

# Adherence to Infection Prevention and Control Practices among Health Care Workers and its Outcome in Non-COVID Areas in a Tertiary Care Hospital

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## ABSTRACT

**Aim and Objective:** 1. To study the adherence to Infection Prevention and Control (IPC) practices by health care workers in Non-COVID areas. 2. To compare the proportion of COVID affected health care workers among those adhering to proper IPC and those with non-adherence. **Background:** Hospitals serve as frontline health care institutions caring for the increased number of COVID-19 patients. The health care personnel working in hospitals are at increased risk of acquiring the disease during the pandemic. It is the prime responsibility of the Hospital Infection Control Committee to protect the health care workers (HCW) and prevent nosocomial transmission. **Materials and Methods:** In the cross sectional study, all health care workers from non-COVID areas of the hospital who were exposed to COVID-19 patient during the study period were assessed according to the risk assessment criteria. **Results:** A total of 1049 health care workers had contact with COVID-19 patients. Of this only 6 health care workers were diagnosed with COVID-19. **Conclusion:** The HCW diagnosed with COVID-19 was less than one percentage of exposed. This implies the impact that the IPC training had on the HCW which made them ensure their own safety and prevent the nosocomial spread of SARS-CoV-2 within the hospital. **Key words:** Adherence, Nosocomial infection, Frontline health care workers.

## INTRODUCTION

SARS-CoV-2 is a Novel Corona virus belonging to the beta group of Corona viruses. It was first noted as causing an epidemic in Hunan seafood market in Wuhan, a business hub of China at the end of December 2019, rapidly infecting more than 50 people. It was reported by the Chinese government as cluster cases of pneumonia with unfamiliar aetiology to WHO. Initially named as Wuhan Corona virus or 2019 novel Corona virus was later renamed by the International Committee on Taxonomy of Viruses (ICTV) as SARS-CoV-2 and the disease as COVID-19.<sup>1</sup>

Based on current evidences, novel Corona virus is transmitted between people through close contacts and droplets. Airborne transmission also occurs during Aerosol generating procedures and support treatments (like Non-invasive ventilation). The aerosols can penetrate the human body (lungs) via inhalation through the nose or mouth. Hospital infection control committee regularly provides measures to manage COVID-19 infections in the hospital. The health work force is a valuable resource for the smooth functioning of the health care delivery system. With large number of health personnel being affected by the pandemic and getting isolated for treatment and their contacts being quarantined, there

will be a scarcity of human resource to be allocated for ensuring the flawless management of sick patients. Currently there is no vaccine to prevent COVID-19. The best way to prevent the illness is to avoid being exposed to virus, and thus comes the importance of Infection Prevention and control strategies. Use of PPE is only one of the IPC measures and not to be relied on as the primary prevention strategy. Prevention of COVID-19 transmission relies on adherence to both the standard and transmission-based precautions and also on appropriate risk assessment of exposed individuals and their timely management.<sup>2</sup>

## MATERIALS AND METHODS

**Study design:** Cross sectional study

**Study Setting:** Non-COVID areas of Government Medical College, Kozhikode.

**Study Period:** 1<sup>st</sup> August 2020 – 31<sup>st</sup> August 2020

**Sample size:** All the HCW in non COVID areas of the hospital who were exposed to COVID-19 patients during the study period

This study includes the health care workers attending to patients admitted in the non COVID areas in Government medical college Kozhikode. As per the institutional guidelines HCW in different settings of

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hospital shall follow infection prevention and control (IPC) practices appropriate to their risk profile. The HICC gives regular training regarding standard and transmission-based precautions and other aspects of IPC to all the HCW in the institution.

According to the advisory put forward by the Ministry of Health and Family Welfare (dated 15 May 2020),<sup>3</sup> health care workers in both COVID and non-COVID areas of hospital are subjected to risk assessment and further management. Risk assessment committee of the hospitals will

**Table 1 Attire of HCW in the context of COVID-19.**

Sl. No.	Area of care	STD Precautions
1.	OP	All HCW N95 mask, face shield, Head cap, gloves
2.	Casualty	N95 Mask, face shield, gloves
3.	Triage I	Surgical apron, face shield, N95 mask, Gloves
4.	Triage II	Surgical apron, face shield, N95 mask, Gloves
5.	Isolation ward	Full PPE
6.	SARI ICU	Full PPE
7.	Triage III	Full PPE
8.	Red area in the casualty	Surgical apron, face shield, N95 mask, Gloves
9.	COVID ICU/HDU/OT (area where aerosol generating procedures are performed)	Full PPE
10.	Specimen collection for suspected or confirmed COVID	Full PPE
11.	COVID lab (personnel directly handling specimen)	Full PPE
12.	COVID OT (operating team with direct contact)	Full PPE
13.	Corridor in COVID isolation ward	3ply Surgical mask, face shield, gloves.
14.	Dead body packing and transport	Full PPE

The table above shows the level of PPE use that must be adhered to by the HCW while caring for the patients.

categorize the exposed HCW in to low risk, high risk and symptomatic groups.

From August 1 2020 to August 31 2020, 1049 health care workers had contact with COVID 19 patients in Government Medical College Kozhikode. They were categorised by the risk assessment committee as High risk – 203 and Low risk – 846. Among these only 36 HCW were symptomatic and only 6 health care workers were diagnosed with COVID 19. All of them had occupational exposure to COVID 19 patients. The nature of exposure, symptoms (if any), Infection Prevention and Control practices they followed and other detailed history (personal and occupational) were collected by enquiry via phone.

## RESULTS

A total of 1049 health care workers had contact with COVID-19 patients. Of this only 6 health care workers were diagnosed with COVID-19.

## Demographics characteristics and clinical symptoms of HCWs diagnosed with COVID-19

**Table 2: Age wise distribution.**

Age group (In years)	Frequency
20-30	3
30-40	1
40-50	2

Out of the 6 positive HCW's 3(50%) were in the age group of 20-30 years, 2(33.3%) in the age group of 40-50 years and only 1(16.6%) in the age group of 30-40 years (Table 2).

**Table 3: Sex wise distribution.**

Sex	Frequency
Male	1
Female	5

Out of the 6 positive cases (Table 3), only one(16.6%) was a male and five (83.3%) were female.

**Table 4: Designation of HCW.**

Designation	Frequency
Doctor	3
Staff nurse	3

Three (50%) of the affected HCW were doctors and three (50%) were staff nurse (Table 4).

**Table 5: Workstation.**

Workstation	Frequency
MICU	2
SICU	3
SURGERY WARD	1
CANCER WARD	1

3 (50%) of affected HCW were working in the surgical ICU when they had contact with COVID-19 cases. 33.3% of HCW were working in the medical ICU and one (16.6%) each working in the wards (Table 5).

## Risk category

All the 6 diagnosed health care workers were belonging to the high-risk group according to the Risk assessment Committee. All except one HCW had symptoms ranging from mild cough and fever to severe sore throat and anosmia.

## Nature of relation to the COVID-19 patients

Two out of six HCW gave history of multiple contacts with other COVID-19 positive Doctors and Nurses. Two had history of contact with COVID-19 patients and two of them couldn't account for the possible contacts.

## DISCUSSION

SARS-CoV-2 similar to SARS-CoV has been reported to be rapidly spreading in the community and the hospital settings and soon emerged to be a pandemic. High attack rate of SARS-CoV-2 among healthcare workers with direct patient care as well as with co-workers has been observed worldwide, including China, Italy, and United States.<sup>4</sup> Our

study examined the importance of adherence to ICP and its outcome at an early period of outbreak in a tertiary hospital of North Kerala.

The global outbreak of corona virus disease (COVID-19) is caused by the novel severe acute respiratory syndrome corona virus 2 (SARS-CoV-2). During the last 20 years, 2 other corona virus epidemics, SARS-CoV and Middle East respiratory syndrome (MERS)-CoV have resulted in a considerable burden of cases across multiple countries. Outbreaks of newly emerging or reemerging infectious diseases present a unique challenge and a threat to healthcare providers (HCPs) and other frontline responders due to limited understanding of the emerging threat and reliance on infection prevention and control (IPC) measures that may not consider all transmission dynamics of the emerging pathogens. Furthermore, HCP understanding and skills around the use of personal protective equipment (PPE) vary widely.<sup>5,6</sup>

At the early stage of pandemic outbreak, improving IPC behaviours of HCWs is of great significance, which could help guide evidence-based optimal IPC behaviours to combat future large-scale outbreak. However, studies investigating IPC behaviours at the early stage of outbreak have not been found so far, especially those concerning behaviours and key risk determinants of IPC.<sup>7</sup> The healthcare providers are at increased risk of infection while caring for the patients in the non-Covid ward, because the Covid status is unknown or the stage of illness. So they follow the Covid attire which is detailed in the institutional policy. The proper use of the PPE as in the Covid or Non-Covid ward is to be strictly adhered (Table 1). All HCW are in full PPE, in the Covid Positive ward and so there is minimal risk of contracting infection from the Covid positive Ward.

According to WHO interim guidance on Infection prevention and control during health care when corona virus disease (COVID-19) is suspected or confirmed, to mount an optimal response to the COVID-19 outbreak, a facility level IPC programme with a dedicated and trained team or at least an IPC focal point should be in place and supported by the national and facility senior management. In countries where IPC is limited or inexistent, it is critical to start by ensuring that at least basic IPC standards are in place at the national and health-care facility level to provide minimum protection to patients, health workers and visitors. These are known as the minimum requirements for IPC that have been developed by WHO in 2019 based on a broad consensus among international experts and institutions to facilitate the implementation of the WHO recommendations on the core components for IPC programmes.<sup>8</sup>

The five IPC strategies required to prevent or limit transmission of COVID-19 in health care facilities include the following:

1. Screening and triage for early recognition of patients with suspected COVID-19, and rapid implementation of source control measures
2. Applying standard precautions for all patients
3. Implementing additional precautions
  - Isolation and cohousing of patients with suspected or confirmed COVID-19
  - Contact and droplet precautions
  - Airborne precautions
4. Implementing administrative controls: Administrative controls and policies for the prevention and control of transmission of COVID-19 within the health-care facility include, but may not be limited to: establishing sustainable IPC infrastructures and activities; educating patients' caregivers; developing policies for early recognition of patients with suspected COVID-19; ensuring access to laboratory testing for COVID-19 detection; preventing overcrowding, especially in the emergency department; providing dedicated waiting areas for symptomatic patients; planning for and isolating COVID-19 patients;

ensuring adequate supplies of PPE; and ensuring adherence to IPC policies and procedures in all aspects of health care.

### 5. Implementing environmental and engineering controls

Besides the frontline healthcare workers, IPC professionals also played a significant role in emergency preparedness and responses (ie, fever-triage strategies, screening measures, and quarantine practices for infected or suspected patients) to contain the spreading of the virus, especially transmission of infection from patients to healthcare workers.<sup>7</sup>

In Government medical college Kozhikode, the HICC has always played an indispensable role in managing all forms of threats including management of HAI, Sterilization and disinfection of hospital settings, Biomedical waste management, Managing cases of Needle Stick Injury and Antimicrobial stewardship. This in turn has helped in confronting threats like MDRO outbreaks, the NIPAH and Diphtheria outbreak and also the current SARS-CoV-2 pandemic. This in turn is reflected in the number of health care workers who became infected with COVID 19 during their patient contact and other works in the hospital settings. The committee had actively started educating all tiers of HCW regarding the ICP long before the pandemic has reached the country, in addition to the regular trainings. Online education and telephonic supports were continued even during the peak of the pandemic.

The institution being one of the most patient populated tertiary care centres in northern Kerala faced similar situations during the peak of the COVID-19 pandemic, being immediately declared as a COVID hospital, tending to the whole lot of patients hailing from Kasargode, Kannur and also Malappuram districts. In addition to samples being tested from admitted and referred patients, many of the Primary health centres and Community health centres collected the samples from periphery for conducting the test in the well equipped Virus Research and Diagnostic Laboratory in Government medical college, Kozhikode.

This study emphasises the importance of adhering to the IPC in non-COVID areas because, one of the most important task of the HICC is to prevent the emergence of Hospital acquired Infections. During the peak of the pandemic, along with the community spread of virus rampantly affecting the general population, a minor proportion of cases were also documented as being nosocomially acquired. So the prevention of cross infection among hospital admitted patients is mainly in the hands of the HCW, who were sometimes forced to work in both COVID and Non – COVID areas of the hospital owing to the inadequacy of staff.

In our study done during the month of August 2019, which was one of the months were the COVID-19 pandemic was at its peak, only 6 HCW became infected with SARS-CoV-2, in spite of nearly 1049 HCW having contact with positive cases. Considering the demographic characteristics, Of the 6 positive HCW's all were in the age group of 20-40 years and all except one were females. 50% of the affected were doctors and 50% staff nurse, reflecting the equal importance of IPC adherence among the different classes of HCW. 4(67%) of the affected HCW were working in the ICU, 1 and 2(33%) in the ward. This may be attributed to the emergency situations the HCW had to face in the ICU which may have caused failure in their IPC practices, weighing patient life as more important than one's own. All of the 6 HCW were categorised by the Risk assessment Committee as high-risk contacts, depending on the distance maintained, the duration of contact and also the PPE used. Two out of six HCW gave history of multiple contacts with other COVID-19 positive Doctors and Nurses. Two had history of contact with COVID-19 patients and two of them couldn't account for the possible contacts.

An epidemiologic study focusing on self-reported IPC behaviours before and after COVID-19 was conducted among HCWs in Wuhan city, Hubei Province and Ganzhou city, Jiangxi Province at the early stage of pandemic outbreak. The results suggested that the self-reported IPC

behaviours of HCWs significantly improved after COVID-19 outbreak. HCWs who were in the affected area and in high-risk department reported IPC behaviour better.<sup>9</sup> This is in accordance with our study which suggests very high compliance level of the HCW to IPC resulting in the very few numbers being affected by the virus.

According to another study conducted by Mary Eyrasm Ashinyo and Stephen Dajaan Dubik *et al.* in Ghana Healthcare workers' compliance with IPC protocols in different COVID-19 treatment centers was high.<sup>10</sup>

Ensuring an adequate supply of IPC logistics coupled with behaviour change interventions and paying special attention to nonclinical staff is critical for minimizing the risk of COVID-19 transmission in the treatment centres.

## CONCLUSION

Out of 1049 HCW who had contact with COVID 19 patients only 6 HCW were found to be positive i.e., less than one percentage of exposed. This implies the impact that the IPC training had on the HCW which made them ensure their own safety and prevent the nosocomial spread of SARS CoV 2 within the hospital. Those who turned positive were actually high-risk primary contacts because of the unknown exposures they had to patients in dire emergencies as in the ICU settings and also contact with friends and family who had similar unknown exposures elsewhere.

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## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

## ABBREVIATIONS

**OP:** Out patient; **SARI ICU:** Severe acute respiratory illness Intensive care unit; **Covid ICU /HDU/OT:** Intensive care unit/Head injury unit/operation theatre; **MICU:** Medicine intensive care unit; **SICU:** Surgery intensive care unit.

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