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Competency Mapping and Gap Analysis of Housekeeping and Patient Care Assistant Staff in a Tertiary Care Hospital: Implications for Infection Control and Patient Safety

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Abstract: ***Context**: Patient safety, environmental hygiene, and infection control are all greatly aided by housekeeping and Patient Care Assistant (PCA) personnel. However, in many hospital settings, structured competency evaluations of outsourced support staff are still scarce. **Goals**: To identify competency gaps, map the core and role-specific competencies of housekeeping and PCA staff in a tertiary care hospital, and provide organized training solutions. **Methodology**: In a tertiary care hospital in Maharashtra, India that is affiliated with the NABH, a cross-sectional analytical study was carried out. Simple random sampling was used to choose forty employees (20 cleaning and 20 PCAs). A standardized four-point Likert scale method was used to evaluate competencies through supervisor input, direct observation, and self-evaluation. The independent samples t-test and chi-square test were among the descriptive and inferential statistical studies that were carried out. **Findings**: Compared to PCA employees (M = 10.61, SD = 1.33), housekeeping employees had a higher mean competency score (M = 11.88, SD = 2.47). The difference (t = 1.98, p = 0.0549) was on the verge of statistical significance. The distribution of competency categories and staff roles were found to be significantly correlated ($\chi^2 = 8.52$, p = 0.036). Important deficiencies in fall-risk management, biological waste segregation, infection control procedures, and patient confidentiality were found. **Conclusion**: To improve patient safety outcomes and infection control compliance, organized competence mapping of outsourced support personnel is crucial. To enhance staff performance and healthcare quality, regular training, mentoring, and periodic re-evaluation are advised.*

Keywords: Competency Mapping, Housekeeping Staff, Patient Care Assistants, Infection Control, Patient Safety, Hospital Administration

1. Introduction

Globally, healthcare-associated infections (HCAIs) continue to be a significant public health issue, leading to higher rates of morbidity, mortality, extended hospital stays, and escalating medical expenses. According to the World Health Organization (WHO), hand hygiene is the most cost-effective and successful strategy for lowering the spread of infections in hospital settings (World Health Organization [WHO], 2009). All categories of healthcare personnel participating in patient care and hospital services must adhere to effective hand hygiene standards, which are crucial at all levels of healthcare delivery.

Studies have found that healthcare workers can spread healthcare-associated diseases through contaminated hands after contact with patients or their surroundings (Allegranzi & Pittet, 2009). If hand hygiene is missed, done poorly, or not done at the right time, microorganisms that stay on hands for a long time can move between patients (WHO, 2009). Environmental contamination and poor hygiene make cross-infection even more likely, which highlights the importance of good hygiene practices for all staff.

Patient care assistants (PCAs) and housekeeping personnel are essential to preserving hospital sanitation, preventing infections, and ensuring patient safety. While PCAs offer crucial bedside support, such as help with patient hygiene, movement, and basic monitoring, housekeeping staff are in charge of environmental cleaning and biomedical waste disposal. Infection transmission, patient safety problems, and lowered treatment quality may result from these staff groups' inadequate competences (Sharma & Gupta, 2019; Vincent, 2010). Hospital quality improvement programs frequently place insufficient emphasis on structured competency evaluation and systematic training of support workers, despite their crucial significance.

The burden of HCAIs is particularly pronounced in developing countries, where limited resources, overcrowding, understaffing, and inconsistent infection control practices further increase infection risks (WHO, 2009). In India, national accreditation and regulatory frameworks such as the National Accreditation Board for Hospitals and Healthcare Providers (NABH) emphasize the need for continuous staff training, infection control compliance, and competency-based workforce development to improve patient safety outcomes (NABH, 2025).

The WHO promotes multimodal approaches to increase hand hygiene compliance, emphasizing institutional support, behavior modification, teaching, and monitoring as essential elements (WHO, 2009). In order to identify skill gaps and direct focused training interventions, competency-based assessment is essential to these tactics (Dubois & Rothwell, 2004; Kumar & Bhatia, 2018). In this situation, competency mapping offers a methodical way to assess the abilities, expertise, and procedures of housekeeping and PCA personnel and match them with patient safety and infection control requirements.

The present study was undertaken to assess and map the core and role-specific competencies of housekeeping and Patient Care Assistant staff in a tertiary care hospital. By identifying competency gaps and recommending structured training and continuous monitoring strategies, the study aims to strengthen

infection control practices, enhance patient safety, and support hospital quality improvement initiatives.

In the study setting, competency assessment and performance evaluation of payroll and administrative staff are systematically conducted by the hospital's Human Resources department as part of internal workforce management practices. However, housekeeping and Patient Care Assistant (PCA) staff are outsourced through third-party agencies, which often results in comparatively limited structured competency mapping within the hospital's direct monitoring framework. Given their critical role in infection prevention, environmental hygiene, and direct patient support, it became essential to independently assess and evaluate the competencies of these outsourced support staff. Therefore, this project was undertaken to systematically map their skills, identify gaps, and recommend structured training interventions aligned with hospital quality and patient safety standards.

2. Literature Review

Healthcare-associated infections (HCAIs) remain a significant public health challenge worldwide and are recognized as a major cause of preventable morbidity, mortality, and increased healthcare expenditure. The World Health Organization (WHO) has consistently identified hand hygiene as the most effective and economical intervention to prevent the transmission of pathogens within healthcare settings (World Health Organization [WHO], 2009). Evidence indicates that adherence to proper hand hygiene practices can substantially reduce infection rates and improve patient safety outcomes across diverse healthcare environments.

Multiple studies have demonstrated that contaminated hands of healthcare workers play a central role in the transmission of healthcare-associated pathogens. Allegranzi and Pittet (2009) highlighted that inadequate hand hygiene practices are directly associated with the spread of infections, particularly in high-risk hospital areas. Microorganisms are capable of surviving on hands for extended periods and can be transmitted between patients through direct contact or via contaminated surfaces when hand hygiene is improperly performed (WHO, 2009). These findings emphasize the importance of consistent and correct hand hygiene practices among all categories of healthcare workers.

While much of the existing literature focuses on doctors and nurses, there is growing recognition of the critical role played by support staff such as housekeeping personnel and Patient Care Assistants (PCAs). Housekeeping staff are responsible for environmental cleaning, disinfection, and biomedical waste management, which are essential components of infection prevention and control (Sharma & Gupta, 2019). Studies indicate that inadequate environmental hygiene and improper waste segregation significantly increase the risk of pathogen transmission within hospitals, particularly in resource-limited settings (Ministry of Health and Family Welfare, 2016).

Patient Care Assistants contribute directly to patient safety by assisting with daily living activities, mobility, hygiene, and basic monitoring. Errors or skill gaps in these functions may lead to adverse events such as falls, pressure injuries, and breaches of infection control protocols (Vincent, 2010). Joseph and Joseph (2016) emphasized that healthcare workers, including non-clinical staff, are exposed to occupational health risks when infection control practices are insufficient, underscoring the need for structured training and competency development.

Competency mapping has emerged as a valuable human resource management tool for assessing workforce capabilities and aligning employee skills with organizational goals. McClelland's competency theory laid the foundation for evaluating job performance based on observable skills and behaviours rather than formal qualifications alone (McClelland, 1973). In healthcare settings, competency-based approaches have been shown to improve service quality, staff performance, and patient safety outcomes (Dubois & Rothwell, 2004; Kumar & Bhatia, 2018).

In the Indian healthcare context, national accreditation bodies such as the National Accreditation Board for Hospitals and Healthcare Providers (NABH) emphasize the importance of continuous staff training, infection control compliance, and competency-based workforce development. NABH standards mandate regular assessment of staff competencies, particularly in areas related to infection prevention, patient safety, and quality improvement (NABH, 2025). However, empirical studies evaluating the implementation of competency mapping among housekeeping and PCA staff remain limited.

The WHO advocates a multimodal strategy for improving hand hygiene compliance, incorporating education, training, behavioural change, monitoring, and institutional support (WHO, 2009). Competency-based assessment is a key component of this strategy, as it enables healthcare organizations to identify specific skill gaps and implement targeted interventions. Despite the availability of global and national guidelines, gaps persist in the systematic assessment of competencies among hospital support staff, particularly in developing countries.

Overall, the literature highlights the critical role of housekeeping and PCA staff in infection prevention and patient safety, as well as the effectiveness of competency-based approaches in improving healthcare quality. However, there is a notable lack of structured studies focusing on competency mapping and gap analysis among these staff categories in Indian hospital settings. This gap underscores the need for the present study, which aims to assess and map the competencies of housekeeping and Patient Care Assistant staff and provide evidence-based recommendations for training and continuous monitoring.

3. Objective

Competency mapping for housekeeping and Patient Care Assistant (PCA) staff is essential for aligning their skills with organizational goals and enhancing patient care quality. This process involves identifying, assessing, and leveraging competencies to improve performance and ensure effective care delivery.

Importance of Competency Mapping

Alignment with Organizational Goals: Competency mapping helps align individual skills with the strategic objectives of healthcare organizations, enhancing overall performance.

Improved Patient Care: By defining competencies specific to housekeeping and PCA roles, organizations can ensure that staff are equipped to meet the complex needs of patients.

4. Scope

This project focuses on evaluating the skills, knowledge, behavioural traits, and role-specific competencies of Housekeeping and PCA staff across various departments.

Role Definition and Responsibilities

PCAs are involved in direct patient care, including assistance with activities of daily living, and monitoring patient conditions.

Housekeeping staff contribute to maintaining a clean and safe environment, which is crucial for infection control and overall patient well-being.

Training and Development

There is a pressing need for standardized training programs to enhance the competencies of PCAs and housekeeping staff, ensuring they are equipped to meet the demands of their roles.

Implementing competency-based training can improve the integration of these staff into healthcare teams, ultimately benefiting patient care outcomes.

Key Deliverables:

1) Competency Framework Development
- Define core and role-specific competencies for Housekeeping and PCA staff.
- Develop assessment tools

2) Staff Assessment & Data Collection
- Conduct skill audits, observations, and supervisor feedback sessions.
- Evaluate technical skills, patient interaction, infection control, hygiene practices, and emergency responsiveness.

3) Competency Mapping & Gap Analysis
- Map individual and departmental competencies against benchmarks.
- Identify areas of strength and opportunities for improvement.

4) Training & Development Recommendations
- Propose individualized or group training interventions.
- Recommend on-job training, refresher sessions, and behavioural workshops.

5) Reporting & Continuous Monitoring Plan
- Prepare a final report with findings, visual dashboards, and action plans.
- Recommend a system for ongoing competency tracking and re-evaluation.

Expected Outcomes:
- Enhanced service quality and patient experience.
- Better alignment between staff capabilities and job roles.
- Informed decision-making for training, promotions, and task assignments.
- Reduction in service errors, non-compliance, and operational inefficiencies.

Duration:

Approximately 6–8 weeks

Stakeholders Involved:
- Departmental Supervisors
- Infection Control and Nursing In-charge.

5. Research Methodology

Study Design

A descriptive cross-sectional study was conducted to assess and map the competencies of housekeeping and Patient Care Assistant (PCA) staff working in a tertiary care hospital.

Study Setting

The study was carried out in a NABH-aligned tertiary care multispecialty hospital located in Maharashtra, India. The hospital provides comprehensive inpatient and outpatient services and employs dedicated housekeeping and PCA staff across various clinical and non-clinical departments. (WHO, 2009; Kumar & Bhatia, 2018)

Study Population

The study population included housekeeping staff and Patient Care Assistants who were actively employed at the hospital during the study period.

Sample Size and Sampling Technique

A total of 40 staff members participated in the study, comprising 20 housekeeping staff and 20 Patient Care Assistants. Participants were selected using a simple random sampling technique to ensure representation from both staff categories. (Dubois & Rothwell, 2004; McClelland, 1973)

Data Collection Tool

A structured competency assessment tool was developed based on hospital standard operating procedures, infection prevention and control guidelines, and role-specific responsibilities. The tool assessed:
- **Core competencies:** communication skills, teamwork, and infection control practices
- **Role-specific competencies:** environmental cleaning, biomedical waste management, patient assistance, basic clinical monitoring, and emergency response. (WHO, 2009; Allegranzi & Pittet, 2009)

Each competency was rated using a standardized four-point Likert scale:

1 = Basic Understanding
2 = Working Knowledge
3 = Proficient
4 = Expert Level

Data Collection Procedure
Data were collected using a triangulated approach that included self-assessment by staff, direct observation of routine work practices, and supervisor feedback. Data collection was conducted during routine working hours to minimize disruption to hospital operations.

Data Analysis
Descriptive and inferential statistical techniques were used to examine the collected data once it was imported into Microsoft Excel. The mean, standard deviation, frequencies, and percentages were examples of descriptive statistics. Inferential statistical analysis includes an independent samples t-test to compare mean competency scores across housekeeping and PCA personnel, and a chi-square test to assess the association between staff position and competency category distribution. Statistical significance was defined as $p < 0.05$.

Results were expressed in terms of frequencies, percentages, and competency levels. Based on cumulative scores, staff were categorized into four competency groups (A, B, C, and D) to facilitate gap analysis and formulation of targeted training interventions. (World Medical Association, 2013)

Ethical Considerations
Ethical principles were strictly adhered to throughout the study. Participation was voluntary, and informed consent was obtained from all participants prior to data collection. Confidentiality was maintained by assigning unique identification codes to participants, and no personal identifiers were used in data analysis or reporting. The study did not involve any clinical intervention or patient-related data.

Housekeeping and Patient Care Assistant (PCA) Staff

Total Staff

Housekeeping	88
Patient Care Assistant	74

Sample Size
The competency mapping exercise was conducted with a total of **40 staff members** divided into two categories:

Staff Category	Number of Participants
Housekeeping Staff	20
Patient Care Assistants	20

These staff members were randomly selected to ensure a diverse and representative sample.

Competency Assessment Scale
Each competency was rated using a standardized **4-point Likert scale** to measure skill proficiency:

Score	Interpretation
1	Basic Understanding
2	Working Knowledge
3	Proficient
4	Expert Level

This scale was used for both self-assessment and observer assessment, ensuring consistency in evaluation.

Core Competencies (Common to Both Roles)
These competencies are foundational and expected from **both Housekeeping and PCA staff**, as they contribute to overall hospital functioning, patient safety, and work culture.

Core Competency	Description
Communication Skills	Ability to listen, understand, and convey instructions clearly.
Teamwork	Willingness and ability to work cooperatively with others.
Infection Control	Consistently follows hygiene and infection prevention protocols.

Role-Specific Competencies

Housekeeping Staff
Housekeeping staff are responsible for maintaining cleanliness and hygiene across the hospital, and their competencies are oriented toward operational and safety standards.

Competency	Description
Cleaning Protocols	Knowledge and implementation of surface cleaning, dusting, and mopping.
Equipment Handling	Proper use and maintenance of cleaning tools and disinfectants.
Biomedical Waste Mgmt.	Segregation and disposal of waste as per hospital and regulatory norms.
Safety Compliance	Awareness and response to fire hazards, spills, and emergency protocols.

Patient Care Assistant (PCA) Staff
PCAs support nursing staff and ensure the comfort and safety of patients. Their role requires interpersonal and basic clinical skills.

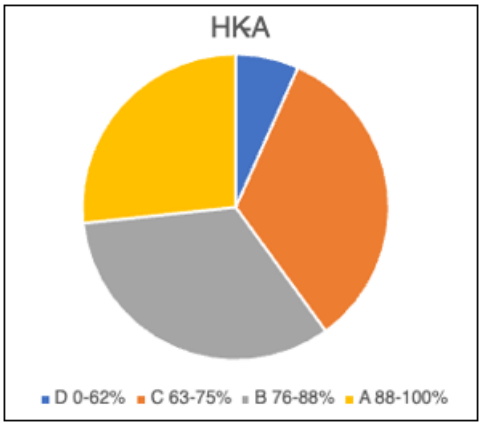
Competency	Description
Patient Assistance	Aiding patients in bathing, feeding, dressing, and mobility.
Vital Sign Monitoring	Measuring and recording temperature, blood pressure, and pulse.
Bedside Care	Ensuring patient hygiene, comfort, and dignity in bed-bound conditions.
Emergency Response	Providing basic support in emergencies and alerting relevant personnel.
Communication with Nurses	Accurately reporting patient conditions, needs, and observations.

Role Specific Staff Assessment

Group	Score Range (%)	Competency Level	Work Capability
D	36– 62%	Low Competence / Needs Training	Requires Training.
C	63 –75%	Basic Competence	Can perform simple tasks but with limited efficiency; needs supervision and support.
B	76 –88%	Competent Performer	Can perform work properly and independently; cannot train or guide other staff.
A	88 -100%	Highly Competent / Expert	Can perform work properly and independently; can also guide, mentor, and train others.

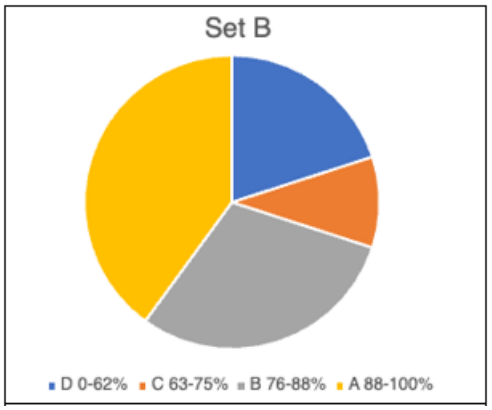
Housekeeping:

Housekeeping Set A					
S. No	Name	Obtain	Total	Percentage	Group
1	HK 1	9	15	60%	**D**
2	HK 2	12	15	80%	**B**
3	HK 3	13	15	87%	**B**
4	HK 4	10	15	67%	**C**
5	HK 5	13	15	87%	**B**
6	HK 6	14	15	93%	**A**
7	HK 7	11	15	73%	**C**
8	HK 8	14	15	93%	**A**
9	HK 9	10	15	67%	**C**
10	HK 10	14	15	93%	**A**
11	HK 11	11	15	73%	**C**
12	HK 12	12	15	80%	**B**
13	HK 13	13	15	87%	**B**
14	HK 14	14	15	93%	**A**
15	HK 15	11	15	73%	**C**



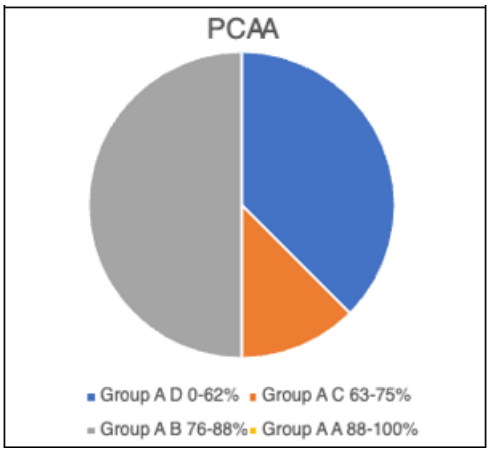
Housekeeping Set B					
S. No	Name	Obtain	Total	Percentage	Group
1	HK 11	13	15	87%	B
2	HK 12	13	15	87%	B
3	HK 13	14	15	93%	A
4	HK 14	14	15	93%	A
5	HK 15	13	15	87%	B
6	HK 16	5	15	33%	D
7	HK 17	10	15	67%	C
8	HK 18	6	15	40%	D
9	HK 19	14	15	93%	A
10	HK 20	14	15	93%	A

Group				
	D	C	B	A
	36-62%	63-75%	76-88%	88-100%
Set A	1	5	5	4
Set B	2	1	3	4

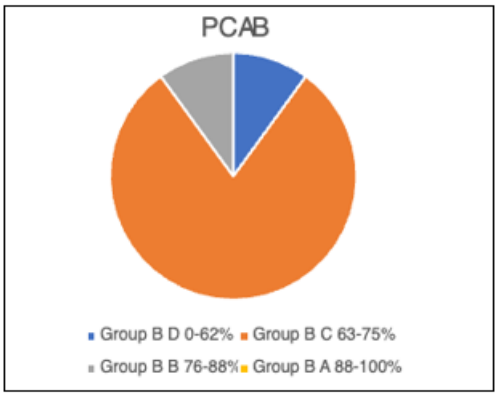


Patient Care Assistant:

PCA-A					
S. No	**Name**	**Obtain**	**Total**	**Percentage**	**Group**
1	PCA 1	9	15	60%	**D**
2	PCA 2	11	15	73%	**C**
3	PCA 3	12	15	80%	**B**
4	PCA 4	12	15	80%	**B**
5	PCA 5	12	15	80%	**B**
6	PCA 6	13	15	87%	**B**
7	PCA 7	9	15	60%	**D**
8	PCA 8	8	15	53%	**D**



PCA-B					
S. No	Name	Obtain	Total	Percentage	Group
1	PCA 11	10	15	67%	C
2	PCA 12	11	15	73%	C
3	PCA 13	10	15	67%	C
4	PCA 14	12	15	80%	B
5	PCA 15	9	15	60%	D
6	PCA 16	11	15	73%	C
7	PCA 17	11	15	73%	C
8	PCA 18	10	15	67%	C
9	PCA 19	11	15	73%	C
10	PCA 20	10	15	67%	C



	Group			
	D	C	B	A
	36-62%	63-75%	76-88%	88-100%
Set A	3	1	4	0
Set B	1	8	1	0

Gap Analysis: Hospital Housekeeping Staff

(Gap analysis is based on most incorrect questions answered by staff)

Set	Questions -Incorrect														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A	6	2	0	9	6	1	7	5	7	0	0	0	0	0	0
B	2	2	3	2	2	2	2	4	4	5	2	2	0	0	4

Set A: Analysis

Question: "हॉस्पिटल कचरा वर्गीकरणासाठी खालीलपैकी कोणता रंग योग्य आहे जैववैद्यकीय (Biomedical) कचऱ्यासाठी?" (Which of the following colours is correct for biomedical waste classification in a hospital?)

- Knowledge Gap: The staff might not know the specific colour coding system for biomedical waste. Incorrect classification can lead to serious public health hazards.
- Required Training: Provide specific, visual training on the hospital's biomedical waste management protocol, including a clear chart of colour codes and the types of waste that go in each bin.

Question: "हॉस्पिटलमध्ये स्वच्छतेदरम्यान Personal Protective Equipment (PPE) का वापरले जाते?" (Why is Personal Protective Equipment (PPE) used during cleaning in a hospital?)

- Knowledge Gap: The staff might not fully grasp that PPE protects both themselves from hazardous substances and patients from cross-contamination.
- Required Training: The training must clearly articulate the dual purpose of PPE and include demonstrations on how to properly don and doff the equipment.

Question: "हॉस्पिटलच्या फरशांची साफसफाई करताना कोणत्या क्रमाने काम करावे?" (In what order should a hospital's floors be cleaned?)

- Knowledge Gap: This addresses procedural knowledge. A staff member might not know the correct procedure of cleaning from "clean" to "dirty" areas, which is essential to prevent the spread of germs.
- Required Training: Perform practical Standard cleaning protocols and train staff on the principle of "clean to dirty," with specific protocols for different areas.

Question: "सर्जिकल विभागात कोणती खास काळजी घेतली जाते स्वच्छतेसाठी?" (What special care is taken for hygiene in the surgical department?)

- Knowledge Gap: The staff might not be aware of the more rigorous, high-level disinfection and sterilization procedures required for a sterile environment like the surgical department.
- Required Training: This requires specialized, in-depth training for staff working in high-risk areas, covering terminal cleaning protocols and specific disinfectants.

Question: "हॉस्पिटलमधील सर्वाधिक महत्त्वाचा स्वच्छतेचा भाग कोणता आहे?" (Which is the most important part of hygiene in a hospital?)

- Required Training: Training should focus on the 'why' behind hospital hygiene protocols—the goal of breaking the chain of infection.

Set B Analysis

Question: "खालीलपैकी कोणता बायोहाझार्ड चिन्ह आहे?" (Which of the following is a biohazard symbol?)

- Knowledge Gap: This is a basic safety recognition question. A failure to identify the universal biohazard symbol is a serious gap in fundamental safety knowledge.
- Required Training: Provide clear and repeated visual training on all universal safety symbols, including biohazard, radioactive, and cytotoxic symbols.

Overall Gap Analysis Summary for Housekeeping

- Infection Control Fundamentals: Staff may not understand the core principles of hospital hygiene.
- Procedural Knowledge: There is a potential gap in knowing standardized procedures for cleaning and waste handling.
- Safety and Regulation: Staff may lack knowledge of critical safety protocols, including waste segregation, PPE use, and symbol recognition.
- Specialized Area Protocols: There is a clear need for differentiated training for staff working in high-risk areas like surgical departments.

Gap Analysis: Patient Care Assistant

SET	Questions-Incorrect														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A	0	7	1	4	1	0	4	8	1	1	3	0	3	0	1
B	0	1	1	3	4	0	4	1	2	3	0	2	0	6	8

Set A Analysis

Question: "हाथ स्वच्छ धुण्याचा योग्य कालावधी किती असावा?" (What is the correct duration for washing hands?)

- Knowledge Gap: A PCA might not know the globally recommended duration for proper hand hygiene. A wrong answer suggests a lack of understanding of infection control protocols.
- Required Training: Reiterate the importance of hand hygiene and provide the specific, evidence-based duration. Practical demonstration and supervision are beneficial.

Question: "रुग्णाला ऑक्सिजन लावताना कोणती पातळी तपासणे आवश्यक आहे?" (Which level needs to be checked when applying oxygen to a patient?)

- Knowledge Gap: This relates to a specific clinical skill. A PCA might not know or not have significant knowledge to

monitor oxygen saturation (SpO2) and flow rate (LPM). This is a significant safety risk, as improper oxygen administration can be harmful.
- Required Training: Provide specific training on patient monitoring for patients on oxygen therapy, including the use of a pulse oximeter, identifying normal SpO2 ranges, and the importance of checking the flow rate. Clarify that their role is to monitor and report, not to adjust settings.

Set B Analysis

Question: "खालीलपैकी कोणती गोष्ट 'फॉल रिस्क' रुग्णासाठी योग्य आहे?" (Which of the following things is appropriate for a patient with 'fall risk'?)
- Knowledge Gap: A PCA might not be aware of all the necessary precautions for a high-risk patient.
- Required Training: Provide comprehensive training on fall risk assessment and prevention, covering strategies like using bed rails, ensuring the call bell is accessible, and using non-slip footwear.

Question: "रुग्णाचे मेडिकल रेकॉर्ड किंवा नोंदी कोणासोबत शेअर करण्यात येतात?" (With whom are the patient's medical records or notes shared?)
- Knowledge Gap: This is about patient confidentiality. Sharing with unauthorized individuals is a serious breach of privacy.
- Required Training: Provide mandatory training on patient confidentiality and data privacy, explaining who has a "need to know" and the consequences of breaching privacy.

Question: "आपल्या हॉस्पिटल मधे मोशन साफ करण्याची योग्य पद्धत य आहे?" (What is the correct way to clean a motion [bedpan] in our hospital?)
- Knowledge Gap: This suggests a potential for hygiene lapses and infection spread.
- Required Training: This points to a need for hands-on, hospital-specific procedural training covering proper use of PPE, waste disposal, and cleaning/disinfecting the equipment.

Overall Gap Analysis Summary for PCA
- Infection Control: A lack of specific knowledge about hand hygiene and cleaning procedures is a major safety risk.
- Patient Safety: Gaps in understanding fall prevention and the scope of practice related to IV lines pose significant risks.
- Clinical Monitoring: The staff needs more training on basic patient monitoring, especially for patients on oxygen.
- Professionalism and Ethics: There is a critical need for training on patient confidentiality and ethical responsibilities.

Housekeeping Staff Competency Questionnaire
(हाऊसकीपिंग कर्मचारी कौशल्य मूल्यांकन प्रश्नावली)

Core Competencies (मूलभूत कौशल्ये)

1) Do you follow the correct hand hygiene protocol in the hospital?
तुम्ही रुग्णालयातील हात स्वच्छतेचे योग्य नियम पाळता का?
2) Do you use Personal Protective Equipment (PPE) properly during cleaning?
साफसफाई करताना तुम्ही PPE योग्य पद्धतीने वापरता का?
3) Are you able to communicate clearly with nurses and other staff members?
तुम्ही नर्स व इतर कर्मचाऱ्यांशी स्पष्ट संवाद साधू शकता का?
4) Do you understand the importance of infection control in preventing hospital infections?
रुग्णालयातील संसर्ग टाळण्यासाठी संसर्ग नियंत्रणाचे महत्त्व तुम्हाला समजते का?
5) Do you follow safety procedures during emergencies (fire, spills, hazards)?
आपत्कालीन परिस्थितीत (आग, सांडलेले द्रव इ.) तुम्ही सुरक्षा नियम पाळता का?

Role-Specific Competencies (भूमिका-विशिष्ट कौशल्ये)

6) Do you correctly segregate biomedical waste according to color coding guidelines?
तुम्ही जैववैद्यकीय कचऱ्याचे योग्य रंग कोडनुसार वर्गीकरण करता का?
7) Can you correctly identify the biohazard symbol?
तुम्ही बायोहॅझर्ड चिन्ह योग्य ओळखू शकता का?
8) Do you follow the "clean to dirty" sequence while cleaning hospital areas?
साफसफाई करताना तुम्ही "स्वच्छ ते अस्वच्छ" हा क्रम पाळता का?
9) Do you follow special cleaning protocols in high-risk areas like ICU and OT?
ICU किंवा OT सारख्या उच्च-जोखमीच्या विभागात तुम्ही विशेष स्वच्छता नियम पाळता का?
10) Do you prepare disinfectant solutions in correct dilution as per hospital protocol?
तुम्ही निर्जंतुकीकरण द्रव्ये योग्य प्रमाणात तयार करता का?
11) Do you follow proper floor and surface cleaning techniques?
तुम्ही फरशी व पृष्ठभाग स्वच्छ करण्याची योग्य पद्धत वापरता का?
12) Do you handle cleaning equipment safely and maintain them properly?
तुम्ही साफसफाईची उपकरणे सुरक्षितपणे वापरता व त्यांची देखभाल करता का?
13) Do you know which areas of the hospital require the highest level of hygiene?
रुग्णालयातील कोणत्या भागात सर्वाधिक स्वच्छतेची आवश्यकता असते हे तुम्हाला माहित आहे का?
14) Do you follow proper protocol while cleaning blood or body fluid spills?
रक्त किंवा शरीरातील द्रव सांडल्यास तुम्ही योग्य प्रक्रिया पाळता का?
15) Do you perform terminal cleaning correctly after patient discharge?
रुग्ण डिस्चार्जनंतर तुम्ही टर्मिनल क्लिनिंग योग्य पद्धतीने करता का?

Patient Care Assistant (PCA) Competency Questionnaire
(पेशंट केअर असिस्टंट कौशल्य मूल्यांकन प्रश्नावली)

Core Competencies (मूलभूत कौशल्ये)

1) Do you perform hand washing for the recommended duration and technique?
तुम्ही शिफारस केलेल्या कालावधी व पद्धतीने हात धुता का?
2) Do you use PPE appropriately during patient care?
रुग्णसेवेच्या वेळी तुम्ही PPE योग्य वापरता का?
3) Do you report patient condition accurately to nurses?
तुम्ही रुग्णाची स्थिती नर्सना अचूकपणे सांगता का?
4) Do you understand the importance of maintaining patient confidentiality?
रुग्ण गोपनीयतेचे महत्त्व तुम्हाला समजते का?
5) Do you work effectively as part of the healthcare team?
तुम्ही आरोग्यसेवा टीमसोबत प्रभावीपणे काम करता का?

Role-Specific Competencies (भूमिका-विशिष्ट कौशल्ये)

6) Do you safely assist patients with bathing, feeding, dressing, and mobility?
तुम्ही रुग्णांना आंघोळ, खाणे, कपडे घालणे व हालचाल करण्यात सुरक्षित मदत करता का?
7) Do you follow proper precautions for patients at risk of falling?
पडण्याचा धोका असलेल्या रुग्णांसाठी तुम्ही योग्य खबरदारी घेता का?
8) Do you know with whom patient medical records can be legally shared?
रुग्णांच्या वैद्यकीय नोंदी कोणासोबत शेअर कराव्यात हे तुम्हाला माहित आहे का?
9) Do you follow the correct method for cleaning and handling a bedpan?
बेडपॅन साफ करण्याची योग्य पद्धत तुम्ही पाळता का?
10) Do you immediately report any change in patient condition?
रुग्णांच्या स्थितीत बदल झाल्यास तुम्ही त्वरित कळवता का?
11) Do you correctly measure and record vital signs (temperature, pulse, BP)?
तुम्ही तापमान, नाडी, रक्तदाब योग्य मोजता व नोंदवता का?
12) Do you check oxygen level (SpO_2) and flow rate under nurse supervision?
नर्सच्या देखरेखीखाली तुम्ही SpO_2 व ऑक्सिजन फ्लो रेट तपासता का?
13) Do you maintain patient dignity during bedside care?
बेडवरील रुग्णांचा सन्मान व गोपनीयता राखता का?
14) Do you respond appropriately during emergency situations?
आपत्कालीन परिस्थितीत तुम्ही योग्य प्रतिसाद देता का?
15) Do you follow infection control protocols during direct patient care?
थेट रुग्णसेवेच्या वेळी तुम्ही संसर्ग नियंत्रण नियम पाळता का?

6. Data Analysis

1) Descriptive Statistics

Group	N	Mean Score	SD	Min	Max
Housekeeping	25	11.88	2.47	5	14
PCA	18	10.61	1.33	8	13

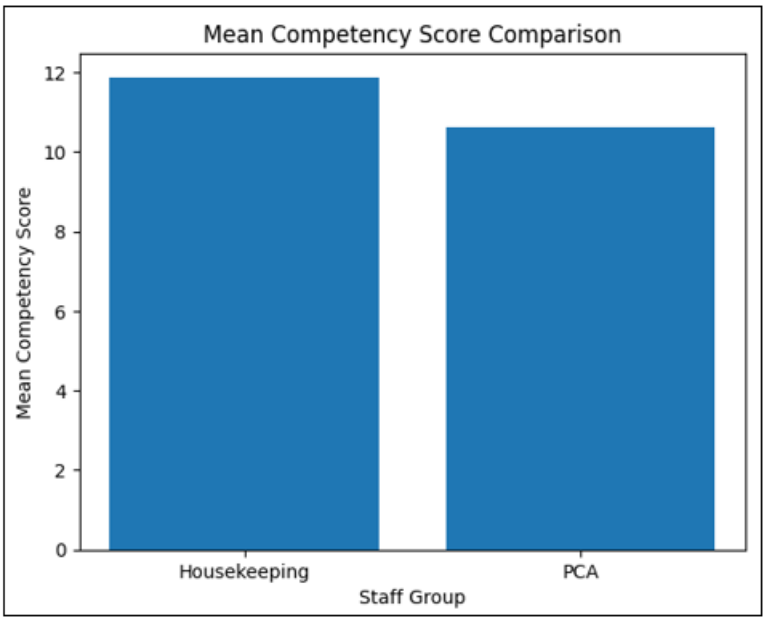
Interpretation:

- Housekeeping staff demonstrated a higher mean competency score (M = 11.88) compared to PCA staff (M = 10.61).
- The higher standard deviation among housekeeping staff (SD = 2.47) indicates greater variability in performance levels.
- PCA scores were more clustered (SD = 1.33), suggesting more consistent but moderate competency levels.

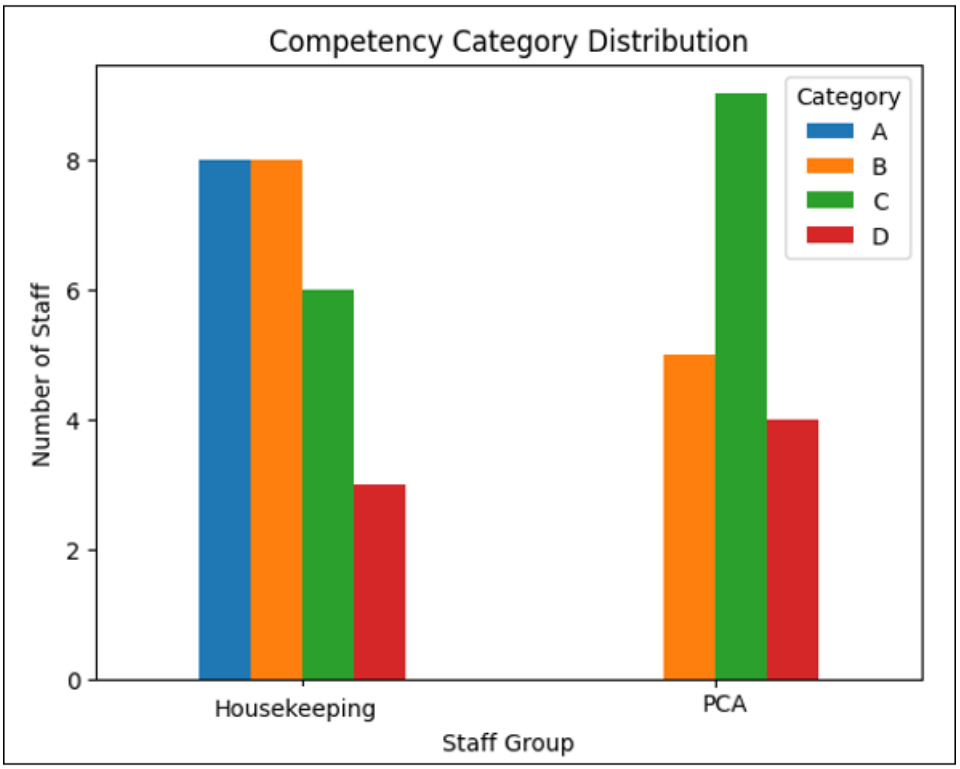
2) Independent Samples t-Test

An independent samples t-test was conducted to compare mean competency scores between housekeeping and PCA staff. Housekeeping staff demonstrated a higher mean score (M = 11.88, SD = 2.47) compared to PCA staff (M = 10.61, SD = 1.33). The difference approached statistical significance ($t = 1.98$, $p = 0.0549$), indicating a trend toward higher competency levels among housekeeping staff; however, the difference did not reach the conventional 5% significance threshold.

The calculated effect size (Cohen's $d = 0.63$) suggests a moderate practical difference between the two groups.



3) Competency Category Distribution (Chi-Square Analysis)



A chi-square test of independence was performed to examine the association between staff role (Housekeeping vs PCA) and competency category (A, B, C, D).

The analysis revealed a statistically significant association between staff role and competency category distribution (χ^2 = 8.52, p = 0.036). This indicates that competency levels vary significantly by job role.

Housekeeping staff had a higher proportion of A and B level performers, while PCA staff demonstrated greater representation in C and D categories.

The effect size (Cramér's V = 0.45) indicates a moderate association between staff role and competency level.

Training Methods

Hands-on Demonstrations- On the 15Th Day
Practical, real-life demonstrations conducted on the hospital floor, where trainees watch and then perform the task themselves. (BMW segregation, High Risk Patient Management, etc)
- Builds confidence by practicing real tasks under guidance.
- Reduces mistakes through "see and do" learning.
- Helps staff remember procedures better than theory alone.
- Helps to identify trainee errors

Simulation Mock Drill Exercises- Per Month
Controlled practice of critical situations in a safe setting to build confidence before real-world application for new staff.
- Prepares staff for rare or high-risk situations without endangering patients or themselves.
- Improves reaction time and decision-making in emergencies.
- Builds teamwork in realistic scenarios.

Providing Classroom
Group A- Monthly
- Keeps skills fresh without taking too much time from work.
- Updates them on new hospital protocols or technologies.
- Improve leadership and mentoring ability.
- Gradually prepares for Team leader or Suppervisors

Group B- 15 Days
- Reinforces skills to close small knowledge gaps.
- Keeps them consistent in following SOPs.
- Gradually prepares them to take on mentoring roles.

Group C- Weekley
- Provides frequent reinforcement to improve speed and accuracy.
- Builds confidence through repeated exposure.
- Reduces errors in daily tasks by correcting habits quickly.

Group D- Twice a Week
- Accelerates learning for critical skill gaps.
- Ensures they can meet minimum competency standards quickly.
- Offers close supervision to prevent mistakes that affect patient safety or hospital hygiene.

Ex: Housekeeping Staff: A classroom session on hospital infection control, including video demonstrations of correct cleaning methods.

PCA Staff: A classroom session on patient handling safety, with group discussions about common challenges in mobility assistance.

Interactive Workshops & playful activities
Short, instructor-led sessions where staff actively participate through **role-plays**, **case studies**, and **group discussions**.
- Encourages active participation and engagement.

- Improves problem-solving and communication skills.
- Allows staff to learn from each other's experiences.
- Builds Teamwork
- Reduces Stress

Mentorship Program: Pair new & Group D employees with a "Highly Competent / Expert" staff member (Group A). The mentor will provide on-the-job training and guidance, with their feedback integrated into the new employee's 3-month performance review.
Encourages Knowledge Sharing

Visual Aids & Posters
Infographics, charts, and pictorial guides placed in work areas to reinforce training topics.
Provides quick, on-the-spot reference for correct practices.

Rotational Training
Staff work in different hospital areas (wards, ICU, OPD, etc.) to gain varied experience.
Improves adaptability and understanding of different unit requirements.

Checklists & SOP-Based Practice
Staff use detailed checklists to follow procedures step-by-step during training.
Reduces errors and standardizes task execution.

Re-evaluation and Continuous Monitoring Plan
Re-evaluation Schedule:

- **3-Month Evaluation**: Conduct a focused review of all housekeeping and PCA staff every three months. This re-evaluation will specifically assess the impact of the training interventions and check for sustained improvement in competency levels.
- **Annual Comprehensive Review:** A more comprehensive competency re-mapping exercise should be performed annually to identify new skill gaps, adapt to any changes in organizational protocols, and inform decisions for promotions or new task assignments.

New Employee Evaluation Monitoring:

- **On boarding Competency Assessment:** New hires will undergo a baseline competency assessment during their initial on boarding period. This will help tailor their initial training plan from day one.
- **2-Month Review:** Conduct a mandatory review after three months to assess the new employee's progress against their initial baseline and ensure they are meeting the required competency standards for their role. This review will include supervisor feedback and direct observation.
- **Integration of Training:** Ensure that new employees are enrolled in the standardized training programs identified in the gap analysis, covering both core and role-specific competencies. Their participation and performance in these programs will be a key part of their ongoing evaluation.

7. Discussion

In order to identify critical gaps in infection control, hygiene practices, patient safety, and basic clinical assistance, the current study evaluated and mapped the competences of housekeeping and Patient Care Assistant (PCA) staff in a tertiary care hospital. The results are in line with previous research that emphasizes how important non-clinical and semi-clinical personnel are to reducing healthcare-associated infections (HCAIs) and guaranteeing patient safety.

The observed gaps in infection control practices, biomedical waste management, and appropriate use of personal protective equipment among housekeeping staff align with previous studies that have reported inadequate awareness and inconsistent adherence to infection prevention protocols among hospital support staff (Sharma & Gupta, 2019; World Health Organization [WHO], 2009). WHO guidelines emphasize that environmental hygiene and proper hand hygiene practices are fundamental components of infection prevention, and deficiencies in these areas can significantly increase the risk of cross-transmission of pathogens within healthcare settings (Allegranzi & Pittet, 2009).

Similarly, prior research showing that inadequate training and ambiguous role definitions contribute to patient safety incidents and adverse events supports the competency gaps found among Patient Care Assistants, especially in hand hygiene duration, fall-risk management, patient confidentiality, and basic clinical monitoring (Vincent, 2010). According to studies, frontline support workers' poor comprehension of patient safety procedures and hand hygiene guidelines might lower the standard of care, particularly in environments with limited resources (Joseph & Joseph, 2016).

According to competency-based workforce studies, routine experience alone does not guarantee sufficient skill development without structured assessment and training (Dubois & Rothwell, 2004; Kumar & Bhatia, 2018). This is reflected in the majority of employees in the current study who were categorized as having basic to moderate competency levels. Particularly in healthcare companies looking to enhance quality and safety results, competency mapping has been acknowledged as an efficient approach for detecting skill gaps and matching staff skills with business goals.

The study findings also support the relevance of national accreditation standards, such as those of the National Accreditation Board for Hospitals and Healthcare Providers (NABH), which mandate regular competency assessment and continuous training of healthcare staff involved in infection prevention and patient care. By systematically identifying gaps and proposing targeted training interventions, the present study contributes practical evidence to support competency-based human resource development in hospital settings.

Overall, the results reinforce existing evidence that structured competency assessment, combined with focused training, mentorship, and periodic re-evaluation, can strengthen infection control practices, enhance patient safety, and improve overall healthcare service quality.

8. Ethics Statement

The study was conducted in accordance with ethical principles for research involving human participants. Participation was voluntary, and informed consent was obtained from all participants prior to data collection. Confidentiality and anonymity were strictly maintained by assigning unique identification codes to participants, and no personal identifiers were included in the analysis or reporting. The study did not involve any clinical intervention, patient-related data, or invasive procedures, and posed minimal risk to participants. All data were used solely for academic and quality improvement purposes.

9. Limitations and Future Scope

Limitations

This study has certain limitations that should be acknowledged. First, the study was conducted in a single tertiary care hospital, which may limit the generalizability of the findings to other healthcare settings. Second, the sample size was relatively small, and the results may not fully represent the competencies of all housekeeping and PCA staff. Third, the use of self-assessment and observational methods may be subject to response bias and observer bias. Additionally, the study relied on descriptive analysis and did not assess the direct impact of competency gaps on clinical outcomes such as infection rates or patient satisfaction.

Future Scope

Future research may expand this work by conducting multi-center studies with larger sample sizes to improve generalizability. Longitudinal studies assessing the impact of competency-based training interventions on infection rates, patient safety indicators, and service quality outcomes would provide stronger evidence. Further research may also explore the cost-effectiveness of competency mapping and training programs, as well as the integration of digital tools for continuous competency monitoring and assessment. Incorporating patient outcome measures and accreditation performance indicators could strengthen the linkage between workforce competencies and healthcare quality improvement.

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