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Quick Response Code:



Website:
www.jehp.net

DOI:
10.4103/jehp.jehp_1605_20

Awareness, perception, and mitigating measures on COVID-19: Do we still need to educate our masses on COVID-19?

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Abstract:

BACKGROUND: COVID-19 was declared an emergency of international concern by the World Health Organization in 2020. This study assesses patients' awareness, perception, and mitigating measures taken during the COVID-19 outbreak visiting an apex tertiary health-care center in North India.

MATERIALS AND METHODS: A cross-sectional study was conducted between September 15, 2020, and November 15, 2020, in a tertiary care public hospital, North India, using a structured self-administered questionnaire. The survey included 809 patients using a consecutive sampling strategy. The self-structured and prevalidated questionnaire was used to collect information on study variables. Chi-square test and independent samples *t*-test, followed by binary and multivariate logistic regression, was used to determine the factors associated with awareness toward COVID-19.

RESULTS: The mean age of participants was 32.41 (± 11.24) years. Multivariate logistic regression shows that married participants (OR: 0.660, 95% CI: 0.440–0.989, $P = 0.044$), reading books/magazine or attended institutional lectures (OR: 2.241, 95% CI: 1.545–3.249, $P = 0.001$), and watching television and radio (OR: 1.824, 95% CI: 1.283–2.592, $P = 0.001$) are significantly more aware than their counterparts. Participants with higher income group (>20,000 Indian rupee) significantly had higher awareness than participants having salary <10,000 rupees (OR: 0.280, 95% CI: 0.178–0.440, $P = 0.001$) or 10,001–20,000 rupees (OR: 0.481, 95% CI: 0.297–0.777, $P = 0.003$). Patients avoiding traveling across or abroad had significantly much reasonably good awareness than their counterparts (OR: 0.357, 95% CI: 0.139–0.918, $P = 0.033$).

CONCLUSIONS: Participants demonstrated good awareness, encouraging perception, and complied with appropriate mitigating measures during the outbreak. Considering frequent waves and the pandemic's long duration, consistent reinforcement of government measures, including masks, maintaining social distance, and frequent handwashing, is much needed.

Keywords:

Awareness, COVID-19, education, mitigation, perception

Introduction

The highly infectious disease, abbreviated as COVID 19, emerged in late December 2019 in Wuhan, China.^[1] The novel coronavirus is an emerging viral infection with a wide range of symptoms such as cough, fever, dyspnea, chills, muscle pain, headache, sore throat, loss of taste, and

smell. However, much scientific work is underway on the epidemic to explore a new era of possibilities of symptoms and treatment.^[2,3]

The high level of contagiousness of SARS-CoV-2 has made it a global pandemic.^[4] In response, the World Health Organization (WHO) announced it as a public health emergency of global concern

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How to cite this article: Bairwa M, Kumar R, Yadav P, Bahurupi Y, Kant R. Awareness, perception, and mitigating measures on COVID-19: Do we still need to educate our masses on COVID-19?. *J Edu Health Promot* 2021;10:275.

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Received: 10-12-2020
Accepted: 11-01-2021
Published: 30-07-2021

on January 30, 2020.^[5] The virus is transmitted through droplet infection from an infected individual with COVID-19, living in the same environment or house, contacting infected surfaces, working together, and traveling along with an infected person with COVID-19.^[6] Currently, 20 countries were most affected by severe viral epidemics globally. The case-fatality ratio is highest in Mexico (10.8%), followed by many other Western countries and India (1.9%).^[7]

The SARS outbreak in 2003 taught a lesson on the perceived risk of fear and anxiety, which created many psychological problems among the population and had given the possibility of future flu pandemic as well.^[8] Given the outbreak, the Ministry of Health Family Welfare, Government of India, tried to empower the citizens by taking unprecedented safety measures, providing the right information, and implementing advisory and safety guidelines regularly on public and social health measures such as social distancing, use of face mask, frequent hand hygiene, travel restrictions, and quarantine for the well-being of people.^[9,10]

India is a country with a wide geographical area and vast diversity; sociocultural, economic disparity, and health services inequalities presented new threats and enormous challenges to deal with the growing COVID-19 pandemic.^[11] In addition, this outbreak has infused a degree of panic among the general public, administrators, and health-care workers alike. Everyday upcoming facts on novel coronavirus also ring an alarm in the population.^[12] Similarly, circulating fake news on media and other electronic handles makes the general public panic and haunts psychological status.^[13] Access and spreading precise and factual information to populations residing in remote areas is still a deficit and indicates more stringent action to make the public aware of the various aspects of virus transmission and prevention.^[14] Earlier research reported that many populations need information on transmission, effective use of face masks, and the concept of social distancing and indicate more research in this area.^[15,16] Research from outside India also reported public knowledge gap for concerned agencies to take more effective and successful awareness strategies using preferred channels.^[17,18]

India faces a severe challenge to control the virus transmission and widespread misinformation on various prevention and management of novel coronavirus infection.^[13] However, adherence to these measures requires up-to-date information, encouraging perception, and adherence to mitigating measures to win the battle over novel coronavirus.^[9,19] Therefore, we planned this study to understand the general awareness, perception, and mitigating measures toward COVID-19 followed by the North Indian population visiting a tertiary

care teaching hospital. A rapid assessment of these parameters is imperative to plan strategies for further policymaking and educational disbursement to manage this ongoing scourge; deep and insightful community participation is vital for the best outcomes.

Materials and Methods

A cross-sectional survey was conducted at a tertiary care teaching hospital, North India. A total of 9000 patients visiting the outpatient department participated in this survey and returned the survey ($n = 809$) with a response rate of 8.98% for the final analysis. The ethics committee approved the project (AIIMS/IEC/20/166). A consent form designed in bilingual (Hindi and English) languages was also attached to the survey questionnaire to consent before taking part in the survey. However, the survey form was refrained from collecting any personal information of the participants. Individuals were informed to ensure privacy and confidentiality at each stage of data collection and disseminating the findings. Individuals were given full freedom to refuse participation without mentioning any specific reason.

Sociodemographic profile sheet

Information on gender, age, occupation, qualification, marital status, residential location, source of information on COVID-19, history of COVID-19 positive in family, travel history to other country and other parts of India, monthly family income (Indian rupees), and the number of family members was collected. Experts in nursing, medicine, and microbiology validated the questionnaire. The profile sheet was pretested among the eligible population before administration for final use.

Awareness questionnaire

A structured awareness questionnaire was used to collect information on different aspects related to COVID-19. The WHO home page was explored for frequently asked questions regarding coronavirus, and previously published research on a similar topic was explored to design this questionnaire.^[12,20] Awareness consists of information on transmission sources, prevailing truth and myths about COVID-19 such as contagiousness, lethality, common sign and symptoms, and a pet dog's role in transmission, role of quarantine/isolation in transmission, and prevention of COVID-19. Each participant was asked to respond to the series of questions on a dichotomous response (yes/no) with an additional "don't know" option. Each correct response was given one score, and zero was assigned to the "no" or "don't know" response. The questionnaire's reliability was tested using the KR₂₀ method and reported 0.82 (ρ KR₂₀ = 0.82) for this study. The questionnaire was validated and pretested among the eligible population before use. The questionnaire was translated into the

Hindi language and pretested before using it for the final use. The total awareness score was categorized into moderate (>60%) and good awareness ($\leq 60\%$) score categories.

Structured perception and mitigating measures checklist

The perception scale consisted of 7 items on a different perspective or views toward the COVID-19. The scale was a five-point Likert scale: never (0) to always (4). The perception scale consisted of questions about “probability of contacting with COVID-19 infection,” “adherence to government guidelines in respect to COVID-19 time to time,” “use of frequent handwashing to reduce the probability the transmission,” “need of quarantine or isolation in case of development of common flu-related (i.e., cough and cold) symptoms,” “need of social distancing to prevent transmission,” “safety of traveling during COVID-19 outbreak,” and “social integration of an individual after complete treatment of COVID-19.” The scale sought validation by the experts of nursing, microbiology, and medicine. The reliability of the perception scale was measured using Cronbach’s alpha ($\alpha = 0.89$) for this study.

A five-item mitigating measures checklist was prepared on standard mitigating measures expected to be followed by everyone in the COVID-19 outbreak: “avoid going to a crowded place,” “comply with government advisory and guidelines,” “use a mask,” “wash hands,” and “avoid social contact during COVID-19 outbreak.” Each participant was questioned to respond to three mitigating items on a dichotomous response (yes/no), and for the rest, two items were asked to rate on a five-point Likert scale: never (1) to always (5), indicative seriousness of compliance to the different mitigating measures in COVID-19 outbreak. Perception scale and mitigating measures checklist were translated into Hindi language and pretested before final use. The validity was checked by taking experts’ opinions in microbiology, medicine, and nursing. The mitigating checklist’s reliability was measured using the test-retest method and found 0.81 ($r = 0.81$) for this study.

Statistical analysis

The Chi-square test and independent samples *t*-test were applied to compare the demographic characteristics on the level of awareness regarding COVID-19 for categorical and continuous data, as appropriate. Bivariate and multivariate logistic regression was used to determine the factors of patients associated with awareness level. The odds ratio (ORs) with 95% confidence interval (CI) was used to quantify the association’s strength between the patients’ level of awareness and sociodemographic characteristics. IBM SPSS Statistics for Windows,

Version 23.0, NY, USA: IBM Corp., was used to analyzing the data. $P < 0.05$ was considered statistically significant for testing all statistical tests (two-sided).

Results

Data of 809 participants were used for the final analysis in this study. The participants’ mean age was 32.41 (11.24) years, ranging from 14 to 75 years. Of the participants, more than three-fourth (76.4%) were male and had graduation (34.5%) as an educational qualification. 55.5% of the participants were married and working in a private job (53.4%) with a monthly income of more than 10,000 Indian rupees. The majority of the participants were Hindu by religion (91%) and were living in urban (46.8%) and rural (44.4%) area and reported a travel history to other parts of India and abroad (4.2%). Interestingly, 5.4% of the patients reported a history of COVID-19 positive among family members. The majority of the participants (73.2%) had access to the Internet and social media for information regarding COVID-19, followed by reading books/magazines and institutional lectures (66.1%). However, more than half of the participants got information on COVID-19, watching television and listening radio (54%), and interacting with friends or family members (51.3%). Information on sociodemographic characteristics is summarized in Table 1.

Awareness about COVID-19 disease

A reasonable number of participants had a good awareness of the essential elements of the disease. More than half (58.6%) were aware that the virus might spread through multiple modes such as coughing, sneezing, kissing, and eating. Seventy-four percent of the participants answered that coronavirus is a contagious disease and highly fatal (48.1%) and negated that no treatment option (57.4%) for treating coronavirus. The majority (85.9%) of the participants said that they could not prevent transmission of the disease and indicate an intensification awareness on this aspect. Most of the participants (92.3%) reported that washing hands frequently could help break the disease’s chain of further transmission. About awareness of the disease’s signs and symptoms, 85.2% of the participants were aware that cough is the most common symptom, followed by fever (83.4%). Further, 67.7% of the participants acknowledged that difficulty in breathing (dyspnea) and sore throat (62.9%) were other common symptoms, along with cough and fever. 88.5% of the participants approved that isolation or quarantine of a person with symptoms could be a useful measure to prevent the spread of infection; furthermore, 36.1% validated the notion that pet dogs at home were able to transmit coronavirus [Table 2].

Table 1: Sociodemographic characteristics and level of awareness on COVID-19 (n=809)

Variables	Categories	Total frequency (%)	Good awareness, frequency (%)		P
			Yes	No	
Age (years), mean±SD (range):	32.41±11.24 (14-75)		31.29±10.98	33.14±11.53	0.022*
Gender	Male	618 (76.4)	241 (76.0)	377 (76.6)	0.844
	Female	191 (23.6)	76 (24.0)	115 (23.4)	
Educational level	Informal	28 (3.5)	5 (1.6)	23 (4.7)	0.001*
	Primary	157 (19.4)	37 (11.7)	120 (24.4)	
	Higher secondary	178 (22.0)	80 (25.2)	98 (19.9)	
	Graduation	279 (34.5)	117 (36.4)	162 (32.9)	
	Postgraduation	109 (13.5)	47 (14.8)	62 (12.6)	
	Professional	42 (5.2)	25 (7.9)	17 (3.5)	
	Others [^]	16 (2.0)	6 (1.9)	10 (2.0)	
Marital status [§]	Unmarried	355 (43.9)	168 (53.3)	187 (38.2)	0.001*
	Married	449 (55.5)	147 (46.7)	302 (61.8)	
Occupation	Government employee	112 (13.9)	59 (18.9)	53 (10.8)	0.007*
	Private job	431 (53.4)	158 (49.8)	273 (55.7)	
	Self-employed	264 (32.7)	100 (31.5)	164 (33.5)	
Religion [§]	Hindu	736 (91.0)	279 (88.3)	457 (92.9)	0.015*
	Muslim	31 (3.8)	14 (4.4)	17 (3.5)	
	Sikh	22 (2.7)	9 (2.8)	13 (2.6)	
	Christian	19 (2.3)	14 (4.4)	5 (1.0)	
Residence location	Urban	379 (46.8)	174 (54.9)	205 (41.7)	0.001*
	Rural	359 (44.4)	115 (36.3)	244 (49.6)	
	Semi-urban	71 (8.8)	28 (8.8)	43 (8.7)	
Source of information on COVID-19**	Books/magazine/institutional lectures	535 (66.1)	157 (49.5)	117 (23.8)	0.001*
	Internal/social media	592 (73.2)	259 (81.7)	333 (67.7)	0.001*
	Television/radio	437 (54.0)	208 (65.6)	229 (46.5)	0.001*
	Friend/family members/neighbors	253 (51.3)	133 (42.0)	120 (24.4)	0.001*
Monthly family income (Rs.)	10,000	439 (54.3)	122 (38.5)	317 (64.4)	0.001*
	10,000-20,000	171 (21.1)	69 (21.8)	102 (20.7)	
	≥20,001	199 (24.6)	126 (39.7)	73 (14.8)	
Family members got COVID-19 positive	Yes	44 (5.4)	19 (6.0)	25 (5.1)	0.517
	No	765 (94.6)	298 (94.0)	467 (94.9)	
History of travel abroad or across the country	Yes	34 (4.2)	7 (2.2)	27 (5.5)	0.023*
	No	775 (95.8)	310 (97.8)	465 (94.5)	

[^]Obtained an informal training to perform an individual task, [§]Divorced and separated (5) and parsi (1) participants excluded from primary analysis; * $P < 0.05$; SD=Standard deviation, HSE=Higher secondary education;** Percentage will exceed 100% due to multiple responses

Perception and mitigating measures about COVID-19 disease

Findings reported that more than 66.5% of the participants followed the government's guidelines to mitigate coronavirus spread and agreed (60.3%) that washing hands frequently could be an essential step to lowering coronavirus risk. 80.8% of the participants believed that social distancing is another essential step to breaking viral spread transmission. Interestingly, 67.4% of the participants thought that traveling across or within country is not safe during the pandemic. Mitigating measures regarding COVID-19 disease, 73.1% of the participants used a mask (any type) while stepping outside of the home and adhered to government guidelines (71.8%) to stop further transmission of the virus. Likewise, 78.2% of the participants refrained from visiting crowded places and stopped calling people at home (88%). Further, more than 60.1% of the

participants agreed to go in quarantine or follow isolating themselves in case of the disease's early symptoms and agreed (51.3%) that a patient should be considered back to his/her community after curing of disease. More than 94.3% of the participants follow frequent hand wash to curb transmission [Table 3].

The higher level of awareness on COVID-19 found a significant association with participants' age ($P < 0.05$), educational status ($P < 0.05$), occupation ($P < 0.05$), residential location ($P < 0.05$), marital status ($P < 0.05$), religion ($P < 0.05$), source of information; books/magazine ($P < 0.05$), Internet/social media ($P < 0.05$), television/radio ($P < 0.05$) and family/friends and neighbor ($P < 0.05$), history of traveling abroad ($P < 0.05$), and monthly family income ($P < 0.05$). However, awareness regarding COVID-19 did not find any significant association with gender, history of COVID-19

Table 2: Awareness about COVID-19 among participants (n=809)

Questions related to awareness of COVID-19	n (%)*
Coronavirus spread through	
Coughing	437 (54.0)
Sneezing	440 (54.4)
Kissing	202 (25.0)
Eating together	154 (19.0)
All the ways mentioned above	474 (58.6)
The truth about coronavirus	
Coronavirus is a highly contagious disease	599 (74.0)
Coronavirus is a highly fatal disease	389 (48.1)
No treatment option as of now for treating coronavirus	464 (57.4)
Stopping transmission/spread of the coronavirus disease is not possible	695 (85.9)
No scientific evidence that self-quarantine can prevent the spread of novel coronavirus infection	140 (17.3)
Frequent handwashing helpful to stop the spread of the coronavirus	747 (92.3)
Symptoms of the coronavirus infection	
Cough	689 (85.2)
Fever	675 (83.4)
Headache	463 (57.2)
Fatigue	343 (42.4)
Myalgia	276 (34.1)
Sore throat	409 (62.9)
Chest pain	312 (38.6)
Dyspnea	548 (67.7)
Isolating a person with symptoms to stop the spread of the coronavirus	716 (88.5)
Pets dog at home able to transmit coronavirus	292 (36.1)

*Values are presented as n (%)

positive in family, and the number of family members of the participants [Table 1].

All variables showing a significant association with awareness status regarding COVID-19 were included in the bivariate logistic regression model. Findings shows that participants younger in age (OR: 0.985, 95% CI: 0.972–0.998, $P = 0.023$) and educated up to higher secondary education (OR: 3.755, 95% CI: 1.366–10.322, $P = 0.010$), graduate (OR: 3.322, 95% CI: 1.227–8.994, $P = 0.018$), post-graduation (OR: 3.487, 95% CI: 1.234–9.853, $P = 0.018$), and completed a professional education (OR: 6.765, 95% CI: 2.149–21.294, $P = 0.001$) have better awareness on COVID-19 in comparison to participants have informal education. Further, married participants (OR: 0.542, 95% CI: 0.407–0.722, $P = 0.001$) shows less awareness on COVID-19 diseases and its related aspects than the unmarried one. Similarly, participants having government job (OR: 1.826, 95% CI: 1.168–2.853, $P = 0.008$) have good knowledge than their counterparts. Likewise, participants belongs to Hindu (OR: 0.218, 95% CI: 0.078–0.612, $P = 0.004$), and Sikh (OR: 0.247, 95% CI: 0.065–0.934, $P = 0.039$) religion

were comparatively have less awareness on COVID-19 than the participants belongs to Christian community. Source of information regarding COVID-19; books/magazine/lectures (OR: 3.145, 95% CI: 2.324–4.256, $P = 0.001$), Internet/social media (OR: 2.312, 95% CI: 1.515–3.001, $P = 0.001$), television/radio (OR: 2.192, 95% CI: 1.637–2.934, $P = 0.001$), friends/family/neighbor (OR: 2.241, 95% CI: 1.654–3.035, $P = 0.001$) found significantly associated with higher level of awareness among participants. Participants have traveling history of abroad or in country (OR: 0.389, 95% CI: 0.167–0.904, $P = 0.028$) are lacking information regarding COVID-19 outbreak. Participants have monthly family income (Indian rupee [INR]); <10,000 (OR: 0.223, 95% CI: 0.156–0.318, $P = 0.001$) and 10,001–20,000 (OR: 0.392, 95% CI: 0.257–0.597, $P = 0.001$), shows a significantly less awareness about COVID-19 disease [Table 4].

Further, findings represent that adequate awareness of patients regarding COVID-19 is significantly associated with patient's professional education (OR: 6.765, 95% CI: 2.149–21.294, $P = 0.001$), postgraduation (OR: 3.487, 95% CI: 1.234–9.853, $P = 0.018$), graduation (OR: 3.322, 95% CI: 1.227–8.994, $P = 0.018$), and higher secondary education (OR: 3.755, 95% CI: 1.366–10.322, $P = 0.010$) in comparison to patients who had formal education only. Further, unmarried patients (OR: 0.542, 95% CI: 0.407–0.722, $P = 0.001$) significantly have less awareness than their counterparts. Awareness was significantly higher in patients working in government setup (OR: 1.826, 95% CI: 1.168–2.853, $P = 0.008$) compared to the self-employed group. Likewise, it has been noted that participants belonging to Hindu (OR: 0.218, 95% CI: 0.078–0.612, $P = 0.004$) and Sikh (OR: 0.247, 95% CI: 0.065–0.934, $P = 0.039$) religion significantly have low awareness in comparison to the Christian community. About the source of information, patients reading books/magazine/institutional lectures (OR: 3.145, 95% CI: 2.324–4.256, $P = 0.001$), using Internet/or social media (OR: 2.312, 95% CI: 1.515–3.001, $P = 0.001$), watching television/radio (OR: 2.192, 95% CI: 1.637–2.934, $P = 0.001$), have a circle of friends/family/neighbor (OR: 2.241, 95% CI: 1.654–3.035, $P = 0.001$) in surrounding have significantly better awareness toward COVID-19 in comparison to them who do not have access to these sources of information. Likewise, patients having monthly income < 10,000 Indian rupees (OR: 0.223, 95% CI: 0.156–0.318, $P = 0.001$) and earning 10,001–20,000 rupees were significantly (OR: 0.392, 95% CI: 0.257–0.597, $P = 0.001$) having poor knowledge than with monthly income more than 20,000 rupees. Patients who traveled abroad or in the country during the COVID-19 outbreak have significantly less awareness on COVID-19 (OR: 0.389, 95% CI: 0.167–0.904, $P = 0.028$) than those who did not travel in the pandemic [Table 4].

Table 3: Perception and mitigating measures about COVID-19 among participants (n=809)

Questions related to perception	Never	Occasionally	Sometimes	Often	Always
A1: You think you can get affected by the COVID-19 infection?	296 (36.6)	200 (24.7)	152 (18.8)	80 (9.9)	81 (10.0)
A2: Compliance with the government issued guidelines regarding the prevention of corona COVID-19?	26 (3.2)	43 (5.3)	77 (9.5)	125 (15.5)	538 (66.5)
A3: Washing hands more frequently can lower down the risk of coronavirus infection?	20 (2.5)	42 (5.2)	80 (9.9)	179 (22.1)	488 (60.3)
A4: Quarantine/isolate self in developing initial symptoms of coronavirus, i.e., fever and cough?	27 (3.3)	53 (6.6)	76 (9.4)	167 (20.6)	486 (60.1)
A5: Social distancing is an essential step to stop virus transmission to others?	17 (2.1)	20 (2.5)	30 (3.7)	88 (10.9)	654 (80.8)
A6: Traveling across/within the country is safe during the COVID-19 outbreak?	545 (67.4)	55 (6.8)	67 (8.3)	63 (7.8)	79 (9.8)
A7: Patients declared cured after COVID-19 should not be allowed to stay within the community at this time?	199 (24.6)	43 (5.3)	71 (8.8)	81 (10.0)	415 (51.3)
Mitigating measures used by the participants					
P1: In last month, have you use a mask (any type) while stepping outside of the home?	8 (1.0)	37 (4.6)	31 (3.8)	142 (17.6)	591 (73.1)
P2: In the last month, have you followed government instructions to prevent the transmission of coronavirus?	14 (1.7)	36 (4.4)	34 (4.2)	144 (17.8)	581 (71.8)
P3: In the last month, have you visited a crowded place?*				177 (21.9)	632 (78.2)
P4: In recent days, do you wash your hands more frequently?*				763 (94.3)	46 (5.7)
P5: In recent days, have you stopped calling other people at your home?*				712 (88.0)	97 (12.0)

*Correct response (%)

Multivariate logistic regression analysis applied for the variables found significant in bivariate regression analysis. Regression findings reported that unmarried patients significantly have adequate awareness compared to the married (OR: 0.660, 95% CI: 0.440–0.989, $P = 0.044$) group [Table 4].

Likewise, patients belonging to the Christian community had significantly better awareness than Hindu (OR: 0.188, 95% CI: 0.060–0.585, $P = 0.004$) and Muslim (OR: 0.242, 95% CI: 0.060–0.978, $P = 0.047$). Further, it is revealed that patients who have updated information by going through books/magazine on COVID-19 or attended institutional lectures (OR: 2.241, 95% CI: 1.545–3.249, $P = 0.001$) and regularly watching television and news on radio (OR: 1.824, 95% CI: 1.283–2.592, $P = 0.001$) significantly had better awareness as compared to their counterparts. Similarly, patients with monthly income more than 20,000 Indian rupees significantly had more awareness compared to having salary < 10,000 (OR: 0.280, 95% CI: 0.178–0.440, $P = 0.001$) or 10,001–20,000 INR (OR: 0.481, 95% CI: 0.297–0.777, $P = 0.003$). Patients who refrained from traveling outside or across the country are significantly more aware on disease aspects (OR: 0.357, 95% CI: 0.139–0.918, $P = 0.033$) compared to their counterparts [Table 4].

Discussion

COVID-19 is a public health emergency, and the need for good awareness is of utmost importance among

the population for its prevention and management.^[21,22] It is proved in earlier research that having adequate information ensures a more encouraging attitude and supports adherence to safe practice to coronavirus disease.^[22,23] Inadequate understanding often leads to a careless attitude, impeding early preparedness to counteract the challenges.^[12] Therefore, this study attempted to assess the awareness, perception, and mitigating measures related to COVID-19 after 6 months of declaring a public health emergency. The present study shows that majority of the participants had good awareness about COVID-19 disease. Of the participants, more than half (58.6%) reported that coughing, sneezing, kissing, and eating are the source of infection and believed that disease is highly contagious and frequent handwashing mitigates the further transmission of the virus. The present study findings are in agreement with the earlier work conducted in India and outside of India.^[12,19,24-26] On the other hand, contradictory findings reported a significant gap in awareness in earlier work conducted outside Indian continents.^[17,18] Variation in the findings may be because of different populations, tools, and study timing and warrant more research in this area to reach a specific conclusion. Likewise, a study conducted in China reported that more than 91% of the population abide by major preventive strategies including avoiding going outside, using masks, and avoiding public gatherings.^[27] These findings draw the concerned Indian authorities' attention to use their think tank to plan and use novel strategies to spread awareness.

Table 4: Findings of logistic regression on factors associated with knowledge score on COVID-19 in participants (n=809)

Variables	Bivariate analysis		Multivariate analysis	
	OR (95% CI)	P	OR (95% CI)	P
Age (years)	0.985 (0.972-0.998)	0.023*	1.004 (0.986-1.023)	0.641
Educational status				
Informal education	Reference category	Reference category	Reference category	Reference category
Primary education	1.148 (0.504-3.3993)	0.558	1.307 (0.423-4.039)	0.641
HSE	3.755 (1.366-10.322)	0.010*	2.802 (0.903-8.690)	0.074
Graduate	3.322 (1.227-8.994)	0.018*	2.294 (0.756-6.962)	0.143
Postgraduate	3.487 (1.234-9.853)	0.018*	2.238 (0.699-7.162)	0.175
Professional education	6.765 (2.149-21.294)	0.001*	3.410 (0.933-12.468)	0.064
Others^	2.760 (0.681-11.191)	0.155	1.581 (0.344-7.258)	0.556
Marital status				
Unmarried/single	Reference category	Reference category	Reference category	Reference category
Married	0.542 (0.407-0.722)	0.001*	0.660 (0.440-0.989)	0.044*
Occupational status				
Self-employed	Reference category	Reference category	Reference category	Reference category
Government employee	1.826 (1.168-2.853)	0.008*	0.617 (0.350-1.088)	0.095
Private job	0.949 (0.692-1.303)	0.949	0.758 (0.521-1.101)	0.146
Religion				
Christian	Reference category	Reference category	Reference category	Reference category
Hindu	0.218 (0.078-0.612)	0.004*	0.188 (0.060-0.585)	0.004*
Muslim	0.294 (0.085-1.019)	0.053	0.242 (0.060-0.978)	0.047*
Sikh	0.247 (0.065-0.934)	0.039*	0.219 (0.047-1.013)	0.052
Residential status				
Semi-urban	Reference category	Reference category	Reference category	Reference category
Urban	1.303 (0.777-2.188)	0.315	1.390 (0.761-2.539)	0.284
Rural	0.724 (0.428-1.224)	0.218	1.144 (0.620-2.111)	0.668
Source of information on COVID-19				
Books/magazine/lectures (yes vs. no)	3.145 (2.324-4.256)	0.001*	2.241 (1.545-3.249)	0.001*
Internet/social media (yes vs. no)	2.132 (1.515-3.001)	0.001*	1.461 (0.984-2.170)	0.060
Television/radio (yes vs. no)	2.192 (1.637-2.934)	0.001*	1.824 (1.283-2.592)	0.001*
Friends/family/neighbor (yes vs. no)	2.241 (1.654-3.035)	0.001*	1.480 (1.000-2.189)	0.050
Travel abroad or other parts of the country (yes vs. no)	0.389 (0.167-0.904)	0.028*	0.357 (0.139-0.918)	0.033*
Monthly family income (INR)				
≥20,000	Reference category	Reference category	Reference category	Reference category
<10,000	0.223 (0.156-0.318)	0.001*	0.280 (0.178-0.440)	0.001*
10,001-20,000	0.392 (0.257-0.597)	0.001*	0.481 (0.297-0.777)	0.003*

*P<0.05; ^Obtained informal training to perform an individual task. HSE=Higher secondary education, OR=Odds ratio, CI=Confidence interval, INR: Indian rupee

The majority of the participants (85.2%) were aware of initial symptoms, i.e., cough (85.2%), fever (83.2%), dyspnea (67.2%), and 57.4% knew that there is no standard treatment option as of the date of the present manuscript. Participants in the current study believe that coronavirus is highly contagious (74%) and fatal (48.1%). The coronavirus disease has been reported to be highly contagious and fatal.^[28] Findings on awareness of symptoms and the nature of coronavirus disease agree with the earlier published literature.^[12,29] Likewise,

studies conducted on the general public and health professionals on knowledge toward COVID-19 also reflected satisfactory results.^[20,30-32]

It is a cause of concern that more than three-fourth (85.9%) of the participants said that preventing disease spread is impossible at this stage. This lack of awareness demonstrated by the participants might mitigate the government's action plan and discourage health professionals from winning the race against the deadly

virus. These participants are not likely to follow the government's policy and guidelines to reduce the virus's transmission. It indicates that a large proportion of the general public was unaware of the disease's preventive measures and seriousness and urged to disseminate health education and spread awareness during an outbreak to take the right measures to prevent disease.^[12,33,34]

Many participants were educated either graduate (32.9%) or up to primary education (24.4%). A good number of participants had a reasonable level of awareness on modes of spread, initial symptoms, and a piece of awareness regarding different preventive strategies, i.e., handwashing, social distancing and quarantine, and isolation. The study population reported frequent use of handwashing, avoiding crowded places to visit, refrain calling people at home, using masks while going outside, and adherence to instructions issued by the government to curb the disease from time to time. Awareness and sensitization regarding coronavirus disease also reported in their perception as a reasonably good number of participants (more than 3/4th) agreed with the norms for maintaining social distancing, avoiding travel, self-quarantine or isolating self, washing hand frequently, and complying with the government recommendations and policy about the preventive measures. Different government agencies and mass media's role in educating the population regarding preventive strategies remain remarkable in this direction. The study findings are supported by the earlier research work that reflected a satisfactory level of awareness for corona and other epidemics, such as Middle East respiratory syndrome.^[22,34-36]

The present study found that many participants reflect a positive perception toward compliance with government policies and guidelines, frequent handwashing, isolation or quarantine, and following social distancing to overcome COVID-19. High levels of encouraging perception were also demonstrated in earlier similar research conducted in India^[14] and China^[19] and Malaysia.^[32] The Indian government's timely unprecedented measures via early lockdown and rapid awareness through mass media helped mitigate the virus's transmission.

Further, the present study reported that higher awareness is significantly associated with age, family income, education, marital status, religion, access to the source of information, and avoiding traveling during the pandemic. Findings on the association of level of awareness with younger age,^[14] higher education qualification,^[14] higher income group,^[37] and marital status^[19] were found in agreement with the earlier research on awareness and perception toward COVID-19

from India and abroad. All pandemics and epidemics share unique characteristics in terms of cause, ways of transmission, progression, and preventive or control measures. Therefore, it is fundamental to educate the population and spread awareness during these situations for effective and timely prevention.

The study findings should be appraised under many limitations. First, the study findings are limited to the northwestern area of India. The study population is only patients attending a single tertiary care center for medical services in the hilly region of North India. Second, considering the cross-sectional study, chances of subjectivity and responses might not represent patients' actual behavior. Likewise, it is challenging to record the patients' behavior accurately and urge other researchers to use the findings in other settings cautiously. Third, the number of males is more in contrast to female participants in the study and may be a reason of bias in actual findings. The study strength lies in the large sample size during the time government took unprecedented measures to mitigate the virus's spread. The study was conducted in a large tertiary care nodal referral public hospital dedicated to COVID-19 patients.

Conclusions

In light of pieces of evidence presented by the study, the findings suggest an adequate level of knowledge, encouraging attitude and compliance to practices on mitigating the pandemic. However, considering the large proportion of the elderly and illiterate population in the country, we urge to use a novel approach to spread awareness, follow the accurate practice, and demonstrate acceptable public place behavior. Considering frequent waves and the pandemic's long duration, consistent reinforcement of government measures, including masks, maintaining social distance, and frequent handwashing, is much needed. In the shadow of the mentioned limitations and strengths, future studies can be planned on a more objective assessment of public behavior toward COVID-19 and may suggest other different measures to ensure higher compliance toward current government guidelines and other preventive measures toward COVID-19.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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