VOLUME - 11, ISSUE - 12, DECEMBER - 2022 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Medical Microbiology

IMPACT OF COVID-19 PANDEMIC ON HEALTHCARE ASSOCIATED INFECTIONS: A STUDY FROM A TERTIARY CARE TEACHING INSTITUTE FROM NORTH INDIA

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ABSTRACT **Background:** The disease COVID-19 caused by SARS CoV-2 is highly contagious and strict infection control strategies have been adopted to limit the spread of this virus. We studied the impact of COVID-19 prevention and control measures on the rates of other healthcare associated infections (HCAI). **Aims and Objectives:** Impact of COVID-19 prevention and control measures on the rates of other HCAIs. **Study Design:** This retrospective study was conducted in the department of microbiology, tertiary care teaching hospital during 2019 and 2020. **Material and Methods:** Strict Infection prevention and control measures were implemented since 2020 including segregation of patients with respiratory symptoms, mandatory use of mask and strict adherence to standard precautions like hand hygiene. The rates of HCAIs were compared during pre- and post-pandemic periods. **Results:** Total number of samples were 14,778 and 12,018 in the years 2019 and 2020 respectively. Out of 14,778 samples 271 (1.83%) were found to be positive for HCAI in 2019, while 224 (1.86 %) out of 12,018 samples were found to be positive for HCAI in the year 2020. **Conclusion:** This study concluded reduction in the rate of SSI during the COVID-19 in the year 2020. Adherence to strict hand hygiene practices was one of the most important factors in preventing SSI.

KEYWORDS : Covid-19, Hcai, Ssi, Clabsi, Cauti.

INTRODUCTION:

Coronaviruses are enveloped positive sense RNA viruses with spike like projections on its surface giving it a crown like appearance; hence the name coronavirus (1).

World Health Organization (WHO) declared coronavirus disease (COVID-19) as a public health emergency worldwide on February 11, 2020 (2). COVID-19 is a disease caused by a new type of coronavirus named as severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) (3). COVID-19 is primarily transmitted via respiratory droplets and close contact, and affect people of all age groups. The symptoms of the disease vary from person to person ranging from mild flu like symptoms to shortness of breath and even death (4, 5). In India, till 11 October 2021, there have been 33,971,607 confirmed cases of COVID-19 with 450,782 deaths, reported to WHO (6). To combat this pandemic strict infection control measures were adopted worldwide like wearing mask was mandatory in public places, repeated hand washing and sanitization, public events were banned and social distancing etc. Adopting these strict control measures not only helped in the reduced transmission of the SARS CoV-2 but also helped in the reduction of many health care associated infections and communicable diseases (7, 8). Healthcare associated infection (HCAI) is defined as infection occurring 48 to 72 hours after admission to health care centres; the infection does not exist at the time of admission and is not in the incubation period at the time of admission (9). According to WHO, globally the rate of nosocomial infections per annum is 1.7 million in which India contributes to a major number annually (10).

Highlighting the importance of HCAI and pandemic of COVID-19 and the lack of a related study, this study was conducted to investigate the positive or negative impact of COVID-19 outbreak on the rate of HCAI which is a major cause of mortality and morbidity.

MATERIAL AND METHODS:

Study Design and Setting: -

This hospital based retrospective study was conducted in the Department of Microbiology, tertiary care teaching hospital to investigate the rate of HCAI before and during COVID-19 outbreak. The data collected for the samples received during the study period of two consecutive years from January 2019 to December 2020 was analyzed.

Ethical Clearance: This study was approved by institutional ethical committee.

Inclusion criteria:

The inclusion criteria were:

1. Samples from all age groups
2. All the samples from IPD patients suspected of SSI, CAUTI and CLABSI during the study period

Exclusion criteria:

The exclusion criteria were:

1. Samples with incomplete and inaccurate data
2. Samples from IPD patients without any suspicion of SSI, CAUTI and CLABSI during the study period
3. Samples from OPD patients

Methodology: -

Data related to samples received from patients suspected of HCAI like Surgical Site Infection (SSI), Central Line Associated Blood Stream Infection (CLABSI) and Catheter Associated Urinary Tract Infection (CAUTI) during the study period following inclusion and exclusion criteria was collected. These samples were routinely processed according to standard microbiological procedures, like culture, identification and sensitivity testing in the Post Graduate Department of Microbiology (11).

Statistical analysis:

The data collected during the study period was analyzed by SPSS 20 for statistical analysis and Chi square test was applied to know any significant outcome considering p-value of <0.05 as statistically significant.

RESULTS: -

Total number of samples included in this study were 14,778 in

the year 2019 and 12,018 in the year 2020 during the COVID-19 outbreak. Out of 14,778 samples 271 (1.83%) were found to be positive for HCAI in 2019, while 224 (1.86 %) out of 12,018 samples were found to be positive for HCAI in the year 2020 (Table-1).

Table 1: Year wise Distribution of samples

Year	Total samples	Positive samples
2019	14,778	271 (1.83 %)
2020	12,018	267 (1.86 %)

Although the overall rate of HCAI seems to be almost the same in both the years in our study but there was a significant decrease in the SSI, while an increase was noticed in number of CLABSI in the year 2020 as compared to 2019 and there was no significant change noticed in CAUTI.

Reasons for decreased SSI were noted to be increased frequency of hand washing in COVID-19 (2020) as compared to year 2019, while increase in CLABSI accounts for the long hospital stay in COVID-19 patients (Table-2).

Table 2: HCAI specific distribution of samples

SITE	2019		2020	
	Total	Positive	Total	Positive
SSI	730	96 (13.15%)	1723	60 (3.48%)
CAUTI	13,299	154 (1.15%)	8779	160 (1.82%)
CLABSI	749	21 (2.8%)	1516	47 (3.10%)

The total number of cases from critical care/ intensive care units (CCU/ ICU) with HCAI in our study were 128 (47.2%) during the year 2019 while 135 (50.5 %) in the year 2020, which were found to be higher than the total CCU/ ICU cases in the year 2019. There was a decrease in SSI in the year 2020 as compared to 2019 which was found to be statistically significant ($P < 0.05$) while the difference in CAUTI and CLABSI rates in the year 2019 and 2020 were not found to be statistically significant (Table-3).

Table 3: Distribution of HCAI rate in critical care units and wards

SITE		2019	2020	p-Value
SSI	Critical care units/ ICU	10	16	0.0139
	Wards	86	44	
CAUTI	Critical care units/ ICU	100	95	0.0908
	Wards	54	32	
CLABSI	Critical care units/ ICU	18	24	0.1282
	Wards	3	13	

DISCUSSION:

The results of the present study showed a statistically significant reduction in the rate of SSI during the COVID-19 outbreak in the year 2020. Adherence to strict hand hygiene practices during the COVID -19 outbreak was one of the most important factors in preventing SSI. The proportion of nosocomial infections in CCU/ ICU as compared to other wards was found to be higher due to the long duration of admission and the implementation of various invasive procedures.

HCWs are the warriors of the COVID-19 pandemic. COVID-19 has increased the awareness of basic infection control measures and subsequently reduced the incidence of SSI in our hospitals. One of the most frequently reported strategies implemented in hospitals was frequent hand hygiene with soap and water or hand sanitizer by HCWs (12, 13, 14).

A study done by Chacón-Quesada T, et al. in 2020 also showed that the rate of SSI dropped dramatically since the beginning of the COVID-19 pandemic which are found to be concordant to our study (15).

In another study which had similar results was done in February 2021 by Mohamad G. Fakih et al. noticed increase in CLABSI rates by 51.0% during the pandemic period while there was no change in CAUTI rates (16).

A reduction in the rate of SSI and increase in the rate of CLABSI observed in our study were also consistent with the study conducted by Jabarpour M. et al. and reduction in the rate of SSI was also found to be statistically significant in their study (17).

CONCLUSION:

From this study, we conclude that implementation of strict infection prevention measures reduced the rate of SSI during COVID-19 pandemic. Admission to CCU/ ICU were associated with increased rate of CLABSI & CAUTI during COVID-19 pandemic.

Limitation of the Study:

There was decline in the number of patients seeking medical care during COVID-19 pandemic, this data may have a different picture if the patients consulted the clinician without fearing COVID-19 pandemic. This study was limited to a small geographical region, so we cannot generalize the data to a wide spectrum of population.

Conflicts of interest: No conflicts of interest to disclose.

Source of funding: Nil.

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