RESEARCH ARTICLE

KNOWLEDGE AND ATTITUDES TOWARDS CORONAVIRUS AND COVID-19 AMONG MEDICAL GRADUATES AND PROFESSIONALS: AN ONLINE CROSS-SECTIONAL SURVEY IN INDIA

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ABSTRACT: **Background:** Globally, the coronavirus disease-2019 (COVID-19) is today the biggest public health problem and has already affected over 2.8billion people. This online study was carried out from April 2nd to May 1st 2020 was carried out to determine the knowledge, attitude and practices (KAP) of medical professionals towards COVID-19 during the early days of lockdown in India. **Methods**: An online cross sectional, descriptive study was undertaken through WhatsApp Messenger among the medical graduates and professionals. The KAP toward COVID-19 was assessed by using a pre-validated questionnaire. The results were stratified based on academic/professional status as medical graduate, post graduate and faculty/professional. The data was expressed as frequency and percentage analyzed using the chi square/Fishers exact test using IBM version 22. Ap value of <0.05 was considered significant. **Results:** A total of 388 responses from the medical professionals were received. Most volunteers were females 54.9%, single/unmarried 79.6% and younger than 30 years of age 54.1%. In the study, 57.2% were MBBS graduates, 18.6% were pursuing post-graduation and 24.2% were either practicing private doctors or teaching faculty in medical college hospitals. The results indicated that 99.5% were aware of the prevailing Covid -19 situation. Regarding knowledge on biology of the virus and its pathogenesis, majority of the volunteers answered the questions correctly. Majority of the professionals opined that they had a risk of getting infected. Most volunteers also agreed that quarantine, hand washing and wearing face mask were to be adopted. **Conclusions**: The results of this study conducted during the early stage of the lock down indicate that the medical professionals who had filled the questionnaire had very good knowledge on corona virus and Covid-19.

KEYWORD: Knowledge, attitude, Practice, Coronavirus disease 2019, Medical professionals

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INTRODUCTION:

Since the emergence of the coronavirus Disease 2019 (COVID -19) caused by the Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV-2) the world has been going through a heightened sense of uncertainty and apprehension[1-4]. This ailment first reported on December 31st, 2019 as a cluster of pneumonia characterized by fever, cough and fatigue associated with the people at the Huanan Seafood Wholesale Market in Wuhan, Hubei pprovince of China. Within thirty days, it rapidly spread to at-least 21 countries including India and United States of America[1-4]. On March 11th, 2020, the World Health Organization (WHO) announced that COVID-19 should be categorized as a global pandemic[5].As on going to print, there are more than 2.8 billion confirmed cases worldwide, with USA having largest positive (6.58 million) and India is in second place with 4.65 million cases[6-7].

During this pandemic, health care workers are the front-liners who are responsible for delivering good quality management and treatment. Health-care professionals(HCPs) risk their lives at work; however they should also protect their health while they are treating patients. The Healthcare Infection Control Practices Advisory Committee (HICPAC) by the Centers of Disease Control (CDC) recommends the use of standard and droplet route isolation with proper hand hygiene practices to prevent COVID-19 transmission. Medical graduates and junior residents usually do not have long term clinical experiences and therefore they may potentially be at a greater risk in comparison to other health care workers if infection control practices are not followed adequately. Hence, this study was undertaken to evaluate the knowledge and attitudes concerning the transmission routes of COVID-19 pandemic protection measures adopted by health professionals from Mangalore, Karnataka, India.

METHODOLOGY:

Study design:

This cross-sectional study was conducted from April 2th to May 2th 2020, during the lockdown in India after approval from the Institutional Ethics Committee (MIEC/V6.1/032). Since it was not feasible to do a community-based sampling survey during this period, we decided to collect using online self-administered questionnaire distributed to medical professionals of Mangalore and nearby areas, India. The inclusion criteria included medical professionals (medical graduates, postgraduate residents and faculty/practicing doctors) whom the investigators knew, while the exclusion criteria included other healthcare professionals, general public, undergraduate medical students). The response of the questionnaire was collected following the consent of the volunteers which was included in the beginning.

Questionnaire

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 questions on virology, transmission and pathogenesis, and safety practices to be followed while treating COVID-19 patients. The third part included the belief and attitude towards risk of getting infected and transmitting COVID -19 among the volunteers. The final part was on opinion about various methods of prevention and treatment of COVID-19.

The questionnaire was structured in English, and the content was validated by microbiology and public health experts. Subsequently, the questionnaire was formatted into Google forms, internet-based software commonly used for data collection via personalized survey. This was preferred for its convenience, efficiency and high popularity especially in the current scenario where all

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educational institutions of the country were closed by the government as a part of the lockdown. After formatting the questionnaire into Google forms, a link was generated for the same and randomly distributed online among medical professionals.

Statistical analysis:

Data from the online survey was entered into Microsoft Excel and then imported into Statistical Package for Social Sciences (SPSS) version 25. Output measures were portrayed as simple frequency (n) and percentage (%), level of outcome measures expressed as mean and standard deviation (SD). The data was stratified based on academic/professional qualifications of the volunteers as MBBS graduates, post graduates and practicing doctors or faculty staff to detect the significant difference between the different mean level of Knowledge, Attitude, Practice and satisfaction parameters, and subjected to chi square/Fisher's exact test, A p value of 0.05 or less was considered statistically significant.

RESULTS:

A total of 388 responses were received from the medical professionals. Among them, the most volunteers were females 54.9% (213/388), single/unmarried 79.6% (309/388) and younger than 30 years of age [54.1% (210/388)]. In the study, 57.2% (222/388) were MBBS graduates, while 18.6% (72/388) were pursuing post-graduation. The remaining 24.2% (94/388) were either practicing private doctors or teaching faculty in medical college hospitals. Most of the volunteers [37.6% (146/388)] had less than two years of experience in the profession. Overwhelming 99.5% (384/388) were aware of the COVID-19 situation prevailing in the world and in India and almost 54% (207/388) of them expressed that they had complete information on the clinical and treatment aspect of COVID-19 (Table 1). Majority of the participants 70.6% (274/388) expressed that the corona pandemic will prevail for less than a year. The most important

aspect was that only a small fraction of the medical doctors were involved in the 7.2% (28/388) in treating/diagnosis/caring of COVID-19 patients (Table 1).

Table 1: The demographic details of the volunteers who participated in the study

Question	Choice	Frequency (%)
Gender	Female	213(54.9)
	Male	175(45.1)
	Total	388(100)
Marital status	Single/unmarried	309(79.6)
	Married	79(20.4)
	Total	388(100)
Age Code	26 to 30 years	210(54.1)
	31 to 40 years	146(37.63)
	Above 40 years	32 (8.25)
	Total	388(100)
UG/PG/Staff	MBBS graduates	222(57.2)
	Post graduate	72(18.6)
	Practicing doctors + Faculty staff	94(24.2)
	Total	388(100)
Number of years in Medical profession	Less than 2 years	146(37.6)
	2 – 5 years	126(32.5)
	6-10 years	67(17.3)
	11 – 20 years	38(9.8)
	More than 20 years	11(2.8)
	Total	388(100)
Are you aware of the COVID-19 situation in the world and in India?	Yes	384(99.5)
	No	2(0.5)
	Total	386(100)
Currently do you feel that you have the complete information on clinical and treatment aspects of COVID-19?	Yes	207(53.6)
	No	179(46.4)
	Total	386(100)

Concerning knowledge on biology of the virus and its pathogenesis, it was observed that for majority of the questions (4 out of 5) the volunteers answered the questions correctly by all groups of volunteers. A difference was seen only with the question on full form of COVID-19, where only 79.1% (307/388) volunteers answered the correct answer of "coronavirus Disease 2019". Analysis showed that 78.4% (174/222) of the MBBS graduates, 90.3% (65/72) of the postgraduates and 72.3% (68/94) of the professionals answered it correct with p value of 0.017 (Table 2).

Table 2: Knowledge of Corona virus and COVID 19 among the volunteers who participated in the study

Knowledge on biology of the virus and its pathogesis

Question	Answer choice	All (388)	Graduates (222)	PG (72)	Staff (94)
Which of the following is not the subtype of Coronaviruss? **Correct answer: Theta**	Alpha	5(1.3)	3(1.4)	0(0)	2(2.1)
	Beta	14(3.6)	9(4.1)	1(1.4)	4(4.3)
	Gamma	45(11.6)	22(9.9)	10(13.9)	13(13.8)
	Theta	324(83.5)	188(84.7)	61(84.7)	75(79.8)
	Total	388(100)		P = 0.66	
Which among the following is not a Coronaviruss? **Correct answer: HERS-CoV**	SARS-CoV	11(2.8)	7(3.2)	3(4.2)	1(1.1)
	SARS-CoV-2	4(1)	0(0)	2(2.8)	2(2.1)
	HERS-CoV	336(86.6)	195(87.8)	62(86.1)	79(84)
	MERS-CoV	37(9.5)	20(9)	5(6.9)	12(12.8)
	Total	388(100)		P = 0.185	
SARS-CoV is a **Correct answer: Single stranded RNA virus**	Single stranded DNA virus	27(7)	16(7.2)	6(8.3)	5(5.3)
	Double stranded DNA virus	61(15.7)	30(13.5)	11(15.3)	20(21.3)
	Single stranded RNA virus	300(77.3)	176(79.3)	55(76.4)	69(73.4)
	Total	388(100)	P = 0.49		
The receptor to which the SARS-CoV-2 attaches itself is Angiotensin **Correct answer: Converting Enzyme 2(ACE2) receptor**	Angiotensin Converting Enzyme 2(ACE2) receptor	253(65.2)	142(64)	48(66.7)	63(67)
	Intrinsic factor receptor	39(10.1)	23(10.4)	6(8.3)	10(10.6)
	Acetyl choline (ACh) receptor	63(16.2)	34(15.3)	12(16.7)	17(18.1)
	Metallo-beta-lactamase receptor	33(8.5)	23(10.4)	6(8.3)	4(4.3)
	Total	388(100)	P = 0.73		
Full form of COVID-19	Correct	307(79.1)	174(78.4)	65(90.3)	68(72.3)
	wrong	81(20.9)	48(21.6)	7(9.7)	26(27.7)
	Total	388(100)	P = 0.017		

Knowledge on transmission and pathogenesis

Question	Answer choice	All(388)	Graduates(222)	PG(72)	Staff(94)
Q1: Mode of transmission of SARS-CoV-2 in community is mainly by **Correct answer: Droplet**	Contact	57(14.7)	40(18)	5(6.9)	12(12.8)
	Droplet	301(77.6)	171(77)	60(83.3)	70(74.5)
	Airborne	29(7.5)	11(5)	7(9.7)	11(11.7)
	Blood borne	1(0.3)	0(0)	0(0)	1(1.1)
	Total	388(100)		P = 0.043	
Q2: The high risk groups for COVID-19(individuals with co-morbid conditions) are all except **Correct answer: Migraine**	Hypertension	7(1.8)	7(3.2)	0(0)	0(0)
	Bronchial Asthma	15(3.9)	13(5.9)	1(1.4)	1(1.1)
	Migraine	356(91.8)	195(87.8)	69(95.8)	92(97.9)
	Diabetes Mellitus	10(2.6)	7(3.2)	2(2.8)	1(1.1)
	Total	388(100)		P = 0.050	
Q3: Results from around the world indicate that the most affected age group of	15 - 30 years	11(2.8)	5(2.3)	4(5.6)	2(2.1)
	31 - 45 years	34(8.8)	13(5.9)	13(18.1)	8(8.5)

Knowledge on safety practices	individuals for SARS-CoV-2 is **Correct answer:>60 years**	45 - 60 years	58(14.9)	37(16.7)	8(11.1)	13(13.8)
		>60 years	285(73.5)	167(75.2)	47(65.3)	71(75.5)
		Total	388(100)		P = 0.035	
	The surface disinfectant recommended during SARS-CoV-2 pandemic is **Correct answer: 1% Sodium Hypochlorite**	1% Sodium Chloride	19(4.9)	13(5.9)	1(1.4)	5(5.3)
		1% Sodium Hypochlorite	331(85.3)	182(82)	66(91.7)	83(88.3)
		1% Potassium Chloride	11(2.8)	6(2.7)	0(0)	5(5.3)
		1% Potassium Hypochlorite	27(7)	21(9.5)	5(6.9)	1(1.1)
		Total	388(100)		P = 0.032	
	The personal protective equipment to be worn by the health care professional while aiding a COVID-19 patient are all except- **Correct answer: Heavy duty gloves**	Mask	16(4.1)	16(7.2)	0(0)	0(0)
		Gown	77(19.8)	65(29.3)	3(4.2)	9(9.6)
		Heavy duty gloves	234(60.3)	100(45)	60(83.3)	74(78.7)
		Face shield	61(15.7)	41(18.5)	9(12.5)	11(11.7)
		Total	388(100)		P = 0.0001	

With regard to question on the mode of transmission of SARS-CoV-2 in community, 77.6% of the volunteers answered droplet correctly and majority [83.3% (60/72)] were post graduates (p < 0.043) (Table 2). With regard to the questions on which people with ailments are not at high risk, majority of the volunteers [91.8% (356/388)] answered people with migraine are least at risk when compared to hypertension, bronchial asthma and diabetes mellitus (Table 2). It was also observed that 73.5% (285/388) of the volunteers agreed that people above the age of 60 were at higher risk (Table 2).

With regard to the domain on knowledge on safety practices, most volunteers [85.3% (331/388)] knew that 1% sodium hypochlorite was the surface disinfectant recommended during SARS-CoV-2 pandemic. Detailed analysis showed that when compared to the MBBS graduates and the professionals, majority of the post graduates 91.7% (66/77) answered it right and was significant (p< 0.032) (Table 2). However, for the question on personal protective equipment, it was observed that 60.3% (234/388) knew that heavy duty gloves were not used while treating COVID-19 patients. Detailed analysis showed that majority of the post graduates [83.3% (60/72)] and professionals [78.7% (74/94)] were aware of this fact while only 45% (100/222) MBBS graduates were aware (p<0.0001) (Table 2).

For questions assessing the beliefs and degree of fear towards COVID-19, the observations were striking. Majority of the professionals opined that they had a high (38.3%) to very high (22.3%) risk of getting infected with coronavirus during the pandemic and was significant (p=0.001) when compared to MBBS graduates and post graduates (Table 3). However, on asking, if they were infected by coronavirus, how seriously would they think it would affect their health, very few volunteers (7.2%; 45/388) expressed that the chances that they will be extremely/very seriously affected, while majority (51.3%; 199/338) felt they will only be somewhat affected. With respect to addressing apprehensions during care of patients, it was observed that the professionals expressed high to very high fear for majority of the questions. Of importance was the observation that significant percentage (70.2%) of professionals expressed that to work in situations where personal protective equipment and masks were absent/ inadequate was filled with fear. Also, majority of the participants feared the possibility of being physically abused during their line of duty (p=0.0001).

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Table 3: Beliefs and attitudes towards Corona virus of the volunteers who participated in the study

	Choice	All	Educational position		
			Graduates	**PG**	**Staff**
Please indicate your level of risk of getting infected with Coronavirus during the pandemic	Very high	45(11.6)	9(4.1)	15(20.8)	21(22.3)
	High	71(18.3)	18(8.1)	17(23.6)	36(38.3)
	Medium	122(31.4)	72(32.4)	21(29.2)	29(30.9)
	Low	88(22.7)	74(33.3)	9(12.5)	5(5.3)
	Very low	52(13.4)	41(18.5)	9(12.5)	2(2.1)
	Don't know	10(2.6)	8(3.6)	1(1.4)	1(1.1)
	Total	388(100)	P = 0.0001 HS		
If you were infected by Coronavirus and developed Covid 19, how seriously do you think it would affect your health?	Extremely/ Very seriously	28(7.2)	9(4.1)	8(11.1)	11(11.7)
	Seriously	105(27.1)	67(30.2)	15(20.8)	23(24.5)
	Somewhat	199(51.3)	112(50.5)	39(54.2)	48(51.1)
	Not at all	11(2.8)	8(3.6)	1(1.4)	2(2.1)
	Don't know	45(11.6)	26(11.7)	9(12.5)	10(10.6)
	Total	388(100)	P = 0.22 NS		
To work in situations where Personal Protective equipment and masks are absent/ inadequate and have to examine possible suspected cases of COVID-19	High fear	199(51.3)	88(39.6)	45(62.5)	66(70.2)
	Moderate fear	160(41.2)	112(50.5)	24(33.3)	24(25.5)
	Less/no fear	29(7.5)	22(9.9)	3(4.2)	4(4.3)
	Total	388(100)	P = 0.0001 HS		
Thought that I may get infected with COVID-19 and spread it to other patients	High fear	198(51)	104(46.8)	40(55.6)	54(57.4)
	Moderate fear	161(41.5)	96(43.2)	29(40.3)	36(38.3)
	Less/no fear	29(7.5)	22(9.9)	3(4.2)	4(4.3)
	Total	388(100)	P = 0.175 NS		
Thought that I may get infected with COVID-19 and spread it to my family.	High fear	244(62.9)	129(58.1)	50(69.4)	65(69.1)
	Moderate fear	120(30.9)	78(35.1)	15(20.8)	27(28.7)
	Less/no fear	24(6.2)	15(6.8)	7(9.7)	2(2.1)
	Total	388(100)	P = 0.045 S		
Working under fear	High fear	102(26.3)	40(18)	24(33.3)	38(40.4)
that I may get physically abused when doing duty of screening for COVID-19 in the community	Moderate fear	160(41.2)	85(38.3)	35(48.6)	40(42.6)
	Less/no fear	126(32.5)	97(43.7)	13(18.1)	16(17)
	Total	388(100)	P = 0.0001 HS		
Treating or caring for patients with an ailment that has less definitive cure	High fear	83(21.4)	33(14.9)	19(26.4)	31(33)
	Moderate fear	213(54.9)	129(58.1)	38(52.8)	46(48.9)
	Less/no fear	92(23.7)	60(27)	15(20.8)	17(18.1)
	Total	388(100)	P = 0.005 HS		

With regard to questions addressing opinion on prevention and prophylaxis measures, the results are expressed in Table 4. Preventive measures like quarantine, hand washing and wearing face mask were agreed by 93.8%, 94.8% and 73.5%of the volunteers, respectively. The opinions on preventive medication, practicing doctors agreed that gargling of mouthwith salt water or iodine water and the use of vaccine when available is the best way to prevent coronavirus infection (p<0.0002 to 0.0001). Similarly, most of the participants did not approve the use of antibiotics, antiviral and hydroxychloroquine for treatment purposes.

Table 4: Opinion on steps for personal hygiene and preventive prophylaxis/ medication for Corona virus among the volunteers who participated in the study.

	Question	Choice	All	Educational position		
				Graduates	**PG**	**Staff**
Opinion on personal hygiene	Op 11: Do you think quarantine is the best way to prevent Coronavirus?	Strongly yes	220(57)	129(58.1)	40(55.6)	51(55.4)
		Yes	142(36.8)	82(36.9)	26(36.1)	34(37)
		Unsure	14(3.6)	6(2.7)	2(2.8)	6(6.5)
		No	8(2.1)	4(1.8)	3(4.2)	1(1.1)
		Strongly no	2(0.5)	1(0.5)	1(1.4)	0(0)
		Total	386(100)	P = 0.591 NS		
	Op 13: Do you think hand washing is the best way to prevent Coronavirus?	Strongly yes	171(44.3)	88(39.6)	31(43.1)	52(56.5)
		Yes	195(50.5)	122(55)	37(51.4)	36(39.1)
		Unsure	10(2.6)	8(3.6)	1(1.4)	1(1.1)
		No	9(2.3)	4(1.8)	2(2.8)	3(3.3)
		Strongly no	1(0.3)	0(0)	1(1.4)	0(0)
		Total	386(100)	P = 0.07 NS		
	Op 15: Do you think wearing a face mask is the best way to prevent Coronavir	Strongly yes	80(20.7)	35(15.8)	16(22.2)	29(31.5)
		Yes	204(52.8)	121(54.5)	39(54.2)	44(47.8)
		Unsure	53(13.7)	35(15.8)	6(8.3)	12(13)
		No	46(11.9)	30(13.5)	10(13.9)	6(6.5)
		Strongly no	3(0.8)	1(0.5)	1(1.4)	1(1.1)
		Total	386(100)	P = 0.07 NS		

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	us?				
Opinion on preventive methods	Op 19: Do you think gargling mouth/throat with salt water is the best way to prevent Coronavirus?	Strongly yes	19(4.9)	5(2.3)	2(2.8)	**12(13)**
		Yes	87(22.5)	52(23.4)	13(18.1)	22(23.9)
		Unsure	100(25.9)	54(24.3)	19(26.4)	27(29.3)
		No	124(32.1)	75(33.8)	23(31.9)	26(28.3)
		Strongly no	56(14.5)	36(16.2)	15(20.8)	5(5.4)
		Total	386(100)		P = 0.001 HS	
	Op 20: Do you think gargling mouth/throat with iodine water is the best way to prevent Coronavirus?	Strongly yes	19(4.9)	3(1.4)	3(4.2)	**13(14.1)**
		Yes	63(16.3)	35(15.8)	14(19.4)	14(15.2)
		Unsure	136(35.2)	84(37.8)	20(27.8)	32(34.8)
		No	117(30.3)	70(31.5)	21(29.2)	26(28.3)
		Strongly no	51(13.2)	30(13.5)	14(19.4)	7(7.6)
		Total	386(100)		P = 0.0001 HS	
	Op 12: Do you think vaccine is the best way to prevent Coronavirus?	Strongly yes	154(39.9)	68(30.6)	34(47.2)	**52(56.5)**
		Yes	115(29.8)	70(31.5)	21(29.2)	24(26.1)
		Unsure	95(24.6)	67(30.2)	14(19.4)	14(15.2)
		No	16(4.1)	12(5.4)	2(2.8)	2(2.2)
		Strongly no	6(1.6)	5(2.3)	1(1.4)	0(0)
		Total	386(100)		P = 0.002 HS	
	Op 18: Do you think taking herbal drugs are the best way to prevent Coronavirus?	Strongly yes	5(1.3)	2(0.9)	0(0)	3(3.3)
		Yes	10(2.6)	3(1.4)	2(2.8)	5(5.4)
		Unsure	115(29.8)	68(30.6)	15(20.8)	32(34.8)
		No	143(37)	92(41.4)	23(31.9)	28(30.4)
		Strongly no	113(29.3)	57(25.7)	32(44.4)	24(26.1)
		Total	386(100)		P = 0.008 HS	
Opinion on treatment for Covid 19	Op 16: Do you think taking antibiotics is the best medicine to treat Covid 19?	Strongly yes	7(1.8)	1(0.5)	1(1.4)	5(5.4)
		Yes	16(4.1)	11(5)	2(2.8)	3(3.3)
		Unsure	73(18.9)	49(22.1)	10(13.9)	14(15.2)
		No	148(38.3)	87(39.2)	32(44.4)	29(31.5)
		Strongly no	142(36.8)	74(33.3)	27(37.5)	41(44.6)
		Total	386(100)		P = 0.03 HS	
	Op 17: Do you think hydroxychloroquine is the best medicine to treat Covid 19?	Strongly yes	14(3.6)	5(2.3)	3(4.2)	6(6.5)
		Yes	81(21)	54(24.3)	13(18.1)	14(15.2)
		Unsure	187(48.4)	105(47.3)	35(48.6)	47(51.1)
		No	87(22.5)	51(23)	19(26.4)	17(18.5)
		Strongly no	17(4.4)	7(3.2)	2(2.8)	8(8.7)
		Total	386(100)		P = 0.123 NS	
	Op 14: Do you think taking antivirals are the best medicine to treat Covid 19??	Strongly yes	23(6)	16(7.2)	1(1.4)	6(6.5)
		Yes	77(19.9)	49(22.1)	9(12.5)	19(20.7)
		Unsure	167(43.3)	97(43.7)	31(43.1)	39(42.4)
		No	101(26.2)	53(23.9)	26(36.1)	22(23.9)
		Strongly no	18(4.7)	7(3.2)	5(6.9)	6(6.5)
		Total	386(100)		P = 0.17 NS	

DISCUSSION :

Health-care professionals are atthe highest risk of getting infected with COVID-19 while managing bothsymptomatic and asymptomatic individuals. Awareness regarding the natural history contagion is very necessary among all the health care workers; so as to safeguard themself. So virtual training sessions are being conducted and then they are allowed to treat patients with appropriate precautions. Therefore knowledge, belief, attitude and opinion of the disease are assessed in our study. Our study had around 55% of female doctors'responsese similar to a study conducted in Mumbai, India [8]. Majority of the professionals treating these patients in designated hospitals are recently graduated orpost graduate residents; our study constituted around 75% of such volunteers and 70% of them have less than 5 years' experience in the profession.

Knowledge on etiopathogenesis and safety practices was significantly high among the respondents. SARS–CoV-2 is an enveloped single stranded RNA virus belonging to beta group Coronaviridae family. Coronavirus is known to infect the respiratory and gastrointestinal systems of humans, birds, bats, rodents and other wild animals. Earlier, two other strains of coronavirus were identified in similaroutbreaks, viz. Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV-1) and Middle East Respiratory Syndrome Coronavirus (MERS-CoV) in2002-03 and 2012, respectively. The novel SARS-CoV-2 believed to be a bat virus [9-11], which adapted to get transmitted to humans and later human to human transmission [12,13]. The primary mode of transmission is through droplet transmission especially when the person is in close contact (less than1 meter) with the patients [14], finally reaching the lower respiratory tract. Among health care providers (HCP), the aerosol producing procedures like intubation of patients pose a higher risk of transmission. After the entry of the virus, the envelope-anchored spike protein of the virus gets attached to the angiotensin-converting enzyme 2 (ACE-2) receptor in humans causing disease [15]. A wide spectrum of clinical features of COVID -19 has been reported such as dry cough, low grade

fevers, body aches, diarrhea and dyspnea. Male patients with underlying morbidities like hypertension, diabetes, COPD, cardiovascular disease, cerebrovascular disease and an immune compromised status, are more prone for severe form of the disease with high case fatality [16-18]. Age >65 years is also a predictor for increased mortality among patients with COVID pneumonia with an odds ratio of 3.76[19].

Transmission is prevented by social distancing, frequent hand hygiene, and wearing face mask in public. As the safety of HCP is an important priority to keep the healthcare services functioning, while entering into the patient area or while performing procedure in patients, wearing clean gowns, face mask/ N95, goggles face/shield and clean gloves are recommended [20]. Contact transmission of the virus from the environmental surface is very well documented. The virus can survive on environmental surface for prolonged period; hence frequent surface decontamination using 1% sodium hypochlorite is recommended [21]. Around 15% of the volunteers were unable to correctly answer 1% hypochlorite solution as the recommended disinfectant. Heavy duty gloves are recommended for housekeeping staff while cleaning the patient area.

Health-care professionals are at the highest risk of getting infected, especially while treating COVID patients. As there is increase in cases, the HCPs are physically and psychologically stressed out with extended duty hours and mental trauma. Moreover, recent events of physical abuse by the patient attendees' have added to the existing insecurity.

During any pandemic, public health measures play a key role in prevention of its spread. As per Cochrane review, quarantine of those who are exposed to confirmed cases was effective in preventing infections and death verses no such measures. Other measures like school closure, travel restrictions and physical distancing when combined with quarantine had a greater impact on reducing

transmission of COVID-19[22]. Around 94% of volunteers have answered quarantine as the best way to prevent the spread in the community.

At individual level as a standard precaution, proper and frequent hand hygiene practice prevents the spread of infection; with soap and water when hands are visibly soiled or with alcohol based hand rub[23]. Another measure to prevent infection at individual level is wearing of mask. As per CDC and IndianCouncil of Medical Research guidelines, mask is recommended to be worn in public. But there is a need to increase awareness in public, on need of proper wearing of mask with mouth and nose snugly covered. If not, it will lead to a false sense of security[24]. Positively, 95% and 74% of volunteers have opined that regular hand washing and wearing of mask in public can prevent spread of COVID-19, respectively.

Even though, there are no specific evidence on benefit of gargling mouth and throat with salt water or iodine solution, around 27% and 21% volunteers, respectively have agreed these measures can prevent infection. Around 70% responded that a vaccine, when available will be a break-through intervention to curb this pandemic. However, as vaccine development is a lengthy and expensive process, the vaccine developed needs to be effective in preventing infection as well as safe for human use[25]. Mass production of the successful vaccine is also challenging as it needs to reach millions of people before they are infected and equally should be affordable across different economic backgrounds.

Chinese officials have approved the use of 3 herbal molecules for use in COVID-19, Lianhuaqingwen capsules and Jinhuaqinggan granules for mild conditions, and Xuebijing (injectable) for severe conditions. The evidence regarding their efficacy is not robust and is based on in vitro and anecdotal clinical data[26]. No Indian trial has provided any evidence for or against the use of Indian herbal medicine in COVID. More clinical trials are

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required to answer this question of efficacy of suchherbal medicine. In similar lines only 4% responsesfavoredherbal medicine.

Till date, no specific drug is used to treat COVID. Use of hydroxychloroquine (HCQ) has a conflicting data regarding its efficacy in prevention and treatment of COVID-19. HCQ has multiple mechanisms by which it can act on the virus. It prevents viral entry, inhibits post translational modifications of M proteins leading to alterations to viral assembly and budding. It also has immunomodulatory effects and has been shown to have in vitro synergistic effect with azithromycin. HCQ showed to increase virological clearance in 36 COVID patients compared to control group in a French study. Another supportive study from China reported earlier remission of fever and cough in patients with COVID pneumonia who were given additional HCQ over the standard treatment[27]. On the contrary, another open labeled randomized controlled trial of 150 patients from China did not show any difference in improvement in clinical symptoms and virological conversion in the HCQ arm[28].Although no antibacterial drug has been recommended, physicians prefer using it empirically as cover for secondary bacterial infection in critically ill COVID-19 patients. A study from China reported 58% of their patients being on antibiotics. The surviving sepsis guidelines suggest the use of empirical antibacterials for secondary bacterial infection in mechanical ventilated patients [29].

CONCLUSION:

The health care professionals have adequate knowledge on etio-pathology, transmission and prevention of COVID -19, even at graduate level which constituted more than half of the volunteers. Senior professionals were more concern about getting infected, especially when there is inadequate supply of PPE and later, transmitting to their family members. Fear of physical abuse by the patient attendees is another concern among the respondents.

This study emphasizesthe need of adequate supply of PPE, judiciouslytimed duty and reassurance on security as the utmost necessaryis for continuity in the health care services in coming days, as India has not yet reached its plateau phase of the pandemic.

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