



Knowledge, Attitude and Practices of Infection control measures during COVID-19 pandemic among health care workers in Chhindwara, Madhya Pradesh

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Abstract

Background

Healthcare workers are at greatest risk of transmission of COVID-19 and for safety of healthcare workers, hospitals implement infection control measures. Knowledge, attitude and practice studies help to decide best intervention program.

Objectives

Study objectives were to assess knowledge, attitude and practices of healthcare workers towards infection control practices during the COVID-19 pandemic in Chhindwara, Madhya Pradesh.

Material and methods

This study was conducted among healthcare workers of Chhindwara from February 2021 to March 2021. Data was collected using Google form platform as online survey. A self designed pre validated questionnaire with four parts general instructions, knowledge, attitude and practice of infection control practices during COVID-19 pandemic was prepared comprising of 13 knowledge, 17 attitude and 18 practice.

Results

Out of 46 participants, 60.86% were males and 39.13% were females. Majority of the participants were of 31 – 40 years age group (45.65%). 50% were doctors, 28.26% were para medical staff. Hundred percent healthcare workers had knowledge that COVID-19 positive patients should be isolated in proper place for 14 days, wearing of masks can help prevent SARS CoV-2 virus infection. Eighty nine percent healthcare workers agreed that using hand wash / sanitizer can prevent us from COVID-19 infection, wearing well fitted mask is effective in preventing COVID-19 infection. Majority of the healthcare workers agreed that use hand sanitizer more frequently and dispose PPE in color coded bags.

Conclusion

The present study showed that healthcare workers had better knowledge, positive attitude and good practices regarding COVID-19 and infection control practices.



Keywords – Knowledge, attitude, practice, COVID-19, infection control, healthcare workers

Introduction

The World Health Organization (WHO) had declared the Coronavirus disease (COVID-19) as a global pandemic on 11th March 2020. India has a total of 3,43,66,987 confirmed COVID-19 cases among which 1,42,826 are active cases and 11,451 new cases as on 8th November 2021 (1). Coronavirus a large family of viruses causing disease ranging from common cold to more severe disease of respiratory tract pneumonia, acute respiratory distress syndrome, acute respiratory failure and other complications (2).

Healthcare workers are at the greatest risk of transmission of COVID-19. Many health care workers were reported to acquire this disease while working in wards and intensive care units (ICUs) with the infected patients. Safety of healthcare workers is of utmost importance ensuring that they themselves do not transmit the infection to others. To ensure safety of the healthcare workers, hospitals implemented aggressive infection control measures of wearing complete personal protective equipments (PPE), N-95 masks, goggles, gloves.

A number of strategies were identified by the World Health Organization (WHO) which aimed to reduce the risk of transmission of SARS – CoV- 2 in healthcare settings, implementation of standard precautions to all patients and additional precautions to suspected COVID-19 patients (3). Frequent hand washing, social distancing, keeping rooms well ventilated and respiratory hygiene were some of the practices recommended by the WHO to prevent COVID-19 transmission (4).

Attitude and practice of infection control measures may vary among healthcare workers despite their availability due to socioeconomic contexts, preparation of healthcare system and motivation and belief of the healthcare workers. Awareness and implementation of infection control measures among healthcare workers is important to minimize the spread of COVID-19 infection. Understanding the expertise of various classes of healthcare workers, identifying the different factors which will influence their attitude and practices is essential to have appropriate protection and practices among healthcare workers. Knowledge, attitude and practice (KAP) studies can help the policy makers to decide the best intervention program. This study will thus help the authorities to provide essential educational programs and advanced learning necessary to deliver the appropriate infection control practices among healthcare workers which will help in controlling the pandemic.

Aims and Objectives

The study aimed to assess the awareness of COVID-19 disease and its related infection control practices among healthcare workers in Chhindwara, Madhya Pradesh.



The objectives of the study were to assess the knowledge, attitude and practices of healthcare workers towards infection control practices during the COVID-19 pandemic in Chhindwara, Madhya Pradesh.

Material and methods

Study design, participants and data collection

This study was conducted among healthcare workers of Chhindwara from February 2021 to March 2021. Data was collected using Google form platform as an online survey. The link of Google form was posted and circulated using various social media platforms and personal email address of the healthcare workers. Details of the study objectives for filling the questionnaire were conveyed to the study participants. Informed consent was obtained from each participant. It was disclosed to all participants that their identity will be kept confidential and results will be used only for research purpose. Out of 109 total participants, 105 had participated in the study, 04 participants did not give consent, and thus final responses were 105.

Questionnaire

A self designed pre validated questionnaire was prepared. Validation was done by 2 external and 1 internal subject experts followed by a small pilot study to test for its simplicity and difficulty. Questionnaire comprised of four parts such as general instructions, knowledge, attitude and practice of infection control practices during COVID-19 pandemic among healthcare workers. The questions were adapted from the earlier published literature (5). The first part of the questionnaire contained questions regarding demographic and general information of the participants, second part covered questions on knowledge about infection control measures during COVID-19. Third part contained questions regarding attitude towards infection control measures during COVID-19 and fourth part contained questions regarding practices towards infection control measures during COVID-19.

General and demographic information included age, gender, speciality, years of experience, current working status and whether they have attended any training or webinar on infection control practices. The self designed questionnaire comprised of 09 questions regarding knowledge, 08 questions regarding attitude and 08 questions for practice about infection control measures during COVID-19. The questions on knowledge, attitude and practice were responded on a true/ false and "I can't say" option. The true answer was assigned with 1 point and false/ I can't say answer option were assigned 0 point. Higher scores represented a better knowledge about infection control practices during COVID-19.

Statistical analysis

Statistical analysis was performed using online Graphpad platform. Measurement data were expressed as mean \pm SD and categorical data were presented as frequency and percentage. For comparison between different subgroups of the participants pre-intervention, parametric



test (t) was used. Comparison of KAP scores among healthcare workers were done using independent samples *t* test and one-way analysis of variance (ANOVA), as appropriate. The statistical significance level of the test was expressed as $\alpha = 0.05$.

Results

General characteristics

General information of the healthcare workers such as gender, age and profession are provided in **Table 1**. Out of 46 participants, 60.86% were males and 39.13% were females. Majority of the participants were of 31 – 40 years age group (45.65%), 39.13% of 21 – 30 years and 6.52% of 60 – 70 years age group. Among all the participants, 50% were doctors, 28.26% were para medical staff.

Table 1 : General characteristics

S. No.	Variable	Number	Percentage
1	Gender		
	Male	28	60.86%
	Female	18	39.13%
2	Age group		
	21-30	18	39.13%
	31-40	21	45.65%
	41-50	02	4.34%
	51-60	02	4.34%
	60-70	03	6.52%
3	Profession		
	Doctor	26	50%
	Para medical staff	13	28.26%
	Other staff	07	15.21%

Table 2 represents the knowledge of the healthcare workers towards COVID-19 and infection control practices. Most of the healthcare workers had good knowledge regarding COVID-19 and infection control practices. Hundred percent healthcare workers had knowledge that COVID-19 positive patients should be isolated in proper place for 14 days, wearing of masks can help prevent SARS CoV-2 virus infection, avoiding crowded places and public transportation can help prevent spread of SARS-CoV-2 virus infection. Use of Personal protective equipments (PPE) such as N95 mask, surgical mask, face shields and gloves help in protecting healthcare workers from suspected COVID-19 patients. 93% participants agreed that disinfecting the frequently touched surfaces is effective infection control measure.



Table 2: Knowledge of the healthcare workers towards COVID-19 and infection control practices

Knowledge	N (%)	Agree	Disagree
Eating or contacting wild animals would result in the infection by the COVID-19 virus.	46	23 (50%)	23 (50%)
The disease is more dangerous in patients with diabetes, chronic respiratory illness, cancer.	46	46 (100%)	0
The person with COVID-19 cannot infect the virus to others when fever is not present.	46	08 (17.39%)	38 (82.60%)
Isolation and treatment of confirmed cases of SARS-CoV-2 can curtail the spread of the virus.	46	39 (84.78%)	07 (15.21%)
People who have a contact history with positive COVID-19 patients should immediately be isolated in proper place for 14 days.	46	46 (100%)	0
Do you believe that warm saline gargles, drinking haldi milk, kadha can cure COVID-19?	46	23(50%)	23(50%)
Multiple proven curative treatment options are now available for COVID-19 all over the world?	46	27 (58.69%)	19 (41.30%)
Washing hands with soap and water is more effective compared to hand sanitizers in eliminating the SARS-CoV-2 virus.	46	39 (84.78%)	07 (15.21%)
Wearing of masks can help to prevent the infection of SARS-CoV-2 virus.	46	46 (100%)	0
Avoiding crowded places, avoid taking public transportations can help to prevent the spread of SARS-CoV-2 virus.	46	46 (100%)	0
Personal protective equipments (PPE) such as N95 mask, surgical mask, face shields and gloves are useful in	46	46 (100%)	0



protecting me from a patient suspected to have COVID-19.			
Disinfecting frequently touched surfaces and materials is an effective measure for infection control.	46	43 (93.47%)	03 (6.52%)
Vaccination will help in preventing the spread of SARS-COV-2 infection.	46	41 (89.13%)	05 (10.86%)

Attitude of the healthcare workers towards COVID-19 and infection control practices is depicted in **Table 3**. Ninety one percent participants agree that this infection is highly contagious. Eighty nine percent healthcare workers agreed that using hand wash / sanitizer can prevent us from COVID-19 infection, wearing well fitted mask is effective in preventing COVID-19 infection. Healthcare workers (89%) showed a positive attitude that asking the patients to sit far from each other, wearing masks, washing hands in reception area can prevent COVID-19 infection. They also had a positive attitude for health education of public about infection control practices to prevent COVID-19 spread.

Table 3: Attitude of the healthcare workers towards COVID-19 and infection control practices

Attitude	N (%)	Agree	Disagree
I understand that this infection is highly contagious.	46	42 (91.30%)	04 (8.69%)
I think COVID-19 is a communicable disease just like flu and is being given undue importance.	46	24 (52.17%)	19 (41.30%)
COVID-19 is a punishment from GOD because people sinned against GOD	46	06 (13.04%)	40 (86.95%)
SARS-COV-2 was invented to reduce the human population.	46	13 (28.26%)	33 (71.73%)
Have you gone to any crowded place recently?	46	12 (26.08%)	34 (73.91%)
I think travel restriction, lockdown, quarantine of all suspected cases are an exaggeration for the current situation.	46	15 (32.60%)	31 (67.39%)
I think when COVID-19 pandemic is over many benefits and good things will be seen.	46	25 (54.34%)	21 (45.65%)
You are afraid when you provide care	46	15 (32.60%)	31 (67.39%)



to a confirmed / suspected COVID-19 patient.			
Are you wearing masks when leaving home?	46	43 (93.47%)	03 (6.52%)
Wearing well fitted mask is effective in preventing COVID-19.	46	42 (91.30%)	04 (8.69%)
Using hand wash/ hand sanitizer can prevent you from getting COVID-19.	46	41 (89.13%)	05 (10.86%)
Do you think about asking patient to sit far from each other, wearing masks and washing hands in reception area/ OPD?	46	41 (89.13%)	05 (10.86%)
I am sure vaccination will overcome COVID-19 infection soon.	46	31 (67.39%)	15 (32.60%)
I believe that health care personnel get infected due to negligence.	46	27 (58.69%)	19 (41.30%)
It is important to educate public about infection control practices to prevent spread of COVID-19.	46	41 (89.13%)	05 (10.86%)
It is my opinion that awareness considering COVID-19 in society is sufficient.	46	19 (41.30%)	27 (58.69%)
It is my opinion that health education can help prevent COVID-19.	46	41 (89.13%)	05 (10.86%)

Table 4 represents the practice of the healthcare workers towards COVID-19 and infection control practices. Majority of the healthcare workers agreed that unnecessary travel, outing should be avoided, use mask everytime going out of house, cover face with handkerchief everytime while coughing or sneezing, encourage social distancing, use hand sanitizer more frequently and dispose PPE in color coded bags.

Table 4: Practice of the healthcare workers towards COVID-19 and infection control practices

Practice	N (%)	Agree	Disagree
Did you avoid unnecessary travel, outing during the outbreak?	46	42 (91.30%)	04 (8.69%)
Did the COVID-19 outbreak make you use mask everytime you step out of your house?	46	41 (89.13%)	05 (10.86%)
Do you cover face with handkerchief,	46	41 (89.13%)	05 (10.86%)



tissue everytime while coughing/ sneezing?			
Do you provide face covers/ masks to patients nowadays?	46	39 (84.78%)	07 (15.21%)
Do you provide face covers/ masks to your staff members nowadays?	46	40 (86.95%)	06 (13.04%)
I pay more attention to my personal hygiene than usual nowadays.	46	41 (89.13%)	05 (10.86%)
Do you refrain from hand shaking nowadays?	46	38 (82.60%)	08 (17.39%)
Do you encourage social distancing at your OPD/ clinic nowadays?	46	42 (91.30%)	04 (8.69%)
Did you start maintaining social distancing at your clinic/ OPD during the COVID-19 outbreak?	46	46 (100%)	0
Do you practice physical protection such as opening windows, using air filters nowadays?	46	35 (76.08%)	11 (23.91%)
Do you prefer to walk by stairs than using a lift nowadays?	46	37 (80.43%)	09 (19.56%)
Do you screen patients for known/ suspected COVID-19 infection before treating the patient?	46	35 (76.08%)	11 (23.91%)
Are all the patients checked with thermometer before providing care?	46	36 (78.26%)	10 (21.73%)
Did the COVID-19 outbreak make you increase the frequency of washing hands?	46	36 (78.26%)	10 (21.73%)
Did the COVID-19 outbreak make you use hand sanitizer more frequently?	46	46 (100%)	0
Do you provide hand sanitizers at your clinic/ OPD for the patients and staff nowadays?	46	40 (86.95%)	06 (13.04%)
Do you wear PPE more often than you use to nowadays?	46	34 (73.91%)	12 (26.08%)
Do you dispose PPE in appropriate colour coded bags after use?	46	41 (89.13%)	05 (10.86%)



DISCUSSION

COVID-19 spread can be limited by use of effective infection control and preventive practices. Healthcare workers have higher risk of acquiring this infection as they are directly or indirectly involved in patient care and are at the forefront of the battle against this extremely contagious disease. [6] Healthcare workers being the frontline warriors can directly suffer this deadly disease and hence need to have adequate knowledge about infection control practices. These infection control practices need to be implemented in the hospital and ICUs where confirmed and suspected COVID-19 patients are admitted and treated. This is a cross sectional survey conducted in online mode among healthcare workers of Chhindwara, Madhya Pradesh. A similar type of study including 450 healthcare workers was conducted in Bihar, India in which a higher proportion of healthcare workers were male (70.7% vs 29.3% females). [7] Majority of the healthcare workers (around 80%) had good attitude towards infection control regarding Covid-19 pandemic. Only 19.3%, 4.7%, 9.5% participants scored maximum scores for knowledge, attitude and practice, respectively. A similar type of study was conducted in 81 intensive care unit (ICU) staff of a Dedicated Covid care hospital, India. In this study, more than 80% of maximum score with respect to Knowledge, attitude practice scores were between 80 – 90 %. [8]

In our study, healthcare workers had better knowledge scores regarding COVID-19 and infection control practices. Similar higher knowledge scores are reported by Flores et al among healthcare workers. [9] Knowledge on how to protect oneself against the disease was assessed, Large proportion strongly agreed that wearing well-fitting masks and Handwashing prevent COVID-19 transmission. These findings are similar to our study findings where majority of the healthcare workers had better knowledge that use of PPE, N95 and surgical masks, face shields, gloves helped in protecting healthcare workers from suspected COVID-19 patients and majority also agreed that disinfected the frequently touched surfaces is effective infection control measure.

Majority of the healthcare workers had a positive attitude and agreed that using hand wash / sanitizer can prevent us from COVID-19 infection, wearing well fitted mask is effective in preventing COVID-19 infection. They also had a positive attitude for health education of public about infection control practices to prevent COVID-19 spread. A study conducted in China among healthcare workers showed that majority of healthcare workers showed a positive attitude towards COVID-19. In this study, 80% healthcare workers had a good attitude score towards COVID-19.

In our study, majority of the healthcare workers had shown good practice regarding COVID-19 and infection control practices. Majority of the healthcare workers agreed that unnecessary travel, outing should be avoided, use mask everytime going out of house, cover

face with handkerchief everytime while coughing or sneezing, encourage social distancing, use hand sanitizer more frequently and dispose PPE in color coded bags. In a study conducted by Kumar et al [7], around 10% of the participants had poor practice score. To inculcate and develop good infection control practices amongst staff members in hospital, frequent monitoring of practices by seniors plays a very important role. Structured teaching programs are very effective as concluded by a research conducted by a UK study. [11]

Limitations

A small number of participants had participated in this study due to their heavy duty schedule and work load during the COVID-19 pandemic and also due to short duration of access to the questionnaire among the healthcare workers. More research and study is needed which can target a larger number of healthcare workers.

Conclusions

From this study, we concluded that knowledge, attitude and practice scores are higher for the healthcare workers in Chhindwara. This can be attributed to the fact the government had conducted frequent trainings at local and national level regarding importance of infection control practices among healthcare workers which has is helpful in preventing COVID-19 infection among healthcare workers. Further study and health education is needed and will be helpful in targeting the healthcare workers of Chhindwara district which will help HCWs to limit the spread of infection to them and to others.

List of Abbreviations

COVID-19 - Coronavirus disease 2019

ICUs – Intensive care units

PPE – Personal protective equipments

WHO – World Health Organization

SARS – CoV – 2 - Severe Acute Respiratory Syndrome Coronavirus 2

KAP - Knowledge, attitude and practice

ANOVA - One-way analysis of variance

Ethical Approval - This study was reviewed and approved by the Institutional Ethical committee, Chhindwara Institute of Medical Sciences (CIMS), Chhindwara, Madhya Pradesh (IEC no. CIMS/Ethics Committee/2022/624).

Conflicts of interest – The author(s) declare no potential conflicts of interest.

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Author's contribution – PCT has made substantial contribution to conception, design, acquisition, analysis, interpretation, drafting the manuscript. RKS has contributed in design, analysis, interpretation and drafting the manuscript. HS has contributed in acquisition, analysis



and drafting the manuscript. RU has contributed in acquisition and drafting. All authors read and approved the final manuscript.

Availability of data

All the data generated and analyzed during the study are included in this manuscript.

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