International Journal of Community Medicine and Public Health
Malhotra A et al. Int J Community Med Public Health. 2020 Nov;7(11):4392-4401
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20204735

Original Research Article

Original research: knowledge and attitude for information gathering practices related to COVID-19: a cross sectional study amongst healthcare workers in New Delhi

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Received: 11 August 2020
Revised: 16 September 2020
Accepted: 17 September 2020

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ABSTRACT

Background: COVID cases in India have surpassed the 50,000 mark as per data available on 7th May with more than 1783 reported deaths. Measures have been deployed by competent authorities to optimally educate healthcare workers (HCWs) in various aspects of this novel disease. Along with an assessment of the prevailing knowledge regarding COVID among HCWs, our study aimed to gather insight into the resources used and efforts made to keep up with the latest developments taking place during the pandemic.
Methods: A cross sectional web-based study was conducted in April 2020 using a self-prepared 38 item questionnaire which was distributed to HCWs. Appropriate statistical tools were used for data analysis with p-value < 0.05 being considered as significant.
Results: 275 HCWs completed the survey with a response rate of 40.1% with a majority of respondents being doctors (56.6%) and medical students (34.9%). Respondents showed suboptimal knowledge about clinical features, prevention, treatment, and complications of COVID-19. Mean % correct responses were 52.89% (SD±9.83%). Information seeking efforts made by respondents significantly correlated with their knowledge(p=0.043). Official government websites were the most used resource (37.8%). HCWs who had received formal training/guidelines from their institutions had higher knowledge (p=0.003).
Conclusions: It is of utmost significance to identify and bridge critical gaps in knowledge by using authentic sources of information to improve understanding of this novel disease to ensure better patient outcomes.

Keywords: Coronavirus disease 2019, Knowledge, Healthcare workers, Information gathering practices

INTRODUCTION

Coronaviruses are a large family of viruses that can cause illness in animals or humans. In humans, several coronaviruses are known to cause respiratory infections from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS). The most recently discovered coronavirus SARS-CoV-2 causes the disease Coronavirus Disease 2019 (COVID -19).[1] This new virus and disease were unknown before the outbreak was reported in Wuhan city, China, in December 2019 which has since then spread to over a hundred countries and claimed 2,47,503 lives as of 6th May 2020.[2,3] The World Health Organization (WHO) declared COVID -19 as a pandemic on March 11, 2020.[4]

The first case of COVID-19 in India was reported from Kerala on 30th January 2020 in a patient with a history of travel to Wuhan and the toll has since risen to 52,952 cases with 1783 deaths as per official data available on 7th May 2020.[5]

By the end of January, the WHO and Centers for Disease Control and Prevention (CDC) had published recommendations for the prevention and control of COVID19 for HCWs.[6,7] The WHO also initiated several online training sessions and materials on COVID-19 in various languages to strengthen preventive strategies, including raising awareness and training HCWs in preparedness activities.[8] In India, the Ministry of Health and Family Welfare (MoHFW), along with the Indian Council for Medical Research (ICMR) has launched multiple initiatives to provide necessary training and impart essential knowledge to Health Care Workers (HCWs) regarding the novel disease and published guidelines related to it.[9]

With the situation progressing at an exponential pace, the need of the hour is for healthcare professionals to be optimally informed about the latest updates and trends related to the pandemic and acquire adequate knowledge as they form the first line of defence against this novel illness. Knowledge of disease can influence HCWs attitudes and practices, and incorrect attitudes and practices directly increase the risk of them becoming infected and spreading the infection.[10] Understanding HCWs' knowledge, attitudes, and practices (KAP) and possible risk factors help to predict the outcomes of planned behaviour.[11]

An online questionnaire based survey was carried out amongst HCWs in UAE which found significant gaps in the sources of information about COVID-19 and depth of knowledge amongst HCWs as well as discrepancies in perceptions of COVID-19 among the participants.[12] A similar questionnaire based study was performed in a district hospital from Vietnam concluded that the majority of HCWs had good knowledge and a positive attitude toward COVID-19.[13] However, the level of knowledge and attitude is lower than that expected in some HCWs for their position level towards the virus. It was also seen that HCWs there predominately used social media to inform themselves about COVID-19 (91.1%). There is a paucity of such literature in India.

Thus, this study aims to assess knowledge about COVID-19 amongst HCWs in New Delhi and to identify critical gaps in their understanding, as well as to gather insight about the attitude of HCWs towards acquiring the necessary knowledge which is expected of them. With new updates and guidelines being rolled out every day, it was also considered worthwhile to investigate what resources/platforms Indian HCWs currently use to stay informed and their level of satisfaction with these available sources of information.

METHODS

Study design

An online questionnaire based cross-sectional study was conducted in April 2020 using a survey instrument designed after reviewing the Questions & Answers about COVID-19 from the WHO website, guidelines issued by the ICMR, and MoHFW of India about the disease.[14,15]

Questionnaire design

The self-administered survey instrument consisted of 38 questions of which 11 were Yes/No close ended questions, 26 were single correct /multiple correct choice questions and 1 was an open-ended question. The average time taken to complete the questionnaire was estimated between 3 to 4 minutes.

The questionnaire was divided into 5 sections. The first section consisted of the description and consent for the study while the second section was used to gather demographics of the participants which included age, gender, designation, and work experience. Third section consisted of 24 questions used to assess the knowledge about COVID-19 which included questions about epidemiology of the disease, its diagnosis & clinical features, prevention & Personal Protective Equipment (PPE) as well as its treatment & complications. The Fourth section consisted of 8 questions directed at evaluating the attitude for information gathering practices and the resources used by HCWs to gather knowledge about SAR-CoV-2 and the final section included 6 questions to assess the satisfaction of HCWs with the available sources of information. A 5-point Likert scale was used to self-assess the effort made in gathering information and to self-assess the perception of knowledge amongst participants.

The questionnaire was reviewed by the faculty of Community Medicine and then pretested among 10 HCWs to determine its acceptability and the clarity of the questions and advised modifications were made accordingly.

Study sample & ethical considerations

Participants included HCWs (physicians, interns, medical students, dentists, and nurses) who were approached using online communication platforms. Convenience sampling was used and a total of 275 complete responses were recorded. Consent for voluntary participation was obtained from all the participants after explaining the purpose of the study. Responses were kept confidential and anonymity was maintained while analysing the data.

Data analysis

The gathered data was tabulated, coded, and analysed using SPSS version 21. Only complete responses were analysed. Descriptive analysis was reported as mean scores and percentages. Analytical tests were performed using "t-test" and "ANOVA". Spearman's correlation was used to assess the relationship between mean knowledge and attitude towards gathering information. The

differences between the variables were considered statistically significant if the p value was <0.05.

RESULTS

A total of 281 healthcare workers responded to the survey, with a response rate of 40.1% and a completion rate of 97.8%. Majority of the responders i.e. 57.5% were from the age group 21-25 years (n=158). Males comprised 57.8% (n=159). Table 1 depicts the demographic characteristics of the study population. 50.5% (n=139) of the respondents were actively involved in providing patient care while 7.3% (n=20) of the respondents were involved in providing care to COVID-19 patients (Table 1).

Table 1: Demographic characteristics of the study participants (n = 275).

Characteristics	Subgroups	Number (N)	Percentage (%)
Gender	Male	159	57.8
	Female	116	42.2
Age	Less than 20 yrs	27	9.8
	21-25	158	57.5
	26-30	51	18.5
	31-35	11	4.0
	36-40	7	2.5
	40-45	6	2.2
	More than 45	14	5.1
Current designation	Medical students	96	34.9
	Interns	29	10.5
	MBBS graduates/	48	14.5
	Junior Residents	56	20.4
	PG residents	13	4.7
	Senior Residents	18	6.5
	Consultants	8	2.9
	Dental	3	1.1
	Paramedical	4	1.5
	Others		

*Others comprises of nurses

The 24 questions that assessed participating HCWs' knowledge about COVID-19 were divided into the following 4 subsections and relevant data was tabulated accordingly.

Here, (Table 2) depicting 'Epidemiology' subsection of knowledge shows that 88.4% of study participants were aware of the estimated incubation period of COVID-19. Only 29.5% of the sample rightly knew the R0 of the disease whereas a larger subgroup of 31.3% of participants was unaware of what R0 stands for.

Table 2: Knowledge of healthcare workers about Epidemiology of COVID-19 (n = 275).

Questions	Answer Choices	N	%
Declaration of COVID-19 as a public health emergency of international concern (PHIEC) by WHO.	30th January 2020	133	48.4%
	22nd February 2020	112	40.7%
	10th February 2020	30	10.9%
	15th March 2020	0	0.0%
Primary modes of transmission	Droplet method	236	85.8%
	Person to person contact	167	60.7%
	Fomites	158	57.5%
	Airborne	58	21.1%
	Bats	36	13.1%
	Feco-Oral	21	7.6%
	Consumption of meat and poultry	7	2.5%
	Sexual transmission	3	1.1%
Incubation period	1-14 days	243	88.4%
	7-21 days	15	5.5%
	1-7 days	10	3.6%
	7-28 days	7	2.5%
Estimated R0 for COVID-19	I'm not aware what R0 stands for	86	31.3%
	2 to 2.5	81	29.5%
	2.5 to 3	45	16.4%
	1.5 to 2	42	15.3%
	More than 3	13	4.7%
	Less than 1.5	8	2.9%
Disease transmission by asymptomatic cases	Yes	266	96.7%
	No	4	1.5%
	I'm not sure	5	1.8%

Here, (Table 3) outlines the 'Testing & Clinical Features' subsection of the knowledge questionnaire. 92.7% of the participants said they were aware of testing strategies for COVID-19, however, only 53.1% responded correctly when asked which patients were eligible for COVID-19 testing at present as per ICMR guidelines. Majority of the participants were adequately informed about the diagnostic and confirmatory tests for COVID-19. Even though 96.4% of the participants were aware that Nasopharyngeal/ Oropharyngeal swab specimens are used for testing, only 49.1% and 34.2% of the participants were informed of the utility of BAL and sputum specimens respectively for the same purpose. It was

observed that the majority of the participants were adequately informed about common symptoms of the disease, but less than 50% of the participants were informed about headache, lethargy, nasal congestion, and chest pain as possible clinical findings. Participants also had insufficient knowledge about the pertinent common lab investigation findings for COVID-19.

Here, (Table 4) depicts the knowledge of participants about the 'PPE and prevention' of COVID-19. Majority of participants were aware of physical distancing measures, the recommended duration of the quarantine period for the disease, and that asymptomatic cases could transmit the disease. Responders also knew the PPE required for the care of confirmed/suspected COVID patients. However, it was observed that while the majority of participants were aware of measures that help prevent transmission of disease in hospital settings such as Masks, Physical distancing, and covering nose and mouth while coughing, only 20.7% of the participants selected hand hygiene as a preventive measure against the disease. Moreover, less than half of the participants i.e. 48% were aware of the correct order of donning PPE. Only 30.2% of the participants knew about the maximum duration for which an N95 mask can be used continuously.

Table 3: Knowledge of healthcare workers about testing & clinical features of COVID-19 (n=275).

Questions	Answer Choices	N	%
As per the ICMR guidelines, are we currently testing all patients who develop symptoms of a respiratory tract infection/ influenza like illness?	No	146	53.1
	Yes	108	39.3
	Not Sure	21	7.6
Diagnostic tests being used for COVID-19	RT-PCR	250	90.9
	Serology (Antibody)	175	63.6
	Viral culture	22	8.0
	RNA electrophoresis	18	6.5
Confirmatory test	RT-PCR	226	82.2
	Im not sure	20	7.3
	Serology(Antibody)	16	5.8
	Viral Culture	13	4.7
Specimens used to perform above mentioned tests.	Nasopharyngeal/ Oropharyneal swab	265	96.4
	Broncho-alveolar lavage sample	135	49.1
	Sputum Sample	94	34.2
	Stool sample	10	3.6
	Urine	6	2.2
	I'm not sure	5	1.8
Common symptoms of COVID-19	Fever	272	98.9
	Shortness of breath	257	93.5
	Dry cough	257	93.5
	Sore throat	200	72.7
	Lethargy	132	48.0
	Headache	97	35.3
	Diarrhea	81	29.5
	Nasal congestion	62	22.2
	Chest pain	61	22.1
	Joint pain	30	10.9
	Pedal edema	0	0.0
Lab findings in severe COVID-19 cases	Elevated CRP	129	55.4
	Lymphocytopenia	104	44.6
	Lymphocytosis	84	36.1
	Elevated TLC	79	33.9
	Elevated D dimers	74	31.8
	Elevated LDH	69	29.6
	Thrombocytopenia	39	16.7
	RF positive	5	2.1

Table 4: Knowledge of healthcare workers about prevention & PPE of COVID-19 (n=275).

Questions	Answer choices	N	%
Minimum distance to avoid transmission	Atleast 1 meter	215	78.2
	Atleast 2 meters	57	20.7
	Im not sure	3	1.1
Duration of self-quarantine/ isolation	14 days	257	93.5
	21 days	16	5.8
	7 days	2	0.7
Measures preventing spread of COVID-19 in hospital settings.	Masks	215	78.2
	Covering nose and mouth while sneezing or coughing	255	92.7
	Physical distancing	250	90.9
	Avoiding use of common toilets	88	32.0
	Hand hygiene	57	20.7
	Gargles	45	16.4
	Flu vaccination	16	15.8
	Steam inhalation	27	9.8
PPE necessary before treating COVID-19 patients	Gloves	256	93.1
	N 95 mask	251	91.3
	Gown	227	82.5
	Face shield	226	82.5
	Shoe covers	204	74.2
	Head covers	183	66.5
	Protective eyewear	158	57.5
	Leg overalls	136	49.5
	HAZMAT suit	132	48.5
	Medical 3 layer mask	113	41.1
Order of donning PPE	Gown > mask & eye visor/ goggles > gloves	132	48.0
	Gloves > gown > mask & eye visor/goggles	98	35.6
	Mask & eye visor/ goggles > gown > gloves	45	16.4
Duration for which an N95 mask can be used continuously	8 hours	83	30.2
	24 hours	59	21.5
	I'm not sure	57	20.7
	12 hours	39	14.2
	6 hours	37	13.5
Availability of vaccine against COVID-19	No	267	97.1
	Yes	4	1.5
	I'm not sure	4	1.5

Table 5: Knowledge of healthcare workers about treatment & complications of COVID-19 (n = 275).

Questions	Answer choices	N	%
ICMR reccomendation for COVID-19 prophylaxis	Hydroxychloroquine 400 mg BD followed by 400 mg once a week	189	68.7
	Hydroxychloroquine 400 mg OD for 1 week followed by weekly dose	39	14.2
	Hydroxychloroquine 400 BD followed by 100 mg OD daily	34	12.4

Continued.

Questions	Answer choices	N	%
	Hydroxychloroquine 500 mg weekly dose	13	4.7
Treatment options recommended by ICMR (As on 10th April '20)	Supportive care, azithromycin and hydroxychloroquine	140	50.9
	Supportive care, oseltamavir and antiretrovirals	49	17.8
	Supportive care, combination of antiretrovirals	44	16.0
	Supportive care only	42	15.3
Complications of COVID-19	ARDS	254	92.4
	Pulmonary fibrosis	118	42.9
	Acute Kidney Injury	84	30.5
	Septic shock	83	30.2
	DIC	62	22.5
	Bronchiectesis	54	19.6
	Acute Liver Injury	36	13.1
	Cardiomyopathy	30	10.9
	Rhabdomyolysis	6	2.2
	Malignancy	3	1.1
Complications of hydroxychloroquine	Arrythmias	208	75.6
	Maculopathy	110	40.0
	Hepatic injury	95	34.5
	Agranulocytosis	86	31.3
	Tinnitus	83	30.2
	Vertigo	59	21.5
	Hyponatremia	24	8.7
	Fluid retention	21	7.6
	Haematuria	20	7.3

Table 5 outlines the knowledge of respondents related to 'Treatment and complications' of the disease. While 68.7% of participants were informed of the current recommendation by ICMR for chemoprophylaxis of COVID-19, only 50.9% knew about the current treatment options for severe COVID-19 patients as recommended by the same organization (As on 6th April 2020). When participants were asked about potential complications of COVID-19, 92.7% knew about ARDS as a potential outcome, however, poor knowledge was observed regarding other known complications of the disease. The same trend was seen with complications of hydroxychloroquine therapy in which 75.6% of the participants were aware of arrhythmias as a possible complication but poor knowledge was observed with other known complications of the drug.

Knowledge was assessed based on % correct responses. The mean of % correct responses in the study sample was 52.89 ± 9.83. In (Table 6) depicts the average knowledge about COVID-19 amongst the various designation subgroups. Maximum average % knowledge was seen amongst interns at 58.1% while medical students had an average % correct of 50.33%. On comparing the mean % correct answers between the various designation groups it was found that Medical Students had significantly lower % correct responses versus Interns (p=0.001), PG residents (p=0.001), SRs (p=0.048) and Consultants (p=0.009).

As depicted in (Table 7) our study revealed that male participants have significantly higher knowledge about COVID-19 versus their female counterparts (p=0.04). It was also observed that HCWs currently involved in providing patient care had significantly higher mean % correct responses as compared to those who were not (p=0.001).

An attempt was made to evaluate the general attitude and resources used for data gathering by participants of our study. Participants were asked to self-assess their efforts to keep informed with the latest developments taking place related to COVID-19 using a Likert scale. The amount of effort put by respondents significantly co-related with % mean correct responses of the participants (p=0.043). Participants were also asked to self-evaluate

how well informed they thought they were. No significant correlation was observed between their % correct response and their self-assessment of how well informed they were.

Table 6: Mean % correct responses in the knowledge component of the questionnaire amongst various designation subgroups (n=275).

Designation	Correct responses Mean ±Standard Deviation (%)
Medical Students	50.33±8.54
Intern	58.15±8.71
MBBS Graduate/JR	52.01±7.61
PG Resident	56.13±9.35
Senior Resident	55.65±12.06
Consultant	56.57±12.01
Dental	39.38±11.89
Paramedical	40.53±6.32
Others	52.50±10.24

* Others comprises of Nurses and other allied workers.

Table 7: Comparison of mean % correct responses amongst various study participant subgroups using Students t-test.

Characteristic	Knowledge (mean % correct responses)	P value
Gender		
Male	53.92±9.32	0.043
Female	51.49±10.36	
Actively involved in patient care		
Yes	54.96±10.77	0.001
No	50.78± 8.82	
Designation		
Medical Students	50.33±8.54	
Interns	58.15±8.71	0.001
Medical Students	50.33±8.54	0.001
PG Residents	56.13±9.35	
Medical Students	50.33±8.54	0.048
SRs	55.65±12.06	
Medical Students	50.33±8.54	0.009
Consultants	56.57±12.01	
Data gathering practices		
Govt Websites	53.81±8.76	0.006
Social Media	47.08±9.57	
COVID-19 training in institution		
Yes	54.80±9.82	0.003
No	50.81±10.26	

The primary source used for gathering data as reported by respondents is depicted in (Figure 1). While 37.8% of participants used Official Govt Websites as their primary information resource, 12.4% used discussion amongst peers and 5.8% used Social media platforms as their primary source of gathering information. In addition to the primary resource responders used, 55.3% and 45% reported using discussion between peers and social media respectively as a secondary source of data gathering. Individuals using social media as their primary source of data gathering reported significantly lower % correct responses as compared to those using official government websites (p=0.006), research papers (p=0.019), and online courses (p=0.015).

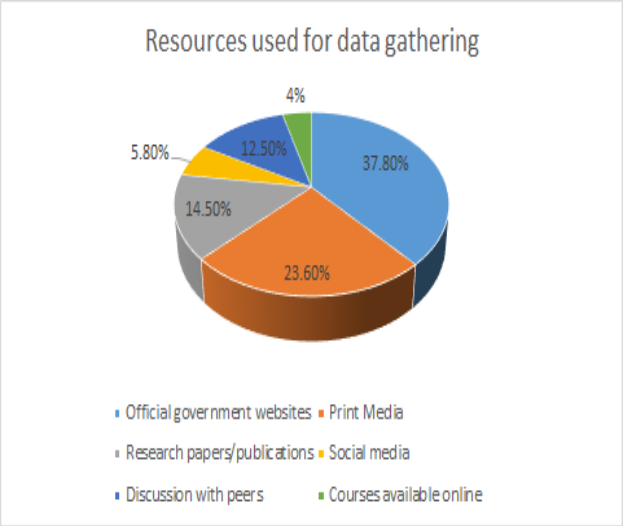

Figure 1: Distribution of resources used for data gathering by study participants (n=275).

52.7% participants responded with affirmation when asked if their institution had provided them with formal training and guidelines regarding COVID-19 and on comparing their mean % correct responses with those participants which denied receiving any formal training it was observed that the difference in the mean % correct responses of the two groups was statistically significant (p=0.003).

Majority of the respondents (82.5%) had come across people in their vicinity that were misinformed about the pandemic and 85.9% reported reaching out to them to provide authentic sources of information. Participants were asked about what intervention they thought was necessary to control the spread of the disease. 45.5% of the participants believed that it was necessary to have a complete lockdown to control the public spread of COVID-19.

Participants were also asked for their insights about the current resources available for data gathering. 60% of the respondents were satisfied with the resources currently available to keep themselves informed about the novel

disease. It was observed that 69.3% of the participants viewed information provided by premier agencies such as WHO, CDC, ICMR, etc. as reliable but don't trust it in all instances.

A majority (91.5%) of participants felt the need for responsible authorities to provide a more uniform, readily available source of information and updates in research and management guidelines of Covid-19. They were also asked for their suggestions for a "one-stop resource" to keep themselves updated about the prevailing situation. 69.4% participants preferred links to authentic sources with reference, a sizeable number of respondents also expressed a need for short standardized courses online about various aspects of the disease (38.8%), constant intimations via subscribed email newsletters (35.8%) as well as print media updates provided by their respective institutions (30.2%).

DISCUSSION

As the COVID-19 pandemic enfolds, HCWs play a pivotal role in promptly diagnosing and treating COVID-19 cases. India has been hard hit by this novel disease and has reported over 50,000 cases as on 7th May 2020.16 While the nation's HCWs shoulder the responsibility of identifying and isolating these exponentially growing cases, our apex institutions play an equal part in empowering the HCWs with the current knowledge and updates about COVID-19. Our study shows that while there are authentic and updated resources of information available, there still exist gaps in the knowledge of our frontline workers which are not adequately informed about SARS CoV-2.

In our study, we found that the average knowledge about COVID-19 was merely 52.89%. This is much lower than a similar study done by Giao et al in HCWs in a District Hospital in Ho Chi Minh city which reported a mean knowledge score of 8.17±1.3 (range 4-10) amongst 327 HCWs.[13] A reason for this could be the difference in study tools used to assess knowledge but may also be due to lacunae in the communication of knowledge to the HCWs.

Another study done in UAE by Bhagavathula et al showed most of the HCWs used social media to obtain the information (61%), and a significant proportion of HCWs had poor knowledge of its transmission (61%), and symptoms onset (63.6%).[17] In our study, we found participants to be severely under-informed about the current treatment guidelines of COVID-19 and commonly known complications of the disease. Similarly, responders were unaware of some of the common presenting symptoms and common lab findings associated with the disease. Without accurate knowledge in these areas, HCWs might not be able to diagnose or treat COVID-19 patients with the swiftness that is crucial in combating this pandemic.

We found that HCWs who received formal training from their respective institutes performed significantly better than those who did not (p=0.003) which highlights that standardized education interventions if made by institutions can have a remarkable impact on the awareness of HCWs about COVID-19. Since in our study medical students and dentists performed poorly in comparisons to physicians, upcoming education programs should also keep them in mind while devising education materials. A similar finding was reported in a study conducted in Mumbai which expressed the need for educational intervention for all healthcare workers.[18]

Our study also revealed that those HCWs who used social media platforms to acquire knowledge about SARS CoV 2 were statistically under-informed versus those who used official Govt websites and online courses for the same. This finding suggests that the sources of information available on social media platforms may be unreliable, making it a considerable concern that needs addressing by healthcare authorities. It is difficult to evaluate the authenticity of information on social media platforms and thus HCWs should be vigilant while accessing such resources.

A study titled 'Knowledge, attitude, and practice regarding COVID-19 among healthcare workers in Henan, China ' by Zhang et al found that careful removal of protective equipment was found to be positively associated with a higher education level (OR: 2.12; 95% CI:1.39e3.24).[11] HCWs are at a much higher risk of contracting diseases including COVID-19 and our similar finding of grossly inadequate knowledge about the sequence of donning PPE by HCWs raises an important issue which should be an area of focus while formulating education materials for HCWs.

Our results offer compelling evidence for the need to further evaluate knowledge about COVID-19 amongst HCWs at a larger scale. It also sets a great responsibility on health care authorities to increase the accessibility of education materials by varying the means of information delivery, aiming to improve knowledge levels. Moreover, greater motivation is needed for HCWs to access official guidelines and sources of information made available by the concerned authorities.

CONCLUSION

This study gave us the opportunity to assess the knowledge of frontline HCWs and students regarding the ongoing COVID-19 pandemic. New literature and updates are being released regularly and little is certain about the management of this novel disease at this time. Our work suggests that there may be significant lacunae in knowledge about COVID-19 in HCWs. Additionally, we have been able to demonstrate the effect social media may have on the knowledge levels of HCWs. Taken together, these findings highlight the need of prompt and

standardised educational interventions. It is important to identify and bridge critical gaps in knowledge by using authentic sources of information to improve understanding of this novel disease to ensure better patient outcomes. Hopefully this research will be of value to policy makers while formulating learning materials and act as a blueprint for further studies in this area.

Limitations

The majority of the HCWs that participated in the study were from urban hospitals of New Delhi they do not truly represent the healthcare professionals of the entire country and hence cannot be generalised. A downside in our methodology was our sample size and that the online self-administered questionnaire which may be subject to recall. Therefore, future studies conducted on a larger scale could better estimate the knowledge and attitude of HCWs about this novel disease.

ACKNOWLEDGEMENTS

We thank all healthcare workers that participated in this study.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

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Cite this article as: Malhotra A, Siwach I, Yadav G. Original research: knowledge and attitude for information gathering practices related to COVID-19: a cross sectional study amongst healthcare workers in New Delhi. Int J Community Med Public Health 2020;7:4392-401.