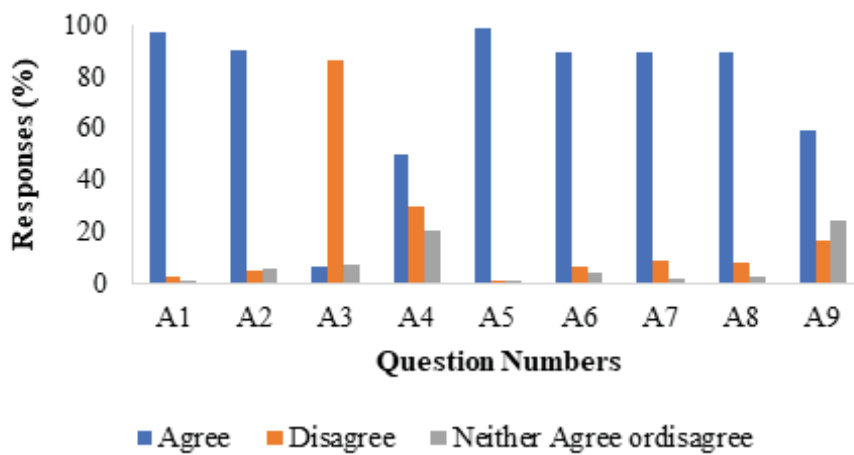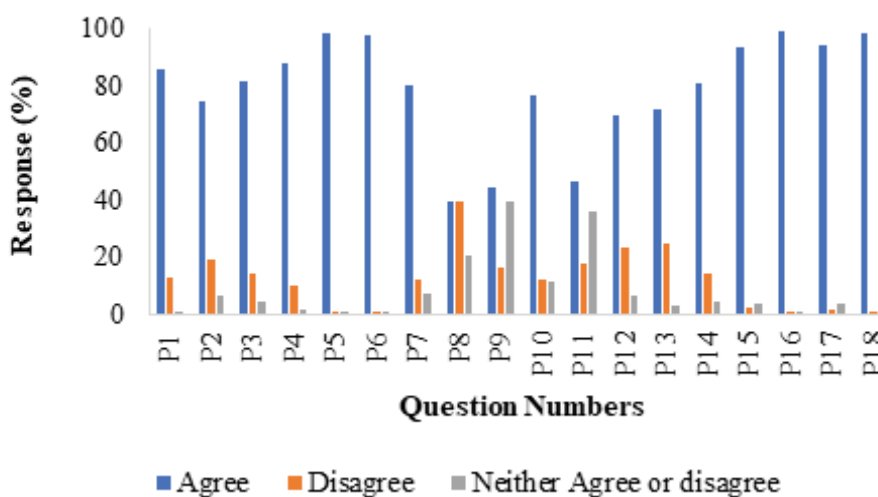

Figure 1 Attitude towards Covid-19

Figure 2 Perception towards Covid-19

Further, age impact on Knowledge, attitude, risk perception on covid-19 was analyzed among the study participants it shows that among the age group of 21-30 years of 63.4%, 30-40 years of 67%, 41-50 years of 66%, 51-60 years of 63% and >60 years of 66% respondents have appropriate knowledge toward COVID-19 (Figure 3). Similarly,

infection prevention and control attitude are analyzed among the age group of 21-30 years of 82%, 31-40 years of 86.18%, 41-50 years of 86.36%, 51-60 years of 81.17%, and >60 years of 73% of respondents have an appropriate attitude toward COVID-19. Further, 21-30 years of 78%, 31-40 years of 80.33%, 41-50 years of 79.88%, 51-60 years of 78.39%, and >60 years of 80.39% respondents have appropriate risk perception toward COVID-19. Similarly, 64.52% of female respondents and 64.46% of male respondents have sound knowledge followed by 84% of female respondents and 82.75% of male respondents have appropriate attitudes followed by 78.79% of female respondents and 78.8% of male respondents has appropriate perception toward COVID-19 (Figure 4). Based on the place of living impact on knowledge, attitude, and risk perception toward COVID-19 was analyzed with a rural background of 65.26%, semi-urban of 63.88% and urban of 64.36% of respondents have sound knowledge on COVID-19. Similarly, 82.27% of rural, 84.79% of semi-urban and 83.14% of urban background respondents has appropriate infection control and prevention attitude. Further, 76.71% of rural, 77.64% of semi-urban, and 80.57% of urban respondents have appropriate perceptions toward COVID-19. Finally, the respondent's moderate knowledge of infection control (79 points) (Figure 4). Further, the impact of educational qualification and profession was analyzed which 65.91% of healthcare professional and 60.68% of non-healthcare professional has sound knowledge. Similarly, 83.82% of healthcare professional and 81.94% of non-healthcare professional has an appropriate attitude toward COVID-19. Further, 79.59% of healthcare professional and 76.71% of non-healthcare professional has an appropriate risk perception toward COVID-19 (Figure 5). Finally, the knowledge on infection prevention and risk perception is good i.e., attitude and practice scores were 2.74 out of 3 points and 2.66 out of 3 points respectively. The significant difference emerges in infection knowledge and prevention attitude based on demographic details. Knowledge is significantly correlated with attitude and attitude with risk perception toward COVID-19.
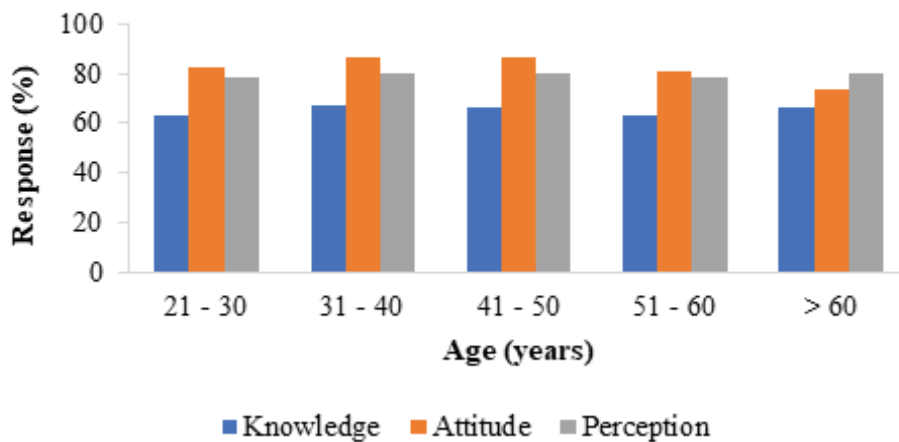

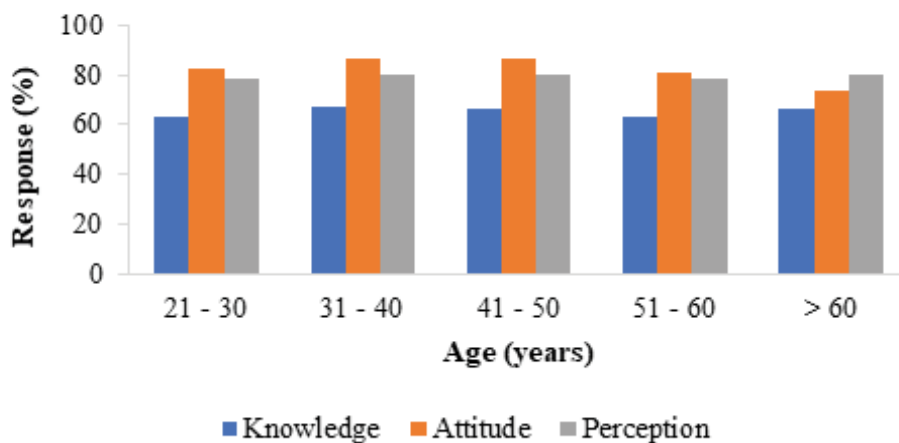**Figure 3 Impact of age on knowledge, attitude and perception**

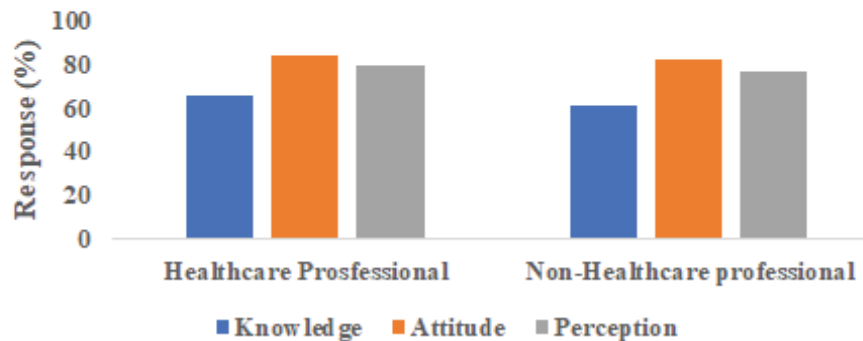**Figure 4 Impact of gender and place of living on knowledge, attitude, and perception**

Figure 5 Impact of the profession on knowledge, attitude, and perception

DISCUSSION

Since the outbreak of nCoV-19 viruses from Wuhan in December 2019, it has rapidly become a global threat to public health and also caused a socio-economic burden around the world. Robust measures are taken by the government and international bodies to control the spread of COVID-19 by effectively implementing lockdown, travel restrictions, promoting social distancing, wearing masks, and hand hygiene practice. In addition, public health education has been recognized as an effective measure to prevent and control the infection as well as public preparedness against such situations through acquiring adequate knowledge, attitude, and practices. So KAP has a significant role to prevent and manage the pandemic.

In the present study, 500 responses were collected public to analyze knowledge, attitude, and perceptions on nCoVI and COVID-19 toward infection prevention and control of pandemic. However, average scores on knowledge show that the respondents have moderate when compared with survey reports among the Chinese general population (90%) [14]. However, there is a slightly greater than KAP towards COVID-19 among US residents (80%) [15]. This is possible because both the studies assessed COVID19 symptoms using a semi-structured questionnaire. In the present study, the questionnaires are structured and close-ended. Generally, the majority of the respondents had sufficient knowledge about COVID19 which is in line with findings among Vietnam about COVID-19 [16]. There is a significant difference that emerges from knowledge score to attitude and risk perception, the population has a positive attitude, appropriate risk perception than knowledge which is influenced by some demographic factors like age, gender, and place of living.

In this study, we analyzed various demographic factors like gender and its association with KAP toward COVID19 which are generally by other studies [17]. However, this study analyzed some key factors which are not reported in other studies like age, place of living, and professional impact on KAP. In our study, there is no significant difference in knowledge and risk perception among the gender but a significant difference is seen in infection control and prevention attitude between the gender in which females tends to have better attitude compare to males. India is a dynamic nation with a large population are youth and digital transformation has a great impact on KAP during the pandemic in which the age group 30-40 years age has a fair level of KAP compare to others. In which age group 51-60 years has the low level of knowledge, attitude, and perception toward COVID-19 and they also possess high risk due to increased age and prevalence of co-morbidities. Initial steps and efforts are taken by govt. and other agencies on infection prevention and control measures by effective awareness campaign through TV, leaflets, poster to the public across the country has reflected with better knowledge across all population especially rural population has significant knowledge compare to urban. But there is a significant difference in attitude and risk perception about the importance of protective items (like masks etc.) among rural populations compared to urban and semi-urban it emphasizes authorities should raise the awareness on positive attitude and infection control and prevention practice.

CONCLUSION

Our findings indicate that there is significant infection control knowledge, prevention attitude, and risk perception among the population toward the COVID-19 pandemic after the outbreak and followed by robust measures taken by the central and state governments. Our findings suggest the need for effective and tailored health education programs

aimed to improve COVID-19 knowledge, thereby leading to more favorable attitudes and implementation to maintain safe health and practice among the communities.

DECLARATIONS

Conflicts of Interest

The authors declared no potential conflicts of interest concerning the research, authorship, and/or publication of this article.

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