Original Article

# Perception of Patient Safety Culture among Health-care Providers in a Tertiary Care Hospital, South India

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## Abstract

**Introduction:** Patient safety is a global concern and is the most important domains of health-care quality. Medical error is a major patient safety concern, causing increase in health-care cost due to mortality, morbidity, or prolonged hospital stay. **Aim:** The aim of the study was to assess the perceptions on patient safety culture among health-care providers (HCPs) at a public sector tertiary care hospital in South India. **Settings and Design:** A hospital-based cross-sectional study was conducted 1 year after patient safety initiatives were implemented. **Materials and Methods:** Participants were selected through proportionate stratified random sampling. The Hospital Survey on Patient Safety Culture was used to assess perception of patient safety culture. Responses were collected on a Likert scale and were categorized into four types as negative, neutral, positive response, and nonresponse. **Statistical Analysis Used:** The data were entered in EpiData Version 3.1 and analyzed using SPSS Version 17. "Composite positive response rate" for the various dimensions was calculated. **Results:** The overall response rate in the study was 91.6%. Average composite positive response rate was 58%, and it varied among different cadres of HCPs ranged from 53% to 61%. The dimensions "teamwork within the unit," "organizational learning and continuous improvement," and "supervisor or officer-in-charge expectations" showed highest positive responses (80.1%, 77.8%, and 71.5%, respectively). **Conclusions:** This survey conducted after implementation of patient safety drive showed that, in many dimensions, the patient safety culture has taken roots. The dimensions such as "hand-off and transitions," "frequency of events reporting," and "communication openness" had scope for further improvement.

**Keywords:** Health care providers, hospital quality management, patient safety culture

## Introduction

Patient safety in health care includes safety of both patients (clients) and health-care providers (HCP). It is clinical, economical, managerial, and organizational concern in the health-care system. Patient safety culture is a key driver of health-care quality. Patient safety emphasizes reporting, analysis and prevention of medical errors that often lead to adverse health events.[1] Most of the adverse events are preventable and occur due to defect in design of system or organization rather than poor performance of HCP. Clients are not only harmed by misuse of technology but also could be harmed by poor communication between different HCP or in rendering treatment.[2]

Several studies on medical errors report that one in ten patients are harmed while receiving hospital care.[3] Estimation from global studies reported the rate of adverse events as 3.2–16.2 per 100 hospital admissions The rate of adverse events to patients varies with different States in the US; it ranges between 3.2% and 5.4%, it is 11.7% in the UK, and 9% in Denmark.[4] Safety culture differed significantly not only between hospitals but also within the institutions.[5]

India is still lacking a regulatory system for the control of medical errors and mandatory reporting. It is a common problem in all hospitals, especially in government hospitals,

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where overcrowding is more and funding is limited. The common reasons for underutilization of services in government sector are due to provision of poor quality of services and attitudes of HCP.[6] A grass roots model of health-care quality was conceived at Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER) a tertiary care hospital at Puducherry, South India. In this model, one member from each department or service domain was nominated to form a Quality Council, rather than forming a standalone Quality cell, which is the norm. A JIPMER Quality Council (JQC) with seventy members from various departments was developed in August 2012. The aim of this quality council was to improve patient safety and provision of quality health care across all departments and service area by iterative self-improvement at JIPMER.[7]

Although patient safety is a critical issue in health-care delivery, there are very few studies on this aspect, especially from developing countries such as India. Considering the dearth of information on this key aspect, this study was planned to assess the perceptions on patient safety culture among HCPs at a tertiary care public sector hospital JIPMER in Puducherry, South India. In this context, this study was aimed to assess the perception of patient safety culture among HCPs at a tertiary care hospital in Puducherry.

## Materials and Methods

This hospital-based cross-sectional study was conducted in multispecialty, large public sector hospital with undergraduate, postgraduate, and allied health sciences programs. The hospital provides free medical care, especially to people of lower socioeconomic status from the adjoining South India states. It has 104 inpatient wards and the average outpatient attendance per day is around 6500. Around 3500 permanent HCPs are working at this hospital, apart from outsourced staff for security and sanitation.[8]

The sample size was calculated using the formula $4pq/d^2$. The average positive perception of safety culture across all dimensions was found to be 48% in a study done in Andhra Pradesh, India.[9] Using this proportion and absolute precision of 5% at 95% confidence interval with 10% nonresponse rate, the minimum sample size required was calculated to be 421. All permanent front line health care providers total 2128 [Doctors = 194, Nurses1304 and Other technical staffs 630 (Pharmacist, Lab technician, Dialysis technician, Operation theatre technician and Dressing technician)] working in this Institute for more than six months were eligible for participation of the study. Students were excluded from the study.

After the approval from Postgraduate Research Monitoring Committee and Institute Ethical Committee and hospital authorities, staff list was obtained. Staff from different cadres was proportionately selected to participate in the study using computer-generated random number (proportionate stratified random sampling). The questionnaire, Hospital Survey on Patient Safety Culture (HSOPSC) that was developed by the Agency Healthcare Research Quality from the United States was used to assess perception of patient safety culture among the study participants. The questionnaire included 12 dimensions[10] such as "Supervisor/manager expectations and actions promoting safety," "Organizational Learning and Continuous Improvement," and "Teamwork within Hospital Unit" (supplement HSOPSC tool). The questionnaire was verified by two experts from the Institute Quality Council, and the unclear terms were modified to enable clear understanding of HCPs in this part of India. The validated questionnaire was pretested with ten HCPs, two from each stratum.

After obtaining written informed consent, the questionnaire was self-administered to the randomly selected participants. The questionnaire was anonymous so as to increase the response rate and to avoid social desirability bias. The main outcome variable "perception regarding patient safety culture" was assessed through the modified HSOPSC questionnaire. Responses were collected on a five-point Likert scale (1 - strongly disagree, 2 - disagree, 3 - neither agree nor disagree, 4 – agree, and 5 - strongly agree). The responses were categorized as negative, neutral, positive response, and nonresponse. The negatively framed questions were reverse coded. Sociodemographic information such as age, gender, occupation group, year of experience, and training on patient safety was also collected.

The data were entered into EpiData (Version 3.1) Association, Odense, Denmark and analysis was done in SPSS (Version 17.0) (Chicago). "Composite positive response rate" for the various dimensions were calculated. Composite positive response rate for particular dimension = total number of positive responses to the items in the dimension/total number of responses (positive, neutral, and negative) to the items in the dimension.[10] The mean and standard deviation (SD) of the composite positive response of the items in a domain was computed. The composite index was compared across various occupational groups. The statistical significant was calculated using one-way ANOVA and $P < 0.05$ was considered statistically significant.

## Results

A total of 386 out of the 421 randomly selected front-line HCPs (proportions: doctors − 38, nurses − 255, pharmacists, and OTS = 128 completed the questionnaire, giving an overall response rate of 91.6%. Thirty-six HCPs (doctors - 1, nurses – 25, and OTS - 9) have not returned the filled questionnaire. Mean age of the study participants was 38 (SD: 9.7) years and the majority of them 238 (61.7%) were females. Around 58.8% of the study participants had a work experience of at least 5 years and 22.8% had received training on patient safety [Table 1].

The total composite positive perception of patient safety culture among the HCP at the institute was found to be 58%. The dimensions of "teamwork within the unit," "organizational learning and continuous improvement," and "supervisor or

officer-in-charge expectations" showed the highest positive responses 80.1%, 77.8%, and 71.5%, respectively. The dimensions of "hand-offs" "frequency of events reported" and "Communication openness" had received the least positive responses 41.8%, 41.2%, and 40.8%, respectively [Table 2].

The overall composite mean positive response rate on "Patient safety culture" varied among the different occupational groups of HCPs: doctors and nurses and OTSs (pharmacist, lab technician, dialysis technician operation theater technician, and dressing technician). Doctors scored highest average positive response rate in the dimensions of "Teamwork within the Unit," "Feedback and Communication error," and "Organizational Learning and continuous improvement" (78.4%, 71.2%, and 67.6%). Nurses scored highest average positive response rate in the dimensions are "Teamwork within the Unit," "Organizational Learning and continuous improvement," "Supervisor/officer-in-charge expectations," and "Feedback and Communication error" (83.3%, 77.1%, 74.5%, and 69.4%). OTSs scored higher positive response in the dimensions of "Organizational Learning and continuous improvement," "Teamwork within the Unit," "Supervisor/officer-in-charge expectations," "Supervisor/officer-in-charge expectations," and "Management support" (84.6%, 78.9%, 76.7%, and 68.2%). OTSs obtained less score in the domains of "hand offs and transitions" and "Frequency of events reported" (35.4% and 37.8%) compared to doctors and nurses [Table 3].

**Table 1: Sociodemographic characteristics of the study participants, Puducherry (2015), (*n*=386)**

| Sociodemographic details | *n* (%) |
|---|---|
| Age (years) | |
| 21-30 | 116 (30.1) |
| 31-40 | 126 (32.6) |
| 41-50 | 89 (23.1) |
| >50 | 55 (14.2) |
| Gender | |
| Male | 148 (38.3) |
| Female | 238 (61.7) |
| Years of experience | |
| 1-5 | 159 (41.2) |
| 6-10 | 66 (17.1) |
| >20 | 161 (41.7) |
| Working department | |
| Surgical | 101 (26.2) |
| Medical | 75 (19.4) |
| Laboratory | 43 (11.1) |
| Emergency medical services | 38 (9.8) |
| ICU | 32 (8.3) |
| Radiology | 31 (8) |
| Super speciality | 28 (7.3) |
| Rehabilitation | 28 (7.3) |
| Pharmacy | 10 (2.6) |
| Attended CME/workshop regarding quality control | |
| Yes | 88 (22.8) |
| No | 298 (77.2) |

ICU: Intensive Care Unit, CME: Continuing medical education

## Discussion

Considering the importance of patient safety culture in health-care delivery, various hospital accreditation systems such as Accreditation Commission for Health Care, National Accreditation Board for testing and calibration for Laboratories, and International Standard for Organizations are incorporating this as one of the main elements in their checklists. This study conducted among various cadres of HCPs showed variations in the positive perception of patient safety culture among different cadres ranging from 53% to 61%.

Although various tools are available to assess the patient safety culture, HSOPSC is the one to assess it in a comprehensive manner. The composite score which includes all 12 dimensions of HSOPSC tool showed the mean positive response percentage of 58% though it varied among various cadres of HCPs. This positive response was low compared to estimates

**Table 2: Composite positive response rate of "patient safety culture" in all dimensions of modified Hospital Survey on Patient Safety Culture among study participants**

| Dimensions of patient safety | Number of items in the dimension | Average composite positive response percentage | SD |
|---|---|---|---|
| Teamwork within the unit | 4 | 80.1 | 5.2 |
| Supervisor/officer-in-charge expectations | 4 | 71.5 | 8.8 |
| Organizational learning and continuous improvement | 3 | 77.8 | 8.4 |
| Management support | 3 | 60.7 | 12.2 |
| Overall general perception | 4 | 60.8 | 9.1 |
| Feedback and communication error | 3 | 65.7 | 7.3 |
| Communication openness | 3 | 40.8 | 10.6 |
| Frequency of events reported | 3 | 41.2 | 6.9 |
| Teamwork across the unit | 4 | 51.6 | 5.8 |
| Staffing about patient safety | 4 | 59.7 | 6.5 |
| Hand offs and transitions | 4 | 41.8 | 9.5 |
| Nonpunitive response error | 3 | 48.1 | 7.0 |
| Total | 42 | 58.0 | 13.4 |

SD: Standard deviation

**Table 3: Average composite positive percentage of "patient safety culture" among different health care providers, Puducherry (2015)**

| Patient safety culture dimensions | Average composite positive response percentage (SD) | | | *P** |
|---|---|---|---|---|
| | Doctors (*n*=37) | Nurses (*n*=230) | OTS (*n*=119) | |
| Teamwork within the unit | 78.4 (16.7) | 83.3 (11.4) | 78.9 (7.1) | <0.001 |
| Supervisor/officer-in-charge expectations | 59.5 (10.1) | 74.5 (4.3) | 76.7 (4.3) | <0.001 |
| Organizational learning and continuous improvement | 67.6 (20.0) | 77.1 (14) | 84.6 (4.7) | <0.001 |
| Management support | 41.2 (5.0) | 57.5 (16) | 68.2 (4.6) | <0.001 |
| Overall general perception | 51.6 (12.0) | 52.8 (27.3) | 66.1 (6.4) | <0.001 |
| Feedback and communication error | 71.2 (17.3) | 69.4 (10.6) | 65.9 (5.9) | <0.001 |
| Communication openness | 49.6 (10.2) | 49.6 (14.7) | 37.8 (6.4) | <0.001 |
| Frequency of events reported | 31.5 (1.6) | 36.7 (5.7) | 46.0 (2.6) | <0.001 |
| Team work across the unit | 43.7 (13.2) | 58.1 (15.1) | 53.6 (2.4) | <0.001 |
| Staffing about patient safety | 50.7 (16.0) | 56.2 (17.4) | 64.7 (2.7) | <0.001 |
| Hand offs and transitions | 53.4 (11.0) | 50.3 (14.3) | 35.4 (4.9) | <0.001 |
| Nonpunitive response error | 38.2 ( 2.2) | 50.0 (8.1) | 50.8 (5.9) | <0.001 |
| Total | 53.1 (14.0) | 60.0 (14.0) | 61.0 (12.3) | 0.006 |

**P* value was calculated using one-way ANOVA. A total number of items in the dimensions: 42. OTS: Other Technical Staff, SD: Standard deviation

reported from developed countries such as Norway, the US, and the Netherlands (60% to 86%).[11,12,13,17] It is lesser even compared some of developing countries such as Egypt and Ethiopia.[2,14] However, the positive responses in the current study are higher compared to the response reported from other Indian settings (48%).[9]

Across all studies, the highest positive response was reported in the dimension of "teamwork within the unit."[9,12,15] Contrary to this, majority of the studies reported low positive response in the dimension of "teamwork across the unit.[9,16] The present study also showed a high positive response in "teamwork within the unit" (80.1%) and less in "teamwork across the unit" was 51.6%. The domain on "hand offs and transitions" which needs cooperation from other departments also showed low positive responses in many studies (20%–40%) including the present study (41.8%).[9-15] In the present study apart from the dimension on teamwork within the unit, other dimensions such as "supervisors or in-charge officer's expectation" (71.6%), "organizational learning and continuous improvement" (77.8%), and "feedback system" (65.7%) had more positive responses. A study from one of the Indian hospitals also reported similar findings.[9] Frequency of event reporting got less positive responses across all studies including the present one (41.2%).[9]

This study showed average composite positive response among physicians (53%) and highest among other technical and nursing staffs (61%). On the contrary, a study from the Netherlands reported more positive response among physicians.[11] The more positive response obtained among OTSs could be due to the nature of their work which directly relates to patient safety (all invasive procedures and medication errors which can occur during care and dispensing of medicine) and closer involvement of their work with other departments in day-to-day work. Similarly, the most positive response reported among nursing staff could be the result of inbuilt system developed by the organization for nursing staff which facilitates day-to-day supervision and conflicts management among the staff. Further, a majority of the reporting systems are under the control of nursing staff. This also could have invited the more positive response among nursing staff. The recent introduction of feedback registers and reporting of never events under JQC in the study area could have influenced much. Institute work culture such as death audit and monthly audit of departmental activities, bedside handover, standard treatment protocols, and provision of patient wise boxes to prevent hospital-acquired infections would also have played a role to the response being more positive.

Although many studies report patient safety among HCPs, very few studies report responses based on different cadres of HCPs and very few hospital surveys classify the responses based on hospital settings such as emergency, ICU and hospital theaters.[12] The HSOPSC tool is a self-administered questionnaire which avoids the possibility of interviewer bias. Since confidentiality of the participant was maintained through anonymity and they were ensured that their responses will not be used for any punitive measures. Hence, the responses obtained were considered to have high reliability. Response rate in this study was higher (91.6%) than that observed in the other studies.[2,9,11,13,16,18] This high rate of participation perhaps reflects our ongoing efforts at transformation of grassroots architecture.

JIPMER is a renowned academic training and research institute, and this hospital is one of the referral centers in South India which handles the highest number of patient load. These factors can make a differential impact compared to hospitals which are nonacademic or facilities which handle lesser patient load. Hence, the results should be interpreted with caution. These study observations are expected to further refine the system in terms of staff recruitment, reporting and feedback system, communication process, and continuous professional

learning. Further, after few months of implementation, the same survey tool can be repeated to assess the change of perceptions on patient safety culture.

Some of the dimensions which had negative responses among HCPs reported in this study could be addressed toward system optimization. Examples of the strategies which can help to achieve better results in these weaker dimensions include conducting regular interdisciplinary focused group meeting and training workshops among staff; mandatory written and bedside oral hand offs between health-care team across shifts, and strengthening awareness programs on blame free, online, and also the handwritten error reporting system.

## Conclusions

The composite score in patient safety culture assessed in all 12 dimensions through validated HSOPSC study tool showed the average positive response rate of 58%. The positive response varied among different dimensions and different cadres of HCPs. Among 12 dimensions, more positive response was reported in the dimensions of "teamwork within the unit" and in "supervisor's expectations" followed by "organizational learning." Dimensions such as "communication openness," "staff hand offs and transitions," and "events reporting" had scope for further improvement. To achieve the optimum perception of safety culture among HCPs, they need to be sensitized regarding patient safety, especially on standard treatment protocols, administrative framework of hospital, and communication mechanism through Continuing Medical Education (CMEs) or job training.

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### Conflicts of interest

There are no conflicts of interest.

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