



# Knowledge, attitude, and practise about COVID-19, vaccination acceptability, and post-infection consequences across North India: A cross-sectional study

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### ABSTRACT

This study aimed to assess COVID-19 awareness, attitude, practice, and post-infection effects, as well as vaccine acceptance, among general people in North India at the end of the first COVID-19 wave in India. A cross-sectional survey took place from 20 January to 28 February 2021 in Northern India, covering 8 states, including Haryana, Punjab, Himachal Pradesh, Uttar Pradesh, Uttarakhand, Jammu and Kashmir, Delhi, and Chandigarh to assess the KAP in the context of COVID-19. A validated questionnaire was distributed via social media (Instagram, WhatsApp), and responses were collected via a Google Form. The total number of participants was n=813, out of which more than half of the responders were male (54.2%). The majority of respondents belong to the age category 18 to 29 years (66.9%) and (85.8%) of respondents come from a nuclear family. Mean (percentage) scores for knowledge, attitude, and practice were 57.91%, 60.98%, and 89.79% respectively. The vaccine acceptance in participants was quite high (70.8%), (67.7%) have a positive belief in vaccine efficacy, and (42.7%) of respondents were willing to take the vaccine at a health centre/clinic. Out of the total participants (74.5%) believe that vaccines can control the spread of COVID-19. The prevalence of post-infection effects was more in females with a mean percentage of 52.94, like (94.1%) of females and (70.4%) of males were facing the loss of taste and smell even after recovering from COVID-19, similarly, (70.6%) of female and (38.9%) of male were facing sexual problems after recovering from COVID-19. Although the overall KAP regarding COVID-19 disease was average and balanced in some areas (69.56% overall in all categories of KAP) in our participants. Our result finding shows that there were certain gaps in knowledge, attitude, and practice of participants. Due to these gaps, India faced the second wave of COVID-19. These gaps can be decreased by efficient and tailor-made health education initiatives as the third wave is rousing.

## Introduction

COVID-19 has been affected globally since December 2019. SRAS-CoV-2 is a chronic acute respiratory condition. This is easily transmitted from the surface to the body. The first case was registered in Wuhan, China on 31st December 2019 (1). It has quickly spread to more than 200 countries, prompting the World Health Organization to call it a global pandemic (WHO). As of 23rd January 2022, 340,543,962 out of which 5,570,163 deaths have been reported worldwide. Patients had been diagnosed with COVID-19 worldwide (2, 3, 4). India's response to the COVID-19 pandemic was one of the most rigorous in the world, earning a perfect 100 on the "Oxford COVID-19 Government Response Tracker (OxCGRT)," which compares different governments' responses to the coronavirus outbreak around the world (5). The country's initial increase in the number of cases was slow, which can be due to many government interventions and the introduction of a nationwide lockdown at an early stage of the pandemic. However, as the world's second-most populated nation, the inevitable rapid increase to become the second-most contaminated country could not be stopped. The COVID-19 pandemic has reached its peak in India, and the war is still ongoing. In India, it has been diagnosed with 39,237,264 people and 489,409 deaths have been recorded on the World Health Organisation's official website on 23rd January 2022 (6). While restricting people's movements can restrict the spread of the disease, motivating civilians to have the right information and promoting strict obedience to government advice is vital to the management of outbreaks. The 2003 SARS epidemic data show that awareness and attitudes towards infectious diseases are generally associated with high levels of population anxiety which may complicate further actions to deter disease transmission (7). This research aims to explore the KAP and post-infection effects faced after being recovered from COVID-19 within the general population of North India to promote outbreak control and to evaluate patient readiness to consider behavioral improvements.

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## Method

The study was conducted in the Northern region of India which includes eight states that are Haryana, Punjab, Himachal Pradesh, Uttar Pradesh, Uttarakhand, Jammu and Kashmir, Delhi, and Chandigarh. A cross-sectional and anonymous population-based online survey was carried out of people over the age of 18. The survey was performed between January 20 and February 28, 2021, following the government of India and the opening of educational institutions. The WHO Europe region used a pre-validated questionnaire and applied several questions to this questionnaire, carried out the survey using the Google Tool (Google Forms), and shared a connection created with the public on social media (i.e., Instagram, WhatsApp). The connection was also personally shared with the contact list of researchers and assistants. The decision of the investigators to collect the data using online methods was based on social distance in India during this pandemic.

The research protocol, questionnaire, and consent form were approved in I.S.F College of Pharmacy, Moga, India by the Department of Pharmacy Practice and adopted the Helsinki Guidelines Declaration. All the general public over the age of 18 who agreed with our consent form and want to participate during our survey time are accepted as research participants. People who don't want to join don't adhere to the form and anyone under the age of 18 has been disqualified from the report.

The questionnaire was validated by two different co-investigators during pilot testing. The questionnaire was in English and was not translated to the native language, which was then approved by the ethical committee.

The questionnaire consisted of different parts are socio-demographic details, perception towards risk of COVID-19 infection and COVID-19 Vaccine, knowledge, attitude, practice, and post-infection effects of COVID-19.

## Socio-demographic data

Gender, age, residential area, healthcare worker status, employment status, occupation, and family type (nuclear/joint) were all collected as socio-demographic data. 16 questions.

## Knowledge, attitude, and practice

A total of 16 questions (six for information, five for attitude, and five for practice) were included in the survey to determine the respondents' knowledge, attitude, and practice towards COVID-19. The

survey questions were translated and updated from previously published research on survey tools and guidance rapid, simple, flexible behavioral insights on COVID-19 by the WHO Europe region (8).

The knowledge segment had six questions, with answers ranging from "Yes" to "No" (for example, "Is COVID-19 a deadly disease?"). The correct answer (Yes) was given a value of 1, while the incorrect answer (No) was given a value of 0. The cumulative score ranged from 0 to 6, with a higher overall score indicating more precise expertise. For more precise information, a cut-off level of  $\geq 4$  was chosen.

The attitude segment consisted of five questions, each with a "Yes" or "No" answer option (e.g., "Health education will play a major role in the prevention of COVID-19?"). The cumulative score was determined by adding the raw scores from the five questions, which ranged from 0 to 5, with a higher overall score reflecting more favorable attitudes toward COVID-19. For more positive attitudes toward COVID-19 prevention, a cut-off level of  $\geq 4$  was created.

The practice section included five practice steps concerning the COVID-19, with four out of five elements being scored on a three-point scale as follows: Can you wear a mask in public? 0 ("Never"), 1 ("Sometimes"), and 2 ("Always") (e.g., "Do you wear a mask in public?") and one out of five items was given as follows on a 4-point scale, 0 ("Never"), 1 ("Once a month"), 2 ("Once a week"), and 3 ("Daily") (e.g., "How often do you update your information about COVID-19?"). The average score for each practice item varies from 0 to 11, with a higher cumulative score indicating more regular activities against the COVID-19. For more regular sessions, a cut-off threshold of 10 was set.

## Statistical Analysis

Analysis of data was conducted with Microsoft Excel 2019 and SPSS 26.0. For editing, arranging, and coding, Microsoft Excel was used. The outstanding file was then imported into the applications of SPSS. Descriptive statistics (frequencies, percentages, means) and first-order calculations were conducted (i.e., Chi-square tests). A 95% confidence interval has been carried out to assess important links between categorical dependent and independent variables Binary logistic regression and Statistical significance were described as a P value of 0.05 or less (9, 10).

## Ethical Considerations

The research was carried out in compliance with the Institutional Research Ethics Committee's guidelines

and the Helsinki Declaration. The Institutional Ethics Committee of the I.S.F College of Pharmacy in Moga, Punjab, India gave formal ethical approval to the research. The study's goals, purpose, and protocol were all recorded in the consent form. Anonymity and confidentiality were upheld to the fullest extent possible.

## Results

### Demographic Details

The final study included 813 respondents, 54.2 %, of whom were male, and the majority of responders were from the age category 18-29 years (66.9%). Nearly all respondents lived in a nuclear family (85.8 %). The majority of the people were unemployed (56.1%), most of them were students (42.1%), the majority were metropolitan (55.8 %). Detailed socio-demographic details of participants are discussed in the tabular and graphical representation in **Table 1**: Demographic details of participants (N=813) and **Figure 1**: Graphical representation of demographic details.

### Perception

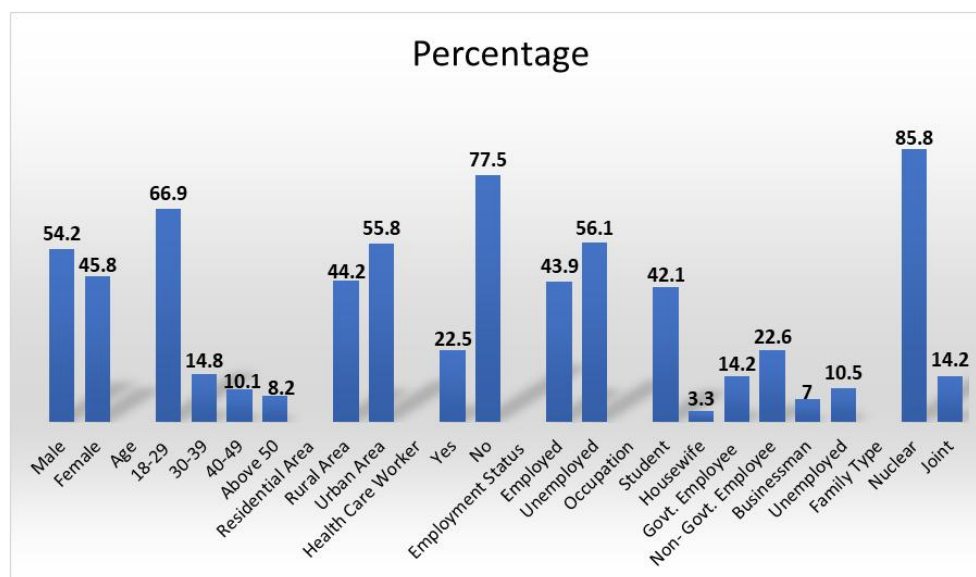
**Table 2**: Perception of participants towards own risk of COVID-19 infection and COVID-19 Vaccine, summarises our findings in the perception portion. For the own probability of getting COVID-19, (36.5%) of the respondents think they have a very low chance of getting COVID-19 infection followed by (22.4%) have low chance, (16.6%) high chance, (15.4%) extremely high chance of getting COVID-19 and (9.1%) were reported previously infected with COVID-19. Most of the respondents (70.8%) were willing to take the vaccine for COVID-19. For how the vaccine will affect you, (40.6%) of the respondents think the vaccine will reduce the chance of infection followed by (27.2%) think the vaccine will increase the chance of recovery, (24.6%) think the vaccine will there will be more severe side effects, and (7.6%) think the vaccine will cause death. Most of the respondents (74.5%) think vaccines can control COVID-19. And for a preferred vaccinated place, (42.7%) of respondents preferred health center/clinic followed by (22.6%) will prefer home, (7.4%) will prefer workplace, (4.4%) will prefer pharmacy, (1.2%) will prefer a community center, meeting hall to get vaccinated and (21.6%) of respondents prefer not to get the vaccine.

### Knowledge

In **Table 3**: Participant's knowledge and gender difference (N = 813), the distribution of participants' responses with gender differences is provided for each knowledge problem. In this section majority of

**Table 1.** Demographic details of participants (N=813).

Variables	n	%
Gender		
Male	441	54.2
Female	372	45.8
Age		
18-29	544	66.9
30-39	120	14.8
40-49	82	10.1
Above 50	67	8.2
Residential Area		
Rural Area	359	44.2
Urban Area	454	55.8
Health Care Worker		
Yes	183	22.5
No	630	77.5
Employment Status		
Employed	357	43.9
Unemployed	456	56.1
Occupation		
Student	343	42.1
Housewife	27	3.3
Govt. Employee	116	14.2
Non- Govt. Employee	184	22.6
Businessman	57	7.0
Unemployed	86	10.5
Family Type		
Nuclear	698	85.8
Joint	115	14.2

**Figure 1.** Graphical representation of demographic details

**Table 2.** Perception of participants towards own risk of COVID-19 infection and COVID-19 Vaccine.

Variables	Total N=813		Male		Female	
	n	%	n	%	n	%
Own probability of getting COVID-19?						
Previously infected	74	9.1	44	59.5	30	40.5
Low	182	22.4	99	54.4	83	45.6
Very low	297	36.5	155	52.2	142	47.8
High	135	16.6	76	56.3	59	43.7
Extremely high	125	15.4	67	53.6	58	46.4
Will you get yourself Vaccinated?						
Yes	576	70.8	294	51.0	282	49.0
No	237	29.2	147	62.0	90	38.0
How vaccine will affect you?						
Death	62	7.6	39	62.9	23	37.1
There will be more severe side effects	200	24.6	108	54.0	92	46.0
Increase the chance of recovery	221	27.2	110	49.8	111	50.2
Reduce the chance of infection	330	40.6	184	55.8	146	44.2
Do you believe that vaccines can control COVID-19?						
Yes	606	74.5	310	51.2	296	48.8
No	207	25.5	131	63.3	76	36.7
Where do prefer to get vaccinated?						
Home	184	22.6	92	50.0	92	50.0
A community centre, meeting hall	10	1.2	4	40.0	6	60.0
Workplace	60	7.4	36	60.0	24	40.0
Pharmacy	36	4.4	25	69.4	11	30.6
Health centre/clinic	347	42.7	166	47.8	181	52.2
I don't want the vaccine	176	21.6	118	67.0	58	33.0

**Table 3.** Participant's knowledge and gender differences (N = 813).

Variable	Total N=813		Male		Female		$\chi^2$	df	p-value
	n	%	n	%	n	%			
Do you know peoples around you who are or have been infected with COVID-19?									
Yes	484	59.5	259	58.7	225	60.5	0.258	1	0.61
No	329	40.5	182	41.3	147	39.5			
Do you know someone who died from COVID-19?									
Yes	298	36.7	155	35.1	143	38.4	0.943	1	0.33
No	515	63.3	286	64.9	229	61.6			
Is COVID-19 a deadly disease?									
Yes	673	82.8	342	77.6	331	89.0	18.485	1	0.01
No	140	17.2	99	22.4	41	11.0			
Is it exclusive to humans?									
Yes	623	76.6	322	73.0	301	80.9	7.029	1	0.01
No	190	23.4	119	27.0	71	19.1			
Can it pass down from animals to humans?									
Yes	411	50.6	197	44.7	214	57.5	13.341	1	0.01
No	402	49.4	244	55.3	158	42.5			
Is it spread by animal products (such as milk and meat)?									
Yes	336	41.3	162	36.7	174	46.8	8.388	1	0.01
No	477	58.7	279	63.3	198	53.2			

female know some around them have been infected with COVID-19 i.e. (60.5% vs 58.7% of males who know some around them have been infected with COVID-19,  $p=0.61$  there is no significant association in between these variables), majority of male respondents doesn't know someone died from COVID-19 i.e. (64.9% vs 61.6% of female,  $p=0.33$  there is no significant association in between these variables), majority of female think COVID-19 is a deadly disease i.e. (89.0% vs 77.6% of male think COVID-19 is a deadly disease,  $p=0.01$ ), majority of female respondents think COVID-19 is exclusive to humans i.e. (80.9% vs 73.0% of male think COVID-19 is exclusive to humans,  $p=0.01$ ), majority of female think COVID-19 can pass down from animals to humans i.e. (57.5% vs 55.3% male think COVID-19 cannot pass down from animals to humans,  $p=0.01$ ), and the majority of male think COVID-19 cannot spread by animal products i.e. (63.3% vs 53.2% of female think COVID-19 cannot spread by animal products,  $p=0.01$ ).

### Attitude

In **Table 4**: Participant's attitudes and gender differences ( $N=813$ ), the distribution of responses from participants is provided for each attitude-oriented question. The response rates of 'yes' in males were higher (93.0% vs 91.1% in male  $p=0.33$ ) to "Health education will play a major role in the prevention of COVID-19", the response rates of 'no' in females were higher (61.8% vs 61.7% in male  $p=0.96$ ) to "Is it treatable at home", the response rate of 'yes' in female was significantly higher (57.5% vs 50.3% in male  $p=0.04$ ) to "It is important to notify health officials of any suspicious cases", the response rates of 'yes' in male were higher (51.9% vs 51.1% in female  $p=0.80$ ) to "Will you share your contacts if you have been tested positive for COVID-19", and the response rate of 'yes' in female were significantly higher (79.8% vs 60.5% in male  $p=0.01$ ) to "If you have been in contact with a patient of COVID-19 then will you get yourself tested". The results showed that 60.98% of those surveyed were a more optimistic attitude towards COVID-19.

### Practice

The distribution of responses from participants is summarised in **Table 5**: Participant's practice and gender differences, for each question of practice. The 'Always' response rate was significantly higher among females (70.2% vs 56.7% in male  $p=0.01$ ) to the item of practice section regarding "Do you wear a mask in public", and for "Do you wash hands with soap and water or use disinfectant" (69.1% vs 59.6% in male  $p=0.01$ ). Likewise, the 'always' answer rates in females were substantially higher (49.7% vs 34.5% in male  $p=0.01$ ) for "Do you maintain physical distancing", and the 'sometimes' answer rates in

females were substantially higher (63.7% vs 58.5% in male  $p=0.01$ ) for "Did you avoid social events". The 'Once a week' response rate was higher among females (39.0% vs 34.7% in males  $p=0.24$ ) for "How often do you update your information about COVID-19". The results showed that females have more practice towards COVID-19.

### Post-Infection effects of COVID-19

In **Table 6**, the participants facing post-infection effects after recovering from COVID-19 according to gender, the distribution of responses from participants is provided for each post-infection effect after recovering from the COVID-19 oriented question. The 'yes' in female were higher (94.1% vs 70.4% in male  $p=0.01$ ) to "Loss of taste and smell", the response rates of 'yes' in female were higher (94.1% vs 83.3% in male  $p=0.13$ ) to "General weakness and difficulty in workouts", the response rate of 'yes' in female were higher (52.9% vs 40.7% in male  $p=0.26$ ) to "Sleeplessness", the response rates of 'yes' in female were higher (94.1% vs 81.5% in male  $p=0.09$ ) to "Lung patch", the response rates of 'no' in female were significantly higher (100.0% vs 85.2% in male  $p=0.02$ ) to "Hearing impairment", the response rates of 'yes' in female were significantly higher (70.6% vs 38.9% in male  $p=0.01$ ) to "Sexual problems", the response rates of 'no' in male were higher (70.4% vs 52.9% in female  $p=0.09$ ) to "Joint pain", the response rates of 'no' in female were higher (88.2% vs 85.2% in male  $p=0.68$ ) to "Skin patch/rashes", and the response rate of 'no' in female were higher (94.1% vs 92.6% in male  $p=0.78$ ) to "Kidney or Heart problems". The results showed that females are more prone to post COVID-19 problems.

pain", the response rates of 'no' in females were higher (88.2% vs 85.2% in male  $p=0.68$ ) to "Skin patch/rashes", and the response rate of 'no' in females was higher (94.1% vs 92.6% in male  $p=0.78$ ) to "Kidney or Heart problems". The results showed that females are more prone to post COVID-19 problems.

### Discussion

This study aimed to measure the degree of COVID-19 understanding, attitude, practice, and perceptions of the disease among Northern Indians. The results show a considerable number of sociodemographic factors affecting KAP and should be useful to prepare health education initiatives for emerging infectious diseases.

In our view of perception towards COVID-19, we concentrated on vaccine acceptance, vaccine trust, and preferred place of vaccination. Participants

**Table 4.** Participant's attitudes and gender differences (N=813).

Variable	Total N=813		Male		Female		$\chi^2$	df	p-value
	n	%	n	%	n	%			
Health education will play a major role in the prevention of COVID-19?									
Yes	749	92.1	410	93.0	339	91.1	0.944	1	0.33
No	64	7.9	31	7.0	33	8.9			
Is it treatable at home?									
Yes	311	38.3	169	38.3	142	38.2	0.002	1	0.96
No	502	61.7	272	61.7	230	61.8			
It is important to notify health officials of any suspicious cases?									
Yes	436	53.6	222	50.3	214	57.5	4.191	1	0.04
No	377	46.4	219	49.7	158	42.5			
Will you share your contacts if you have been tested positive for COVID-19?									
Yes	419	51.5	229	51.9	190	51.1	0.059	1	0.80
No	394	48.5	212	48.1	182	48.9			
If you have been in contact with a patient of COVID-19 then will you get yourself tested?									
Yes	564	69.4	267	60.5	297	79.8	35.356	1	0.01
No	249	30.6	174	39.5	75	20.2			

**Table 5.** Participant's practise and gender differences.

Variable	Total N=813		Male		Female		$\chi^2$	df	p-value
	n	%	n	%	n	%			
Do you wear a mask in public?									
Always	511	62.9	250	56.7	261	70.2	16.323	2	0.01
Sometimes	257	31.6	165	37.4	92	24.7			
Never	45	5.5	26	5.9	19	5.1			
Do you wash hands with soap and water or use disinfectant?									
Always	520	64.0	263	59.6	257	69.1	8.597	2	0.01
Sometimes	270	33.2	162	36.7	108	29.0			
Never	23	2.8	16	3.6	7	1.9			
Do you maintain physical distancing?									
Always	337	41.5	152	34.5	185	49.7	19.412	2	0.01
Sometimes	384	47.2	234	53.1	150	40.3			
Never	92	11.3	55	12.5	37	9.9			
Did you avoid social events?									
Always	196	24.1	98	22.2	98	26.3	14.021	2	0.01
Sometimes	495	60.9	258	58.5	237	63.7			
Never	122	15.0	85	19.3	37	9.9			
How often do you update your information about COVID-19?									
Daily	242	29.8	136	30.8	106	28.5	4.202	3	0.24
Once a week	298	36.7	153	34.7	145	39.0			
Once a month	143	17.6	73	16.6	70	18.8			
Never	130	16.0	79	17.9	51	13.7			

perception about their risk probability of getting COVID-19 infection was low (36.5%) and similar to another study (42.0%) conducted by Walid A. Al-Qerem and Anan S. Jarab(11). Similarly, the majority of participants were willing to take vaccines when available (70.8%) and in another study more than half of the participants (53.23%) were willing to take vaccines conducted by Alqudeimat Y et al (12). For knowledge, attitude, and practice we compare our study to one other study (13) to identify the gaps

between knowledge, attitude, and practice towards COVID-19 of people of North India. In the knowledge section of our study, the result shows the majority of participants (82.8%) think that COVID-19 is a deadly disease and similar to another study (96.7%) conducted by Ferdous et al., 2020. Similarly, the majority of participants (76.6%) think that COVID-19 is exclusive to humans, and similar to another study (60.0%) conducted by Ferdous et al., 2020, the majority of participants (50.6%) think that

**Table 6.** Participant's practise and gender differences.

Variable	Total N=88		Male		Female		$\chi^2$	df	p-value
	n	%	n	%	n	%			
Loss of taste and smell?									
Yes	70	79.5	38	70.4	32	94.1	7.231	1	0.01
No	18	20.5	16	29.6	2	5.9			
General weakness and difficulty in workouts?									
Yes	77	87.5	45	83.3	32	94.1	2.218	1	0.13
No	11	12.5	9	16.7	2	5.9			
Sleeplessness?									
Yes	40	45.5	22	40.7	18	52.9	1.253	1	0.26
No	48	54.5	32	59.3	16	47.1			
Lung patch?									
Yes	76	86.4	44	81.5	32	94.1	2.829	1	0.09
No	12	13.6	10	18.5	2	5.9			
Hearing impairment?									
Yes	8	9.1	8	14.8	0	0.0	5.541	1	0.02
No	80	90.9	46	85.2	34	100.0			
Sexual problems?									
Yes	45	51.1	21	38.9	24	70.6	8.390	1	0.01
No	43	48.9	33	61.1	10	29.4			
Joint pain?									
Yes	32	36.4	16	29.6	16	47.1	2.739	1	0.09
No	56	63.6	38	70.4	18	52.9			
Skin patch/rashes?									
Yes	12	13.6	8	14.8	4	11.8	0.165	1	0.68
No	76	86.4	46	85.2	30	88.2			
Kidney or Heart problems?									
Yes	6	6.8	4	7.4	2	5.9	.076	1	0.78
No	82	93.2	50	92.6	32	94.1			

COVID-19 can it pass down from animals to humans and similar to another study (50.2%) conducted by Ferdous et al., 2020, the majority of participants (58.7%) think that COVID-19 doesn't spread by animal products (such as milk and meat) and similar to another study (50.2%) conducted by Ferdous et al., 2020.

In the attitude section of our study, the result shows the majority of participants (92.1%) think that health education will play a major role in the prevention of COVID-19 and similar to another study (95.6%) conducted by Ferdous et al., 2020. Similarly, the majority of participants (53.6%) think that it is important to notify health officials of any suspicious cases similar to another study (98.8%) conducted by Ferdous et al., 2020. In our study majority of participants (61.7%) think that COVID-19 is not treatable at home but in another study conducted by Ferdous et al., 2020, the majority of participants think COVID-19 is treatable at home (57.4%).

In the practice section of our study, results show that the majority of participants (62.9%) always wear a mask in public similar to another study (98.7%) conducted by Ferdous et al., 2020. Similarly, the

majority of participants (64.0%) always wash hands with soap and water or use disinfectant similar to another study (93.8%) conducted by Ferdous et al., 2020. In our study, we found (47.2%) and (41.5%) participants sometimes and always respectively maintain physical distance and in other studies conducted by Ferdous et al., 2020 (90.8%) and (7.2%) participants always and sometimes respectively maintain physical distance.

### Limitations

There are some limitations of this study. First, a cross-sectional analysis was conducted. Causal inferences cannot, therefore, be made. Second, self-reporting has drawbacks, including numerous distortions, compared with face-to-face interviews. Third, this study used an online survey approach to prevent potential dissemination, so that the cohort only represents sampling difficulties via the online survey. However, our analysis shows that KAP assessments for the COVID-19 pandemic of vulnerable populations need special efforts to overcome the shortcomings of the current strategy. Fourth, to assess the degree of awareness, attitude, and practice we have used a small number of

questions. Therefore, it is necessary to make more assessments to identify the actual degree of KAP in the general population, using all aspects of KAP against COVID-19. In addition, this research was carried out at a time when there are fewer cases a day in India and people's awareness, attitude, and practice shift with time and condition.

## Conclusion

Our findings show that while people generally know well about COVID-19 and appear to be average on how to overcome the pandemic. The results of our finding are average and balanced, which leads to a gap in knowledge, attitude, and practice towards COVID-19. Because of that gap, North India faces a devastating second wave of COVID-19, with an increasing death rate. Our results indicate the need for efficient and tailor-made health education initiatives aimed at improving awareness in COVID-19, thus leading to more favorable behaviors, the introduction, maintenance, and coherent reinforcement by public health authorities of preventive guidance is necessary for the strict observance of the public.

## Contribution of authors

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## Conflict of interest

There are no conflicts of interest.

## Statement of Ethics

Not applicable

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