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RESEARCH ARTICLE

KNOWLEDGE AND ATTITUDES OF MEDICAL STUDENTS TOWARDS COVID-19: A CROSS-SECTIONAL STUDY DURING THE EARLY STAGES OF PANDEMIC IN INDIA

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ABSTRACT: Background: Presently, the COVID 19 has made its presence all over the world. Since, there is no definitive cure available, prevention is the only mode to control the increase of the disease. Thus, this study was undertaken to evaluate the knowledge and attitude of medical students towards COVID19 in Mangalore, Karnataka, India. **Methods:** An online questionnaire was circulated among the medical students using the Google form. The questionnaire contained questions regarding the demographic details, attitude and knowledge of the students to be assessed. The response was typed in Microsoft Excel and analyzed using the Statistical Package for Social Sciences (SPSS) version 17 and data represented as frequency (n) and percentage (%). **Results:** A total of 321 responses were received from medical students, majority were female (199, 62%), nearly 50% were from Final (Clinical) phase. More than 10% of the students believed that the pandemic will last for more than 1 year. Most of the students were aware of the methods to prevent COVID 19 while most were unsure whether antibiotics (76%), hydroxychloroquine (47%), herbal drugs (97%) useful in prevention of COVID 19. **Conclusion:** The medical students were aware of the pathogenesis of COVID and IPC practices to be followed to prevent its spread. But they were not sure about the appropriate medication for the disease, which was not clear even to specialist, during the period which the study was undertaken.

KEYWORD: COVID 19, Medical students, Knowledge, attitude, online

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INTRODUCTION:

In December 2019, an infectious viral pneumonia emerged with unknown etiology in Wuhan city in China [1, 2]. The genetic sequences of the virus were identified and revealed the positive stranded RNA virus which belongs to Corona viridae family and named as *"Severe Acute Respiratory Syndrome Corona Virus-2 SARS-CoV-2"* [3]. In February 2020, "*World Health Organization WHO termed the disease caused by this virus as Coronavirus Disease 2019 COVID-19 and declared it as a pandemic"* [3]. Transmission of this virus is through the respiratory route and had human to human spread. Transmission was also through direct exposure to respiratory droplets within 6 feet distance or transmitted through contact with contaminated surface and fomites [4-6].

In the past 20 years, similar fatal pneumonia was diagnosed in Fashon, China on 16 November 2002, more than 8096 people from 29 different countries got infected which was named as Severe Acute Respiratory Syndrome SARS [7]. World Health Organization reported about 80% of COVID-19 patients with mild symptoms and about 20 percent of COVID-19 patients with severe symptoms such as shortness of breathing, septic shock, and multi-organ failure. Furthermore, 99 percent of infected people showed up with fever, dry cough, dyspnea and bilateral lung infiltration [8, 9], at present, there is no specific treatment and trials on vaccines for coronavirus infection are ongoing. Therefore, preventive guideline was made to decline the spread of infection such as use of face masks to cover nose and mouth, social distancing, use of hand sanitizer, repetitive hand washing and isolation of suspected and confirmed cases [10].

Health Care Workers HCW have always been at high risk for air born infection and can spread it in community [11-13]. Not only health care workers, even medical students and Interns also at high risk of coronavirus infection who may have close contact with affected people [6]. Lack of knowledge and lack of preventive training in this pandemic situation which increases stress and affect their mental and physical aspects [14]. Being in stressful situation, medical students who can't attend their theory and practical classes due to pandemic may panic about their limited knowledge and clinical practices. Moreover, Interns who just joined as house officer have to work for longer duration and have to work in corona wards may find difficult to handle the situation [15]. This study attempted at understanding the knowledge, preventive behavior and perception about COVID-19 among medical students and interns.

METHODOLOGY:

Study design:

This cross-sectional study was conducted from April 5th to 12th 2020, during the lockdown in India, after obtaining the ethics committee permission. The data was collected online using the self-administered questionnaire by e-mail or WhatsApp group from MBBS students including interns of various medical colleges in Mangalore, India. The study was conducted in accordance with the ethical principles mentioned in the Declaration of Helsinki.

Questionnaire

The questionnaire was initially structured by the investigators thereafter content was validated by microbiology and public health experts. Subsequently, the questionnaire formatted into the Google forms, commonly used for data collection via personalized survey. It was preferred for its convenience, efficiency and high popularity especially in the current scenario where all educational institutions of the country were closed by the government due to the lockdown to combat COVID-19 after detecting a number of cases starting from March 2nd, 2020 till first week of April 2020.

The link of the developed google form was distributed to Email/ WhatsApp groups among students in health-care colleges that met the inclusion criteria. The online questionnaire was

composed of four different parts. The first part included demographic data of the participants (sex, age, education level, and work experience). The second was knowledge part, which included data on common symptoms of COVID-19, the participant's awareness of diagnosing and treating COVID 19 patients. The third was infection prevention practice part, which included measures that the participant follows to prevent acquiring the infection such as hand washing with soap and water, using a hand sanitizer that contains at least 60% alcohol, covering face while sneezing or coughing, avoiding touching one's face or hand shaking and implementing social distancing. The fourth part was attitude, which included questions reflecting his/her attitudes and opinions toward preventive measures, regarding COVID-19 updates, visiting their doctor if symptoms develop, preventing a hospital visit due to social stigma or one's religious beliefs that they may not acquire the infection.

Data collection

The questionnaire was prepared in Google forms as per standard procedure and mailed to students through the college email or through WhatsApp groups. The study objective was explained and also that they were free to withdraw from the study. Online informed consent was requested to be clicked for their approval. Volunteers were then directed to a questionnaire sheet and requested to fill all the items. On completion they were directed to submit the same and thanked for their participation.

Statistical analysis:

Data was retrieved, coded and imported into the Statistical Package for Social Sciences (SPSS) version 17. The data was stratified based on academic/professional qualifications of the volunteers as preclinical (1st and 2nd year students), clinical (3rd and 4th year students) and interns and subjected to Chi square/Fisher's exact test. A probability value of 0.05 or less was considered statistically significant.

RESULTS:

A total of 321 completed responses were received from the medical students of various medical colleges. Majority of the response was from female (199, 62%), Clinical students i.e., III and IV MBBS students (161,50.2%) and age group of 20-21 (141, 43.9%) as represented in **Table 1**.

Table 1: Demographic details of the participants:

Parameters		Count (%) (n=321)
Group	I and II year	75(23.4)
	III and IV year	161(50.2)
	Intern	85(26.5)
Gender	Female	199(62)
	Male	122(38)
	Total	321(100)
Marital status	Single	310(96.6)
	Married	11(3.4)
Age	18-19	72(22.4)
	20 to 21	141(43.9)
	22 to 24	108(33.6)
Are you aware of the COVID-19 situation?	No	1(0.3)
	Yes	320(99.7)
Do you feel that you currently have enough information about the COVID-19 situation?	No	156(48.6)
	Yes	165(51.4)
How long do you think a pandemic will last?	< 2 months	19(5.9)
	2 to 4 months	115(35.8)
	4 to 6 months	100(31.2)
	6 to 9 months	39(12.1)
	10-12 months	6(1.9)
	>1 year	42(13.1)

More than half (51.4%) of the respondents expressed they had enough knowledge about COVID 19. Nearly 34% of the respondent expressed that the pandemic will last for 2-4 months but around 13.1% students believed it will last for more than one year. Most of the respondents were of the opinion that hand washing, wearing mask, quarantine, administration of the vaccine are the

ways to prevent COVID 19. They also opined that consuming of antivirals; hydroxychloroquine was not of any help. With regard to consumption antibiotics and herbals medicine, most of them respondents were not sure of its benefits (**Table 2, P.No.7**). Majority of the students responded correctly for the questions on origin of COVID 19, mode of transmission, route of entry, subtype of the virus, type of receptor involved in pathogenesis, common organ involved in COVID 19, Concentration of alcohol used for hand rub, PPE usage, use alcohol, soaps kill COVID 19, diagnostic tool and full form of SARS-CoV and COVID 19 (**Table 3, P.No.8**).

DISCUSSION:

Since the declaration of COVID 19 as a pandemic, all the healthcare professionals were made aware of the strict infection control practices like wearing of PPE, hand hygiene, quarantine of the exposed ones. The information about the disease and its prevention was conveyed through the media by the authorities on real time basis. In this study we have surveyed the Undergraduate (MBBS) students for their level of knowledge and their opinion on the novel COVID 19. It showed that students were not sure whether they had sufficient information about the novel COVID-19, this may be due to the information that was available in media like print, socialite leading to fear and stigma[16]. The interns, who were already oriented in IPC practices and treating the patients in the hospital had higher updated knowledge about the course, treatment and prevention of the disease, as these were oriented in IPC practices compared to students.

The students were of the opinion that COVID 19 can be prevented by frequent hand hygiene, wearing mask, quarantine and this also reduced the transmission of the disease [17]. Use of antivirals, antibiotics, HCQ, herbal medicine were not endorsed by the students, similar observation was seen in a study in South India [16]. The knowledge of the student's regarding SARS CoV was more among the students attending the Para clinical subjects than clinical, whereas the later were more correct on the prevention and treatment of the COVID. Majority of the students knew structure, pathogenesis and prevention of COVID. The significant numbers of students were aware of the co-morbidity which made individuals prone for the disease and heavy-duty gloves will not help in the prevention of the disease, mainly among the interns, which again emphasizes that they are well versed in IPC practices in their hospital [18].

CONCLUSION:

Even though, the study was conducted in the early days of the pandemic, most students were sure that it will be controlled within a year. Most of the students had adequate knowledge about the structure, pathogenesis, and mode of transmission and prevention of the disease spread. The IPC practices awareness was high among the interns compared to the other groups. Use of antivirals, antibiotics and herbal medicines were not endorsed by the students. This high level of knowledge among these professional students will surely help to create awareness among the public on IPC practices. The limitation of the study is that the students who received the link of the google form were only included, and this is not representing the whole MBBS student population of the region under study. We have not included students from other streams of education. A study with larger sample size of students and general population would help to gather the knowledge and opinion on COVID 19, which in turn help to create awareness among the public.

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Table 2: Opinion of students regarding knowledge on COVID 19

Question	Choice	Total (n=321)	Year of study			P value
			I and II MBBS (n=75)	III& IV MBBS (n=161)	Intern (n=85)	
Alcohol, soap and detergent kills SARS-CoV-2 as the envelope is made up of	Wrong	115(35.8)	22(29.3)	56(34.8)	37(43.5)	0.16
	Correct	206(64.2)	53(70.7)	105(65.2)	48(56.5)	
Mode of transmission of SARS-CoV-2 in community is mainly by	Wrong	70(21.8)	21(28)	34(21.1)	15(17.6)	0.27
	Correct	251(78.2)	54(72)	127(78.9)	70(82.4)	
SARS-CoV-2 was first reported in Wuhan City	Wrong	3(0.9)	1(1.3)	2(1.2)	0(0)	0.58
	Correct	318(99.1)	74(98.7)	159(98.8)	85(100)	
Which of the following is not the subtype of Coronavirus?	Wrong	50(15.6)	10(13.3)	27(16.8)	13(15.3)	0.79
	Correct	271(84.4)	65(86.7)	134(83.2)	72(84.7)	
The surface disinfectant recommended during SARS-CoV-2 pandemic is	Wrong	48(15)	15(20)	24(14.9)	9(10.6)	0.25
	Correct	273(85)	60(80)	137(85.1)	76(89.4)	
The route of entry of SARS-CoV-2 is through all except	Wrong	50(15.6)	14(18.7)	23(14.3)	13(15.3)	0.6
	Correct	271(84.4)	61(81.3)	138(85.7)	72(84.7)	
High risk groups for COVID-19 (individuals with co-morbid conditions) are all except	Wrong	31(9.7)	9(12)	19(11.8)	3(3.5)	0.08 Trend
	Correct	290(90.3)	66(88)	142(88.2)	82(96.5)	
Which among the following is not a Coronavirus?	Wrong	39(12.1)	13(17.3)	15(9.3)	11(12.9)	0.20
	Correct	282(87.9)	62(82.7)	146(90.7)	74(87.1)	
The number of steps involved in Hand hygiene, as per WHO guidelines,	Wrong	219(68.2)	51(68)	110(68.3)	58(68.2)	0.99
	Correct	102(31.8)	24(32)	51(31.7)	27(31.8)	
The steps involved in prevention of spread of SARS-CoV are	Wrong	2(0.6)	1(1.3)	1(0.6)	0(0)	0.56
	Correct	319(99.4)	74(98.7)	160(99.4)	85(100)	
The most common organ involved in severe COVID-19 is	Correct	321(100)	75(100)	161(100)	85(100)	
The recommended concentration of Ethyl alcohol in hand rub is	Wrong	132(41.1)	27(36)	72(44.7)	33(38.8)	0.39
	Correct	189(58.9)	48(64)	89(55.3)	52(61.2)	
The recommended mask for health care workers serving COVID-19 patients is	Wrong	14(4.4)	3(4)	7(4.3)	4(4.7)	0.98
	Correct	307(95.6)	72(96)	154(95.7)	81(95.3)	
SARS-CoV is a	Wrong	63(19.6)	17(22.7)	28(17.4)	18(21.2)	0.58
	Correct	258(80.4)	58(77.3)	133(82.6)	67(78.8)	
The receptor to which the SARS-CoV-2 attaches itself is	Wrong	110(34.3)	30(40)	53(32.9)	27(31.8)	0.48
	Correct	211(65.7)	45(60)	108(67.1)	58(68.2)	
Results from around the world indicate that the most affected age group of individuals for SARS-CoV-2 is	Wrong	84(26.2)	16(21.3)	47(29.2)	21(24.7)	0.41
	Correct	237(73.8)	59(78.7)	114(70.8)	64(75.3)	
Personal protective equipment to be worn by health care professional while caring for COVID-19 patient are all except	Wrong	145(45.2)	48(64)	77(47.8)	20(23.5)	0.0001 HS
	Correct	176(54.8)	27(36)	84(52.2)	65(76.5)	
Eating reared/farm animals like (poultry chicken, mutton, beef, pork etc.) would result in the infection by the Coronavirus	Wrong	72(22.4)	16(21.3)	40(24.8)	16(18.8)	0.54
	Correct	249(77.6)	59(78.7)	121(75.2)	69(81.2)	
COVID-19 is thought to be originated from the wild bats	Wrong	113(35.2)	33(44)	63(39.1)	17(20)	0.002
	Correct	208(64.8)	42(56)	98(60.9)	68(80)	HS
An individual with COVID-9 can transmit the virus to other individuals only after developing fever	Wrong	31(9.7)	8(10.7)	15(9.3)	8(9.4)	0.94
	Correct	290(90.3)	67(89.3)	146(90.7)	77(90.6)	
Contacting reared animals like hen, cow, goat, pig, dog, cat can result in the infection by the Coronavirus	Wrong	106(33)	25(33.3)	54(33.5)	27(31.8)	0.96
	Correct	215(67)	50(66.7)	107(66.5)	58(68.2)	
Eating wild animal meat (like deer, peacocks, wild boar etc) can result in the infection by new viruses and microbes	Wrong	155(48.3)	40(53.3)	77(47.8)	38(44.7)	0.54
	Correct	166(51.7)	35(46.7)	84(52.2)	47(55.3)	
PCR is an important diagnostic tool used to diagnose SARS CoV-2	Wrong	24(7.5)	6(8)	14(8.7)	4(4.7)	0.52
	Correct	297(92.5)	69(92)	147(91.3)	81(95.3)	
Full form of SARS-CoV	Wrong	78(24.3)	20(26.7)	34(21.1)	24(28.2)	0.40
	Correct	243(75.7)	55(73.3)	127(78.9)	61(71.8)	
Full form of COVID-19	Wrong	100(31.2)	22(29.3)	49(30.4)	29(34.1)	0.78
	Correct	221(68.8)	53(70.7)	112(69.6)	56(65.9)	

Table 3: Opinion of students regarding lifestyle practices and medication use to prevent COVID 19

Domain	Question	Choice	Total (n=321)	Year of study			P value
				I and II MBBS (n=75)	III and IV MBBS (n=161)	Intern (n=85)	
Practices to prevent COVID 19	Do you think quarantine is the best way to prevent Coronavirus?	Yes	303(94.4)	71(94.7)	154(95.7)	78(91.8)	0.58
		No	9(2.8)	3(4)	3(1.9)	3(3.5)	
		Unsure	9(2.8)	1(1.3)	4(2.5)	4(4.7)	
	Do you think vaccine is the best way to prevent Coronavirus?	Yes	208(64.8)	49(65.3)	106(65.8)	53(62.4)	0.58
		No	91(28.3)	22(29.3)	41(25.5)	28(32.9)	
		Unsure	22(6.9)	4(5.3)	14(8.7)	4(4.7)	
	Do you think hand washing is the best way to prevent Coronavirus?	Yes	304(94.7)	73(97.3)	152(94.4)	79(92.9)	0.20
		No	9(2.8)	0(0)	4(2.5)	5(5.9)	
		Unsure	8(2.5)	2(2.7)	5(3.1)	1(1.2)	
	Do you think wearing a face mask is the best way to prevent Coronavirus?	Yes	235(73.2)	55(73.3)	118(73.3)	62(72.9)	0.99
		No	42(13.1)	10(13.3)	20(12.4)	12(14.1)	
		Unsure	44(13.7)	10(13.3)	23(14.3)	11(12.9)	
	Do you think gargling mouth/throat with salt water is the best way to prevent Coronavirus?	Yes	75(23.4)	12(16)	40(24.8)	23(27.1)	0.54
		No	82(25.5)	21(28)	40(24.8)	21(24.7)	
		Unsure	164(51.1)	42(56)	81(50.3)	41(48.2)	
Drugs to Prevent COVID 19	Do you think taking antivirals are the best way to prevent Coronavirus?	Yes	81(25.2)	14(18.7)	43(26.7)	24(28.2)	0.37
		No	134(41.7)	38(50.7)	61(37.9)	35(41.2)	
		Unsure	106(33)	23(30.7)	57(35.4)	26(30.6)	
	Do you think taking antibiotics are the best way to prevent Coronavirus?	Yes	17(5.3)	3(4)	8(5)	6(7.1)	0.42
		No	60(18.7)	10(13.3)	30(18.6)	20(23.5)	
		Unsure	244(76)	62(82.7)	123(76.4)	59(69.4)	
	Do you think taking hydroxychloroquine, an anti-malarial drug, is the best way to prevent Coronavirus?	Yes	79(24.6)	18(24)	37(23)	24(28.2)	0.30
		No	152(47.4)	30(40)	79(49.1)	43(50.6)	
		Unsure	90(28)	27(36)	45(28)	18(21.2)	
	Do you think taking herbal drugs are the best way to prevent Coronavirus?	Yes	8(2.5)	1(1.3)	5(3.1)	2(2.4)	0.82
		No	87(27.1)	19(25.3)	47(29.2)	21(24.7)	
		Unsure	226(70.4)	55(73.3)	109(67.7)	62(72.9)	