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ORIGINAL ARTICLE

Knowledge and attitude regarding COVID 19 among healthcare workers in India

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Abstract

Aim

Covid-19 has engulfed the world and involved the healthcare workers (HCWs) worldwide. So, they should have the most updated knowledge and good attitude towards the disease. Hardly there is any study which evaluates the knowledge and attitude of healthcare professionals regarding Covid-19. This study assesses knowledge and attitude toward Covid-19 among HCWs across the country.

Methods

This was a multicentric cross-sectional study. It was performed from 10th-20th April, 2020. Convenient random sampling was used. Data was collected through self-administered questionnaire of knowledge and attitude of HCWs regarding Covid-19. Data was analysed to describe: demographic, mean knowledge and attitude score. Pearson correlation, Kruskal Wallis-H test and one way ANOVA were carried out to evaluate the relationship between study variables. Wherever required, post-hoc analysis was done using Tukey's HSD method.

Results

Total 458 HCWs (56.8% were senior residents/postgraduate trainee) had mean knowledge score of 14.2±1.65 and mean attitude score of 3.80±0.52. 69.4% had sufficient knowledge but lack of knowledge was seen when Covid-19 infection rate and fatality rate was compared with seasonal flu. Nearly 85% didn't know when to screen a patient and the components of Personal Protective Equipment. Significant difference in knowledge was seen between the junior residents/MBBS and senior resident/Postgraduate trainee, between nursing/allied sciences and consultants, and between nursing/allied sciences and senior resident/postgraduate (p-value <0.001). There was positive correlation between knowledge and attitude score (r =0.111, p =0.019).

Conclusion

Most HCWs had good knowledge and positive attitude but there were few lacunas. More frequent educational training programmes are required to overcome this chasm.

Keywords: Covid 19, Knowledge and attitude, Pandemic

1 | INTRODUCTION

Today, coronavirus disease – 2019 acronym as CoViD-19 has become a global pandemic against which each and every healthcare system of the world is fighting unanimously. The virus causing Covid-19 was initially named as novel coronavirus (2019-nCov) as it is completely new to the mankind but was changed to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) by the International Committee of Taxonomy of Virus [1]. SARS-Cov and MERS-Cov belonging to the same family had previously caused SARS and MERS epidemic. The first case of Covid-19 was reported from Wuhan of Hubei province, China on 31st December 2019. In India, the first case was reported from Kerala state on 30th January, 2020. As of 15th May 2020, the Ministry of Health and Family Welfare have confirmed a total of 56,316 cases, 36,823 recoveries (including one migration) and 3029 deaths in the country[2]. As the first cases of the Covid-19 disease were linked to direct exposure to the Huanan Seafood Wholesale Market of Wuhan, animal-to-human transmission was thought to be the main mechanism. But then further cases were not associated with this exposure mechanism. Therefore it was concluded that the virus could also be transmitted from human-to-human by close contact (within about 6 feet) with infected people via respiratory (coughs or sneezes) or transmitted by touching a surface or object that the virus on it [3,4]. The attack rate is 30-40% with a R_0 of 2.8 which means that on an average each patient spreads the infection to 2.8 other people as compared to R_0= 3 of SARS, 1.3 for seasonal flu and 0.8 for MERS. The case fatality rate is 3.4% as compared to 9.6% of SARS, 34.4% of MERS and 0.1% of seasonal flu[5]. With these data it has high infectivity and high CFR than seasonal flu. The range of CFR of CoViD-19 is 0.5-4.0% [5]. Thus, the best preventive measure is to avoid contact with a positive patient and to abstain from any social gathering to prevent the spread of virus.

Looking at these figures and the way it is transmitted, the health care workers (HCWs) have the highest probability of contracting this virus. Thus they are the ones who are expected to be well versed with Covid-19. It was due to lack of knowledge, attitude and practice about the MERS-CoV and SARS-CoV that posed to be highest risk for the epidemic which had occurred in 2002-03 and 2012 respectively [6,7,8,9]. To the best of our knowledge, this was the first study evaluating the knowledge and attitude among the HCWs about Covid-19. Findings of this study would help the various concerned authorities organize the necessary awareness programs in order to address the lacunas, provide up-to-date information and deliver the best practice to control the Covid-19 disease.

2 | MATERIALS AND METHOD

It was a multicentric questionnaire based cross-sectional study done from 01/05/2020 to 15/05/2020. An online questionnaire was prepared by the authors with the help of WHO Q&A about Covid-19 on its webpage[10] and was critically analysed by four experts for appropriateness of the content and the questions. Pre-testing was done to know its feasibility and based on the inputs a few changes were made. Sample size was calculated by the formula $N= Z^2pq/d^2$ where the correct response was assumed to be 71.2% based on a previous study with 95% confidence interval and a precision of 5 % and it came out to be 315. It was a non-random (convenient) sampling. The final version was sent to 700 potential responders all across the country. This self-administered questionnaire consisted of three sections that had: four questions on socio-demographic data, 19 questions on knowledge about Covid-19 and nine questions about attitude of HCWs towards it. Each correct answer in knowledge section was given one point. Total score of knowledge varied between zero (minimum) to 20 (maximum). Two questions

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had multiple options but correct scoring was given only if they identified all correct options. Cut-off was taken as 14 (70%). For the attitude section a five point Likert scale was used with one as strongly disagree and five as strongly agree. Therefore, higher the attitude scores were, higher the probability of positive attitudes and the reverse applied for a low score. Analysis of data was done using SPSS version 23.0 and MS Excel 365. Descriptive statistics were calculated for each variable. Parametric and non-parametric variables were identified using the Shapiro Wilk test. Pearson correlation, Kruskal Wallis- H test and one way ANOVA were carried out to know if the differences between groups were statistically significant or not (significant if p-value <0.05).Post hoc analysis in one way ANOVA was done using Tukey's HSD test.

3 | RESULTS

Out of the total 458 participants, more than half (56.8%) were senior residents or post graduate trainees whereas participation from the nursing/allied sciences and intern/PRCA was below 5%. (Table 1).

As per table 2, more than two thirds (69.43%) of the participants had sufficient knowledge regarding the Covid-19 pandemic. More than 90% of them responded correctly to the causative agent, mode of infection, duration of the incubation period and availability of vaccine. However, less than one third of the participants responded correctly with respect to the infection rates and fatality rates of Covid-19 as compared to seasonal flu. Also, only a few responded accurately as to when a patient should be screened for Covid-19 (17%) and the complete components of PPE (personal protective equipment) (13.5%) which was an important finding of the study. (Both of these questions were multiple choice questions).

In table 3, we have shown the level of knowledge regarding Covid-19 among the five participating healthcare workers groups. One way ANOVA was applied to find out if there was a difference in the knowledge scores between the groups of healthcare workers. It was found to be significant (p-value <0.001). On doing the post-hoc analysis there was a significant difference between the junior residents/MBBS and senior resident/Postgraduate trainee (p-value <0.001), between nursing/allied sciences and consultants (p-value =0.001), between nursing/allied sciences and senior resident/postgraduate (p-value <0.001) using Tukey's HSD method.

With respect to the attitude (Figure 1), about two-thirds of the healthcare workers agreed on the fact that they were worried about contracting the disease (67.7%). They were also worried about the elders at their homes getting the disease from them (84.3%). More than 78% of the participants strongly agreed on the fact that Healthcare workers working in Covid-19 infrastructure and/or attending to Covid-19 patients must not attend to Non- Covid patients. About 69.5% of the people also agreed to the fact that ease of access to healthcare for Non Covid patients have decreased.

Less than half (49.4%) of the HCWs were satisfied with their knowledge of usage of the PPEs. Around 86.4% of the participants believed that community based lockdowns would help to reduce the implications of the pandemic. An interesting finding was that about 43.7% of them were not willing to undergo a vaccine trial for Covid-19, while about 19.7% of the participants remained neutral. More than two thirds of them (73.4%) were comfortable going into quarantine after the duty period. About one third of them (34.1%) remained neutral on the topic of enough evidence being there for the usage of hydroxychloroquine for Covid-19, while more than one third of them did not agree that there was enough evidence (37.1%). Total mean (± SD) attitude score was 3.80 (±0.52) (Figure 2). A Pearson's correlation done between the mean knowledge score and mean attitude score showed that there was a positive correlation between good knowledge and agreement (r=0.111, p= 0.019(p value less than 0.05 was considered to be significant)).

TABLE 2: Knowledge regarding Covid-19

Question	Participants who gave the Correct Answer
Covid 19 is caused by a virus called SARS cov2	428(93.4%)
The main mode of transmission from person to person is both respiratory droplet and contact with infected person	412(90%)
Who is considered a close contact at risk for transmission?	348(76%)
What is the incubation period of Covid 19?	414(90.4%)
Covid 19 vaccine is available	454(99.1%)
Covid 19 has a higher infection rate than seasonal flu	62(13.5%)
Covid 19 has a higher fatality rate than seasonal flu	106(23.1%)
Healthcare workers are at an increased risk of developing Covid 19	450(98.3%)
Underlying comorbidities put a patient of Covid 19 at a higher risk of complications and death	454(99.1%)
The virus causing Covid 19 dies immediately on coming to contact with surfaces	452(98.7%)
Antibiotics are effective against Covid 19	424(92.6%)
When an infected person coughs or sneezes, the droplets remain airborne for more than 12 hours	308(67.2%)
Handwashing with soap and water is effective against the spread of Covid 19	446(97.4%)
When should a person be screened for Covid 19?	78(17.0%)
What fatal side effect does the drug Hydroxychloroquine have?	362(79.0%)
Which of the following are components of PPE (personal protective equipment)?	62(13.5%)
Most of the patients of Covid 19 require ventilation	404(88.2%)
A Covid19 patient on ventilator has a high chance of survival	378(82.5%)
Chances of detecting coronavirus by throat swab (the most common method currently employed) is close to 100%	298(65.1%)
Total knowledge score	Mean ± SD= 14.2445 ± 1.65293 Median= 14 Sufficient knowledge= 69.43% (318) of the participants Insufficient knowledge= 30.56% (140) of the participants

*SARS cov2 – Severe acute respiratory syndromecorona virus 2. SD – Standard deviation

TABLE 1: Level of healthcare provider

Participant group	Frequency	Percent
Consultant	52	11.4
Intern/PRCA	16	3.5
Junior resident/MBBS	110	24.0
Nursing/Allied Sciences	20	4.4
Senior resident/Post graduate trainee	260	56.8
Total	458	100.0

PRCA- Pre-registered clinical assistant

TABLE 3: Level of knowledge amongst the participant group

Participant group	Level of knowledge	
	Sufficient	Insufficient
Consultant	69.2%	30.8%
Intern/PRCA	62.5%	37.5%
Junior resident/MBBS	63.6%	36.4%
Nursing/Allied Sciences	30.0%	70.0%
Senior resident/Post graduate trainee	75.4%	24.6%

*PRCA- Pre-registered clinical assistant

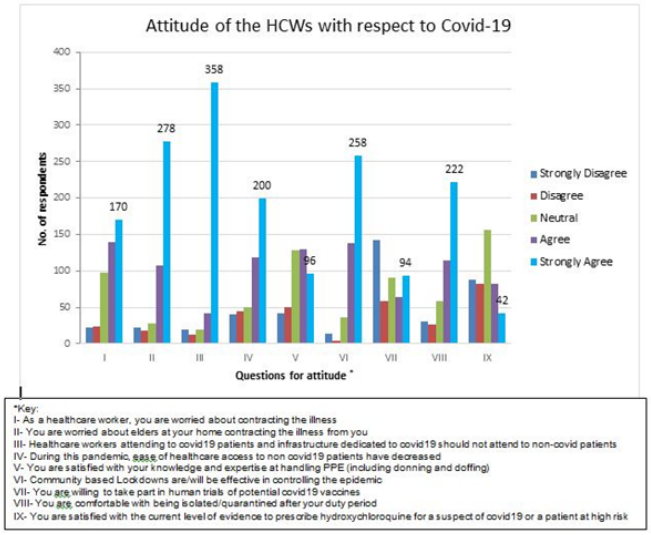

FIGURE 1: Attitude of the HCWs with respect to Covid-19

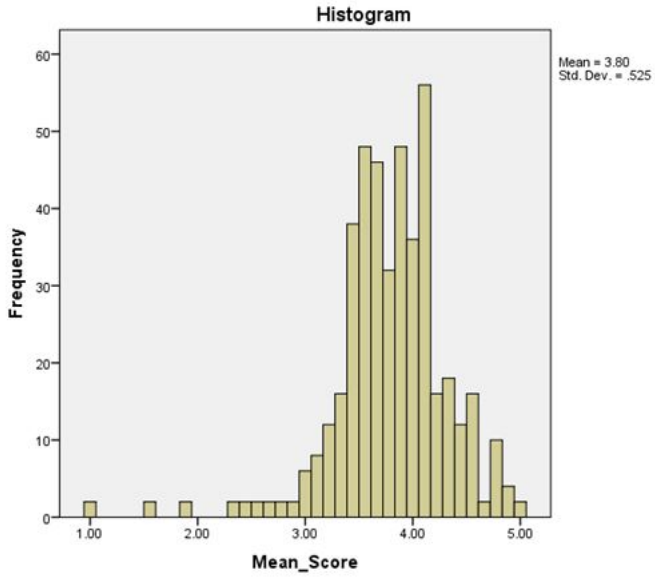

FIGURE 2: Stem and leaf plot for calculating mean score of attitude

4 | DISCUSSION

Since the time Covid-19 has started it has affected nearly three million people worldwide with nearly 0.2 million deaths within a short span of about four months. One main reason for this is its way of transmission i.e. via close contact, as it can spread by respiratory droplets[4]. Because HCWs are the frontline warriors against this deadly disease they are supposed to have a good knowledge and attitude.

When compared to a study done by Giao et al[11] where adequate knowledge was found in 84% of their respondents, our study found that only 69% participants had sufficient knowledge about the disease. Though the government has taken measures like spreading awareness about coronavirus using the telecom industry and various other measures, still there is huge gap in the knowledge of our HCWs about Covid-19. As most respondents having insufficient knowledge belonged to the nursing/allied sciences group the government should focus more on this segment of HCWs. It was due to this lack of knowledge that there was absence of an effective response to the initial outbreak of SARS which resulted in a crisis in China[12].

To find out the lacunae we look at a specific knowledge segment and it is evident that less than one

fourth of the HCWs were aware that Covid-19 has higher infection rate and fatality than seasonal flu. This drastic pitfall may be due to the fact that the clinical presentation of Covid-19 is similar to seasonal flu and because this is a novel virus, there is a dearth of knowledge among HCWs regarding its epidemiological characteristics like case fatality rate and R_0 value.

Only about two-third respondents were aware of the fact that Coronavirus was not 100% detected by throat swab. This lack of knowledge can be attributed to the fact that this method is being extensively used everywhere for the detection of Coronavirus which might have led to over relying by HCWs on this method. Whereas the reality is, that there is only 63% chance of detecting a virus if sample is taken from nasal swab and 32% if taken from pharyngeal swab. With Broncho-alveolar-lavage it is 93%, with sputum it is 72%, 46% when taken from fibrobroncoscope brush biopsy, 29% from feces and 1% from blood[13].

As far as the preventive aspects of this disease are concerned almost 100% respondents knew that handwashing with soap and water is effective. This gives a sigh of relief as HCWs are the ones who are very much exposed to this virus and if they know how to prevent its spread it will be of very much help in containing the spread of virus. This high positive response may be attributed to the WHO's document "Getting your workplace ready"[14] points from which, have been circulating extensively among our HCWs.

Only 17% HCWs new exactly when to screen a patient for Covid-19. This lacuna in knowledge regarding screening may be because; the criteria for screening are frequently being updated and might not reach those HCWs working in the remote areas. It should be as an obligation for the mass media to disseminate the latest guidelines as early as possible.

The complete component of a PPE was known only to 13.5% respondents. There are various reasons for such a negative result. First, as PPE has multiple components a HCW may forget one of them while answering the question. Another is that, 55% of our respondents had not yet worked or were scheduled to work on a later date and 19.7% had worked in screening/fever clinic so they had never wore a PPE which makes them very prone to miss a few component of PPE. Thus, the government should circulate more and more videos or pictures showing the PPE and its components.

More than 80% HCWs had correct knowledge about requiring a ventilator and then followed by the prognosis of Covid-19 patient on ventilator. This was because most HCWs remain in the hospital and are well versed with the natural history of a Covid-19 patient as they are closely followed-up. In the study done by Giao et al[11] where only 79.2% HCWs were aware that patients with co-morbidities contracting Covid-19 had poorer prognosis, almost 100% HCWs in our study were aware of this fact.

In our study, questions that evaluated the treatment aspect of Covid-19 (Q. no. 11 & 15) showed a much better result as compared to study done by Bener and Khan et al in which 40% and 57.6% of participants respectively had no knowledge of the treatment of SARS and MERS [9,15] . This shows how the training programmes among the HCWs are having a positive impact as far as treatment aspect is concerned.

There was a positive correlation between good knowledge and having an agreeable attitude about Covid-19. This is in accordance with the "theory of reasoned action" where a person's intention to perform a behaviour is the main predictor of whether or not they actually perform that behaviour[16]. However, there was a significant concern among HCWs about contracting the virus themselves and thereby infecting their family members. Most positive attitude was towards the condition that the doctors attending a Covid-19 patient should not be attending a non-Covid case. This must be due to the knowledge about how much contagious the virus is. The HCWs also agreed to the fact that due to this pandemic, there has been a shift of healthcare resources leading to perplexity among non-Covid infected patients. Two most important reasons which may be responsible for this are- depletion of resources to provide routine care and decreased access to routine care. Government should understand the seriousness of this finding because during the 2014 West Africa Ebola epidemic, lack of routine care for malaria, HIV/AIDS, and tuberculosis led to an estimated

10,600 additional deaths in Guinea, Liberia, and Sierra Leone[17]. In 2009 when influenza pandemic occurred, an increase in hospital admissions for influenza and pneumonia was associated with statistically significant increases in mortality attributable to acute myocardial infarction and stroke[18].

A very neutral response was seen regarding the prescription of hydroxychloroquine for Covid-19 with the level of evidence present till now. This shows the importance of evidence based medicine. Phase three trial by Novartis pharmaceuticals, assessing hydroxychloroquine as a treatment for hospitalized patients with COVID-19 is about to begin[19]. There was an inclination towards disagreement among HCWs to take part in clinical trials for potential Covid-19 vaccine. Joshi and Kulkarni in their study from India reported that despite understanding the fact that clinical trials are a must for advancement of scientific research, their willingness to enrol in trials were low due to the fear of side effects[20]. Most respondents were fine with being isolated after their duty hours and also supported the government decision of community lockdown. In our study less than half of the participating HCWs were satisfied with the expertise at handling the PPEs which also include donning and doffing. This is in line with the low level of awareness with regard to PPE seen in the knowledge section. As HCWs are the forefront in incidents, optimizing PPE use is a crucial element of preparedness. There are studies which show low rates of compliance and high rates of misuse, even in high-risk settings[21]. Moreover, previous studies have shown a strong link between HCW confidence and PPE compliance[22].

This study had some limitations. As Covid-19 is a novel coronavirus disease and new information are coming up on daily basis, directives are changing every day from various health authorities like CDC, WHO and ICMR leading to a difference in knowledge among responders. Also, in a country of 1.8 million registered medical graduates[23], a bigger sample size is required to generalise our findings.

From our study we conclude that most of our HCWs had good knowledge and positive attitude toward COVID-19, though there are some lower knowledge and negative attitudes than expected in a few areas. More educational campaigns from time to time, particularly webinars, are required for HCWs to entrust them with the appropriate knowledge through proper channel. This will make them have a better understanding about the nature of the disease so as to fill-in the short-comings revealed from this study.

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REFERENCES

1. Modi P D, Nair G, Uppe A, et al. (April 02, 2020) COVID-19 Awareness Among Healthcare Students and Professionals in Mumbai Metropolitan Region: A Questionnaire-Based Survey. Cureus 12(4): e7514. DOI: 10.7759/cureus.7514
2. www.mohfw.gov.in. COVID-19 INDIA. (Accessed on 19th May, 2020).
3. Cascella M, Rajnik M, Cuomo A, et al. Features, Evaluation and Treatment Coronavirus (COVID-19) [Updated 2020 Apr 6]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2020 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK554776/ (Accessed on 19th May, 2020).
4. CDC. Coronavirus disease 2019 (COVID-19). 2020. [Online]. Available from: https://www.cdc.gov/coronavirus/2019-ncov/about/transmission.html (Accessed on 19th May, 2020).
5. www.bloomberg.com. How Bad Is the Coronavirus? Let's Run the Numbers. Available from: https://www.bloomberg.com/opinion/articles/2020-03-05/how-bad-is-the-coronavirus-let-s-compare-with-sars-ebola-flu (Accessed on 19th May, 2020).
6. Sameer A, Mohammad B, Mansour A, Abdulrahman A. Knowledge and attitude of dental health professionals about Middle East respiratory syndrome in Saudi Arabia. J Int Soc Prev Community Dent 2018; 8: 137-144.

7. Abdullah A, Allen C. Knowledge, attitudes and behaviours of healthcare workers in the Kingdom of Saudi Arabia to MERS coronavirus and other emerging infectious diseases. Int J Environ Res Public Health 2016; 13: 1214.
8. Deng JF, Olowokure B, Kaydos-Daniels SC, Chang HJ, Barwick RS, Lee ML, et al. Severe acute respiratory syndrome (SARS): Knowledge, attitudes, practices and sources of information among physicians answering a SARS fever hotline service. Public Health 2006; 120(1): 15-19.
9. Bener A, Al-Khal A. Knowledge, attitude and practice towards SARS. J R Soc Promot Health. 2004 Jul;124(4):167-70.
10. WHO. Q&A on coronaviruses (COVID-19). 2020. [Online]. Available from: https://www.who.int/news-room/q-a-detail/q-a-coronaviruses (Accessed on 19th May, 2020).
11. Huynh G, Nguyen TNH, Tran VK, Vo KN, Vo VT, Pham LA. Knowledge and attitude toward COVID-19 among healthcare workers at District 2 Hospital, Ho Chi Minh City. Asian Pac J Trop Med 2020; 13. doi: 10.4103/1995-7645.280396
12. Huang Y. The SARS epidemic and its aftermath in China: A political perspective. In: Institute of Medicine (US) Forum on Microbial Threats; Knobler S, Mahmoud A, Lemon S, et al., editors. Learning from SARS: Preparing for the Next Disease Outbreak: Workshop Summary. Washington (DC): National Academies Press (US); 2004. Available from: https://www.ncbi.nlm.nih.gov/books/NBK92479/ (Accessed on 19th May, 2020).
13. Wang W, Xu Y, Gao R, et al. Detection of SARS-CoV-2 in Different Types of Clinical Specimens. JAMA. Published online March 11, 2020. doi:10.1001/jama.2020.3786 (Accessed on 19th May, 2020).
14. www.who.int. Getting your workplace ready for COVID-19. Available from: https://www.who.int/docs/default-source/coronaviruse/getting-workplace-ready-for-covid-19.pdf (Accessed on 19th May, 2020).
15. Khan, M.U., Shah, S., Ahmad, A. et al. Knowledge and attitude of healthcare workers about middle east respiratory syndrome in multispecialty hospitals of Qassim, Saudi Arabia. BMC Public Health 14, 1281 (2014). https://doi.org/10.1186/1471-2458-14-1281.
16. McEachan R, Taylor N, Harrison R, Lawton R, Gardner P, Conner M. Ann Behav Med. 2016; 50: 592–612. doi:10.1007/s12160-016-9798-4
17. Parpia AS, Ndeffo-Mbah ML, Wenzel NS, Galvani AP. Effects of Response to 2014-2015 Ebola Outbreak on Deaths from Malaria, HIV/AIDS, and Tuberculosis, West Africa. Emerg Infect Dis. 2016 Mar;22(3):433-41. doi: 10.3201/eid2203.150977.
18. Rubinson L, Mutter R, Viboud C, Hupert N, Uyeki T, Creanga A, et al. Impact of the fall 2009 influenza A (H1N1) pdm09 pandemic on US hospitals. Med Care. 2013;51:259–265. doi: 10.1097/MLR.0b013e31827da8ea
19. www.genengnews.com. Novartis Plans Phase III Trial of Hydroxychloroquine for COVID-19. Available from: https://www.genengnews.com/news/novartis-plans-phase-iii-trial-of-hydroxychloroquine-for-covid-19/ (Accessed on 19th May, 2020).
20. Joshi V, Kulkarni AA. Public awareness of clinical trials: A qualitative pilot study in Pune. Perspect Clin Res. 2012 Oct;3(4):125-32. doi: 10.4103/2229-3485.103593.
21. Daugherty E.L., Perl T.M., Rubinson L., Bilderback A., Rand C.S. Survey study of the knowledge, attitudes, and expected behaviors of critical care clinicians regarding an influenza pandemic. Infect. Control Hosp. Epidemiol. 2009;30(12):1143–1149. doi: 10.1086/648085.
22. Schwartz D, Shapira S, Bar-Dayan Y. Health care workers' knowledge and confidence in personal protective equipment during the H1N1 pandemic in Israel. Disaster Med Public. 2014;8(2):150–157. doi: 10.1017/dmp.2014.25.
23. Kumar R, Pal R. India achieves WHO recommended doctor population ratio: A call for paradigm shift in public health discourse! J Family Med Prim Care. 2018 Sep-Oct;7(5):841-844. doi: 10.4103/jfmpc.jfmpc_218_18.

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