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BARRIERS AND FACILITATORS TO INFECTION CONTROL PROCEDURES IN HOSPITAL SETTINGS: A DESCRIPTIVE QUALITATIVE STUDY FROM WESTERN INDIA

Dr Smita Singh[1], Dr TK Rath[2], Dr Shilpa Katoch[3], Dr Saurabh Mahajan[4]*

[1]MD, Air Force Academy, Dundigal, smita.drs@gmail.com
[2]MD, Col Health, Central Command, tusharkant219@gmail.com
[3]MD, Station Health Organisation, Agra, shilpakatoch@gmail.com
[4*]MBBS, Armed Forces Medical College, Pune, saurabhmhjn@gmail.com

***Corresponding author:** Dr Saurabh Mahajan
[*]MBBS, Armed Forces Medical College, Pune, saurabhmhjn@gmail.com

Abstract

Background: Healthcare-associated infections (HAIs) represent a significant challenge to patient safety globally, with higher incidence in developing countries. Understanding the barriers and facilitators to infection control implementation in secondary and tertiary care hospitals is essential for improving patient safety.

Objectives: This study investigates the barriers and facilitators of infection control procedures in secondary and tertiary care hospitals in Western India and identifies resource constraints and potential managerial interventions.

Methods: A descriptive qualitative design was employed. Data were collected through semi-structured interviews using the Systems Engineering Initiative for Patient Safety (SEIPS) framework, with 100 healthcare professionals (50 nurses and 50 doctors) from secondary and tertiary care hospitals in Northern Rajasthan. Data were analyzed through thematic analysis with inter-rater reliability checks.

Results: Major organizational barriers included lack of resources (65%), inadequate staffing (55%) and inconsistent policies (45%). Environmental barriers encompassed poor infrastructure (35%) and overcrowded wards (45%). High workload and burnout emerged as the most significant individual factor (75%), along with lack of training and awareness (55%). Key facilitators were strong leadership (55%), adequate supplies (65%), effective communication (45%), regular training programs (75%), continuous education (65%) and application of the SEIPS framework (55%).

Conclusions: This study reveals the complex interplay of organizational, environmental and individual factors affecting infection control practices. Implementation of targeted interventions addressing resource allocation, staff training, institutional support and standardized protocols is essential. Leveraging technology and establishing multi-level governance structures can enhance infection control effectiveness in resource-limited settings.

Keywords: Barriers and facilitators; Infection control; Hospital management; Patient safety; Qualitative research; India

Introduction

Healthcare-associated infections (HAIs) represent a critical challenge to patient safety and public health globally, with particularly pronounced impacts in low- and middle-income countries (LMICs). The World Health Organization estimates that 7 out of every 100 hospitalized patients in developed countries and 10 out of every 100 in developing countries acquire at least one HAI during their hospital stay.[1] These infections result in extended hospital stays, increased healthcare costs, elevated mortality rates and contribute significantly to the growing crisis of antimicrobial resistance. In India, where the healthcare system faces considerable resource constraints, the burden of HAIs is particularly acute.

Public hospitals in India confront unique challenges in managing HAIs, including heavy clinical workloads, chronic staff shortages, language barriers and inconsistent adherence to infection control guidelines.[2] The National Patient Safety Implementation Framework (NPSIF) 2018-2025 aims to standardize patient safety practices across India's healthcare sector, with infection control as a key priority.[3] However, implementation remains hampered by inadequate workforce training, insufficient resource allocation and inadequate institutional support.

Previous research has highlighted multiple barriers to effective infection control, including clinical workload pressures, staffing shortages, non-compliance with guidelines, absence of regular audits and lack of institutional support. Despite these well-documented challenges, relatively few comprehensive qualitative studies have examined the contextual factors that both impede and facilitate infection control implementation in Indian healthcare settings.[4] Moreover, the absence of regular audits and reporting mechanisms further exacerbates the problem, leading to a lack of reliable data on the exact prevalence of HAIs in India.[5]

Studies focusing on various healthcare professionals in tertiary hospitals underline the importance of continuous education and adherence to policies to enhance IPC practices.[6] Assessing the awareness and practices of healthcare professionals regarding infection control is vital. The Systems Engineering Initiative for Patient Safety (SEIPS) model offers a comprehensive framework that addresses organization, technology, environment, tasks and personnel to enhance patient safety.[7] Effective leadership and continuous training are essential components in improving infection control practices. Studies from Ghana and other regions highlight the importance of leadership commitment, infection prevention and control (IPC) training, and patient engagement in enhancing infection control measures.[8]

This study aims to explore the barriers and facilitators of infection control procedures in secondary and tertiary care hospitals in Western India. By utilizing the SEIPS framework, this research will examine how organizational, environmental, and individual factors influence infection control practices. The findings will provide actionable insights and recommendations to enhance patient safety and reduce the incidence of HAIs in Indian hospitals.

Methods

Study Design and Setting

This study employed a descriptive qualitative design to explore the lived experiences and professional perspectives of healthcare workers regarding infection control barriers and facilitators. The research was conducted in secondary and tertiary care hospitals located in a city in Northern Rajasthan, India, between January and June 2024. These hospitals provided diverse environments reflecting variations in infrastructure, resource availability and patient census, essential for examining the complexity of infection control implementation.

Study Population and Sampling

The target population consisted of nurses and doctors working in direct patient care roles. Simple random sampling was utilized to select 100 participants (50 nurses and 50 doctors) from the eligible hospital staff. Inclusion criteria encompassed: (1) direct involvement in patient care in secondary or tertiary care hospitals; (2) current employment at participating facilities in Northern Rajasthan; and

(3) English language proficiency for interview conduct. Students, trainees and non-English speakers were excluded.

Data Collection

Semi-structured interviews were conducted with all 100 participants using a standardized questionnaire developed based on the SEIPS framework. The questionnaire examined organizational factors (management support, institutional policies, interdepartmental communication), technological factors (electronic systems, monitoring tools), environmental factors (physical infrastructure, facility layout), task factors (workload, infection control responsibilities) and individual factors (knowledge, training, motivation). Each interview lasted approximately 30-45 minutes and was documented through detailed notes.

Data Analysis

Interview responses were systematically transcribed and coded independently by two researchers. Thematic analysis guided by the SEIPS framework was employed to identify key barriers and facilitators. To ensure reliability, discrepancies between independent coders were discussed until consensus was achieved. Barriers and facilitators were categorized as organizational, environmental or individual factors. Descriptive statistics (frequencies and percentages) were used to summarize demographic characteristics and quantify the frequency of identified themes.

Ethical Considerations

Informed written consent was obtained from all participants and hospital authorities prior to data collection. Participant confidentiality and anonymity were maintained throughout the study. The research protocol was reviewed and approved by the institutional ethics committee.

Results

Demographic Characteristics

The study cohort comprised 100 healthcare professionals: 50 nurses (40 female, 10 male) and 50 doctors (20 female, 30 male). Among nurses, 40% were aged 21-30 years, 40% were 31-40 years and 20% were 41-50 years, with experience ranging from less than 5 years (30%) to more than 15 years (10%). Among doctors, 20% were aged 21-30 years, 60% were 31-40 years and 20% were 41-50 years, with 10% having 0-5 years of experience and 20% having more than 15 years of experience.

Barriers to Infection Control Implementation

Participants identified multiple barriers categorized into three domains:

Organizational Barriers: Lack of resources represented the most frequently cited barrier (65% of participants), encompassing insufficient supplies of disinfectants, personal protective equipment (PPE) and hand hygiene products. Inadequate staffing levels were reported by 55% of respondents, creating workflow pressures that compromised infection control compliance. Inconsistent institutional policies (45%) created confusion regarding protocols and accountability mechanisms.

Environmental Barriers: Poor physical infrastructure (35% of participants) including inadequate hand-washing stations, waste disposal systems and isolation facilities hindered implementation. Overcrowded wards (45%) exceeded safe capacity standards, making it impossible to maintain appropriate infection prevention measures.

Individual Factors: High workload and burnout emerged as the most significant barrier (75% of participants), directly impacting adherence to infection control protocols. Lack of training and awareness among healthcare workers (55%) limited knowledge and skill in implementing effective measures. Non-compliance with established guidelines, though identified by 35% of participants, was less prominent than anticipated.

Facilitators of Infection Control Implementation

Participants also identified substantial facilitators:

Organizational Support: Strong leadership commitment (55%) emerged as a critical facilitator, with engaged senior management championing infection control initiatives. Adequate supply availability (65%) when institutional commitment ensured procurement, significantly enhanced compliance. Effective interdepartmental communication (45%) facilitated coordination of infection prevention efforts.

Training and Education: Regular training programs (75%) and continuous education (65%) were identified as major facilitators, substantially improving knowledge and adherence. Peer education approaches leveraging experienced staff proved particularly effective.

Technological and Systematic Approaches: Application of the SEIPS framework (55%) as a systematic approach enhanced understanding and implementation of infection control practices. Implementation of electronic health records (35%) supported tracking and monitoring, though with less perceived impact than organizational and educational interventions.

Discussion

This qualitative study provides comprehensive insights into the complex, multifactorial nature of infection control barriers and facilitators in secondary and tertiary care hospitals in Western India. The findings extend existing literature by demonstrating how organizational, environmental and individual factors interact within the Indian healthcare context.

Organizational and Environmental Barriers

The identification of resource scarcity, inadequate staffing and inconsistent policies aligns with previous research in similar settings. A qualitative study by Barker et al. (2017)[9] conducted in a tertiary care hospital in Northern India identified similar organizational obstacles, including nursing staff turnover and heavy workloads. Our findings emphasize that these challenges are not unique to individual institutions but reflect systemic resource constraints across the Indian healthcare landscape. Environmental barriers such as poor infrastructure and overcrowded wards correlate with findings from Tu et al. (2022)[8] in Malawi, suggesting that structural constraints represent a global challenge in LMICs.

The Burden of Workload and Burnout

The emergence of high workload and burnout as the most prevalent barrier (75% of participants) represents a particularly significant finding. This aligns with contemporary research in Tamil Nadu, which similarly identified staff burnout as a major impediment to infection control effectiveness. This finding has important implications, suggesting that purely technical interventions without addressing workforce wellness are unlikely to succeed. Healthcare professionals operating under extreme time pressure and emotional exhaustion are less capable of adhering to meticulous infection control protocols, regardless of their knowledge or institutional support.

The Critical Role of Training and Education

Training and continuous education emerged as major facilitators (75% and 65%, respectively), consistent with seminal work by Pittet et al. (2008)[10] demonstrating that comprehensive training programs significantly reduce HAI incidence through improved hand hygiene compliance. The strong endorsement by participants suggests that education-based interventions represent a particularly feasible strategy in resource-limited contexts, as they may require less capital investment than infrastructure improvements while yielding substantial benefits.

Leadership and Institutional Commitment

The identification of strong leadership as a key facilitator (55%) aligns with WHO guidance emphasizing leadership's role in fostering a culture of patient safety. Institutions with dedicated

infection control officers and strong management support demonstrate better compliance and outcomes. This suggests that administrative interventions may represent a cost-effective strategy for enhancing infection control effectiveness.

Application of Systemic Frameworks

The application of the SEIPS framework received endorsement from 55% of participants, indicating receptiveness to systematic approaches that address multiple domains simultaneously. This contrasts with traditional siloed approaches that address organizational, environmental or individual factors in isolation. The framework's emphasis on examining how different system components interact appears particularly relevant in complex healthcare environments.

Non-Compliance as a Context-Dependent Phenomenon

The finding that non-compliance with guidelines (35%) was less emphasized than anticipated suggests that knowledge and awareness gaps, rather than deliberate non-compliance, may be primary barriers. This interpretation aligns with Kaushal et al. (2017)[11], who identified the absence of regular audits and standardized protocols as enabling non-compliance. The implication is that creating clear, consistently communicated, context-appropriate guidelines, coupled with regular feedback mechanisms, may be more effective than assuming deliberate resistance.

Study Implications

The findings underscore the necessity of multi-level interventions addressing organizational restructuring, resource allocation, workforce support, systematic implementation protocols and technology integration. Single-level interventions targeting only individual knowledge or compliance are unlikely to succeed without concurrent attention to organizational and environmental constraints.

Conclusion

This study reveals that barriers to infection control in secondary and tertiary care hospitals in Western India are multifactorial, reflecting systemic challenges in resource allocation, workforce capacity and institutional support. Importantly, the study also identifies substantial facilitators like strong leadership, education programs and systematic frameworks that institutions can leverage immediately.

Effective infection control improvement requires a comprehensive approach addressing organizational, environmental and individual domains. Healthcare leaders should prioritize: (1) ensuring adequate resource allocation for infection control supplies and infrastructure; (2) implementing robust training and continuous education programs; (3) establishing or strengthening infection control teams with dedicated leadership; (4) conducting regular audits and providing transparent feedback; (5) addressing workforce stress and burnout through reasonable workload management and support programs; and (6) applying systems-based frameworks like SEIPS to ensure coherent, integrated interventions.

Future research should employ longitudinal designs to track whether specific interventions produce sustained improvements in infection control compliance and HAI reduction. Research should also explore the cost-effectiveness of various intervention strategies in resource-limited contexts. Additionally, investigations into how institutional culture and change management processes affect implementation success would provide valuable insights.

References

1. Patient safety research: a guide for developing training programmes [Internet]. [cited 2020 Oct 24]. Available from: https://www.who.int/publications/i/item/9789241503440
2. Osborne SR, Alston LV, Bolton KA, Whelan J, Reeve E, Wong Shee A, et al. Beyond the black stump: rapid reviews of health research issues affecting regional, rural and remote Australia. Med J Aust. 2020 Dec;213 Suppl 11:S3-S32.e1.

3. National Patient Safety Implementation Framework (2018-2025) | National Health Systems Resource Centre [Internet]. [cited 2020 Oct 21]. Available from: https://nhsrcindia.org/national-patient-safety-implementation-framework-2018-2025
4. Houghton C, Meskell P, Delaney H, Smalle M, Glenton C, Booth A, et al. Barriers and facilitators to healthcare workers' adherence with infection prevention and control (IPC) guidelines for respiratory infectious diseases: a rapid qualitative evidence synthesis. Cochrane Database Syst Rev. 2020 Apr 21;4(4):CD013582.
5. Eames I, Tang JW, Li Y, Wilson P. Airborne transmission of disease in hospitals. J R Soc Interface. 2009 Dec 6;6 Suppl 6(Suppl 6):S697-702.
6. Carayon P, Schoofs Hundt A, Karsh BT, Gurses AP, Alvarado CJ, Smith M, et al. Work system design for patient safety: the SEIPS model. Qual Saf Health Care. 2006 Dec;15 Suppl 1(Suppl 1):i50-58.
7. Carayon P, Kleinschmidt P, Hose BZ, Salwei M. Human Factors and Ergonomics in Health Care and Patient Safety from the Perspective of Medical Residents. In: Donaldson L, Ricciardi W, Sheridan S, Tartaglia R, editors. Textbook of Patient Safety and Clinical Risk Management [Internet]. Cham (CH): Springer; 2021 [cited 2020 Sep 24]. Available from: http://www.ncbi.nlm.nih.gov/books/NBK585616/
8. Tu JV, Pashos CL, Naylor CD, Chen E, Normand SL, Newhouse JP, et al. Use of cardiac procedures and outcomes in elderly patients with myocardial infarction in the United States and Canada. N Engl J Med. 1997 May 22;336(21):1500–5.
9. Barker AK, Brown K, Siraj D, Ahsan M, Sengupta S, Safdar N. Barriers and facilitators to infection control at a hospital in northern India: a qualitative study. Antimicrob Resist Infect Control. 2017;6:35.
10. Pittet D, Allegranzi B, Sax H, Dharan S, Pessoa-Silva CL, Donaldson L, et al. Evidence-based model for hand transmission during patient care and the role of improved practices. Lancet Infect Dis. 2006 Oct;6(10):641–52.
11. Kaushal P, Sangwan G, Rana K, Biswal M, Kaur M, Lakshmi PVM. Implementation status of national airborne infection control guidelines in the health care facilities of a North Indian State: A mixed method study. Public Health Pract. 2020 June 8;2:100149.