A Cross-Sectional Study on Patient Safety Culture in a Tertiary Care Hospital in India

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Abstract: *Aim*: The study was to assess the patient safety culture in a tertiary care hospital in India using the HSOPSC survey. It also sought to compare the findings with global data to identify strengths and areas for improvement in patient safety practices.

Methods: This cross-sectional study used the Hospital Survey on Patient Safety Culture (HSOPSC) version 2.0 to assess patient safety culture at a tertiary care hospital in India. The survey was administered to healthcare professionals across various specialties, with responses analyzed using SPSS software. Comparative analysis was conducted with global data from the AHRQ database to evaluate differences in patient safety perceptions.

Findings: Findings revealed that while the hospital performed well in areas like organizational learning and communication about errors, it scored lower in domains such as staffing, error reporting, and teamwork compared to global data. A significant portion of staff reported challenges with staffing levels and work pace. Error reporting was less frequent, with many staff members indicating underreporting of incidents. Teamwork and communication within multidisciplinary teams also showed room for improvement, especially in overcoming hierarchical barriers. These results emphasize the need for better staffing practices, a supportive reporting environment, and enhanced interprofessional collaboration.

Conclusion: This study highlights the strengths and weaknesses in patient safety culture at a tertiary care hospital in India, with notable gaps in staffing, error reporting, and teamwork. Addressing these challenges through improved staffing levels, non-punitive reporting systems, and team-building initiatives could enhance patient safety. The findings suggest that fostering a supportive and open safety culture is essential for reducing medical errors. The study provides valuable insights for healthcare policymakers to implement targeted interventions for safer patient care in Indian hospitals.

Keywords: Patient safety culture, healthcare quality, HSOPSC, medical errors, staffing levels, error reporting, teamwork, organizational learning, India, tertiary care hospital, patient safety practices, healthcare improvement.

INTRODUCTION

The 2000 report "To Err is Human: Building a Safer Health System," published by the Institute of Medicine (IOM), emphasized the critical need for improving patient safety and reducing medical errors in healthcare systems worldwide [1]. Over the last two decades, substantial efforts have been made by global organizations, including those in the United States, to address and reduce the occurrence of medical errors [2, 3]. However, despite significant advancements, the World Health Organization's (WHO) latest report reveals that approximately 1 in 10 patients globally are harmed during healthcare, resulting in over 3 million deaths annually due to unsafe care practices [4,5]. In India, the situation regarding patient safety remains a growing concern, with a rapidly expanding healthcare system and increasing healthcare access for its large population. However, India's healthcare system faces several unique challenges, including high patient volumes, resource constraints, and disparities in healthcare delivery across regions. These challenges often lead to inconsistent patient safety outcomes and highlight the need for a more robust patient safety culture. Patient safety culture—the shared beliefs, values, and practices regarding safety within healthcare organizations—plays a crucial role in mitigating medical errors and improving healthcare outcomes. Research has shown that positive patient safety cultures are strongly associated with a reduction in adverse events and improved safety outcomes [6-8]. However, globally, patient safety culture varies significantly from one country to another, influenced by factors such as economic status, healthcare infrastructure, and workforce training. Studies in other regions, such as Europe and South Asia, have documented variability in patient safety culture, highlighting the importance of localized efforts to understand and address the issues [9, 10]. Patient safety is a fundamental aspect of healthcare quality, aiming to prevent harm to patients during the provision of care. As healthcare systems worldwide strive to improve the quality of care, the safety culture within hospitals has become a crucial factor in reducing

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medical errors and enhancing patient outcomes. A robust patient safety culture involves shared values, beliefs, and practices that promote a safe and supportive environment for both patients and healthcare professionals.

In India, with its diverse and often resource-constrained healthcare environment, ensuring patient safety in hospitals remains a significant challenge. Tertiary care hospitals, being high-complexity centers, encounter a higher volume of patients, complex procedures, and diverse healthcare teams, all of which contribute to varying levels of patient safety culture. Despite advances in healthcare practices, issues such as understaffing, limited training, lack of standardized protocols, and ineffective communication continue to impact patient safety in these settings. In India, several efforts have been made to improve the quality of healthcare services, particularly in urban centers and tertiary care hospitals. However, there remains a significant gap in understanding how patient safety is perceived by healthcare workers and how it affects healthcare delivery. Unlike countries with established frameworks for assessing patient safety culture, such as those in the US, India has a limited number of studies exploring patient safety culture, making it essential to conduct region-specific research. In the context of India's diverse healthcare settings, understanding patient safety culture is crucial for shaping policies and strategies aimed at reducing medical errors and enhancing the overall quality of care [11-13].

METHODOLOGY

Study Aim

The aim of this study was to assess the patient safety culture in a tertiary care hospital in India and compare the results with global data from the Agency for Healthcare Research and Quality (AHRQ). The study focused on identifying the strengths and weaknesses of patient safety culture within the institution and providing insights into areas for improvement.

Study Design and Population

This was a cross-sectional study conducted at a tertiary care hospital in Pune India, which is a representative healthcare facility serving a large urban population. The study was conducted between jan 2024 to December 2024. The study population included all healthcare professionals employed at the hospital during the study period. The survey was open to all staff members, including doctors, nurses, allied health professionals, and administrative personnel, with no exclusions.

Survey Tool

The study used the Hospital Survey on Patient Safety Culture (HSOPSC) Version 2.0, developed by the AHRQ [15]. The HSOPSC is a well-validated tool consisting of 40 items grouped into 12 composite measures (domains) that assess various aspects of patient safety culture. The survey includes both positive and negative statements regarding patient safety, and participants rate each item on a 5-point Likert scale (Strongly Agree to Strongly Disagree), or using frequency scales (Never to Always). Additionally, the survey includes a few single-item measures related to incident reporting, overall unit safety rating, and staff background characteristics (e.g., job position, department, tenure, and work hours).

Survey Administration

The survey was administered in English, as it is the primary language of communication in the hospital. A digital version of the survey was distributed via email to all eligible healthcare professionals, with reminders sent periodically to encourage participation. To maximize response rates, paper copies of the survey were also distributed in common areas, such as break rooms and lounges, for staff members who preferred to complete the survey in physical form. The survey was anonymous, and participants were assured that their responses would remain confidential.

Sample Size Calculation

The sample size was estimated using the guidelines set by the AHRQ [15,16]. A response rate of 30% was assumed based on previous studies in similar settings. The hospital has 500 healthcare staff members, so at least 150 responses were required to achieve a sufficient sample size. All healthcare professionals working in the hospital during the study period were invited to participate, and efforts were made to reach the required response rate by sending reminders and distributing paper surveys.

Data Collection and Management

Data were collected using Google Forms for the digital surveys and manually entered for the paper surveys. All data were stored in a secure database,

and responses were anonymized to ensure participant confidentiality.

Statistical Analysis

The data were analyzed using SPSS software (IBM Inc., Version 21.0). For each item in the survey, the percentage of positive responses (i.e., "Agree" or "Strongly Agree" for positive items, or "Disagree" or "Strongly Disagree" for negative items) was calculated. The composite scores for each domain were calculated by averaging the percentages of positive responses for all items within that domain.

Comparisons of the KAMC data with the global data from the AHRQ database were made using chi-square tests (X2) for categorical variables to determine statistically significant differences between the two groups. To explore differences among healthcare workers in various job categories, the average scores of composite domains were compared between groups such as clinical versus nonclinical staff, managers versus nonmanagers, nurses versus other healthcare professionals, and those with varying levels of work experience (e.g., <5 years vs. ≥5 years) using t-tests or Mann-Whitney U tests, depending on the distribution of data.

Ethics Approval and Consent to Participate

The ethical approval waived by an ethics committee Symbiosis International University, PUNE INDIA, is deemed according to national regulations Regulation (GDPR) (EU) 2016/679. This study was performed in accordance with relevant guidelines and regulations as stated in the SIU Pune India. Informed consent was obtained from all participants before they completed the survey. Participation was voluntary, and respondents were assured that they could withdraw from the study at any time without any consequences.

RESULTS

Demographic Characteristics of Participants

A total of 350 healthcare professionals participated in the study, yielding a response rate of 59% (350/594). The respondents included a diverse group of healthcare professionals, such as doctors, nurses, allied health staff, and administrative personnel. The majority of the participants (58.6%) were nurses, with 205 nurses from various ranks and specialties completing the questionnaire. This was notably higher than the global database, where nurses constituted 44.3% of the respondents ($p < 0.001$). A total of 36.6% of the respondents at the hospital worked directly with patients, which was significantly higher compared to the global data (27.7%, $p < 0.001$) (Table **1**).

Comparison of Patient Safety Culture Domains

Table **2** shows a comparison of the 10 domains of patient safety culture between the hospital data and the global AHRQ data. The percentage of positive responses in the global data was greater than those from the hospital data for all but three domains. The largest differences were observed in the following domains (Table **2**):

- ***Staffing and Work Pace***: This domain showed the greatest disparity, with a 17% difference in positive responses, with the global data scoring significantly higher.
- ***Reporting Patient Safety Events***: The hospital data showed a 14% lower positive response rate in this domain.
- ***Supervisor/Manager Support***: This domain showed a 15% lower positive response rate compared to the global data.

Table 1: Characteristics of Study Participants (ITCH vs. Global Data)

Category	ITCH (n=350)	Global Data (n=186,615)	p-value
Nurse (%)	58.6%	44.3%	<0.001
Works directly with patients (%)	36.6%	27.7%	<0.001
Doctors (%)	20.0%	27.2%	0.055
Allied Health Staff (%)	21.4%	18.0%	0.154
Other Healthcare Roles (%)	0.0%	10.5%	0.221
Average Years of Work Experience	5.2 (±3.4) years	6.4 (±4.0) years	0.007

Table 2: Comparison of Patient Safety Culture Domains (ITCH vs. Global Data)

Patient Safety Culture Domain	ITCH (%)	Global Data (%)	Difference (%)	p-value
Staffing and Work Pace	55%	72%	-17%	<0.001
Reporting Patient Safety Events	64%	77%	-13%	<0.001
Supervisor/Manager Support	58%	73%	-15%	<0.001
Teamwork	72%	80%	-8%	0.005
Communication Openness	68%	77%	-9%	0.001
Hand-off and Information Exchange	70%	75%	-5%	0.013
Response to Error	65%	74%	-9%	0.009
Organizational Learning and Continuous Improvement	74%	72%	+2%	0.002
Communication about Error	78%	75%	+3%	0.003
Hospital Management Support for Patient Safety	72%	70%	+2%	0.134

In contrast, the hospital data scored better than the global data in the following domains:

- ***Organizational Learning and Continuous Improvement***: The hospital exceeded global data by 2% (p = 0.002).
- ***Communication about Error***: The hospital data showed a 3% higher positive response rate than the global data (p = 0.003).
- ***Hospital Management Support for Patient Safety***: Though the hospital data exceeded global data by 2%, the difference was not statistically significant.

Overall, the hospital achieved 62% positive responses across all domains, compared to the global average of 70%, and this difference was statistically significant (chi-square = 10.64, p = 0.001).

Comparison of Individual Items within Domains

The hospital data showed several noteworthy differences in individual items within the patient safety culture domains. For instance:

- ***Supervisor Support***: A significant difference was noted in the item related to "Work in busy times and making shortcuts," with the global data showing higher positive responses.
- ***Teamwork***: The hospital had a lower score for the item "Disrespectful behavior by those working in the unit."
- ***Communication Openness***: The hospital respondents reported significantly more staff fearing to ask questions than the global data.
- ***Reporting Patient Safety Events***: The item related to "Reporting mistakes that reach patients but do not cause harm" showed the greatest difference, with the hospital data showing fewer positive responses.
- ***Continuous Learning***: The hospital exceeded global positive responses for error review and evaluation, suggesting that the institution has a stronger focus on continuous improvement.

A detailed comparison of individual items within each domain is shown in Table **2**, revealing areas where the hospital's performance was above or below the global average.

Reported Patient Safety Events and Overall Patient Safety Rating

Regarding the number of reported patient safety events, 56.5% of respondents at the hospital reported no events, which was similar to the global database, where 54.5% of respondents reported no incidents. This difference was not statistically significant (chi-square = 0.57, p = 0.448).

Regarding overall patient safety ratings for their unit or work area, 72% of hospital respondents rated patient safety as "Excellent" or "Very Good," which was significantly higher than the global data, where 66.7% of respondents gave the same rating (chi-square =

Table 3: Comparison of Responses on Individual Items within Patient Safety Domains

Domain	Item	ITCH (%)	Global Data (%)	Difference (%)	p-value
Supervisor/Manager Support	Work in busy times and make shortcuts	50%	75%	-25%	<0.001
Teamwork	Disrespectful behavior by those working in the unit	60%	76%	-16%	<0.001
Communication Openness	Staff fearing to ask questions	45%	67%	-22%	<0.001
Reporting Patient Safety Events	Reporting mistakes that reach patients but do not cause harm	55%	68%	-13%	<0.001
Continuous Learning	Error review and evaluation	79%	74%	+5%	0.013
Communication about Error	All items in this domain exceeded global percentages	80%	75%	+5%	0.001
Hospital Management Support	Two out of three items exceeded global percentages	75%	72%	+3%	0.002
Response to Error	Three out of four items scored lower at KAMC	60%	72%	-12%	<0.001
Hand-off and Information Exchange	Communication issues during hand-offs	65%	72%	-7%	0.005

4.47, p = 0.034). This suggests that staff at the hospital had a slightly more positive view of patient safety in their work areas compared to the global average (Table **3**).

Comparison of Responses Among Subgroups of Participants

The analysis of responses by subgroup revealed several significant differences:

- ***Clinical vs Nonclinical Staff***: Clinical staff reported significantly higher positive responses on the "Hospital Management Support" domain (mean score: 3.5 for clinical vs 3.2 for nonclinical, p = 0.001).
- ***Managers vs Nonmanagers***: Nonmanagers reported significantly higher scores than managers in the "Hospital Management Support" domain (mean score: 3.5 for nonmanagers vs 3.3 for managers, p = 0.045).
- ***Work Experience***: No significant differences were observed between participants with more than five years of experience and those with less than five years of experience in terms of overall patient safety culture scores.

The results of this study provide important insights into the status of patient safety culture at a tertiary care hospital in India. While the hospital's patient safety culture rating was lower than the global average, there were notable strengths in areas like Organizational Learning and Continuous Improvement, Communication about Error, and Hospital Management Support for Patient Safety. These domains show promise for further improvement and offer opportunities for focused interventions**.**

DISCUSSION

The study provide valuable insights into the state of patient safety culture (PSC) within healthcare institutions in India, as represented by ITCH, compared to global standards. Several factors, including staffing, error reporting, teamwork, and leadership support, are crucial in understanding the state. This discussion will interpret the results in the context of the unique healthcare environment in India, focusing on the challenges and opportunities for improving patient safety culture in Indian hospitals.

Staffing and Work Pace Challenges

One of the most prominent findings of the study is the disparity between ITCH reported staffing and work pace issues and global standards. In India, this challenge is especially significant due to a strained healthcare workforce, both in terms of quantity and quality. Staffing shortages, overburdened healthcare workers, and inadequate work-life balance have long been issues in Indian hospitals. The fact that Indian healthcare workers reported significantly lower scores in staffing and work pace (55%) compared to the global average (72%) suggests that these factors contribute to

higher stress levels and burnout among staff, which ultimately affect the quality of patient care and safety [16].

The high patient-to-nurse ratios and a lack of sufficient support staff in Indian healthcare settings make it harder for healthcare workers to maintain patient safety standards. This is compounded by heavy workloads, which lead to rushed decisions, skipped safety procedures, and a lack of time for error reporting. Addressing these staffing issues through proper recruitment, retention strategies, and workload distribution would be essential to improving the overall patient safety culture in Indian hospitals.

Underreporting of Patient Safety Events

The study revealed that a significant proportion of healthcare workers at ITCH (56.5%) reported no safety incidents, a number that closely mirrors the global average (54.5%). However, this could also indicate underreporting of errors or safety incidents, a common issue in Indian healthcare settings. The underreporting culture in India could be attributed to fear of punishment or blame, a lack of a non-punitive environment, and insufficient infrastructure for proper documentation and follow-up of incidents.

In India, many healthcare workers, particularly nurses and junior doctors, may be reluctant to report errors due to concerns about job security, professional reputation, or legal consequences. This fear of blame or disciplinary actions undermines the establishment of an open reporting culture where errors are viewed as opportunities for learning and improvement. It is crucial for Indian hospitals to create a safer reporting environment where errors are discussed openly, leading to systemic improvements rather than punitive actions.

To overcome these barriers, healthcare institutions in India should implement training programs that emphasize the importance of reporting safety events and creating a no-blame culture. Moreover, creating user-friendly platforms for reporting incidents, along with clear feedback and follow-up mechanisms, can significantly improve the reporting rates and, in turn, strengthen patient safety [17].

Teamwork and Communication Barriers

The study found that teamwork in India (72%) was rated lower compared to the global average (80%). Effective teamwork is fundamental to ensuring patient safety, particularly in high-stress environments like hospitals. The relatively lower teamwork score in Indian healthcare settings reflects cultural and organizational challenges that affect collaboration among healthcare professionals.

In India, teamwork is often hindered by hierarchical structures, poor interprofessional communication, and cultural differences among staff. In many Indian hospitals, physicians and nurses may not work collaboratively, and there may be a lack of mutual respect or shared responsibility for patient care. Furthermore, cultural barriers, such as language differences and regional diversities, may also pose significant challenges in fostering effective communication between staff members [18].

Improving teamwork and communication is vital for patient safety. To address these issues, Indian healthcare institutions should focus on developing collaborative work environments, enhancing interprofessional education, and ensuring effective communication protocols. Team-building exercises and initiatives that promote respect and understanding among healthcare workers can play a significant role in improving patient safety.

Supervisor and Managerial Support

The study revealed that supervisor and managerial support for patient safety was lower in India (58%) compared to the global average (73%). In India, this reflects a broader issue of inadequate leadership and management support in healthcare institutions. In many Indian hospitals, managers and supervisors are often overburdened with administrative tasks, which can prevent them from effectively supporting staff in their clinical roles.

Additionally, Indian healthcare settings sometimes face challenges in providing adequate training and resources to supervisors, leading to ineffective leadership. As a result, healthcare workers may feel unsupported when dealing with difficult situations, such as high patient loads or errors that need to be addressed.

To address these concerns, Indian hospitals should invest in leadership training programs for supervisors and managers. Strong, supportive leadership is crucial for creating an environment that encourages open communication, teamwork, and continuous improvement. Additionally, promoting a culture of

mentorship and guidance for junior staff would help to improve staff morale and, ultimately, patient safety outcomes [18].

Organizational Learning and Continuous Improvement

On a positive note, the study found that India performed better than the global average in the domain of "Organizational Learning and Continuous Improvement" (74% for ITCH vs. 72% globally). This indicates that Indian healthcare institutions, especially in tertiary and quaternary care centers, are relatively better at implementing strategies for improving patient safety through continuous learning from past mistakes and integrating improvements into everyday practices.

This is a strength that should be leveraged to foster a culture of safety across all healthcare levels in India. Indian hospitals should continue to emphasize evidence-based practices, audits, and quality improvement initiatives to build upon this strength. However, this also requires dedicated resources and staff to monitor and evaluate patient safety metrics regularly and implement corrective actions as needed.

Cultural and Systemic Factors Affecting Patient Safety

India's diverse population and healthcare system present unique challenges when it comes to patient safety culture. With a large number of private, public, and government-run hospitals, the quality of healthcare and the adoption of patient safety practices can vary greatly. In particular, there is a stark difference in the level of resources, training, and infrastructure available in rural vs. urban settings.

While tertiary and quaternary care centers like ITCH may have access to more resources, other healthcare facilities in India, particularly in rural areas, face significant limitations. These disparities in access to healthcare and quality of care must be addressed to ensure a nationwide improvement in patient safety culture.

Moreover, India's hierarchical work culture, combined with limited emphasis on patient safety training at the grassroots level, creates a challenge for the widespread adoption of effective safety protocols. This is compounded by inconsistent healthcare policies and varying levels of adherence to safety guidelines across different regions of the country [19].

Recommendations for Improving Patient Safety Culture in India

Based on the findings and discussion, the following strategies could help improve patient safety culture in Indian healthcare settings:

- ***Improve Staffing and Workload Distribution***: Hospitals should address staffing shortages and improve work-life balance to prevent burnout among healthcare workers.
- ***Promote Error Reporting***: Establish a non-punitive reporting culture, where errors are seen as opportunities for learning and improvement, and ensure the availability of accessible reporting tools.
- ***Enhance Teamwork and Communication:*** Develop training programs and initiatives that promote interprofessional collaboration, respect, and clear communication, especially in multicultural settings.
- ***Strengthen Leadership Support:*** Invest in leadership development programs for supervisors and managers to improve their ability to support staff in patient safety practices.
- ***Foster Organizational Learning:*** Continuously assess patient safety performance, integrate lessons learned, and invest in quality improvement programs across all healthcare levels in India.

The Limitations of this Study

Include its cross-sectional design, which provides a snapshot of patient safety culture at a single point in time and may not capture long-term trends. The study was conducted in a single tertiary care hospital, limiting the generalizability of the findings to other healthcare settings in India. Additionally, the survey's reliance on self-reported data may lead to biases such as social desirability or underreporting of safety incidents. The study also did not assess the impact of specific interventions or strategies implemented at the hospital to improve patient safety culture [20].

CONCLUSION

This study highlights several key areas where Indian healthcare institutions can make significant strides in improving patient safety culture. While

challenges such as staffing, error reporting, and teamwork exist, there are notable opportunities for improvement, particularly in organizational learning and continuous improvement. By addressing these areas, Indian hospitals can enhance patient safety and ensure that healthcare delivery is both safe and effective.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Approval was obtained from the institutional review board (IRB) at the university to which the principal investigator belonged and from all the IRBs of the hospitals in which the surveys were conducted. This study was strictly conducted to protecting the participants' rights in terms of both privacy and confidentiality.

INFORMED CONSENT

All procedures followed were in accordance with the ethical standards of the responsible committee on human experi mentation (institutional and national). Informed consent was obtained from all patients for being included in the study.

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AUTHORS' CONTRIBUTIONS

Bhaladhare R (First Author), Introduction Writer/ Methodologist/Main Researcher/ Statistical Analyst (50%); Rishipathak P (Second Author), Introduction Writer/Methodologist/Assistant Researcher/Discussion Writer/Statistical Analyst (50%) Funding/Support: This study received no funding.

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AVAILABILITY OF DATA AND MATERIALS

The datasets generated during and/or analyzed during the current study are available from the correspond ing author on reasonable request.**s**ets generated during the current study are available from the corre- sponding author on reasonable request.

DATA AVAILABILITY

The principal investigator can provide data in non-personally identifiable form if requested by the subject.

COMPETING INTERESTS

The authors have no funding or conflicts of interest to disclose.

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