

Healthcare Associated Infections in the Era of Covid-19 Pandemic Literature Review

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Background

- Healthcare associated infections (HAI)*: infections that affect patients in a hospital or other healthcare facility and are not present or incubating at the time of admission.
- Infections acquired by patients in the hospital or facility but appearing after discharge, and occupational infections among staff.
- Most common adverse effect in healthcare delivery globally.
- Nearly 1.7 million hospitalized patients potentially acquire HAI while being treated for other conditions and more than 98,000 patients die annually

Highlights

7% and 10 % of patients will develop a HAI in developed and developing countries respectively

* As per the WHO

Background

- The WHO had stressed on the importance of infection prevention and control (IPC) interventions at national and facility levels for successful containment of antimicrobial resistance and prevention of HAI.
- The COVID-19 pandemic created significant load on healthcare systems and economies globally which may potentially augment the existing HAI burden

Objective

In this study we examined the potential impacts and correlation between Covid-19 and HAI burden.

Methodology

- Review of scientific papers published related to COVID-19 and HAI's and its determinants from the start of the pandemic, 2020.
- Search Engines (Web of Science, Pubmed, Medline, Google Scholar)

Methodology

- 14 articles were included.
- Countries : USA, Mexico ,China, Ireland, Italy, Switzerland, Canada, Spain
- 2 systemic reviews, 2 Literature reviews, 1 cross sectional study , 4 retrospective studies, 1 cohort study , 4 articles

Methodology

Literature Name	Author	Type	Country
Nosocomial transmission and outbreaks of coronavirus disease 2019: the need to protect both patients and healthcare workers	Abbas et al	Narrative literature review	Switzerland
Hospital-Acquired SARS-Cov-2 Infections in Patients: Inevitable Conditions or Medical Malpractice?	Barranco, R et al	Literature review	Italy
Nosocomial infections among patients with COVID-19, SARS and MERS: a rapid review and meta-analysis.	Zhou et al	Systemic rapid review and meta-analysis	China
Nosocomial infections associated to COVID-19 in the intensive care unit: clinical characteristics and outcome	Bardi T et al	Retrospective analysis study	Spain
Predictors and outcomes of healthcare-associated infections in COVID-19 patients.	G. Kumar, A. Adams, M. Hererra et al	Retrospective analysis study	USA
COVID-19 drug practices risk antimicrobial resistance evolution	Afshinnekoo Ebrahim Et al	Cross sectional Sudy	USA
Antimicrobial Resistance Patterns and Antibiotic Use during Hospital Conversion in the COVID 19 pandemic.	Martinez-Guerra, B.A. et al	Prospective Cohort Study	Mexico
The Impact of the COVID-19 Pandemic on Healthcare Acquired Infections with Multidrug Resistant Organisms	J. Cole, E. Barnard	Retrospective, cross-sectional	USA
Hospital-acquired Clostridioides difficile infection during the coronavirus disease 2019 (COVID-19) pandemic	Hazel Karl et al	Atricle retrospective quasi-experimental	Ireland
Evolution of Antimicrobial Consumption During the First Wave of COVID-19 Pandemic. Antibiotics	Grau, S. Et al	Atricle	Spain
Impact of COVID-19 on Traditional Healthcare Associated Infection Prevention Efforts	Stevens MP et al	Atricle	USA
Antibiotics and antimicrobial resistance in the COVID-19 era	M.A.B. Lucien, M.F. Canarie, P.E. Kilgore et al	Article	USA
Assessing the Impact of COVID-19 on Antimicrobial Stewardship Activities/Programs in the United Kingdom	Ashiru-Oredope et al	Article	Switzerland
Economic analysis of healthcare-associated infection prevention and control interventions in medical and surgical units	E. Tchouaket Nguemeleu et al	Systemic Review	Canada

Definition of HAI COVID-19 case by country

England

- Probable healthcare associated COVID-19: a single inpatient who develops COVID-19 more than 7 days after hospital admission

Ireland

- Onset of compatible symptoms ≥ 7 days after admission
- Onset of compatible symptoms 3–6 after admission if epidemiologically linked to hospital exposure
- Onset of clinical features of COVID-19 on day 1 or 2 after admission are considered community acquired unless epidemiologically linked to hospital exposure during a recent hospital admission
- If onset of clinical features cannot be defined, a case by case assessment is required taking account of the date of sampling relative to the date of admission, the CT value of the test result and epidemiological evidence of a link to hospital exposure.

Definition of HAI COVID-19 case by country

United States of America	<ul style="list-style-type: none">• NOT considered nursing home onset COVID-19:• Residents who were known to have COVID-19 on admission to the facility and were placed into appropriate Transmission-Based Precautions to prevent transmission to others in the facility.• Residents who were placed into Transmission-Based Precautions on admission and developed SARS-CoV-2 infection within 14 days after admission
Switzerland	<ul style="list-style-type: none">• Patient with new onset of COVID-19 compatible signs and symptoms* at least 5 days after hospital admission and a positive PCR result and/or thorax CT scan suggestive of COVID-19
Canada	<ul style="list-style-type: none">• Not reported

Definition of HAI COVID-19 case by country

ECDC

- Community-associated COVID-19 (CA-COVID-19): Symptoms present on admission or with onset on day 1 or 2 after admission
- Symptom onset on days 3-7 and a strong suspicion of community transmission.
- Indeterminate association (IA-COVID-19): Symptom onset on day 3-7 after admission, with insufficient information on the source of infection to assign to another category.
- Probable healthcare-associated COVID-19 (HA-COVID-19): Symptoms onset on day 8-14 after admission
- Symptom onset on day 3-7 and a strong suspicion of healthcare transmission.
- Definite HA-COVID-19: Symptom onset on day ≥ 14 after admission

Results

Positive correlation of COVID-19 with HAI:

- COVID-19 transmission model
- Over occupancy of healthcare facilities
- Personal protective equipment (PPE) shortage
- Adverse effect of prescribed medications inappropriate antibiotic prescription .

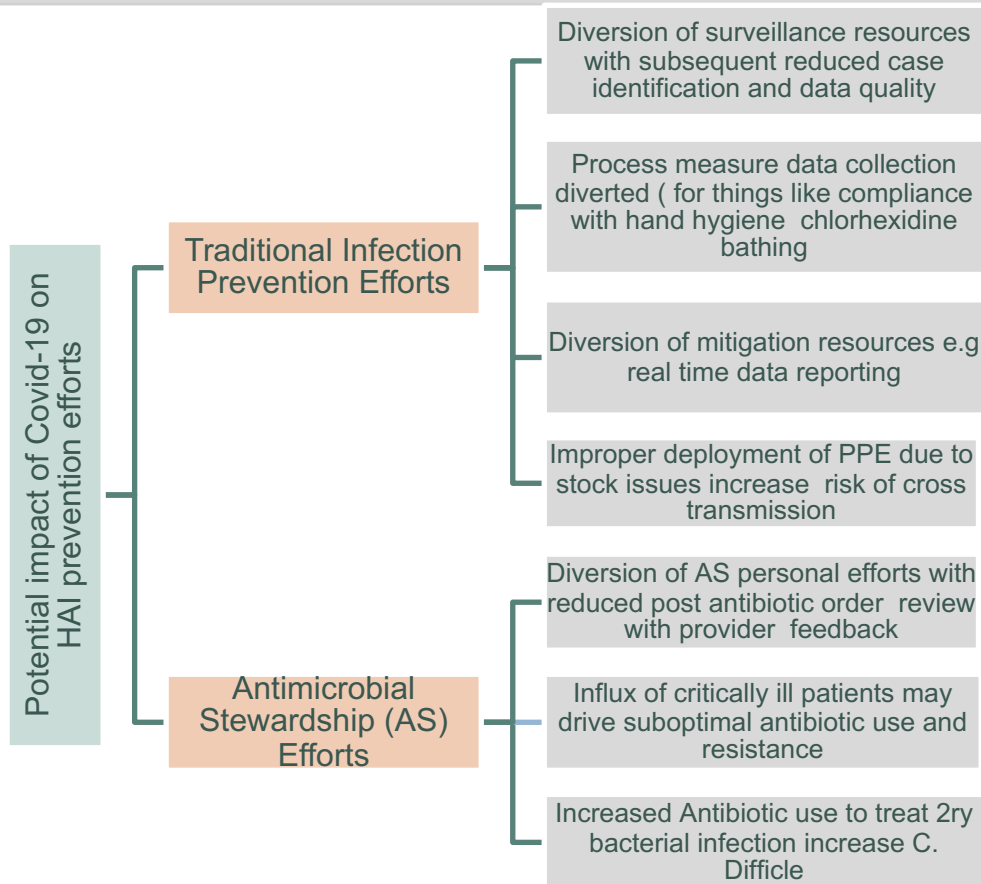
Negative correlation of COVID-19 with HAI:

- Preventative measures (hand hygiene , social distancing) during the pandemic supports preventing and control of HAI
- Limited antibiotic use

Results

The variations among healthcare support systems and guidelines makes it difficult to assess the impact of the COVID-19 pandemic on HAI burden, and this was clear from the discrepancies in the published data from different healthcare system

Potential Impact of COVID-19 on HAI



Potential impact of COVID-19 on healthcare-associated infection prevention efforts adapted from Stevens MP

Conclusion

HAI remains a major public health concern that may get impacted with emerging and reemerging infections. The discrepancies among various studies highlights the importance of conducting a multicenter international study to standardize definitions and protocols for prevention and control of HAI.