Research Article

Awareness, Perceived Risk, and Protective Behavior Towards Covid-19 Among Undergraduate Students of Delhi and NCR, India

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ABSTRACT

Preventive measures are the best cure for any disease as they reduce the infection rate. Preventive measures are affected by knowledge, attitudes, and practices towards the disease. Therefore, this study aimed to assess the awareness, perceived risk, and protective behavior toward COVID-19 among undergraduate students of the Delhi and National Capital Region, India. An online questionnaire-based random survey was conducted amongst 605 undergraduate students to assess the demographic characteristics of participants, their level of awareness, perceived risk, and protective behavior regarding COVID-19. The overall awareness, perceived risk, and protective behavior for COVID-19 were found high in undergraduate students (0.000***,0.000***,0.000***). When variable (Gender, area of living, and subject studies) based analysis was performed among participants, a non-statistical significance difference was observed in total awareness among them (p>0.05) towards COVID-19 (p=0.996, 0.121, 0.937). Whereas Female, urban, and science participants were found to perceive the risk for COVID-19 more accurately in comparison to male, rural and non-science participants in total perceive risk analysis (p= 0.016**, 0.035**, 0.036**). However, urban participants showed more Total protective behavior as compared to the rural participants (p=0.048**) and there was no statistical significance difference in protective behavior in terms of Male/Female and Science/ non-science participants (p=0.189, 0.100). These findings will contribute to the continued regional/ global efforts to better understand preventive crisis response to the COVID-19 pandemic. This study emphasizes the need for conducting periodic webinars for educational intervention for all college students which could be useful to create more awareness.

Key words: *Awareness, COVID-19, Pandemic, Perceived risk, Protective behavior, Students*

INTRODUCTION

The worldwide pandemic of coronavirus disease 2019 (COVID-19) is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) [1, 2]. It was first detected in December 2019 in Wuhan, China, and declared as asa pandemic on 11th March 2020 by World Health Organization. [3, 4]. COVID-19 affects millions of people with mild to moderate type of infections [5]. The most common symptoms of COVID-19 includes a range of high fever, tiredness, shortness of breath, dry cough, sore throat, loss of smell, and viral pneumonia and multi-organ failure under severe conditions [6]. It is a communicable infection spreads through close contact from

people to people by inhaling the respiratory droplets and also through touching the contaminated surfaces [7, 8]. Symptoms mostly seen after 5-6 days of exposure and mostly last for 2-14 days [9]. Depending upon the severity of infection, some people required hospitalization, however patients discharges from hospitals showed high level of Post-traumatic stress disorder (PTSD) and took more time for healing against the infection [10]. For the detection of the virus, the standard test is to be conducted in a reverse transcription-polymerase chain reaction (rRT-PCR) from a nasopharyngeal swab and chest X-rays for pneumonia [11-13]. Pandemic also affected the physical and mental health of people suffering with non-communicable diseases, made their life more miserable [14]. Self-isolation, social distancing, wearing of a mask, and vaccination can prevent the infection. Interpersonal distance of two feet in a condition when everyone is wearing a mask was observed to be effective in combating the spread of disease in the heavily populated areas [15]. Pandemic even did not spare the health care system, thousands of doctors and health care workers lost their lives due to non-stopped working hours in the hospitals. Extra infection load on the hospital system crumbled the health care system and showed their non resilience nature under adverse conditions [16]. COVID-19 have affected the mental health of the elderly, as they experienced more anxiety and depression symptoms [17].

The Ministry of Health and Family Welfare (MoHFW) has confirmed a total of 2,92,258 active cases, 5,34,620 recoveries, and 22,674 deaths in India on 12 July 2020. Three states/ UTs account for around half of all active cases in the country: Maharashtra, Tamilnadu, and Delhi [18]. A Janata Curfew for 24 hours and lockdown for 21 days from March 24, 2020 onwards was imposed by the government of India [19]. India has used digital platforms such as Aarogya Setu mobile app to create awareness about COVID-19 among public and to have a tract of infection people for control of pandemic [20]. To ensure COVID-19 control, an individual's adherence to control measures is essential. Furthermore, adherence to preventive measures is affected by the awareness, perceived risk, and protective behavior towards the COVID-19 [21]. Therefore, this pilot study was carried out to investigate awareness, perceived risk, and protective behavior among undergraduate students in India during the pandemic.

MATERIALS AND METHODS

Study participants

A random online survey was conducted on undergraduate students aged 18-21 years, from 20th June 2020 onwards. A validated questionnaire is circulated in different educational institutes and a total of 605 students have responded in the given time span. These students belong to science and non-science streams, residing in rural and urban areas of Delhi and NCR. There were more female respondents as compared to males in our random online survey.

Data collection

Due to the infectious nature of the disease, online google forms were used to collect the data. The link for the google form was sent randomly to students through WhatsApp groups and/ or Email. The questionnaire consists of multiple-choice questions, which assessed:1. Awareness, 2. Perceived risk, and 3. Protective behavior towards COVID-19. It also consists of demographic variables such as age, gender, area of living (metropolitan city or rural towns), education level, and subject stream of the students.

Statistical analysis

Data analysis was done using statistical software SPSS (version 26.0; SPSS Inc., Chicago, IL, USA). Box plot analysis was done to find the even distribution of demographic factors. Independent t-test analysis was done to find the overall awareness, risk perception, and protective behavior towards COVID-19 among participants. Non-parametric chi-squared analysis was conducted to find the effect of various demographic variables i.e. gender, area of living, and subject stream on awareness, risk perception, and protective behavior towards COVID-19 among participants. The results in each category (awareness, risk perception, and protective behavior) were analyzed in two ways a) Variable based Total awareness, Perceived Risk, and Protective behavior among participants b) Variable based Individual question-wise awareness, Perceived Risk, and Protective behavior among participants. Level of significance was evaluated at ***$p<0.01$, **$p<0.05$, *$p<0.1$.

RESULTS AND DISCUSSION

Demographic characteristics of participants

Six hundred five undergraduate students have participated in the survey. The demographic characteristics which were used in the study were gender, area, and subject studied. Of all 605 participants, 67 (11.1%) were male and 538 (88.9%) were female. 240 (39.7%) participants belonged to rural areas whereas 365 (60.3%) were living in the urban area. However, 460 (76.0%) of participants were studying science, and 145 (23.9%) were studying non-science subjects at the graduation level.

Analysis of data for its even distribution

To analyze the even distribution of participants according to Demographic Factors (Gender, Area, and subject studied), box plot analysis was performed **(Figure 1)**. The box plot result showed that the participants in two different groups such as Male/Female **(Figure 1a)**, Urban/Rural **(Figure 1b)**, and Science/Non-Science **(Figure 1c)** have approximately similar median values and these values were evenly distributed with few outliers in the participants with minimum and maximum scores values.
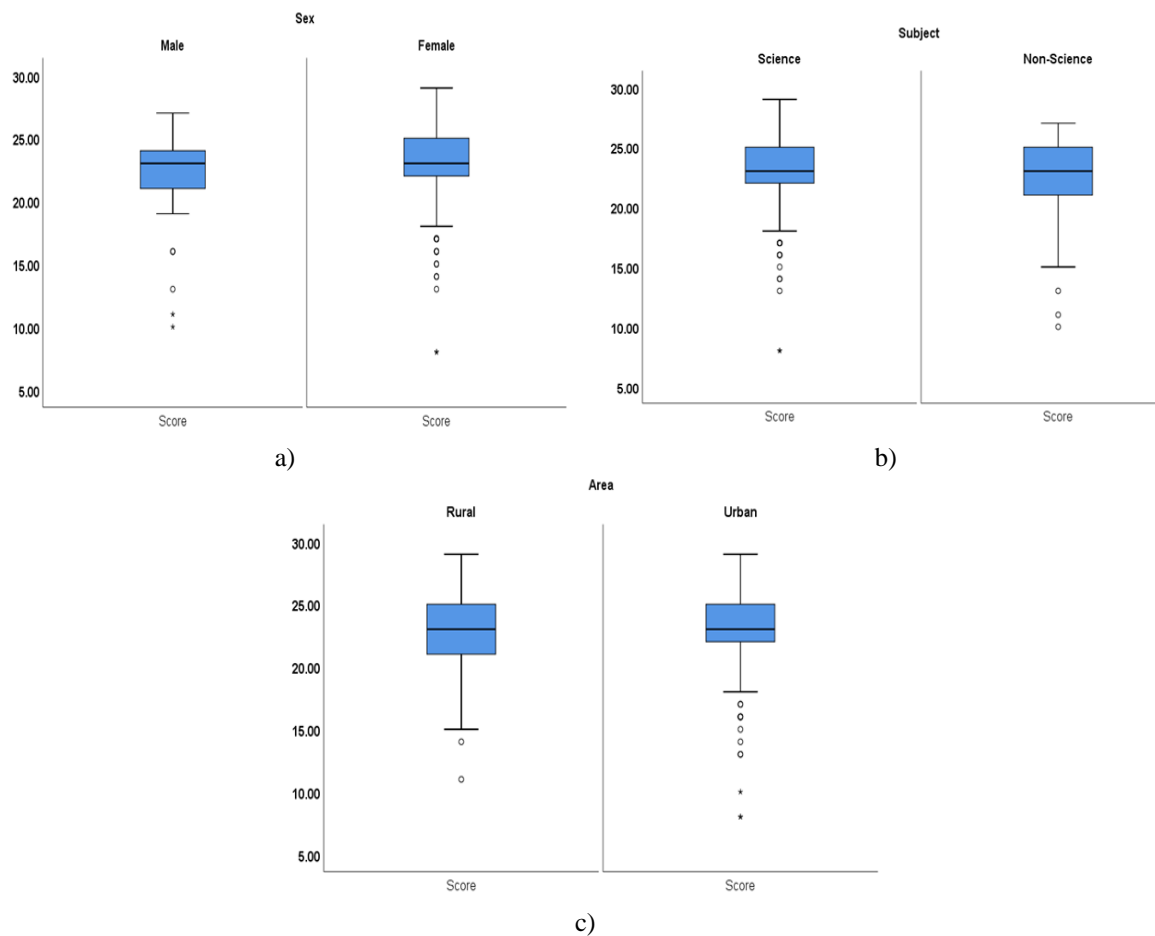

Figure 1. Box Plot Analysis for Even Distribution of Data

Overall Awareness, perceived risk, and protective behavior for COVID-19 among North Indian undergraduate students

The overall Awareness, perceived risk, and protective behavior for COVID-19 were found high in undergraduate students. They showed 72.7% awareness, 73.9 % perceived risk, and 82.1 % protective behavior. Awareness, perceived risk, and protective behavior for COVID-19 were statistically significant among the participants (P=0.000***,0.000***,0.000***) **(Figure 2)**.
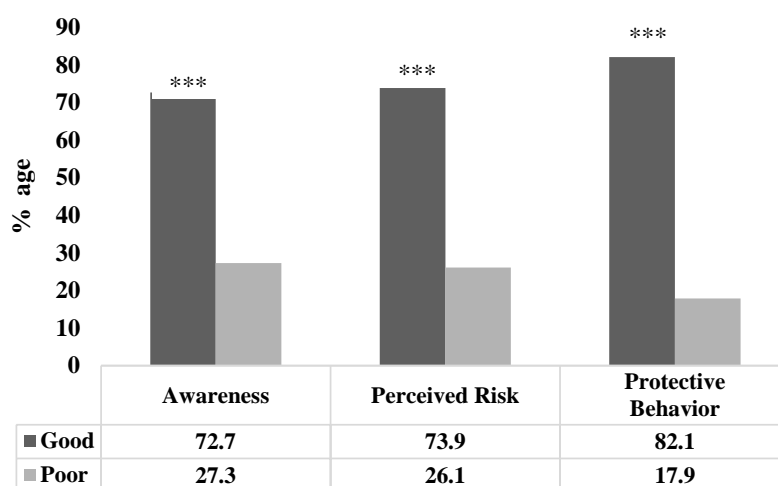
Figure 2. COVID-19 Related Overall Awareness, Perceived Risk, and Protective Behavior.
*** represents the level of significance at p<0.01value.

An analysis was also performed among the female and male participants belonging to rural and urban areas for awareness, perceived risk, and protective behavior towards COVID-19 and it was observed that females belonging to urban areas have more statistical significance differences as compared to females belonging to rural areas (p=0.044**,0.048**,0.045**) and male participants belong to rural and urban areas (p=0.285, 0.426, 0.807).

COVID-19 awareness analysis based on gender, area, and subject stream
The awareness status of 605 participants was analyzed through different variables which are mentioned as gender, area of living, and subject stream of the students. There was no statistically significant difference was observed in total awareness between Male/ female, rural/urban, and Science/ non-science undergraduate students (p>0.5) towards COVID-19 (**Table 1**).

Table 1. Awareness about COVID-19 in North Indian Undergraduate Students.

Q. No	COVID Variables	Awareness status	Male n (%)	Female n (%)	P-value	Rural n (%)	Urban n (%)	P-value	Science n (%)	Non science n (%)	P-value
1	Corona virus	Good	4.5	50.4	0.011**	19.0	35.9	0.005***	43.3	11.6	0.067
		Poor	6.6	38.5		20.6	24.5		32.7	12.4	
2	Corona virus genome	Good	6.1	58.3	0.094	26.8	37.7	0.206	52.2	12.3	0.000***
		Poor	5.0	30.6		12.9	22.6		23.8	11.7	
4	Causative organism of COVID -19	Good	10.4	86.4	0.159	38.5	58.3	0.798	73.7	23.2	0.807
		Poor	0.7	2.5		1.2	2.0		2.3	0.8	
7	Maximum COVID casualties	Good	8.4	64.8	0.570	29.8	43.5	0.424	54.9	18.3	0.299
		Poor	2.6	24.2		9.8	16.9		21.2	5.6	
8	Declaration of COVID-19 pandemic	Good	10.6	85.1	0.939	36.9	58.8	0.006***	72.9	22.8	0.71
		Poor	0.5	3.8		2.8	1.5		3.1	1.2	
9	COVID -19 cure	Good	7.9	71.9	0.076	31.4	48.4	0.740	62.0	17.9	0.065
		Poor	3.1	17.1		8.3	11.9		14.0	6.1	
10	COVID -19 tests	Good	7.6	35.9	0.000***	17.5	26.0	0.780	30.7	12.7	0.007***
		Poor	3.5	53.0		22.1	34.4		45.3	11.3	
11	Number of lockdowns in India	Good	6.0	43.0	0.287	19.0	30.1	0.639	36.5	12.6	0.359
		Poor	5.0	46.0		20.7	30.2		39.5	11.4	
12	PPE kit	Good	8.6	70.4	0.766	30.1	48.9	0.120	58.0	21.0	0.004***
		Poor	2.5	18.5		9.6	11.4		18.0	3.0	

13	Highly infected Indian state	Good	10.2	80.1	0.503	35.1	55.2	0.198	68.1	22.2	0.313
		Poor	0.8	8.9		4.6	5.10		7.9	1.8	
	Total Awareness	**Good**	**8.0**	**64.6**	**0.996**	**28.4**	**44.3**	**0.121**	**55.3**	**17.4**	**0.937**
		Poor	**3.1**	**24.3**		**11.3**	**16.0**		**20.8**	**6.5**	

*, **, *** represents level of significance at p<0.01, p<0.05, p<0.1 value respectively

However, males and females showed statistically significant differences in knowledge of coronavirus and its related testing methods (p=0.011**, 0.000***). Similarly, Urban and rural students were found to have a statistically significant difference in their knowledge regarding the coronavirus and organizations monitoring its spread globally (p=0.005***, 0.006***). Whereas, Science students may have more knowledge as compared to the non-science students regarding the questions which were related to detailed scientific knowledge such as genome of coronavirus, PPE kit, and COVID-19 tests (p=0.000***, 0.007***, 0.004***).

Perceived risk of COVID analysis based on gender, area, and subject stream

A set of questions were used to analyze the risk perception by participants for COVID-19 among the demographic variables. A statistical significant difference ((p>0.05) in total Perceived risk related to COVID-19 was observed among Male/ female, rural/urban and Science/ non-science north India undergraduate students (p= 0.016**, 0.035**, 0.036**). Perceived risk related to Prevention of COVID-19 spread, Role of respiratory droplets in COVID-19, and effective cure for COVID-19 was statistically significantly high among female participants as compared to males (p=0.000***, 0.019**, 0.000***). Similarly, risk perception for COVID-19 was significantly associated with science stream participants. Participants with science subjects may perceive risk more accurately in the case of prevention of COVID-19 spread, the role of respiratory droplets in COVID-19, and effective cure for COVID-19 as compared to non-science participants (p=0.021**, 0.013**, 0.003***). However, urban participants may show significant risk perception related to the role of wild animals in COVID-19 infection as compared to rural participants (p=0.023**). Thus, Female, urban, and science participants may perceive the risk for COVID-19 more accurately in comparison to male, rural, and non-science participants (**Figure 3 and Table 2**).

Table 2. Perceived Risk of COVID-19 in North Indian Undergraduate Students.

Q. No	COVID Variables	Perceived risk	Male n (%)	Female n (%)	P-value	Rural (%)	Urban (%)	P-value	Science (%)	Non-Science (%)	P-value
3	Origin Site for COVID	High	4.1	42.5	0.106	18.2	28.4	0.756	35.5	11.1	0.911
		Low	6.9	46.5		21.5	31.9		40.5	12.9	
5	Prevention of COVID spread	High	10.1	87.6	0.000***	38.7	59.0	0.805	74.9	22.8	0.021**
		Low	1.0	1.3		1.0	1.3		1.2	1.1	
13	Indian state with highest incidence	High	10.2	80.1	0.503	35.1	55.2	0.198	68.1	22.2	0.313
		Low	0.8	8.9		4.6	5.1		7.9	1.8	
1	Clinical symptoms of COVID-19	High	9.8	81.8	0.273	35.7	55.9	0.260	70.0	21.5	0.341
		Low	1.3	7.1		4.0	4.4		6.0	2.5	
19	Age and risk of COVID infection	High	6.8	56.7	0.681	23.5	40.0	0.075	49.1	14.4	0.319
		Low	4.3	32.2		16.2	20.3		26.9	9.6	
20	Role of Respiratory droplets in COVID	High	8.8	79.2	0.019**	34.9	53.1	0.992	68.2	19.7	0.013**
		Low	2.2	9.8		4.8	7.2		7.8	4.3	
2	COVID-19 symptoms	High	5.1	43.1	0.729	19.2	29.1	0.978	37.9	10.4	0.183
		Low	6.0	45.8		20.5	31.2		38.1	13.6	
25		High	8.4	82.1	0.000***	36.0	54.4	0.776	70.2	20.2	0.003***

	Effective cure for COVID-19	Low	2.6	6.9		3.6	6.0		5.8	3.8	
30	Wild animals and COVID infection	High	6.3	42.3	0.158	17.0	31.6	0.023**	36.2	12.4	0.387
		Low	4.8	46.6		22.6	28.8		39.8	11.6	
	Total Perceived risk	**High**	**7.7**	**66.2**	0.016**	**28.7**	**45.2**	0.035**	**56.7**	**17.2**	0.036**
		Low	**3.3**	**22.8**		**11.0**	**15.1**		**19.3**	**6.8**	

*, **, *** represents level of significance at p<0.01, p<0.05, p<0.1 value respectively.
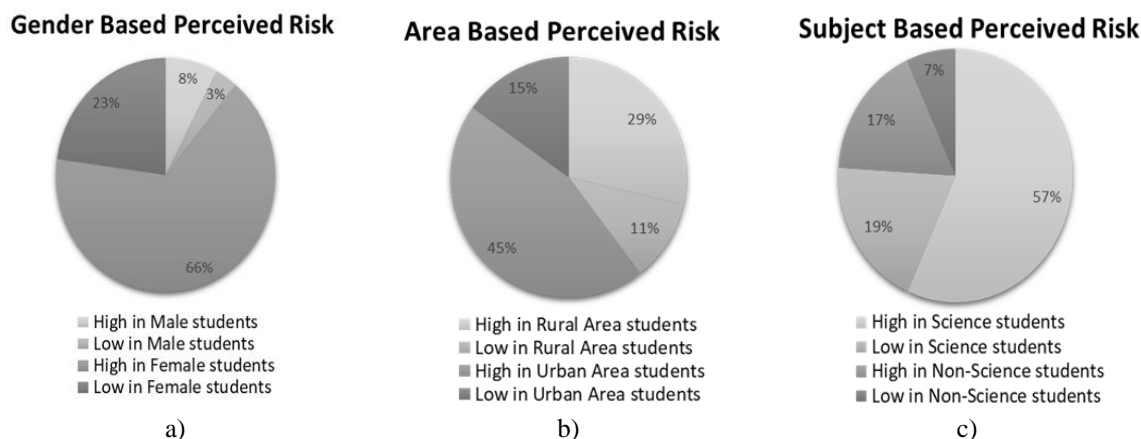
Figure 3. Total Risk Perceived for COVID-19 in North Indian Undergraduate Students

Protective behavior towards COVID-19 analysis based on gender, area, and subject stream

A set of questions were taken to analyze protective behavior towards COVID-19. A non-statistical significance difference related to total Protective behavior was observed among Male/ Female and Science/non-science participants (p=0.189, 0.100), However, urban participants depict more total protective behavior as compared to the rural participants (p=0.048**). Males and females vary in their protective behavior towards effective reduction of the spread of the virus, preventive measures for Children & young adults, and masks-based COVID-19 prevention (p=0.028**, 0.032**, 0.003***). Similarly, rural and urban participants also showed an observable dissimilarity in the protective behavior towards COVID-19 in terms of the detail of sanitizer for COVID-19 and knowledge of effective drugs for COVID-19 treatment (p=0.004***, 0.026**). Likewise, a statistically significant difference was also found in the protective behavior towards COVID-19 in masks-based COVID-19 prevention among science and non-science participants (p=0.000***) **(Table 3)**.

Table 3. Protective Behavior Towards COVID-19 in Indian Undergraduate Students

Q. No	COVID Variables	Protective behavior	Male (%)	Female n (%)	P-value	Rural (%)	Urban (%)	P-value	Science (%)	Non-Science (%)	P-value
6	Indian Government app for COVID -19	Good	10.7	86.6	0.854	38.6	58.7	0.857	74.5	22.8	0.060
		Poor	0.3	2.4		1.0	1.7		1.5	1.2	
14	Sanitizer for COVID	Good	4.3	32.9	0.772	17.5	19.7	0.004***	28.6	8.6	0.704
		Poor	6.8	56.0		22.1	40.7		47.4	15.4	
15	Effective Drugs for COVID -19 treatment	Good	3.1	24.0	0.807	12.7	14.4	0.026**	20.8	6.3	0.780
		Poor	7.9	65.0		26.9	46.0		55.2	17.7	
16	Duration of quarantine period	Good	10.7	87.2	0.617	38.8	59.1	0.928	74.3	23.5	0.939
		Poor	0.3	1.8		0.8	1.3		1.7	0.5	
21	COVID prevention	Good	10.2	82.4	0.993	36.6	55.9	0.962	70.2	22.3	0.776
		Poor	0.8	6.6		3.0	4.5		5.8	1.7	
22	Role of crowded places in COVID spread	Good	10.7	85.0	0.574	37.9	57.9	0.779	72.7	23.0	0.913
		Poor	0.3	4.0		1.8	2.4		3.3	1.0	

23	Effective reduction of the spread of the virus.	Good	9.8	84.3	0.028**	36.5	57.5	0.097	71.9	22.2	0.340
		Poor	1.3	4.6		3.2	2.8		4.1	1.8	
27	Role of Self isolation in infected person	Good	10.6	84.6	0.898	37.5	57.7	0.561	72.7	22.5	0.361
		Poor	0.5	4.3		2.2	2.6		3.3	1.5	
28	Preventive measure for Children & young adults	Good	9.3	81.5	0.032**	37.1	53.7	0.075	69.2	21.5	0.604
		Poor	1.8	7.4		2.6	6.6		6.8	2.5	
29	Masks Based COVID-19 prevention	Good	9.4	84.1	0.003***	37.1	56.4	0.873	72.7	20.8	0.000***
		Poor	1.7	4.8		2.5	4.0		3.3	3.2	
	Total Protective behavior	**Good**	**8.9**	**73.2**	**0.189**	**33.1**	**49.0**	**0.048****	**62.8**	**19.4**	**0.100**
		Poor	**2.2**	**15.7**		**6.6**	**11.3**		**13.2**	**4.6**	

*, **, *** represents level of significance at p<0.01, p<0.05, p<0.1 value respectively.

COVID-19 disease was started in Wuhan, Hubei Province of China and then it spread to the whole world in a short period with the start of 2020. In March (2020), WHO declared it a pandemic for the world. COVID-19 is adversely affecting the social and economic structure of the society as well as of the country. The perfect cure for the disease is yet not available at present but various vaccines are in their different stages of trial and there is a long way to go. The best cure for the COVID-19 pandemic is the awareness and precautions, observed by the people. How people perceive the risk and their attitude toward the disease will decide the future course of the disease in an area. If people are more aware of the disease, and its associated risk factors, then it will become easy for a country to control the pandemic. Many countries are winning the fight against the COVID-19 pandemic due to people's support and attitude [22]. Thus, the present study includes an analysis of awareness, perceived risk, and protective behaviors among the young population of India. Participants showed a high level of awareness of COVID-19 (72.7%, p=.000***). Similarly, most of the previous studies also observed a high level of awareness among participants of COVID-19 [22-24]. Malaysian people showed a high rate of knowledge (80.5%) of the COVID-19 pandemic [22]. Even studies conducted on other sub-population of India also found a high rate of knowledge (80.64) among people [24]. Awareness is affected by different factors such as gender, education, source of income, place of living, etc. In this present study, it was found that the female, urban, and science students have no statistically significant difference in awareness of COVID-19 as compared to the male, rural, and non-science students (p=0.996; 0.121; 0.937). However, various studies were linking the socio-economic status of participants with the awareness and found a statistically significant difference among them. A study in the Egyptian population showed that males (16.27 ± 2.63) and females (16.46 ± 2.62) have similar knowledge scores and there was no statistically significant difference among these regarding knowledge of COVID-19 [23]. However, the same study observed that the participants living in an urban area (Average mean score -16.66 ± 2.53) have more knowledge (p < 0.001) as compared to participants living in rural areas (Average mean score- 15.35 ± 2.74) towards COVID-19. A positive correlation between knowledge and level of education and monthly income was also found in this study. Zhong *et al*., (2020) in their study on the Chinese population showed that the socio-economic status of the participants also affects their knowledge. Participants who were at a young age had more income, and lived in urban areas have more awareness of COVID-19 as compared to participants older in age, had low income, and living in rural [25]. Similarly, a cross-sectional study conducted on the Malaysian population showed a high level of knowledge in females, and those participants who were living in central Malaysia with high income as compared to males and participants with low income living in other parts of the country [22]. A similar type of survey was also performed on the Indian population during the month of March and April. A positive statistical correlation was observed between the knowledge and participant's Gender, place of living, source of income, and educated. Participants who were male (ß = 0.036: p < 0.001), having high source of income (ß = 0.002: p = 0.05), living in urban area (ß = 0.006: p < 0.002) and highly educated (ß = 0.029: p < 0.001) have more knowledge as compared to female participants, having low income, living in rural area with less education [24]. Unlike the previous reports, we did not observe the difference in awareness among different variables. This might be due to the fact that we have considered a young population for the study and they were in constant touch with their smartphones and other media of communication. Secondly, there was a difference in participants' age, education, income, type of questions asked, and scoring methods used in the questionnaires. Due to these differences, it was not possible to make correct comparisons of awareness levels across these studies. However, the Indian Government is also making all efforts to make people aware of the causes and preventive measures related to the pandemic through television and street ads, mobile ring tones, and messages.

Risk perception is an important criterion in order to analyze the behavior of people. How people perceived the risk of getting an infection from a pandemic, will decide the direction of the control of a pandemic in a country. For example, people in some countries have perceived the low risk of a pandemic and did not follow the lockdown rules seriously. Due to this, there was a high rate of infection. In countries in which people have perceived a high risk of a pandemic, the rate of infection is found to be less therefore, the risk perception has enhanced the epidemic control [26]. Risk perception also helps the government agencies to prepare an effective preventive measures and also encourages people to seek treatment or get vaccinated. A high-risk perception was found in our study among the young population (73.9%, p=.000***). The high-risk perception was also observed in different parts of the world during the COVID-19 pandemic. A continental cross-sectional study conducted in Europe, Asia, Africa, showed that the people have perceived the risk for COVID-19 at high rate ($F_{(9, 6904)}$ = 33.12, $p < 0.001$, $\eta2$ = 0.041) [27]. Egyptian people also indicated a high rate of risk perception (86.9%) toward COVID-19 [20]. A high-risk perception among the Vietnamese people was also found (t-stat= 28.94, $p < 0.001$). This showed that they are more worried about the COVID-19 pandemic disease spread and its side effects on health. This perception of Vietnamese people helps them to combat the spread of the pandemic in their country even when they were living near China, an epicenter of COVID-19 pandemic [28]. Risk perception was found to be related to gender, age, place, education, economic status, area of living, and source of information. In our study, a statistically significant difference was observed in risk perception among different variables (p=0.016**; 0.035**; 0.036**). Female, urban, and science students showed high-risk perceptions in comparison to male, rural, and non-science students. High-risk perception is usually linked with the female gender [29, 30]. The study also indicates that the urban people perceived the risk more in comparison to rural people due to more access to information [31]. Similarly, the risk perception of family exposure was found to be too high among the urban population than in the rural population of Uganda and Rwanda (Department of Agriculture).

Preventive health behavior (PHB) is defined as the "activity undertaken by a person who believes himself to be healthy for preventing disease" [32]. It is a characteristic of a population that decides the intensity of the effect of a pandemic on a population. A population with a high rate of preventive behavior was found to be less affected by diseases. For example, Chinese people usually used masks due to the high level of air pollution in the winter. This preventive behavior also helped them to control the COVID-19 pandemic. In our study, good protective behavior was observed among undergraduate students (82.1%, p=000***). Similar observations were also found in the university students of the Czech Republic (Cronbach's alpha=0.85). Health care workers of Uganda also showed good protective practice (74%) toward COVID-19. Gender, education, location, knowledge, perceived risk, and source of income play a significant role in deciding protective behavior. We found a statistically significant difference in protective behavior between rural and urban people (p= 0.048**). The urban population has good protective behavior as compared to the rural population. A cross-Sectional study in China showed that rural participants were less interested in following the protective measures against COVID-19 as compared to the urban participants [33]. These participants were found to have a negative attitude towards the preventive measures and also possess insufficient knowledge regarding the COVID-19 pandemic. Gender and subject variable showed no statistically significant difference in protective behavior (p=0.189; 0.100) in our study. A previous study observed that the female participants were more conscious about the disease as they have to look after their family and thus, showed good protective behavior as compared to males [25]. The contrast observation in our study might be due to the fact that we have considered a young undergraduate student for the study, and they were having sufficient knowledge related to the COVID-19 pandemic. Therefore, we did not observe a significant difference between the awareness level of male and female participants. Protective behavior, knowledge, and perceived risks were found to be directly associated with each other [25]. To conclude, if people have good knowledge, high perceived risk, and good protective behavior, then it becomes easy for the government agencies to control the pandemic without affecting the economic growth. Individual efforts toward the pandemic also play a significant role in the eradication of the pandemic from an area.

CONCLUSION

Our findings revealed good awareness, optimistic perceived risk, and appropriate protective behavior towards COVID-19 in undergraduate students. As the global threat of COVID-19 continues, it is important to improve the knowledge and perceptions of undergraduate students, and further studies are warranted for the same. The media have a great responsibility to communicate the health and travel advice as directed by governing agencies [34]. Therefore, health education and communication research are the need of the hour. time A time to time guidelines

were issued by the Government of India, Ministry of health, and family welfare on generic prevention measures to be followed by the undergraduate students to reduce the risk of COVID-19.

- Health education and Disaster management (Pandemic) should be included in the education system.
- It is important to understand the dynamic of risk perception, missed information, and protective behaviors for the development of policies related to pandemics.

ETHICS STATEMENT : The questionnaire was validated and administrated online with consent from the participants.

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