Novelty Journals

ISSN 2394-966X

International Journal of Novel Research in Life Sciences
Vol. 10, Issue 4, pp: (48-51), Month: July - August 2023, Available at: www.noveltyjournals.com

Surveillance of Healthcare-associated Infections at a Tertiary Care Hospital

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DOI: https://doi.org/10.5281/zenodo.8267972

Published Date: 21-August-2023

Abstract: **The issue of healthcare-associated infections (HAIs) is very serious and concerns public health and contributes significantly to the universal burden of infectious diseases' morbidity and mortality. Healthcare-associated infection is defined as an infection arising in a patient 48 hours after admission to the healthcare setting which was not present or incubating at the time of admission. The study aimed to identify the number of different healthcare associate infections (HAIs) developed over a month period. A descriptive cross-sectional study was conducted at a tertiary care hospital in Pakistan. A non-probability purposive sampling technique was used and the sample size was determined by taking all those cases with positive reports of culture which was identified through passive surveillance in the laboratory. Over the span of one month, a total of 101 (25.6%) cultures were found positive for different pathogens out of 395 cultures performed and 21 HAIs developed in the month of December 2022 per 4590 patient days. In conclusion to the findings of this study, it was observed that healthcare-associated infections (HAIs) affect the patients extensively and add up in the length of patient stay at the hospital and prognosis of the patient resulting in higher costs, increased frustration, and many more deleterious effects.**

Keywords: **healthcare-associated, infections, morbidity, mortality, incubating.**

I. INTRODUCTION

The issue of healthcare-associated infections (HAIs) is very serious and concerns public health and contributes significantly to the universal burden of infectious diseases' morbidity and mortality (Saleem et al., 2019). Healthcare-associated infection is defined as an infection arising in a patient 48 hours after admission to the healthcare setting which was not present or incubating at the time of admission (Wang et al., 2019). Secondary infections post viral illnesses happen abundantly and often cause deleterious effects. In recent epidemics of influenza, the major cause of increased mortality was bacterial pneumonia acquired after admission at the healthcare setting (Kumar et al., 2021). Definitions established by NHSN are extensively used for surveillance of healthcare-associated infections (HAIs) because the NHSN continuously strives to increase its capability with further reporting units, facility types, countrywide surveillance reports, and targeted standards become more important for healthcare settings and public health institutions to observe advancement in infection prevention and control (Weiner-Lastinger et al., 2020). The environment of the hospital is a pool for the spread of microorganisms. The impact of better cleaning on patient-centered consequences is still vague (Mitchell et al., 2019). The coronavirus disease 2019 (COVID-19) global epidemic employed astonishing demands on the health system, resulting in positive adaptations in usual care practices that could have possibly enhanced or reduced hazards for HAIs (Baker et al., 2022). Moreover, findings from the National Healthcare Safety Network (NHSN) reported remarkable growths in central-line–associated

bloodstream infections (CLABSIs) throughout the initial months of the epidemic (Weiner-Lastinger et al., 2022). Additional consideration has been targeted to the management of HAIs in developed countries, and an autonomous infection control department HAI has been established in most healthcare settings to minimize the incidence of HAIs (Liu et al., 2020).

The study aimed to identify the number of different healthcare associate infections (HAIs) developed over a month period.

II. MATERIALS & METHOD

A descriptive cross-sectional study was conducted at a tertiary care hospital in Pakistan. Over a span of one month (December 2022), a survey was performed to determine the number of cases of different healthcare associate infections and key performance indicators. NHSN definitions and algorithms were used to develop a surveillance form for the identification of the cases of HAIs. A non-probability purposive sampling technique was used and the sample size was determined by taking all those cases with positive reports of culture which was identified through passive surveillance in the laboratory. Patients whose cultures (blood, sputum & urine) were performed in the month of December 2022 and came out to be positive for bacterial infections were selected as a sample, and those positive for fungal infections. The total number and percentages of cases were calculated and categorized for different types of HAIs.

III. RESULTS

Patients, whose cultures were positive for bacterial infections. They were then examined through the surveillance form and patients meeting the criteria were marked as cases of HAIs and were categorized into three categories according to the specimen for inoculation as bloodstream infections, respiratory infections, and urinary tract infections.

At the end of every week of the month, data was acquired from the register of the pathology laboratory of the hospital, and cultures that were positive for different pathogens were recorded. Over the span of one month, a total of 101 (25.6%) cultures were found positive for different pathogens out of 395 cultures performed in the month of December 2022 and they were categorized according to the specimen used for inoculation. Table I below illustrates the breakdown of positive culture reports of the patients based on the specimen used.

Table I. Number of cultures (inoculations) performed in the month of December 2022

Month	Frequency	Percentage
No. of blood cultures positive for pathogens	39	10.0
No. of sputum cultures positive for pathogens	33	8.4
No. of urine cultures positive for pathogens	29	7.4
Total cultures performed	395	

Patients with positive culture reports were followed in the ward and they were assessed for healthcare-associated infections through NHSN algorithms and each patient meeting the criteria was recorded as a case of healthcare-associated infections. Twenty one HAIs developed in the month of December 2022 per 4590 patient days. Patient days were calculated by summing up the number of days, patients were admitted in the hospital. Table II below shows the number of healthcare-associated infections developed per 1000 patient days.

Table II. Number of healthcare-associated infections developed in December 2022

Month	Frequency	Rate per 1000 patient days
Number of Healthcare-associated Infections	21	4.6
Total number of patient days (Admission days)	4590	

Respiratory tract infections (RTI) were found to be most abundant with a percentage of 43% followed by bloodstream infections (BSI) and urinary tract infections (UTI) with 28.5%. Figure I below illustrates the breakdown of HAIs into three categories according to the site of infection.

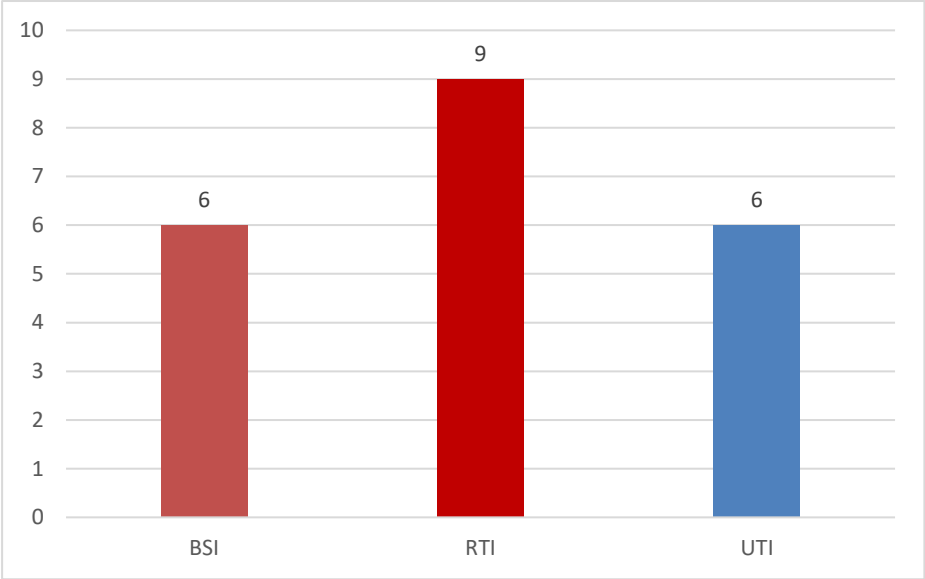

Fig. I. Breakdown of HAIs into according to the site of infection.

IV. CONCLUSION

In conclusion to the findings of this study, it was observed that healthcare-associated infections (HAIs) affect the patients extensively and add up in the length of patient stay at the hospital and prognosis of the patient resulting in higher costs, increased frustration, and many more deleterious effects. Healthcare institutions and hospitals must devise policies to deal with HAIs and implement policies to increase their compliance. There are still numerous other aspects related to HAIs that must be studied to produce strong evidence to help reduce the incidence of this problem.

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