Infection Control Policies in Public Hospitals: Balancing Safety and Resource Constraints.

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ABSTRACT:

Objective: This study aimed to (i) evaluate the level of awareness and implementation of infection control (IC) policies among healthcare professionals, (ii) examine the accessibility of essential resources, (iii) identify obstacles to policy adherence, and (iv) propose feasible and cost-effective strategies for improving infection control in public sector hospitals of Sindh.

Methodology: Three major public hospitals were enrolled in this cross-sectional mixed-methods study. Healthcare professionals were provided with structured questionnaires to fill out, aimed at collecting data regarding their demographics, knowledge, practices, and perceived obstacles. The findings were further enriched by key informant interviews and facility observations. Qualitative responses underwent thematic analysis, while quantitative data were examined using descriptive statistics.

Results: 73.3% of participants were aware of their hospital's infection control policy due to formal training. Hand hygiene practices achieved the highest score of 3.8 out of 5, whereas incident reporting, consistent use of personal protective equipment (PPE), and adherence to sterilization protocols received the lowest ratings of 2.9, 3.4, and 3.2 out of 5, respectively. The uneven availability of resources was caused by frequent shortages of PPE and insufficient waste management facilities. The primary challenges identified were overcrowding (66.7%), inadequate training (53.3%), and Systemic barriers result in inconsistent implementation of infection control policies, even though there is a relatively high level of awareness. In environments with constrained resources, the safety of patients and staff can be improved by strengthening infection control committees, increasing monitoring efforts, and applying cost-effective, high-impact strategies such as phased resource distribution, peer-led compliance assessments, and focused training.

Conclusion: Despite a high degree of awareness, systemic barriers lead to inconsistent application of infection control strategies. Strengthening infection control committees, stepping up monitoring efforts, and using high-impact, low-cost measures including phased resource distribution, peer-led compliance assessments, and targeted training can all help improve patient and staff safety in low-resource settings.

Keywords: Infection control, hospital-acquired infections, public hospitals, resource constraints, Pakistan, healthcare safety.

Introduction:

Worldwide, hospital-acquired infections (HAIs) remain a significant health problem, resulting in increased morbidity, mortality, and healthcare expenses[1]. Public hospitals, particularly in low and middle-income countries such as Pakistan, face the challenge of implementing effective infection control (IC) policies to safeguard both patients and staff while operating with constrained resources.[2,3] The World Health Organization estimates that the prevalence of HAIs in developing countries ranges from 5.7% to 19.1%, with inadequate IC measures being a key contributing factor.[4] Preventive measures such as waste management, isolation protocols, hand hygiene, sterilization, and staff training are encompassed within infection control policies.[5] The implementation of these strategies requires infrastructure, continuous monitoring, and skilled personnel, requiring resources that public hospitals frequently lack[6] despite their substantial impact on reducing infection rates.[7] Public hospitals in Pakistan face numerous challenges, including a high volume of patients, constrained budgets, insufficient safety equipment, and inconsistent enforcement of law.[8,9] These issues are particularly pronounced in the Sindh province, which has important medical institutions in Hyderabad and Jamshoro. Studies show that while there are established IC guidelines, compliance is inconsistent due to administrative gaps, shortages of resources, and inadequate training.[10,11] Innovation, adaptive policymaking, and strategic prioritization are essential for achieving a balance between safety and resource availability.[12]

Research indicates that improving IC outcomes can be accomplished without significantly increasing the budget by utilizing cost-effective strategies such as phased implementation, locally sourced protective equipment, targeted staff training, and optimized waste disposal systems.[13,14] In comparable contexts, peer-led capacity building, digital monitoring tools, and locally tailored protocols have also

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demonstrated promise.[15]

This study will examine infection control practices in several public hospitals located in Hyderabad and Jamshoro, focusing on the execution of safety measures despite financial constraints. It will evaluate the effectiveness of the policy, identify barriers to its implementation, and propose feasible methods for sustainable infection control within limited resources.

Objectives:

1. To assess the current infection control policies and their level of implementation in selected public hospitals of Hyderabad and Jamshoro.
2. To evaluate the effectiveness of these policies in preventing HAIs under existing resource limitations.
3. To identify infrastructure, staffing, supply chain, and administrative barriers affecting policy adherence.
4. To recommend evidence-based, cost-effective, and context-appropriate strategies for improving infection control in resource-limited public hospital settings.

Methodology:

Three public hospitals of Sindh participated in a cross-sectional mixed-methods study during Nov 2025 to Dec 2025. Overall, 150 participants were enrolled using non-probability consecutive sampling after getting written informed consent. Quantitative information on healthcare workers' knowledge, attitudes, and infection control practices was gathered using structured questionnaires. Administrators and members of the infection control committee were interviewed in-depth to gather qualitative data. A WHO-standardized checklist was used for facility observations in order to evaluate resource availability and policy implementation. SPSS is used to analyze quantitative data, and thematic analysis is used to analyze qualitative data. All participants gave their informed consent, and ethical approval was obtained.

Results:

The female outnumber by male and majority of the participants were age between 25-34 years. 33% were on job for between 1-5 years. Nurses and paramedics were 53.3% as shown in table 1.

Table No 1: Demographics of Participants (N=150 healthcare workers)

Variable	Category	N, (%)
Gender	Male	65 (43.3)
	Female	85 (56.7)
Age	<25	20 (13.3)
	25-34	55 (36.7)
	35-44	40 (26.7)
	45-54	25 (16.7)
	≥55	10 (6.7)
Job Category	Doctors	50 (33.3)
	Nurses	60 (40.0)
	Paramedics	20 (13.3)
	Admin Staff	10 (6.7)
	Cleaners	10 (6.7)
Experience (Years)	<1	15 (10.0)
	1-5	50 (33.3)
	6-10	45 (30.0)
	>10	40 (26.7)

Most of the participants (n=110) were aware about the infection control policies; 65 of these learned IC policies through training as shown in table 2.

Table No 2: Awareness of Infection Control Policies.

Awareness Indicator	Yes (%)	No (%)
Aware of hospital IC policy	110 (73.3)	40 (26.7)
Learned via training	65 (59.09)	-
Learned via supervisor	30 (27.27)	-
Self-study	15(13.63)	-

A few important performance indicators show us how well the IC policy is being implemented. These were asked on a Likert scale, and Table 3 displays the mean Likert scale for each KPI.

Table No 3: Implementation of Key Practices (Mean Likert Scores, 1-5)

Practice	Mean ± SD
Hand hygiene before/after contact	3.8 ± 1.1
Correct PPE use	3.4 ± 1.2
Waste segregation	3.6 ± 1.0
Sterilization adherence	3.2 ± 1.3
Prompt incident reporting	2.9 ± 1.4

In order to actively execute IC policy, participants were questioned if resources were constantly and sufficiently available, scarce, or infrequently available, response is shown in table no 4. In response to the question of whether resources and information regarding infection control policies are easily accessible, 100 participants (66.7%) cited overcrowding as the main barrier to successfully implementing infection control policies, followed by a shortage of supplies (95, 63.3%) as shown in table 5.

Table No 4: Resource availability.

Resource	Always Sufficient (%)	Sometimes Limited (%)	Rare/Never (%)
PPE availability	40 (26.7)	70 (46.7)	40 (26.7)
Adequate hand hygiene stations	95 (63.3)	-	55 (36.7)
Sterilization equipment	80 (53.3)	-	70 (46.7)
Standard waste disposal facilities	60 (40.0)	-	90 (60.0)

Table No 5:Reported Barriers

Barrier	n (%)
Shortage of supplies	95 (63.3)
Inadequate training	80 (53.3)
Poor monitoring	70 (46.7)
Lack of staff cooperation	55 (36.7)
Overcrowding	100 (66.7)

Discussion:

1This research assessed the infection control (IC) policies and procedures in public hospitals located in Hyderabad and Jamshoro, highlighting the conflict between limited resources and safety regulations. The findings indicate that while a significant number of healthcare professionals (73.3%) were knowledgeable about the institutional IC policies, there remains gap between resource allocation and consistent implementation. Training emerged as the key factor for awareness (43.3%), aligning with earlier studies that suggest structured education increases compliance.[1] However, 26.7% of individuals were still uninformed, which corresponds with previous research and points to insuffi-

cient orientation and communication systems.[2] Variations existed in the implementation of core practices.

2The significant focus on the cost-effectiveness of hand hygiene in preventing hospital-acquired infections (HAIs) resulted in relatively high compliance (mean score of 3.8).[3] Conversely, compliance with sterilization procedures was suboptimal (mean score 3.2), and incident reporting was even lower (mean score 2.9). This supports earlier reports from Pakistan that showed inadequate accountability and monitoring systems.[4] Additionally, two-thirds of respondents reported supply shortages, which contributed significantly to the inconsistent PPE use (mean score 3.4). Inadequate and inconsistent PPE availability has been noted as a persistent problem in low resource setting.[5]

3 A major issue identified was the shortage of resources. Only 26.7% of participants reported that personal protective equipment (PPE) was reliably accessible, while 60% indicated that there were inadequate facilities for waste disposal. Effective biomedical waste management is crucial for infection prevention, and its inadequacy increases risks to both the environment and the workplace.[6] Concerns raised in surveys conducted at South Asian hospitals were further supported by the finding that 46.7% of these facilities did not have sufficient sterilization equipment.[7]

4The primary challenge identified was overcrowding (66.7%), which underscores the systemic issue of public hospitals being overpopulated. Given that crowded wards promote cross-transmission, this factor is particularly significant in the context of infection spread.[8] A lack of sufficient instruction was observed by 53.3% of participants, highlighting gaps in training as well. Studies have repeatedly shown that enhanced infection control compliance correlates with continuous professional development and refresher training.[9] Additionally, enforcement was compromised by inadequate monitoring (46.7%), exposing a shortfall in regular audits and efficient infection control committees. These findings align with reports indicating that while policy documents often exist, they are not effectively implemented due to governance shortcomings.[10] Resource-sensitive strategies are essential, as highlighted by the study. Examples of low-cost yet high-impact interventions include structured training, peer monitoring, and the promotion of hand hygiene, all of which can yield significant benefits without necessitating substantial financial investments.[11] Innovations tailored to local contexts, such as specific waste segregation systems and reusable personal protective equipment, can enhance compliance. Additionally, hospitals facing resource constraints are encouraged to adopt these changes incrementally, starting with essential interventions like PPE and hand hygiene in high-risk areas.[12] Compliance can be further enhanced by strengthening infection control committees, utilizing digital monitoring tools, and ensuring that policies are visible at the point of care.[13-15] Overall, the results confirm that, even with awareness, the capacity of public hospitals in Sindh to effectively implement infection control policies is hindered by systemic resource and governance challenges. Beyond the need for additional resources, tackling these challenges requires a commitment to organizational responsibility and strategic prioritization.

Conclusion:

1According to this study, most medical staff in Hyderabad and Jamshoro public hospitals are aware of infection control procedures; nevertheless, irregular implementation is caused by a lack of training, overcrowding, poor monitoring, and shortages of supplies. Hand hygiene standards were relatively well-complied with, however waste management and incident reporting were subpar. Sustainable progress requires evidence-based, low-cost interventions such as targeted training, improved monitoring, and phased implementation of IC policies. Policymakers should balance strategic prioritization with scarce resources to provide safer hospital settings and fewer HAIs.

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