

Original Research Article

Knowledge, attitude and practice among health care professionals regarding COVID-19 and barriers faced by health care professionals in South India

Venkata Rama Rao Nallani^{1*}, Rama Rao Nadendla², Naga Swathi Sree Kavuri¹

¹Department of Pharmacy Practice, ²Principal, Chalapathi Institute of Pharmaceutical Sciences, Lam, Guntur, Andhra Pradesh, India

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*Correspondence:

Dr. Venkata Rama Rao Nallani,
E-mail: nvramara009@gmail.com

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ABSTRACT

Background: Corona virus disease or SARS-CoV-2 is the rapidly emerging pandemic in the present world. It has become a major concern for the front liners (health care professionals) globally. Aim of the study to assess the knowledge, attitude and practice among health care professionals regarding COVID-19 and barriers faced by HCP's during practicing in south India.

Methods: A cross sectional online survey was conducted during the month of May. The questionnaire was designed and validated and it was administered among participants. The statistical significance was calculated for collected data.

Results: Total 658 subjects were responded. Gender distribution, females (64%) and males (36%). The questions included about profession, geographical distribution, age, source of information. Out of 658 samples, 418 (63.49%) with good knowledge and 240 (36.51%) with poor knowledge. Regarding attitude findings showed only few have positive attitude. Regarding practice 74.9% have good practice and 25.1% have poor practicing. By calculated the Chi-square test gives the statistical significance $p < 0.0001$ at 95% CI. Logistic regression analysis was done using gender versus knowledge ($p < 0.0001$), age versus knowledge ($p < 0.0001$) and area of residence versus knowledge ($p < 0.438$) hence. Whereas gender versus practice ($p < 0.0001$), age versus practice ($p < 0.402$) and area of residence versus practice ($p < 0.0001$) at 95% CI.

Conclusions: In the present pandemic situation HCP's were the front liners so, they must have proper knowledge, attitude and practicing skills. Our results showed positive outcome still the awareness should be created by conducting educational campaigns, journal clubs and continuous professionals programs for more positive outcome.

Keywords: Attitude, Corona virus, Health care professionals, Knowledge, Practice, Southern India

INTRODUCTION

Coronavirus disease 2019 also known as COVID-19 is a rapidly emerging pandemic caused by a novel human coronavirus which is SARS-CoV-2. COVID-19 was first reported in Wuhan, China at December 2019 among patients with viral pneumonia symptoms.¹ It spread globally, resulting in the ongoing 2019-20 corona virus pandemic. On March 11th 2020, the WHO declared the

novel coronavirus outbreak as a global pandemic viral infection as the number of cases of COVID-19 outside China has increased within number of countries throughout the world.² Recent epidemiology of COVID-19, at the beginning of June month total conformed cases were around 6.8 million and deceased ones were 397 thousand. Where as in India total conformed cases were around 257 thousand, recovered cases 124 thousand and deceased ones were around 7135 persons. As of now 180

countries were affected with COVID-19 worldwide.³ The corona viruses have become the major pathogens of emerging respiratory disease outbreaks. They are large family of single-stranded RNA viruses, which can cause illness ranging from a common cold to severe symptoms like MERS and SARS.⁴ SARS-COV-2 is transmitted from person-to-person through inhalation of aerosols from an infected individual.⁵ Geriatric population and patients with pre-existing co morbidities like hypertension, cardiac disease, lung disease, cancer, or diabetes have been identified as potential risk factors for disease severity and mortality.⁶ The clinical symptoms of COVID-19 include fever, which is the most common symptom, cough, fatigue, malaise, and shortness of breath. The diagnosis test for detection of corona virus is RT-PCR test. To date, there is no antiviral promising treatment or vaccine that has been recommended for COVID-19.⁷ More information about its distribution, transmission, pathophysiology, treatment, and prevention yet to be studied. World Health Organization (WHO) recommends prevention is the only strategy to protect spread of corona virus. Preventive measures like avoiding close contacts, regular hand washing, social distancing, and respiratory hygiene like covering mouth and nose while coughing or sneezing.^{8,9}

Healthcare providers (HCPs) are at the frontline of this pandemic response and are exposed to dangers like virus exposure, psychological stress, fatigue, long working hours at hospital and physical violence, occupational burnout and stigma.¹⁰ Poor awareness among health care workers leads to delayed identification and decrease the quality of treatment leading to rapid spread of this pandemic. To the best of our knowledge, no study has been done in southern part of India to assess KAPs toward COVID-19 specifically among HCPs. So this study was conducted with the primary objective, to assess the knowledge, attitude and practice among healthcare professionals in south India.

METHODS

Study design and study tool

A cross sectional online based survey conducted during the month of May. As it is not able to conduct population-based study due to lockdown to avoid spread of pandemic. So we conduct the online data collection by online questionnaire method. The survey questionnaire was designed in English language and it covered the socio-demographic characteristics, knowledge, attitude and practice regarding COVID-19. Socio demographics characters like age, gender, area of residence and profession. KAP questionnaire contains total of 39 questions among which 15 question regarding knowledge, 9 questions to assessed practice, 9 to assessed attitude and 6 questions regarding barriers.

Sampling and study population

Sample size was expected up to 500-600 and a response rate of 70%, confidence interval (CI) 95%, Z as 1.96. Considering, an additional 10% (n=100) for any error in questionnaire filling. Survey was started on 1st May 2020, and response acceptance was closed on 31th May 2020, when maximum sample size was achieved. A total sample size obtained was 658 subjects.

Inclusion criteria

Participants with more age 18 years of age; participants who were concerned to participate in the study and willing to give informed consent; and those who can understand English language

Exclusion criteria

Those who were illiterates (cannot read, write, understand the questionnaire) excluded from the study and participants who were not willing to participate in the study.

Data collection method

A questionnaire was designed on Google forms and link generated was shared on WhatsApp groups of HCPs. Link was also shared personally to people who were in contact list of investigators. Respondents from other provinces were also eligible to participate if they were willing to fill the questionnaire.

Ethical approval

The study was performed in accordance to declaration of Helsinki. Due to lockdown, universities were closed, hence study protocol was approved from hospital board. Study questionnaire contained consent portion that stated purpose, nature of survey, study objectives, volunteer participation, declaration of confidentiality and anonymity. The study did not collect the name of the respondents on the questionnaire form to ensure confidentiality. Voluntary participation and privacy were ensured during data collection.

Statistical analysis

The collected data was cleaned and entered in excel and then tabulated. Graph pad prism 8.0.1 version was used for the analysis of data. Knowledge and practice score was calculated. Statistical significance was calculated by using chi-square test. We also did logistic regression analysis for factors associated with good knowledge and practice regarding COVID-19.

RESULTS

A total of 658 health care professionals were participated in the study. We included the professionals graduates like, MBBS, Pharm D., B. Pharmacy and M. Pharmacy graduates in our study in order to assess the knowledge

and attitude regarding COVID-19, they also responded to practice questions because they also providing the healthcare services during this pandemic.

Gender distribution (N=658) was female=421 (64%) and male=237 (36%). A total of 658 participants, 64% of study subjects were females and 36% were males.

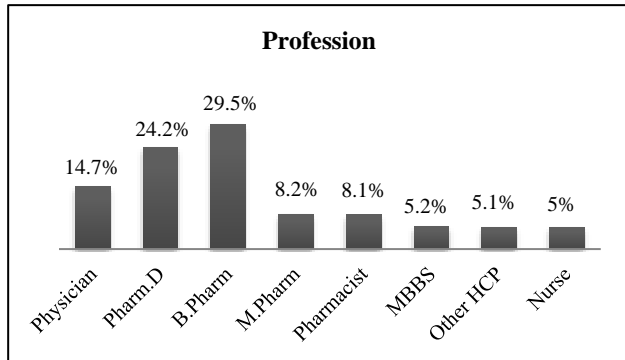


Figure 1: Distribution of participants according to their profession.

Regarding profession, most the graduates of Pharmacy responded well. Highest of 29.5% were B. Pharmacy, 24.2% were Pharm D. and 8.2% were M. Pharmacy. Whereas MBBS graduates were only 5.2%. The healthcare providers who were always stood in the frontline to provide services to COVID-19 patients among them 14.7% of physicians, 8.1% of pharmacists, 5% nurses and 5.1% of other professionals (Figure 1).

Almost 56% of subjects were from urban area and remaining 44% were belongs to rural area of residence (Figure 2). Regarding age the highest of 76.9% of subjects were under age group 18-30 years, 21.6% of subjects were 31-45 years age group and only 1.5% which was 10 subjects with greater than 45 years of age (Figure 3).

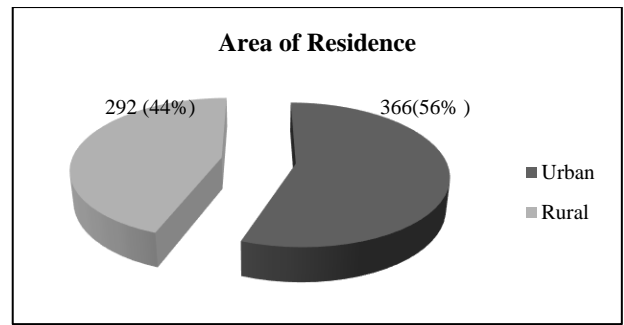


Figure 2: Subjects according to area of residence.

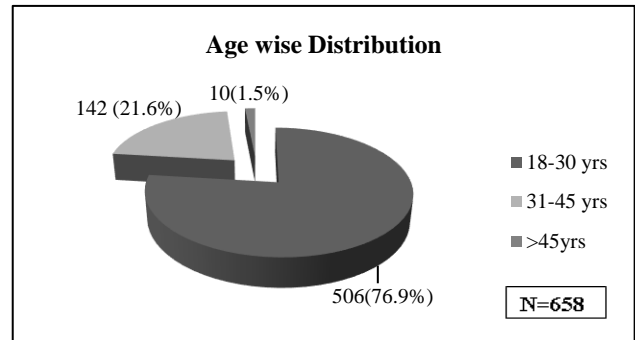


Figure 3: Age wise distribution of subjects.

Table 1: Source of information (n=658).

Source of information	Frequency	Percentages
Television	184	28%
Social media	236	36%
News paper	63	9.6%
Friends/ Relatives	63	9.6%
Internet/Google	65	9.7%
Health websites	23	3.5%
Hospitals	24	3.6%

Table 2: Knowledge among health care professionals about COVID-19 (n=658).

Knowledge among healthcare professionals	Frequency	Percentage
1. Does Influenza vaccine also give protection from COVID-19?		
a) Yes	146	22.3
b) No	319*	48.6
c) Not sure	193	29
2. Why India has less mortality rate compare to other Nations?		
a) May be most of Indians took BCG vaccine	171	26.1
b) May be most of Indians took hydroxy chloroquine	151	22.9
c) May be most of Indians took both BCG vaccine and hydroxy chloroquine	336*	51
3. COVID-19 Patients develop severe acute respiratory illness?		
a) Yes	603*	91.6
b) No	25	4
c) Not sure	30	4.4
4. Do you think source of virus may be Plant?		
a) Yes	61	9.3
b) No	540*	81.9
c) Not sure	57	8.8

Continued.

Knowledge among healthcare professionals	Frequency	Percentage
5. Does corona virus will go off by washing hands vigorously (soap/water/sanitizer)?		
a) Yes	540*	81.9
b) No	62	9.4
c) Not sure	56	8.7
6. Does surface touches by affected person spreads covid-19?		
a) Yes	600*	91.2
b) No	47	7.2
c) Not sure	11	1.6
7. Does corona virus infection could be fatal?		
a) Yes	468*	71.1
b) No	107	16.3
c) Not sure	83	12.6
8. Does vaccination of corona virus disease is available?		
a) Yes	72	10.9
b) No	534*	81.2
c) Not sure	52	7.9
9. Does corona virus Incubation period in humans is 2-14 days?		
a) Yes	614*	93.3
b) No	22	3.35
c) Not sure	22	3.35
10. Do people with co-morbidity like diabetes and hypertension lead to more death rate?		
a) Yes	576*	87.5
b) No	40	6.2
c) Not sure	42	6.3
11. Does polymerase chain reaction (PCR) tests will conform the corona virus?		
a) Yes	514*	78.1
b) No	65	9.9
c) Not sure	79	12
12. Does COVID-19 spreads through close contact like caring/serving?		
a) Yes	552*	83.8
b) No	46	7
c) Not sure	60	9.2
13. Does disease could be transmitted from asymptomatic person?		
a) Yes	482*	73.3
b) No	135	20.5
c) Not sure	41	6.2
14. Does use of a face mask is not essential in protecting themselves from COVID-19 infection?		
a) Yes	206	31.3
b) No	415*	63.1
c) Not sure	37	5.6
15. Do you think close contacts with pet's spreads COVID virus?		
a) Yes	255	38.8
b) No	289*	43.9
c) Not sure	114	17.3

*correct answer

Regarding source of information almost 36% of subjects get aware of corona virus on social media, the second highest of 28% subjects were use TV to get information about corona, 9.6% of subjects use newspaper, 9.7% use search engine like Google, 3.5% searched in different health website and 3.6% get information in hospitals (Table 1).

Knowledge among health care professionals was varied but almost more than half of the study samples have good knowledge. Table 2, contains various questions regarding corona virus and every participants responded well.

Table 3 contains various questions regarding attitude and every participants responded well. From the results it showed that only few participants have good attitude.

Table 3: Attitude of healthcare professionals towards COVID-19 (n=658).

Attitude of HCP's about COVID-19	Frequency	Percentages
1. Healthcare workers must acknowledge themselves with all the information about COVID-19?		
a) Agree	365	55.6
b) Disagree	13	1.8
c) Strongly agree	280	42.6
2. Transmission of COVID-19 infection can be prevented by using universal precautions given by WHO, CDC?		
a) Agree	322	48.9
b) Disagree	18	2.8
c) Strongly agree	318	48.3
3. Prevalence of COVID-19 can be reduced by active participation of healthcare workers in the hospital infection control program?		
a) Agree	375	57
b) Disagree	70	10.6
c) Strongly agree	213	32.4
4. Intensive and Emergency treatment should be given to diagnosed patients?		
a) Agree	300	45.6
b) Disagree	60	9.4
c) Strongly agree	298	45
5. PPE, gloves, mask and goggles must be used when dealing with COVID-19 patients?		
a) Agree	179	27.2
b) Disagree	16	2.4
c) Strongly agree	463	70.4
6. COVID-19 patients should be kept in isolation?		
a) Agree	161	24.5
b) Disagree	16	2.4
c) Strongly agree	481	73.1
7. Do u agree greet your friend or colleague with hand shake/hug?		
a) Agree	54	8.2
b) Disagree	565	85.9
c) Strongly agree	39	5.9
8. Would you buy if protection measures and equipment are available at an affordable price?		
a) Yes	520	79.1
b) No	66	10
c) Not sure	72	10.9
9. Do you watch the updates of WHO to combat the spread of covid-19?		
a) Yes	614	93.3
b) No	10	1.5
c) Not sure	34	5.2

Table 4: Practice of healthcare professionals towards COVID-19 (n=658).

Practice of HCP's towards COVID-19	Frequency	Percentage
1. Do you educate your patient about the disease?		
a) Yes	592*	90
b) No	15	2.2
c) Sometimes	51	7.8
2. Do you use face mask in crowds?		
a) Yes	636*	96.7
b) No	2	0.3
c) Sometimes	19	3
3. Do you cover your nose and mouth with a tissue during sneezing or coughing?		
a) Yes	632*	95.9
b) No	5	0.7
c) Sometimes	21	3.4
4. Do you avoid touching your eyes, nose or mouth as far as you can?		
a) Yes	589*	89.5
b) No	13	2
c) Sometimes	55	8.5
5. Do you use soap or hand sanitizer to wash your hands continuously?		
a) Yes	612*	92.9
b) No	7	1
c) Sometimes	40	6.1
6. Do you throw the used tissue in the trash?		
a) Yes	585*	88.9
b) No	33	5
c) Sometimes	40	6.1
7. Did you receive formal training in hand hygiene in recently?		
a) Yes	502*	76.4
b) No	98	14.9
c) Sometimes	58	8.7
8. The most effective method for prevention of COVID -19 in the healthcare setting by standard precautions?		
a) Yes	604*	92.2
b) No	29	4.1
c) Sometimes	25	3.7
9. Do you think antibiotics are first line treatment in COVID -19 infection?		
a) Yes	298	45.3
b) No	195*	29.7
c) Sometimes	165	25

*Good practice

Knowledge, attitude and practice among health care professionals was varied but almost more than half of the study samples have good knowledge, attitude and practice. The above Table 2, contains various questions regarding knowledge about corona virus, Table 3 contains questions about attitude and Table 4 contains questions

regarding practice and every participant was responded well.

Table 5: Obstacles faced by healthcare professionals (n=658).

Obstacles	Frequency	Percentages
1. Gathering more patients at Covid-OP room is also a barrier in infection control practice?		
a) Agree	234	35.6
b) Strong agree	237	36.1
c) Disagree	159	24.2
d) Neutral	28	4.1
2. Improper cleanliness of health care workers at premises to the policies and procedures?		
a) Agree	273	41.6
b) Strong agree	130	19.8
c) Disagree	202	30.8
d) Neutral	53	7.5
3. Poor hands on training experience in infection control?		
a) Agree	279	42.4
b) Strong agree	117	17.9
c) Disagree	204	31
d) Neutral	58	8.7
4. Lack of awareness about the mode of transmission of the disease COVID-19?		
a) Agree	271	41.2
b) Strong agree	175	26.6
c) Disagree	173	26.4
d) Neutral	39	5.8
5. Patients are examined without mask certain times?		
a) Agree	211	32.1
b) Strong agree	80	12.2
c) Disagree	308	46.9
d) Neutral	59	8.8
6. Unavailability of things/kits/ppes to control of spreading infections?		
a) Agree	280	42.6
b) Strong agree	164	25
c) Disagree	160	24.3
d) Neutral	54	8.1

Above Table 5, gives the details about few obstacles faced by healthcare professionals during providing services to COVID-19 patients.

Total of 658 sample we calculated the knowledge and practice scores, 418 (63.49%) have good knowledge regarding COVID-19 and remaining 240 (36.51%) have poor knowledge. Whereas almost three-fourth (74.9%) of the subjects practice was good and 24.1% have poor practicing skills. The mean and standard deviation for knowledge was 10.5±2.1 and for practice was 7.1±1.9 (Table 6).

Table 6: Knowledge versus practice score calculation (n=658).

	Subjects (frequency)	Percentage
Knowledge score (range 0-15)		
Poor knowledge (<8)	240	36.51
Good knowledge (>12)	418	63.49
Practice Score (range 0-9)		
Poor practice (<4)	165	25.1
Good practice (>7)	493	74.9
Mean±SD (knowledge)	10.5±2.1	
Mean±SD (practice)	7.1±1.9	

We calculated the statistical significance by doing the chi-square test to know the correlation between knowledge and practice by using graph pad prism version 8.0.1 (Table 7). Chi-square test gives the statistical significance $P < 0.0001^{****}$ at 95% CI and the odds ratio 0.385. The resulted p value shows that there is a correlation between knowledge and practice means if the subjects have more knowledge then she/he practices well.

Logistic regression analysis was done for factor associated with good knowledge and practice regarding COVID-19. Using factors like gender, age and area of residence. Odds ratio was calculated for gender versus knowledge it gives the significance value $p < 0.0001^{****}$, age versus knowledge gives the significance value $p < 0.0001^{****}$ and area of residence versus knowledge gives significance value $p < 0.438$ hence, it's clearly resulted that gender and age have some influence on knowledge. Whereas gender versus practice showed significance value $p < 0.0001^{****}$, age versus practice gives significance value $p < 0.402$ and area of residence versus practice showed significance value $p < 0.0001^{****}$ at 95% CI. The results showed that gender and area and residence have some influence on practicing (Table 8).

Table 7: Statistical significance calculation between knowledge versus practice scores by using Chi-square test.

P value and statistical significance		
Test	Chi-square	
Chi-square, df	65.74, 1	
z	8.108	
P value	<0.0001	
P value summary	****	
One- or two-sided	Two-sided	
Statistically significant (p<0.05)	Yes	
Effect size	Value	95% CI
Odds ratio	0.385	0.305 to 0.485
Reciprocal of odds ratio	2.597	2.062 to 3.272

Table 8: Logistic regression analysis for factors associated with good knowledge and practice regarding COVID-19.

Characteristics	Knowledge			Practice		
	OR	95% CI	P value	OR	95% CI	P value
Gender (female, male)	0.489	0.392 to 0.610	p<0.0001****	0.594	0.468 to 0.753	p<0.0001****
Age (18-30 years, 31-45 years, >45 years)	2.893	2.282 to 3.669	p<0.0001****	1.114	0.865 to 1.434	p=0.4021
Area of residence (urban, rural)	1.089	0.877 to 1.353	p=0.4383	0.419	0.332 to 0.530	p<0.0001****

p<0.0001*** shows significance at 95% CI

DISCUSSION

COVID-19 is the emerging viral infection of present world. Health care professionals are the front liners in this pandemic situation and they are the warriors to fight against this highly contagious Infectious disease. HCP's are at risk of exposure to corona virus during the time of providing services to COVID-19 patients and likelihood of acquiring this disease is higher.¹¹ Hence, in this present situation the paramount important that HCP's throughout the world have good knowledge regarding corona virus structure, pathophysiology, symptomology, diagnosis, treatment and prevention methods. Therefore it is very essential to assess the knowledge, practice and attitude of healthcare professionals. To the best of our knowledge present study is the first of its kind to assess the knowledge, attitude and practice of healthcare professionals in southern part of India.

A total of 658 samples, females (64%) were more dominant in number when compared to males (36%). Regarding distribution of subjects according to profession the highest of 29.5% were B. Pharmacy and the least of 5% were nurses (Figure 1).

Most of the subjects nearly 56% of sample from urban area and remaining 44% were from rural area (Figure 2). Whereas the highest of 76.9% of subjects were under age group 18-30 years, 21.6% of subjects were 31-45 years age group and only 1.5% which was 10 subjects with greater than 45 years of age (Figure 3). About source of information, the more number of subjects around 36% get information about corona virus on social media, the second highest of 28% subjects were use TV, 9.6% use newspaper, 9.7% use search engine like Google, 3.5% searched in different health website and 3.6% get information in hospitals (Table 1).

In the present study out of 658 samples, 418 (63.49%) subjects have good knowledge about symptoms, transmission and preventive measures of corona virus and remaining 240 (36.51%) subjects have poor knowledge (Table-6). According to study conducted by Zhong et.al, results showed that 90% subjects have good knowledge and in another study, KAP toward COVID-19 among US residents showed that 80% subjects have good knowledge.^{12,13} By comparing the other study results with our study it showed that only 63.49% HCP's have sufficient knowledge which may be due to lack of

awareness among India population. Further education and training through continuous professional education and journal clubs are essential in improving the knowledge of HCP's about COVID-19 in our setting.

Regarding attitude findings showed highly positive attitude among few HCPs towards wearing PPE, gloves, mask and goggles and isolation of COVID-19 patients. Almost 79% of subjects have attitude of buying protective equipments if they are available at low cost and highest of 93.3% of subjects have good attitude to build their knowledge by watching WHO updates to combat spread of corona virus. HCP's in our study does not have positive attitude towards the question Transmission of COVID-19 infection that can be prevented by using universal precautions given by WHO, CDC and prevalence can be reduced by active participation of healthcare workers (Table 3). Giao et al, reported that majority of HCPs have positive attitude towards COVID-19.¹⁴ Knowledge scores have some influence on attitude of HCP's in our study.

Interestingly, practice scores in our study were different. Almost 74.9% of subjects have good practicing skills and remaining 25.1% of subjects have poor practicing. Around 92.2% of subjects use soap or hand sanitizer to wash your hands continuously. According to study findings of Khan et al who reported 85.7% HCPs used to wash their hands continuously which was less in number compared to our study.¹⁵ The highest of 95.9% subjects were cover their nose and mouth with a tissue during sneezing or coughing, 90% of subjects educate patient about the disease and 45.3% of subjects thinks that antibiotics are first line treatment in COVID-19 infection (Table 4). Overall in our study three-fourth of the participants has good practicing skills likewise the study conducted by Giao et al and Bhagavathula et al also reported that majority of HCPs have good practicing towards COVID-19.^{15,16} Health care professionals were facing many obstacles to treat the COVID-19 patients. In our study 41.6% of subjects agreed that improper cleanliness at premises to the policies and procedures is the barrier to provide services, 26.6% of subjects strongly agreed that lack of awareness about the mode of transmission of the disease COVID-19 was also the barrier for HCP's, the highest of 42.6% subjects agreed that unavailability of things/kits/PPEs to control of spreading infections was the major barrier for treating COVID-19 patients (Table 5).

We calculated the statistical significance by doing the chi-square test to know the correlation between knowledge and practice by using graph pad prism version 8.0.1 (Table 7).

Chi-square test gives the statistical significance $p < 0.0001^{****}$ at 95% CI and the odds ratio 0.385. The resulted p value shows that there is a correlation between knowledge and practice. Logistic regression analysis was done for factor associated with good knowledge and practice regarding COVID-19. Using factors like gender, age and area of residence. Odds ratio was calculated for gender versus knowledge it gives the significance value $p < 0.0001^{****}$, age versus knowledge gives the significance value $p < 0.0001^{****}$ and area of residence versus knowledge gives significance value $p < 0.438$ hence, it's clearly resulted that gender and age have some influence on knowledge. Whereas gender versus practice showed significance value $p < 0.0001^{****}$, age versus practice gives significance value $p < 0.402$ and area of residence versus practice showed significance value $p < 0.0001^{****}$ at 95% CI. The results showed that gender and area and residence have some influence on practicing (Table 8). Overall findings of our study indicated that pharmacists have higher odds of showing good practicing and knowledge compared to other HCPs.

Our study lacks representativeness due to the distribution of the survey through online mode this leads to participation of subjects only those who can read and have internet access. This represents a major limitation of this study.

CONCLUSION

Coronavirus disease also known as COVID-19 is a rapidly emerging pandemic. In this situation healthcare workers were the front liners so, they must have proper knowledge, attitude and practicing skills. The present study was aimed to assess the knowledge, attitude and practice among healthcare professionals in southern India. The results showed that more than half of the health care professionals have good knowledge, regarding attitude most of the subjects have positive attitude and almost three-fourth have good practicing skills.

The study also able to highlight the few aspects of knowledge and few barrier faced by HCP's during practicing. The awareness should be created by conducting educational campaigns, journal clubs and continuous professionals programs it will finally help the HCP's to provide the proper care to the COVID-19 patients and improve the patient's quality of life.

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REFERENCES

- Li Q, Guan X, Wu P, Wang X, Zhou L, Tong Y, et al. Early transmission dynamics in Wuhan, China, of novel coronavirus-infected pneumonia. *N Engl J Med*. 2020;382:1199-207.
- World Health Organization. WHO Director-General's opening remarks at the media briefing on COVID-19, 11 March 2020. Available at: <https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020>. Accessed on 3 May 2020.
- Vara V. Coronavirus outbreak: The countries affected. *Pharmaceutical Technology*. Available at: <https://www.pharmaceutical-technology.com/features/coronavirus-outbreak-the-countries-affected>. Accessed on 3 May 2020.
- Cascella M, Rajnik M, Cuomo A, Dulebohn SC, Di Napoli R. Features, evaluation and treatment coronavirus (COVID-19). In: *StatPearls*. Treasure Island FL: StatPearls Publishing LLC; 2020.
- Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel corona virus in Wuhan, China. *Lancet*. 2020;395:497-506.
- Tian S, Hu N, Lou J, Chen K, Kang X, Xiang Z, et al. Characteristics of COVID-19 infection in Beijing. *J Infect*. 2020;80:401-6.
- Sahin AR, Erdogan A, Agaoglu PM, Dineri Y, Cakirci AY, Senel ME, et al. novel coronavirus (COVID-19) outbreak: a review of the current literature. *EJMO*. 2020;4:1-7.
- World Health Organisation. Infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected. World Health Organization: Geneva, 2020. Available at: [https://www.who.int/publications/i/item/infection-prevention-and-control-during-health-care-when-novel-coronavirus-\(ncov\)-infection-is-suspected-20200125](https://www.who.int/publications/i/item/infection-prevention-and-control-during-health-care-when-novel-coronavirus-(ncov)-infection-is-suspected-20200125).
- World Health Organisation. Coronavirus Disease (COVID-19) Advice for the Public, 2020. Available at: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public>. Accessed 01 April 2020.
- World Health Organisation. Coronavirus disease (COVID-19) outbreak: rights, roles and responsibilities of health workers, including key considerations for occupational safety and health, 2020. Available at: [https://www.who.int/publications/i/item/coronavirus-disease-\(covid-19\)-outbreak-rights-roles-and-responsibilities-of-health-workers-including-key-considerations-for-](https://www.who.int/publications/i/item/coronavirus-disease-(covid-19)-outbreak-rights-roles-and-responsibilities-of-health-workers-including-key-considerations-for-)

- occupational-safety-and-health. Accessed on 3 May 2020.
11. MedScape. In Memoriam: Healthcare Workers Who Have Died of COVID-19, 2020. Available online at: www.medscape.com/viewarticle/927976. Accessed 06 April 2020.
 12. Zhong BL, Luo W, Li HM, Zhang QQ, Liu XG, Li WT, et al. Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross sectional survey. *Int J Biol Sci*. 2020;16:1745-52.
 13. Clements JM. Knowledge and Behaviors Toward COVID-19 Among US Residents During the Early Days of the Pandemic: Cross-Sectional Online Questionnaire. *JMIR Public Health Surveill*. 2020;6(2):e19161.
 14. Giao H, Thi N, Han N, Van KT, Ngan VK, Van TV, et al. Knowledge and attitude toward COVID-19 among healthcare workers at Knowledge and attitude toward COVID-19 among healthcare workers at District 2 Hospital, Ho Chi Minh City. *Asian Pac J Trop Med*. 2020;13:1-6.
 15. Khan MU, Shah S, Ahmad A, Fatokun O. Knowledge and attitude of healthcare workers about middle east respiratory syndrome in multispecialty hospitals of Qassim, Saudi Arabia. *BMC Public Health*. 2014;14:1-7.
 16. Bhagavathula AS, Aldhaleei WA, Rahmani J, Mahabadi MA, Bandari DK. Novel coronavirus (covid-19) knowledge and perceptions: a survey on healthcare workers. *MedRxiv*. 2020.

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