

# Editorial

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## Legal and Ethical Challenges in Healthcare Ecosystem

In recent times the print and social media is galore with adverse news regarding health sector such as doctor-pharma nexus, violence against doctors, medical negligence, cost of drugs/stents, kidney marriages, surrogacy and so on. Prime issues such as doctor-patient ratio, availability of health infrastructure, funding of healthcare system, etc. are generally not addressed. Healthcare industry is growing rapidly, however, some core ingredients such as care, compassion, empathy, trustworthiness and ethical considerations are losing their position of priority. We live in a well-informed society, where patients, relatives, and others are inclined to question healthcare providers if medical outcomes are not appropriate/acceptable. Ethics is considered as a standard of behavior and a concept of right and wrong in any situation. The primary principles of ethics include beneficence, non-maleficence, justice and respect for autonomy. There are legal and ethical dilemmas associated with delivery of healthcare. It is imperative for healthcare professionals to be well conversant with law and ethics—the pillars of healthcare ecosystem. The evolving technologies pose new challenges to the established tenets of medical practice. These challenges often involve social issues and ethical dilemmas with decisions affecting life and its continuity. Recent emerging issues include reproductive rights, fetal health, stem cell research, Euthanasia, do not resuscitate and confidentiality of records in cyber domain. Healthcare professionals need to be concerned about how law and ethics impact not only their respective professions, but also how these issues affect the consumers and society at large. Spiralling cost of healthcare impacts availability, accessibility, affordability and equitable distribution of healthcare resources. It is thus the felt need to introspect and understand the need for these relevant contemporary legal and ethical issues.

Healthcare professionals are generally never exposed to most of these issues in our undergraduate or postgraduate training. This places them in a disadvantageous position wherein if faced with issues requiring actions on essential administrative matters appropriate inputs are not available to facilitating decision making.

The Indian healthcare industry is progressing towards an upward brighter phase as the industry is seen to be growing at a rapid pace and is expected to become a US\$280 billion industry by 2020. Technology is playing a major role in changing the way healthcare was perceived and delivered. Indian health industry is metamorphosing from traditional to modern, from being concentrated at large places to marking its presence in far flung small tehsils and villages.

It is essential to understand that medical science is not prototype assembly line driven as in Industries nor can a specific model be typecast and replicated. The alert ecosystem expects the quality of care to be global, hence the necessity of adhering to global standards of quality in terms of both infrastructure and training resources.

It is imperative that a structured programme is planned on issues pertaining to legal and ethical challenges in healthcare and incorporated in medical curriculums. It is time that the common populace is made sensitive to the challenges in healthcare delivery including Legal and Ethical issues.

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# Guest Editorial

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## Reflections on Quality and Patient Safety at 2015: Progress and Opportunities

It is a great privilege for me to share my personal and professional reflections on the current efforts to improve the quality and safety of patient care across borders. After completing my position as Director of Clinical Quality Improvement at an 800-bed tertiary care hospital affiliated with Harvard Medical School, in 2002, I was afforded the opportunity to collaborate with some Indian hospitals for designing quality management standards into their operating plan. The application of these principles was relatively new to health care at that time, although other industries had shown that this methodology reduced product defects, increased production efficiencies, and supported employee teamwork for meeting established standards.



My collaboration with these tertiary care hospitals within India continued in parallel with efforts to apply quality management techniques in US hospitals. Avedis Donabedian's "structure-process-outcome" model for quality served as our management framework: "structures" as the settings and administrative systems in which care takes place; "processes" as the components of care delivered; and "outcomes" as recovery and improved functional status.

The early efforts with these Indian hospitals proved to be successful, based on several outcomes. I became a part of their management structures and found support from senior leadership and clinical leaders to provide education and training for such innovations. I worked intensively with these hospitals for more than 5 years, developing standardization of patient care protocols, guidelines, and outcome measures for each department. I learned and was inspired by their willingness and excitement to adopt and emphasize new management goals and clinical operational tools:

- Patient care was now the focus and the common purpose of everyone
- The senior leaders and department directors showed high integrity, setting clear expectations based on values and metrics
- Projects had a clear agenda and expected outcomes based upon shared ideas and vision
- Each team member provided value
- Within two years, the staff was trained in the both the model and integration of quality improvement in their daily work
- Failures and vulnerabilities were met with sensitivity and constructive criticism
- Process and outcome measures were specifically defined and measured quarterly

These hospitals achieved the first of Joint Commission International (JCI) accreditations in India, marking what I viewed as the beginning stages of a quality and patient safety movement in India. Professionally and personally, I felt great satisfaction that I was a part of this achievement.

Since then, over 28 Indian hospitals have received JCI accreditation. In 2006, the National Accreditation Board for Hospital and Health care Providers (NABH) was established. Equivalent to the JCI standards approach, the NABH has accredited >400 Indian hospitals. Accreditation has become a recognized "baseline" for an organization's commitment to the quality and safety of patient care, based on the Donabedian model.

### Our Common Imperatives

These early experiences inspired me to build additional partnerships and to share US and international innovations for improvement. Our common imperatives remain important to these efforts today.

While the organization of medicine is culturally different across borders, the needs of our patients remain the same: They get diseases, they worry, and they hope to be cured or relieved of their suffering, and return to work. Patients also want safe and competent care. We organize our health care organizations around care at the bedside, implementing processes that prevent infections, provide the available and appropriate medications, communicate with patients and families, and hopefully increase the likelihood of desired health outcomes based on available professional knowledge and experience.

Practicing medicine is the most intimate of professions. It remains so wherever conducted. Patients expect that they will be treated with dignity, compassion, and the best available standards of care, with the best expected

outcomes. While the quality of hospital care is important in its own right, we try our best to meet the varied needs of patients with whatever resources we have. Our work begins with love and vision: Love of our patients, and love of our work.

International awareness of our common imperatives is reflected by efforts to employ proven strategies that bring patients into closer focus, rather than the sole focus for maximizing revenues. None of this is easy for us, but we push onward – a journey marked by those who embrace change, seek clinical and technical innovations, and hospital leaders who support and encourage these goals in practice.

### **To Err is Human**

The year 2015 marks the 15th anniversary of two landmark reports in the United States: *To Err Is Human: Building a Safer Health System* and *Crossing the Quality Chasm*. The history of the US health care quality movement can be divided by the periods before and after these reports. The conventional wisdom was that the quality of care in our hospitals was generally good. Passing the Joint Commission survey constituted a sufficient measure. While the autonomy of physicians to do what they judged best for patients was usually invoked as the “first principle” of good quality of care, these reports indicated otherwise: Medical errors occurred in 4% of hospitalizations and 27% of those events were preventable, including postsurgical infections due to lack of cleanliness, hospital-acquired infections due to inadequate hygiene practices, and errors in medication management. Errors in US hospitals appeared more common than what was believed, precipitating a major public health concern regarding these gaps in patient safety. Although Joint Commission accreditation remains mandatory for a hospital to operate in the United States, it was clearly not sufficient in fully addressing patient safety.

Since then, with the proliferation of research and proven techniques to improve quality and safety, the international public health community actively supports global efforts and collaborations. The World Health Organization (WHO) provides guidelines, checklists, tools to reduce medication errors, and other materials for global improvement; the Institute for Health Care Improvement provides working papers, online training, and tools/technique, such as trigger tools for identifying potential harm; the International Monetary Fund has a public health initiative to better understand the needs and experiences of patient care; and the Organization of Economic Cooperation and Development recently issued a multicountry study on global patient safety data. Country-specific studies and strategies are published in peer-reviewed patient safety journals. We continue to learn better ways to get better, and we learn through cross-border collaborations.

### **Getting Better at Getting Better: What We have Learned**

With the 2006 deployment of the NABH accreditation standards, Indian hospitals have joined the journey for improving quality and safety. Our common imperatives seek to “do no harm” and to do all what we can to ensure that a proposed treatment’s benefit outweighs the risks inherent in its implementation.

We have learned that preventing infections must include handwashing before and after contact with patients and that hand hygiene must be a global standard. Protocols and guidelines are available to train all staff to monitor adherence. There are new safety protocols across almost every area of a hospital to reduce health care-associated infections, surgical complications, staff “handoff” communications, medication errors, and Intensive Care Unit safety. We’ve learned from other industries, like aviation, that implementing checklists improves patient safety by standardizing practices by adhering to protocols pre- and postsurgical procedures. Surgical checklists have been proven to reduce complications, length of stay, readmissions, and mortality. The WHO checklist has been tested at several hospitals around the world with the following results: Complications after surgery were reduced by more than one-third, and death rates fell by almost half. By 2012 more than 2000 hospitals had implemented checklists, including procedures for central-line insertion, anesthesia, mechanical ventilation, and childbirth. However, the implementation of checklists is not so simple, says Atul Guwande. Studies have shown that too often they are not completed or not always used, required team members were not present all the time, and not all items on the checklist were read aloud. Guwande has found that it is critical for leaders to take time to explain why and how to use checklists. These documents can be modified to fit into the local workflow – such personalization creates a feeling of “pride of ownership” that encourages their utilization. .

Quality and safety is the work of leadership, of clinical staff, and of hospital systems. Devoting human and financial resources in these efforts will reduce repeat testing, readmissions, longer hospital stays, and most importantly improve outcomes for the “high-risk” patient suffering from multiple comorbidities.

## **Advancing Global Quality and Patient Beyond 2015**

With limited resources, we must continue to collaborate globally to incorporate, locally, what we've learned about quality and safety:

- Quality and safety must be a primary responsibility for our health care systems
- The cost to patients, health care systems, and societies not implementing these principles is considerable
- Increasing investment in improvement and prevention, given its successful "track record" is justified
- Local programs, training, and defined interventions must be in place
- Active engagement of staff and patients is critical
- National policies should support these improvement efforts

Going forward, we must together focus on measuring and learning from both what can go wrong and from what goes right in patient care; know that humans are prone to error; measure errors and learn to manage these risks; invest resources that will standardize and simplify complex processes; measure what goes right and teach effectiveness and reliability; and, most importantly, build and invest in our knowledge building (Office of Economic Co-operation and Development, Paris, 2017).

We must be willing to measure care and define outcomes of our patients. Culture matters and local needs will help in such definitions. From the global perspective, we seek to better understand patient outcomes in order to better manage costs and provide value-based care. We want to know how they survive their illnesses and manage their disabilities, how often they suffer from complications and additional comorbidities, and if and how they are able to return to work. These efforts will represent the next decade of quality improvement.

"The highest education is that which does not merely give us information but makes our life in harmony with all existence."

—R. Tagore

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# Determining Organizational Learning Capability: A Study in Private Health Care Organizations

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## ABSTRACT

**Introduction:** Due to the fast-changing and developing business environment, knowledge has become a very important resource for organizations. However, reaching and obtaining knowledge is difficult, the level of organizational learning capability (OLC) perception within the organization is a key for this. This is also true for health organizations. If health care organizations can increase their OLC levels, they might achieve an increase in organizational performance, patient satisfaction, competitive advantage, and employee satisfaction.

**Objective:** In this study, it is aimed to determine the level of OLC perception of employees working in private health care organizations. It is also aimed to examine whether this perception level shows variance according to demographic differences.

**Materials and methods:** Research was done between January 2017 and March 2017 in private health care organizations operating in Turkey. The population of the study includes both administrative staff and health staff working in these organizations. Survey method was used to collect data, and 111 valid questionnaires were collected at the end of data collection period.

**Results and conclusion:** According to the findings, employees perceive their organizations' OLC level positively both for general OLC and for OLC subdimensions. However, it is also concluded that this perception level could be increased as well. In order to achieve this, health care organizations are required to encourage their employees toward learning, investigating, communication, risk taking, and participation.

**Keywords:** Health care organizations, Organizational learning, Organizational learning capability.

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## INTRODUCTION

The rapid change and developments triggered by the globalization have forced organizations to cope with

these developments. Moreover, organizations have become more sensitive to these changes, and they found themselves in a global competition. Therefore, organizations are required to make right decisions and internalize well-established flow of information system within their structure in order to survive in this highly uncertain and competitive global environment.<sup>1</sup> In that kind of competitive environment, one of the most valuable competitive advantage tools is knowledge. What is more, to obtain knowledge systematically, collective learning behavior has become more important than ever.<sup>2</sup>

The concept of learning has been examined by psychologists and pedagogues, and it has been generally examined in terms of individual learning level. Later on, scholars from different disciplines, such as business management and economics have put emphasis on learning, and they have examined the concept of learning in different perspectives, such as behavioral dynamics of individuals in business life.<sup>3</sup> As a result, the concepts, such as organizational learning and learning organizations have come into play. Organizational learning refers to an information processing procedure of acquisition, dissemination, interpretation, and storage of knowledge in organizational memory for further use. For an advanced organizational learning, it is required to have an advanced organizational learning capability (OLC).<sup>4</sup>

Organizational learning capability is defined as "the organizational and managerial characteristics that facilitate the organizational learning process or allow an organization to learn".<sup>5</sup> According to a different definition offered by Limpibuntern and Johri,<sup>6</sup> OLC is defined as "an intrinsic ability of an organization because of which the organization creates, enriches, and utilizes knowledge to outperform its competitors in terms of its competitiveness and performance."

Organizational learning capability implies a complex, multidimensional, and a dynamic concept.<sup>7</sup> In the literature, there are various classifications related to the dimensions of OLC. For instance, according to Jerez-Gómez et al,<sup>8</sup> the dimensions of OLC are managerial commitment, systems perspective, openness and experimentation, and knowledge transfer and integration. On the contrary, Chiva et al<sup>9</sup> offered five dimensions for OLC, namely experimentation, risk taking, interaction with the external environment, dialogue, and participative

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decision-making. These dimensions are explained briefly below:<sup>9,10</sup>

- *Experimentation*: It is defined as to what extent new idea or suggestions are tolerated and welcomed sympathetically. Experimentation dimension is the most supported dimension of OLC in the literature. This dimension involves trying new and innovative ideas, being open to change, and encouraging people who work on new ideas. Moreover, it involves new approaches to the solution of existing problems as well.
- *Risk taking*: It refers to the extent to which uncertainty, ambiguity, and errors are tolerated. Organizations might avoid taking risk if they want to achieve success in the short term because risk taking may lead to errors. However, benefits derived from errors may lead to ease of problem recognition and diversity in organization’s area of movement.
- *Interaction with the external environment*: This dimension involves the scope of relationship with the external environment, which refers to the factors beyond the organization’s direct control, such as competitors, social, economic, and governmental systems.
- *Dialogue*: It can be described as the basic process of developing shared understanding, and it has a very important role in organizational learning. Communication and dialogue among employees, and between employees and managers have a direct influence on learning.
- *Participative decision-making*: This dimension refers to the level of employees’ involvement in decision-making process.

Managerial characteristics that facilitate organizational learning have great importance for providing competitive advantage to organizations.<sup>11</sup> Organizational learning capability has a positive influence on organizations’ performance.<sup>12,13</sup> In health care organizations an increase in staff learning increases both staff performance and organizational performance, which then increases patient satisfaction as well.<sup>14</sup> Therefore, it is important to examine OLC in health care organizations. In this study, it is aimed to determine the level of OLC perception of employees working in private health care organizations. In addition, it is also aimed to examine whether this perception level shows variance according to demographic differences.

**MATERIALS AND METHODS**

The research was done between January 2017 and March 2017 in private health care organizations operating in Turkey. The population of the study includes both administrative staff and health staff working in these organizations. The survey method was used to collect

data, and 111 valid questionnaires were collected at the end of the data collection period.

The questionnaire used in the study has two parts. The first part involves demographic information related to the participants. Statements in the second part are based on determining participants’ perceptions of OLC. Organizational Learning Capability Scale developed by Chiva et al<sup>9</sup> was used in the second part, and reliability and validity of the scale were examined by the authors of this study. The OLC scale involves 14 statements aimed to measure five subdimensions; (1) experimentation (2 items), (2) risk taking (2 items), (3) interaction with the external environment (3 items), (4) dialogue (4 items), and (5) participative decision-making (3 items). Cronbach alpha coefficients were calculated in order to measure the reliability of the scale, and are presented in Table 1. Statements in the questionnaire are measured through 5-point Likert scale (Totally Disagree, Disagree, Neither Agree nor Disagree, Agree, Totally Agree).

In data analysis process, frequencies, percentage distribution, mean, and standard deviations are calculated, and demographic comparisons were performed. According to Kolmogorov–Smirnov test, data were found to be normally distributed. Therefore, in the demographic comparisons, independent samples t-test was used in comparing two independent groups, and one-way analysis of variance test was used in comparing more than two independent groups. The 95% confidence interval and 5% significance level were used to evaluate the findings.

**RESULTS**

Totally, 111 people participated in the study, and 73 (65.8%) of them are female, and 38 (34.2%) of them are male. The age distribution of the participants is as follows: 44 of the participants (39.6 %) are ≤25 years, 49 of them (44.1%) are between 26 and 35 years, and 18 of them (16.2%) are 36 years old or older. When the education levels of the participants are examined, it is found that 21 of them are (18.9%) high school graduates, 38 of them have (34.2%) associate degree, 33 of them have (29.7%) undergraduate degree, and 19 of them have (17.1%) have graduate degree. A total of 53 of the participants (47.7%)

**Table 1:** Reliability analysis

<i>Dimensions</i>	<i>No of items</i>	<i>Cronbach’s alpha</i>
Experimentation	2	0.91
Risk taking	2	0.84
Interaction with the external environment	3	0.84
Dialogue	4	0.87
Participative decision-making	3	0.90
Organizational learning capability	14	0.95



are administrative staff, and 58 of them (52.3%) are health care staff. When the tenures of the participants are examined, 49 of the participants (44.1%) have 1 to 3 years of experience, 29 of the participants (26.1%) have 4 to 6 years of experience, and 33 of the participants (29.7%) have 7 or more years of experience.

According to Table 2, employees participated in the study see OLC level of their organizations as positive both for general OLC and for subdimensions of OLC. The most positively perceived subdimension is dialogue, whereas risk taking is perceived as the least positively perceived subdimension.

In Table 3, gender-based comparison of OLC perceptions is given. According to this table, it is seen that there is only significant difference in risk-taking dimension in terms of gender. However, it is seen that there is no significant gender-based difference both for general OLC perception and for other subdimensions.

In Table 4, age-based comparison of OLC perceptions is given. According to this table, it is seen that there is no statistically significant difference both for general OLC perception level and for OLC subdimensions.

In Table 5, education-based comparison of OLC perceptions is given. According to this table, it is seen that there is no statistically significant difference both for general OLC perception level and for OLC subdimensions.

In Table 6, job position-based comparison of OLC perceptions is given. According to this table, it is seen that

there is only significant difference in interaction with the external environment dimension in terms of job position. However, it is seen that there is no significant job position-based difference both for general OLC perception and for other subdimensions.

In Table 7, tenure-based comparison of OLC perceptions is given. According to this table, it is seen that there is no statistically significant difference both for general OLC perception level and for OLC subdimensions.

## DISCUSSION

According to the findings, employees perceive their organizations' OLC level positively both for general OLC and for OLC subdimensions. Dialogue subdimension is found to be the most positively perceived subdimension, whereas risk-taking subdimension is found to be the least positively perceived subdimension. Another similar study in the literature also supports our findings.<sup>10</sup> The finding that dialogue subdimension is the most positively perceived subdimension can be explained by the extensive importance placed on communication in health care organizations. On the contrary, the finding that risk-taking dimension is the least positively perceived subdimension can be explained by the criticality of human health care. In other words, health care employees are more likely to avoid risk taking when it comes to human life.

When the employees' OLC perception levels are analyzed in terms of gender, it is seen that there is only significant difference in risk-taking dimension. However, it is also seen that there is no significant gender-based difference both for general OLC perception and for other subdimensions. For gender-based comparisons, it is found that men perceive their organizations' OLC levels higher than women do. Similar study done by Aydoğan et al<sup>3</sup> also supports this finding, and it is recommended to examine this subject in detail.

**Table 2:** Descriptive statistics

<i>Dimensions</i>	<i>n</i>	<i>Mean</i>	<i>Standard deviation</i>
Experimentation	111	3.39	1.15
Risk taking	111	3.14	1.18
Interaction with the external environment	111	3.33	1.09
Dialogue	111	3.58	0.98
Participative decision-making	111	3.22	1.19
Organizational learning capability	111	3.36	0.97

**Table 3:** Comparison of perceived OLC level in terms of gender

<i>Dimensions</i>	<i>Gender</i>	<i>n</i>	<i>Mean</i>	<i>Standard deviation</i>	<i>t-value</i>	<i>Significance</i>
Experimentation	Female	73	3.29	1.13	-1.27	0.21
	Male	38	3.58	1.18		
Risk taking	Female	73	2.97	1.19	-2.19	0.03
	Male	38	3.47	1.08		
Interaction with the external environment	Female	73	3.26	1.07	-0.90	0.37
	Male	38	3.46	1.14		
Dialogue	Female	73	3.51	0.98	-1.02	0.31
	Male	38	3.71	0.98		
Participative decision-making	Female	73	3.13	1.18	-1.06	0.29
	Male	38	3.39	1.20		
Organizational learning capability	Female	73	3.27	0.96	-1.39	0.17
	Male	38	3.53	0.97		

**Table 4:** Comparison of perceived OLC level in terms of age

<i>Dimensions</i>	<i>Age</i>	<i>n</i>	<i>Mean</i>	<i>Standard deviation</i>	<i>f-value</i>	<i>Significance</i>
Experimentation	25 and under	44	3.25	1.33	1.53	0.22
	26–35	49	3.36	1.06		
	36 and higher	18	3.81	0.86		
	Total	111	3.39	1.15		
Risk taking	25 and under	44	3.06	1.33	1.17	0.31
	26–35	49	3.07	1.10		
	36 and higher	18	3.53	0.93		
	Total	111	3.14	1.18		
Interaction with the external environment	25 and under	44	3.42	1.17	0.99	0.38
	26–35	49	3.17	1.05		
	36 and higher	18	3.54	0.98		
	Total	111	3.33	1.09		
Dialogue	25 and under	44	3.44	1.10	0.87	0.42
	26–35	49	3.64	0.95		
	36 and higher	18	3.76	0.70		
	Total	111	3.58	0.98		
Participative decision-making	25 and under	44	3.26	1.21	1.06	0.35
	26–35	49	3.07	1.14		
	36 and higher	18	3.54	1.27		
	Total	111	3.22	1.19		
Organizational learning capability	25 and under	44	3.31	1.08	0.91	0.41
	26–35	49	3.29	0.92		
	36 and higher	18	3.64	0.79		
	Total	111	3.36	0.97		

**Table 5:** Comparison of perceived OLC level in terms of education

<i>Dimensions</i>	<i>Education</i>	<i>n</i>	<i>Mean</i>	<i>Standard deviation</i>	<i>f-value</i>	<i>Significance</i>
Experimentation	High school	21	3.43	1.11	0.03	0.99
	Associate degree	38	3.34	1.19		
	Undergraduate	33	3.41	1.28		
	Graduate	19	3.39	0.98		
	Total	111	3.39	1.15		
Risk taking	High school	21	3.24	1.29	0.42	0.74
	Associate degree	38	3.16	1.19		
	Undergraduate	33	3.21	1.23		
	Graduate	19	2.87	0.97		
	Total	111	3.14	1.18		
Interaction with the external environment	High school	21	3.27	1.13	1.27	0.29
	Associate degree	38	3.55	1.07		
	Undergraduate	33	3.31	1.18		
	Graduate	19	2.96	0.90		
	Total	111	3.33	1.09		
Dialogue	High school	21	3.71	0.95	0.34	0.80
	Associate degree	38	3.63	0.94		
	Undergraduate	33	3.46	1.13		
	Graduate	19	3.53	0.85		
	Total	111	3.58	0.98		
Participative decision-making	High school	21	3.16	1.25	1.16	0.33
	Associate degree	38	3.39	1.08		
	Undergraduate	33	3.31	1.30		
	Graduate	19	2.79	1.12		
	Total	111	3.22	1.19		
Organizational learning capability	High school	21	3.39	1.03	0.46	0.71
	Associate degree	38	3.45	0.94		
	Undergraduate	33	3.35	1.07		
	Graduate	19	3.14	0.80		
	Total	111	3.36	0.97		



**Table 6:** Comparison of perceived OLC level in terms of job position

<i>Dimensions</i>	<i>Job position</i>	<i>n</i>	<i>Mean</i>	<i>Standard deviation</i>	<i>t-value</i>	<i>Significance</i>
Experimentation	Administrative staff	53	3.47	0.87	0.73	0.46
	Health staff	58	3.31	1.37		
Risk taking	Administrative staff	53	3.09	0.91	-0.39	0.70
	Health staff	58	3.18	1.39		
Interaction with the external environment	Administrative staff	53	3.11	0.99	-2.06	0.04
	Health staff	58	3.53	1.15		
Dialogue	Administrative staff	53	3.66	0.80	0.84	0.40
	Health staff	58	3.50	1.12		
Participative decision-making	Administrative staff	53	3.03	1.02	-1.60	0.11
	Health staff	58	3.39	1.31		
Organizational learning capability	Administrative staff	53	3.30	0.75	-0.61	0.55
	Health staff	58	3.41	1.14		

**Table 7:** Comparison of perceived OLC level in terms of tenure

<i>Dimensions</i>	<i>Tenure</i>	<i>n</i>	<i>Mean</i>	<i>Standard deviation</i>	<i>f-value</i>	<i>Significance</i>
Experimentation	1-3 years	49	3.39	1.33	0.34	0.71
	4-6 years	29	3.52	1.10		
	7 years and higher	33	3.27	0.91		
	Total	111	3.39	1.15		
Risk taking	1-3 years	49	3.15	1.39	2.80	0.07
	4-6 years	29	3.50	0.94		
	7 years and higher	33	2.80	0.92		
	Total	111	3.14	1.18		
Interaction with the external environment	1-3 years	49	3.39	1.21	1.08	0.34
	4-6 years	29	3.48	0.98		
	7 years and higher	33	3.10	0.99		
	Total	111	3.33	1.09		
Dialogue	1-3 years	49	3.47	1.18	0.64	0.53
	4-6 years	29	3.73	0.84		
	7 years and higher	33	3.60	0.74		
	Total	111	3.58	0.98		
Participative decision-making	1-3 years	49	3.28	1.22	0.76	0.47
	4-6 years	29	3.36	1.14		
	7 years and higher	33	3.01	1.20		
	Total	111	3.22	1.19		
Organizational learning capability	1-3 years	49	3.36	1.12	0.89	0.42
	4-6 years	29	3.53	0.85		
	7 years and higher	33	3.21	0.81		
	Total	111	3.36	0.97		

When the employees' OLC perception levels are analyzed in terms of age, it is seen that there is no statistically significant difference both for general OLC perception level and for OLC subdimensions. A previous study in the literature also found similar results, which supports our findings as well.<sup>14</sup> When the age groups are statistically examined in detail, it is found that older employees have higher OLC perception levels. As employees get older, their knowledge and experience also increase. Moreover, health care organizations aim to benefit this knowledge and experience and also aim to transfer this knowledge and experience to other employees. Therefore, it is possible to argue that older employees participate more in

the organization's learning activities, and, thus, perceive their organizations' OLC level higher.

When the employees' OLC perception levels are analyzed in terms of education, it is seen that there is no statistically significant difference both for general OLC perception level and for OLC subdimensions. Farzianpour et al<sup>14</sup> also found similar results for the relationship between education and OLC perception level, which supports our finding as well. When the education aspect is statistically examined in detail, it is found that there is a negative relationship between education and OLC perception. This finding might be examined through arguing that employees with higher education

levels have more knowledge base, and they have more complex and difficult jobs. In other words, employees, who have higher education levels, are eager to benefit from training and development opportunities in order to perform better, whereas these demands are generally not met and ignored by their organizations. On the contrary, employees with lower levels of education need less amount of knowledge due to the characteristics of their jobs, and the necessary knowledge for their jobs is generally provided by their organization.

When the employees' OLC perception levels are analyzed in terms of job position, it is seen that there is only significant difference in interaction with the external environment dimension. However, it is seen that there is no significant job position-based difference both for general OLC perception and for other subdimensions. It is possible to argue that one of the main reasons behind this finding might be that health staff are required to follow developments and changes in the health care sector in order to sustain their personal development, thus health staff are more likely to engage in interaction with the external environment. When the job position aspect is statistically examined in detail, it is seen that health staff have higher OLC perception level than those of administrative staff. Aydoğan et al<sup>3</sup> also support this finding; specifically, they found that health staff have higher OLC perception levels than administrative staff.

When the employees' OLC perception levels are analyzed in terms of tenure, it is seen that there is no statistically significant difference both for general OLC perception level and for OLC subdimensions. In the literature, other studies also support this result. For instance, Uzuntarla et al<sup>10</sup> found that there is no statistically significant relationship between OLC perception levels of employees and their tenure, which supports our findings as well. When the tenure aspect is statistically examined in detail, it is seen that employees with medium levels of tenure have higher levels of OLC perception, whereas employees with low and high tenure reported lower levels of OLC perception.

## CONCLUSION

Due to the fast-changing and developing business environment, knowledge has become a very important resource for organizations. Organizations, which possess and use knowledge, are more likely to be one step ahead of their competitors. However, reaching and obtaining knowledge is difficult, and OLC perception within the organization is a key aspect for this aim. Changes and developments occurring in health care sector have forced health care organizations to

emphasize and rely on organizational learning more than ever. Moreover, health care organizations have also started to increase their OLC perceptions. If health care organizations can increase their OLC levels, they might achieve an increase in organizational performance, patient satisfaction, competitive advantage, and employee satisfaction.

According to the findings of this study, it is seen that OLC levels of the participants are fair and sufficient. However, it is also concluded that this perception level could be increased as well. In order to achieve this, health care organizations are required to encourage their employees toward learning, investigating, communication, risk taking, and participation. In addition, necessary organizational culture and framework must be established within the organization by obtaining management support. Although this study has limitations, such as limited number of participants, it is still important to demonstrate whether there is a demographic variation among employees in terms of their OLC perception levels. It is recommended that conducting similar studies with higher sample sizes might be beneficial.

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# Community-oriented Primary Care Services Model: Can it improve Morbidity Status in India? An Impact Evaluation Study

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## ABSTRACT

**Introduction:** The community-oriented primary care (COPC) services model is an approach prescribed by the Medical Council of India for existing medical colleges in India from their respective urban and rural health training centers (RHTCs). However, the evidence of whether it is better as compared with pure primary health care approach in the Indian context is lacking in the literature. Therefore, it becomes imperative to study this area for its further expansion.

**Materials and methods:** The study was done in the catchment area of RHTC and neighboring primary health center (PHC; Makhiyali) attached to the medical college in the district of Western Uttar Pradesh in India. Three surveyed villages out of six villages from July 1, 2016, to December 31, 2016, were taken in this study. Finally, the COPC vs primary health care approach comparison was done on four outcome parameters.

**Results:** The utilization of COPC services from RHTC area as compared with primary health care services from PHC area was significantly better for all diseases combined ( $p < 0.005$ ) and also in the category of management of upper respiratory tract infections ( $p < 0.0001$ ) and nutritional deficiencies ( $p < 0.05$ ). On further applying COPC services model, it was also found that RHTC services were significantly better as compared with PHC services in terms of socioeconomic impact on health from services ( $p < 0.0000$ ), identification of health needs from services ( $p < 0.0000$ ), and participation in health care services ( $p < 0.05$ ).

**Conclusion:** The COPC services model appears to be successful in the delivery of health care services from RHTC of a medical college as compared with pure primary health care approach delivered from a PHC. However, authors suggest more in-depth multicentric studies on this issue before generalization of COPC model usage across the world.

**Keywords:** Community-oriented primary care, Primary health care, Primary health center, Rural area, Rural health training center.

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## INTRODUCTION

The Declaration of Alma-Ata (1978) defines primary health care as “an essential health care based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community and country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination”.<sup>1,2</sup>

The community-oriented policy is a strategy of policy that focuses on policy building ties and working closely with members of the communities. The community-oriented primary care (COPC) service model is based on community-oriented policy in which a local health system takes responsibility for the health of an identified community and in collaboration with the community, it identifies the public and personal health problems facing the community, develops and implements community-appropriate public and personal health care interventions, measures the impact of the intervention, and corrects plans and actions based on lessons learned.<sup>1,2</sup> This policy has served as an impetus for the development of the community health center programs in many developed countries.<sup>1,2</sup>

The COPC is a comprehensive approach to care for community members, which not only considers the socioeconomic and cultural determinants of health but also identifies health needs and provides health care to the total community.<sup>3</sup>

Nowadays, globally, primary care is gaining importance because it is the component of health services that tackles most of the health problems arising in a community, and when enhanced by a community orientation, it is a public health at the local level.<sup>4,5</sup>

Community-oriented primary care actually combines elements of clinical medicine and public health to provide

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an effective strategy for tackling today's health problems. A primary care practice or program that develops a partnership with an identified community to describe and prioritize health concerns and design and monitor the impact of an intervention can make a difference to the health of a community. The key ingredient to a successful COPC venture is a motivated practitioner<sup>6</sup> and community-based participatory research (CBPR) practice that has emerged to bridge the gap between research and primary care practice through community engagement and social action to increase health equity.<sup>7</sup>

It has been evident from the literature that many factors influence morbidity patterns in rural areas as catered by a health center or hospital, such as demographic, social, household, and economic.<sup>8-11</sup> Studies conducted in different states of India<sup>12-17</sup> also indicate that the case rate is higher not only for the 18 to 45 years age group but also for preschool children, adolescents, and the elderly in rural areas.<sup>18</sup> Moreover, it has been seen that factors, such as cleanliness of the premises, face-lift, and clean toilet with privacy and availability of safe drinking water facilities can improve client satisfaction in rural health care delivery systems.<sup>19</sup> This kind of scenario places a question mark on quality services from existing primary health care strategy.

The Medical Council of India<sup>20</sup> recognizing this aspect in its regulation has emphasized that every medical college must have three primary health centers/rural health training centers (RHTCs) for training of students in community-oriented primary health care and rural-based health education for the rural community attached to it.

It has been evident from the literature that COPC service model can give us the tools to combine preventive, promotive, and curative approaches by focusing our efforts on a defined community and prioritizing the issues as seen from many studies.<sup>1-7,21</sup> So, the question is whether COPC is a better approach as compared with pure primary care health care approach in the Indian context – this aspect is not evident from the literature. Therefore, the key objective of this study is to know the impact of applying COPC services model on disease status in a rural area of India. This is the reason why the authors choose this research area.

## MATERIALS AND METHODS

Our study is a comparative cross-sectional study which includes all kinds of patients from infants to adults and the elderly conducted from July 1, 2016, to December 31, 2016 (6 months) at a RHTC catchment area in three surveyed villages (Bilaspur, Shernagar, Dhandedha) out of total six villages catered (Bilaspur, Shernagar, Makhiyali, Dhandedha, Bhagwanpuri, and Sikhreda)

by the RHTC. Here, the COPC services were delivered and its comparison was done with primary health care services given from neighboring block primary health center (PHC) which also catered to the same villages as catered by the RHTC. All surveyed population of three villages (Bilaspur, Shernagar, Dhandedha) were considered in this study.

First of all, after noting the sociodemographic data from survey, the morbidity pattern of the area was seen by physically verifying various morbidities in the field by researchers. Thereafter, the comparison of disease patients who were provided COPC services from RHTC and primary health care services from PHC was done regarding their services availed for their respective diseases. Finally, COPC services model parameters were taken for comparison among RHTC and PHC services.

The inclusion criteria adopted in this study included all types of subjects from infants to adults and elderly from any sex, caste, and religion who were willing to participate in giving responses from RHTC and PHC area of three surveyed villages (Bilaspur, Shernagar, Dhandedha).

The comparison parameters considered in COPC service model were based on the studies of Rhyne et al and Longlett et al,<sup>22-23</sup> in which they have elucidated that COPC is a systematic approach to health care based on principles derived from epidemiology, primary care, preventive medicine, and health promotion. Keeping in view this model, the services from both RHTC and PHC were compared following issues after making sociodemographic parameters of the community and making a community diagnosis: (1) Developing and implementing interventions in the form of all kinds of services given at RHTC or PHC, (2) monitoring the impact of the interventions, and (3) involving the community to carry out the previous steps.

The key parameters used for comparison in our study were number of patients received from community-oriented primary care services from RHTC *vs* Number of patients received from primary health care services by PHC. The cross comparisons were done on two issues, i.e., number of patients satisfied with primary health care services by PHC *vs* number of patients satisfied from COPC services from RHTC on four parameters: (1) Socioeconomic impact on health from services as reflected by their better financial and health status after procuring services from either RHTC or PHC, (2) cultural determinants of health identified from services based on their sociocultural aspects identified and fulfilled for their health status after getting services from either RHTC or PHC, (3) identification of health needs from services whether they were satisfied on their health needs

**Table 1:** Sociodemographic profile of catered and surveyed population in RHTC [N = 26,300]

Name of village	Population of village	No of families surveyed	No and % of adults surveyed	No and % of adolescents surveyed	No and % children under 5 years surveyed	No & % of elderly surveyed
Dhandedha	10,050	175	136	19	13	08
Bilaspur	8,142	1323	5627	1902	104	509
Shernagar	8,108	1843	7356	60	124	568
Total	26,300	3,341	13,119	1981	241	1085

**Table 2:** Morbidity profile of catered population in RHTC area [N = 26,300]

Name of village	Population of village	No of families surveyed	No & % of cases (any morbid condition)*
Dhandedha	10050	175 (ongoing)	76 (0.7)
Bilaspur	8142	1323	510 (6.2)
Shernagar	8108	1843	539 (6.6)
Total	26,300	3,341	1,125 (3.1)

identification services from either RHTC or PHC, and (4) participation in health care services based on their participation in health days and health camp services availed.

The exclusion criteria were adopted to exclude the mortality data of three surveyed villages (Bilaspur, Shernagar, Dhandedha) due to the choice of research objective considered in the study.

## RESULTS

Out of the 43,261 population catered by RHTC and PHC area, 7.7% of families were surveyed and out of them, 30.3% adults, 4.5% adolescents, 2.5% elderly, and 0.5% under 5 years children were surveyed in RHTC area and confirmed also by the PHC medical officer as part of the COPC services provided to the catered population of RHTC and PHC area (Table 1).

The prevalence of any morbid condition in total was 2.6% from the whole population, whereas the family-wise prevalence of any morbid condition was 33.7%, which was higher from population residing in village Shernagar (47.9%) and only 6.7% till the completion of this study (Table 2). The Shernagar village had maximum diseases morbidity of 6.6% and village Dhandedha had least morbidity of 0.7% in our surveyed area (Table 2).

When sociodemographic data of three surveyed villages of RHTC were taken, the maximum people belonged to 20 to 40 years age group (56.1%) as compared with elderly age group (1.7%), with more males (51.6%), with a predominant Muslim population (52.5%); the literates were 55.8% and backward castes [scheduled caste (SC)/ scheduled tribe (ST)+ other backward class (OBC)] were only 21.6% (Table 3).

The morbidity pattern of primary care diseases in RHTC and PHC area was dominated by upper respiratory

**Table 3:** Sociodemographic profile of patients in surveyed area of RHTC [N = 1125]

	No.	%
Age groups (in years)		
0–20	134	11.9
20–40	631	56.1
40–60	341	30.3
>60	19	1.7
Total	1,125	100
Sex		
Female	545	48.4
Male	580	51.6
Total	1,125	100
Religion		
Hindu	489	43.5
Muslim	591	52.5
Others	45	4.0
Total	1,125	100
Literacy status		
Illiterate	498	44.2
Literate	627	55.8
Total	1,125	100
Caste		
SC/ST	118	10.5
OBC	125	11.1
General	882	78.4
Total	1,125	100

infections (26.1%), fever (14.8%), and least were diabetes (0.2%) (Table 4).

When comparison of diseases was done for health services availed, it was found it in majority of diseases patients availed COPC services from RHTC as compared with primary health care services from PHC, and this was statistically significant for morbid conditions of upper respiratory tract infections (URTI;  $p < 0.0001$ ) and management of nutritional deficiencies ( $p < 0.05$ ), and for all

**Table 4:** Morbidity pattern of primary care diseases in RHTC and PHC area

Type of disease	No of cases (n = 781)	% of cases
URTI	204	26.1
Fever (clinical malaria+ typhoid)	116	14.8
Scabies	73	9.3
Gastroenteritis (incl gastritis)	58	7.4
Injuries (incl infected wounds)	55	7.0
LRTI	44	5.9
Allergic RTI	45	5.8
Skin ailments (fungal)	34	4.3
Dermatitis (incl acne)	34	4.3
Diarrhea/dysentery	33	4.2
Sinusitis	24	3.0
Undernutrition (PEM)	22	2.8
Ophthalmic keratitis	10	1.3
Abscess	10	1.3
Female RTI and STIs	10	0.9
UTI	07	0.6
Diabetics	02	0.2
Total	781	100

LRTI: Lower respiratory tract infection; PEM: Protein–energy malnutrition; RTI: Reproductive tract infection; STI: Sexually transmitted infection; UTI: Urinary tract infection

the diseases differences were also statistically significant ( $p < 0.005$ ) (Table 5).

When the outcome of applying COPC services model was seen, it was found that RHTC services were

significantly better as compared with PHC services in terms of socioeconomic impact on health from services ( $p < 0.0000$ ), identification of health needs from services ( $p < 0.0000$ ), participation in health care services ( $p < 0.05$ ) except in the issue of cultural determinants of health identified ( $p > 0.05$ ) (Table 6).

## DISCUSSION

The literature reveals that CBPR approaches can increase access to care by building relationships with community partners that can determine geographical areas of need, establish community priorities for health concerns, and ultimately create a more efficient and streamlined health care delivery system.<sup>7</sup> The CBPR is one of the ways to design sustainable community-specific interventions with the potential to produce specific improvements in several chronic conditions.<sup>7</sup> With this background, our study also revealed some similar types of issues as evident from our study results.

In our present study, out of the 43,261 population catered by RHTC and PHC area, 7.7% of families were surveyed. The prevalence of any morbid condition in surveyed area was 2.6% from the whole population, whereas the family-wise prevalence of any morbid condition was 33.7%, which was higher from population residing in Shernagar village (47.9%) and Dhandhera village had least morbidity of 6.7%. The higher morbidities found in

**Table 5:** Comparison of patients with diseases who were provided COPC services from RHTC and Primary health care services from PHC [N = 781]

Total types of diseases	No. of patients who received COPC services from RHTC (n = 329)		No. of patients who received primary health care by PHC (n = 199)		Chi-square test
	Yes	No	Yes	No	
Gastroenteritis (incl. gastritis; n = 58)	23	17	10	8	$\chi^2 = 0.01$ , d.f. = 1, $p > 0.05$
Scabies (n = 73)	27	16	18	12	$\chi^2 = 0.05$ , d.f. = 1, $p > 0.05$
Fever (clinical malaria+ Typhoid; n = 116)	56	30	19	11	$\chi^2 = 0.03$ , d.f. = 1, $p > 0.05$
URTI (n = 204)	91	67	40	6	$\chi^2 = 13.3$ , d.f. = 1, $p < 0.001$
LRTI (n = 44)	11	6	23	4	$\chi^2 = 1.4$ , d.f. = 1, $p > 0.05$
Abscess (n = 10)	3	1	5	1	$\chi^2 = 0.2$ , d.f. = 1, $p > 0.05$
Nutritional deficiencies (n = 22)	2	9	8	3	$\chi^2 = 3.82$ , d.f. = 1, $p < 0.05$
Injuries (incl infected wounds; n = 55)	22	10	13	10	$\chi^2 = 0.006$ , d.f. = 1, $p > 0.05$
Diabetics investigated (n = 02)	1	0	1	0	$\chi^2 = 0.87$ , d.f. = 1, $p > 0.05$
Skin ailments (fungal; n = 34)	14	7	10	3	$\chi^2 = 0.06$ , d.f. = 1, $p > 0.05$
Dermatitis (incl acne; n = 34)	19	3	10	2	$\chi^2 = 0.07$ , d.f. = 1, $p > 0.05$
Ophthalmic keratitis (n = 10)	3	2	4	1	$\chi^2 = 0.00$ , d.f. = 1, $p > 0.05$
Sinusitis (n = 24)	10	3	9	2	$\chi^2 = 0.04$ , d.f. = 1, $p > 0.05$
Allergic RTI (n = 45)	25	10	09	1	$\chi^2 = 0.6$ , d.f. = 1, $p > 0.05$
UTI (n = 07)	3	1	2	1	$\chi^2 = 0.3$ , d.f. = 1, $p > 0.05$
Female RTI and STIs (n = 10)	4	1	4	1	$\chi^2 = 0.6$ , d.f. = 1, $p > 0.05$
Diarrhea and dysentery (n = 33)	15	1	14	3	$\chi^2 = 2.3$ , d.f. = 1, $p > 0.05$
Total	329	184	199	69	$\chi^2 = 8.23$ , d.f. = 1, $p < 0.005$
	513		268		
	781				

LRTI: Lower respiratory tract infection; RTI: Reproductive tract infection; STI: Sexually transmitted infection; UTI: Urinary tract infection

**Table 6:** Outcome of applying COPC services model from RHTC as compared with primary health care services received from PHC [N = 781]

Community-oriented primary care parameters considered	No. of patients satisfied with primary health care services by PHC (n=199)		No. of patients satisfied with COPC services from RHTC (n=329)		Total		Chi-square test
	Yes	No	Yes	No	Yes	No	
Socioeconomic impact on health from services	126	73	275	54	401	127	$\chi^2 = 26.7$ , d.f. = 1, $p < 0.0000$
Cultural determinants of health identified from services	121	78	201	128	322	206	$\chi^2 = 0.0$ , d.f. = 1, $p > 0.05$
Identification of health needs from services	137	62	189	140	326	202	$\chi^2 = 6.34$ , d.f. = 1, $p < 0.05$
Participation in health care services	73	126	226	103	299	229	$\chi^2 = 0.0$ , d.f. = 1, $p < 0.000$

our study area of village Shernagar (47.9%) indicate that real impact of primary health care services from PHC is questionable. This aspect was also revealed in few studies,<sup>8-11</sup> which indicate that not only the communicable diseases (contagious, infectious, and waterborne diseases, such as amoebiasis, typhoid, infectious hepatitis, worm infestations, measles, malaria, tuberculosis, whooping cough, respiratory infections, pneumonia, and reproductive tract infections) dominate the morbidity pattern in rural areas, but also noncommunicable diseases, such as cancer, blindness, mental illness, hypertension, diabetes, human immunodeficiency virus/acquired immunodeficiency syndrome, accidents, and injuries are also on the rise among rural people.<sup>11</sup>

Literature also reveals that nearly 70% of all deaths, and 92% of deaths from communicable diseases, occurred among the poorest 20% of the Indian population.<sup>11</sup> The majority of rural deaths, which are preventable, are due to infections and communicable, parasitic, and respiratory diseases. Infectious diseases dominate the morbidity pattern in rural areas (40% rural: 23.5% urban). Waterborne infections, which account for about 80% of sickness in India, make every fourth person dying of such diseases in the world an Indian.<sup>11</sup>

The literature further reveals that among communicable diseases, URTI (67.06%) and acute gastroenteritis (12.55%) take the maximum burden, whereas musculoskeletal pains (26.55%) and hypertension (15.53%) are the most reported diseases among noncommunicable diseases.<sup>18</sup> It has also been seen that although the increasing trend of noncommunicable diseases has been observed, infectious diseases are still more prevalent even in a well-planned modern city of India like Chandigarh.<sup>18</sup>

In our present study, the sociodemographic dominance of predominant Muslim population in the study area (52.5%) coupled with only literates (55.8%) and enough population belonging to backward castes (SC/ST ± OBC, 21.6%) explains the significant presence of morbid conditions in our study area just similar to other studies.<sup>8-11,18,19</sup>

Our study findings also corroborate with other studies in the literature,<sup>24-26</sup> which however suggests that although PHC is the best approach to achieving universal health coverage<sup>24,25</sup> and a fundamental requirement for achieving the Sustainable Development Goals,<sup>22,24</sup> its real positive impact on health status is questionable. Unfortunately, the concept of PHC was created at Alma-Ata in 1978, and many countries have failed to establish effective PHC.<sup>24,25</sup> The PHC is often neglected and diluted into poor quality health care by inadequately resourced, trained, and scarce health workers; or reduced to a series of selected activities and vertical disease-orientated programs.<sup>24,25</sup> The World Health Report also recommended a number of reforms that are required to establish more effective PHC, thereby improving health equity by focusing on universal coverage, making health systems more people-centered by changing the focus of service delivery, making governance of the system more reliable by developing leadership, and being more community-orientated with a public health perspective.<sup>24,25</sup>

In our present study, the morbidity pattern of primary care diseases in RHTC and PHC area was dominated by upper respiratory infections (26.1%). In the majority of diseases, patients availed COPC services from RHTC as compared with primary health care services from PHC, and this was statistically significant for morbid conditions of URTI ( $p < 0.0001$ ) and management of nutritional deficiencies ( $p < 0.05$ ). Our finding thus also corroborates with other studies in the literature.<sup>27-33</sup>

It has been seen that there is a broader scope of application of COPC as seen in a country, such as Bhutan.<sup>25</sup> The COPC and complementary and alternative medicine are well integrated within the few medical systems, such as Cuban.<sup>28</sup> Significant efforts are required to overcome the market approach of the national health system, and structural changes to social policies at the national and district level are needed if the PHC strategy is expected to achieve its full potential.<sup>29</sup> Moreover, COPC has important values and methods to offer disparate but powerful movements



in public health worldwide.<sup>30</sup> Coordination by dedicated nonphysician staff is often required to implement COPC concepts in rural practices in underserved areas.<sup>31</sup>

In our present study, it was also found that RHTC services were significantly better as compared with PHC services in terms of socioeconomic impact on health from services ( $p < 0.0000$ ), identification of health needs from services ( $p < 0.0000$ ), and participation in health care services ( $p < 0.05$ ). Our finding corroborates with other studies in literature.<sup>17-20,32-37</sup> The COPC, which is “a continuous process by which primary health care is provided to a defined community based on of its assessed health needs by the planned integration of public health with primary care practice,”<sup>17</sup> was also found to be a useful approach in our present study. A COPC practice integrates the care of personal health problems with the community’s major health problems by developing promotive, preventive, curative, and rehabilitative programs to target populations.<sup>17</sup> Studies also indicate that a modified COPC approach which was also used in our present study can be used in general practice and it has more impact at primary care level than at practice level.<sup>18</sup> Community-oriented primary care seems to be the same combination of public health and general practice perspectives currently sought in the formation of primary care trusts in Britain’s National Health Service.<sup>19,20</sup>

It has been seen from the studies that COPC allows primary care physicians to expand the range of health care services and their ability to reach out to people. Incorporation in COPC has the potential to make a major contribution in reshaping health care in the United States.<sup>19,20</sup> By combining personal care with the broader PHC approach, using the tools of COPC, we will build a much more robust and appropriate model of health care for our situation.<sup>32</sup> It has been seen that although government health facilities were more efficient in the delivery of primary health care services as compared with private training health facilities,<sup>33-37</sup> RHTCs can be good supporting components to national health programs<sup>33-37</sup> just similar to the findings of our present study.

We therefore, further suggest a paradigm shift from the current “biomedical model” to a “sociocultural model,” which is the need of the hour, should bridge the gaps and improve quality of rural life, address the prevailing inequalities, and work toward promoting a long-term perspective plan mainly for rural health, and is imperative as suggested by other studies in literature.<sup>11-20</sup>

## LIMITATIONS

The comparison parameters for socioeconomic impact of the two models are not standardized. The nonperformance

of further correlation of comparison parameters is also a limiting factor in our study. The nonstudied effect of confounders may be a restricting factor in our study. Moreover, our study is based on a small setting at the district level, hence, its generalization should be done with caution.

## CONCLUSION

There is no doubt that the universal health coverage achieved through primary health care is a laudable and important goal, but the quality of this primary health care is not of that level on which the population has trust in the services and gains in health outcomes are clearly seen. Here, COPC can be a good answer provided by RHTCs of budding medical colleges in India to take a leading role in this direction for significantly influencing the morbidity status of rural people as found in our study. Authors, however, recommend more in-depth multicentric studies for actually knowing the real impact of this kind of COPC model in a developing country, such as India.

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# Policies and Procedures for Sound-alike and Look-alike Medications

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## ABSTRACT

The sound-alike and look-alike (SALA) drug is one of the most common causes of medication error and is of fear globally. Thus, the probability for error due to confusing drug names is very high. The SALA drug names have become a significant challenge to pharmacists, nurses, patients, and doctors. With thousands of drugs currently on the market, the probability for error is significant. The purpose of this article is to formulate a policy that would help in minimizing medication errors arising with the use of SALA medications.

**Keywords:** Medication errors, Medication management, Patient safety, SALA medications

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## INTRODUCTION

### Sound-alike and Look-alike Medications

Medication names that sound similar are identified as sound-alike medications and medication names in which packaging is visually similar to another product or medication are identified as look-alike medications.<sup>1</sup> Sound-alike medications are those for which generic or trade names of the product or medication sound similar in the spoken or written words. Thus, they have a high potential for medication error.

Human factor concepts that are relevant to the medication use process are simplicity, standardization, differentiation, lack of duplication, and unambiguous communication.<sup>2</sup>

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## NEED OF THE POLICY

The SALA medications create serious problems in health care, leading to 29% of medication dispensing errors. Approximately 25% of errors reported to national medication error reporting programs is the aftermath of confusion with drug names that sound alike and look alike.<sup>3,4</sup>

## MATERIALS AND METHODS

This was a descriptive cross-sectional study carried between March 2016 and March 2017. The study population included doctors, nursing personnel, pharmacists, and quality managers from tertiary care hospitals of both public and private hospitals of India. Checklist was made after an exhaustive review of literature, which was then improvised. Validation of the checklist was done by experts in quality assurance from the National Accreditation Board for Hospitals and Health care Providers-accredited private hospitals. Subsequently, interaction was done with study population against the backdrop of the checklist and policy was formulated.

## ANALYSIS AND RESULTS

Two hundred people which included doctors, nurses, pharmacists, and quality managers of tertiary care public and private hospitals were approached for interaction against the backdrop of the check list. Total response rate was 60%. A total of 25 responded out of 50 doctors approached, 35 nurses responded out of 50, 24 quality managers interacted out of 50, and 36 pharmacists responded out of 50 approached. Policy was framed after incorporating inputs from responses received against the backdrop of the checklist.

## AIM

The aim of the policy is to augment awareness among health care providers with regard to potential for medication errors due to SALA drugs, hence minimizing medication error.

## OBJECTIVES

- To identify SALA medications, i.e., the drugs which have higher potential of medication error due to similarities in their nomenclature (generic/brand name) or their looks (in packaging).

- To increase awareness among health care providers regarding SALA medications.
- To minimize medication errors arising with the use of SALA medications.
- To ensure ordering, storing, handling, and administration of SALA medications in a standardized manner.

## SCOPE

- All areas of the health care facility where pharmacy is stored.
- All patient care areas of the hospital.

## RESPONSIBILITIES

Pharmacist  
Nursing staff  
Clinicians

## POLICY

### Strategies to Monitor SALA Drugs<sup>3,5-8</sup>

- List of SALA medications to be prepared by the pharmacy of the health care facility. The list needs to be updated every 6 months.
- The list is to be prepared in two sets (Set 1 and Set 2) and drugs are stored in two separate racks/containers accordingly intended to avoid medication error due to close proximity of two SALA medications.
- To evade medication error, while dealing with SALA drugs, tall-man lettering should be practiced. In tall-man lettering, part of a drug's name should be in upper case letters to distinguish SALA drugs from one another in order to avoid medication errors (e.g., predniSONE/predniSOLONE).<sup>9</sup>
- Generic names should also be included in the list of SALA drugs for reconfirming the selection of right medication.
- All nursing stations, treatment rooms, and other patient care area should have the list of SALA medications.
- Any query regarding SALA drugs should be answered by the pharmacy/clinicians at the earliest with correct information.

### How to Store SALA Drugs<sup>3,5-8</sup>

- The SALA medications should not be stocked up along with other medications, anywhere in the hospital.
- The SALA medications should be stored separately in two racks in the pharmacy store, Group I medications in one rack and group II medications in the other rack to avoid medication error.
- In the wards, emergency, and operation theater, the SALA drugs should be stored in separate drug bins or plastic boxes.

- In the pharmacy stores, the list of SALA medications should be hanging from both racks.
- In the ward/unit, the list should be pasted inside medication room, if required, on nursing station.

### Standardizing Warning Signage<sup>10</sup>

Warning stickers pink in color and stating *Sound-alike or Look-alike Medications* need to be pasted on the storage racks in pharmacy.

In the ward/unit, emergency, or operation theater, cupboards storing the SALA drugs should have the *pink colored* SALA medication warning label/sticker outside the cupboard.

Inside the cupboard storing SALA drugs, the containers storing groups I and II SALA medications should have *pink colored* SALA warning sticker.

### How to Standardize Ordering/Prescription of SALA Drugs

- While prescribing SALA medications, CAPITAL LETTERS should always be used and handwriting should be clear and legible.
- While ordering or prescribing SALA medications manually, both the brand and the generic name should be documented in the medication chart.<sup>10</sup>
- Formulary should be accessible to clinicians and staff nurses and facility should be provided for confirming
  - Generic name from a brand name or
  - Available brand names from a generic name
- Before documenting the prescription
  - There should be readback confirmation of the drug name
  - The generic composition of the name should be noted

### How to Dispense SALA Drugs

Medication incidents linked to SALA drug names can pose serious harm to the patients. It is often difficult to detect the medication errors related to SALA drugs as the dispensed medication is presumed to have been the one that is prescribed for the patient.<sup>11</sup>

- At pharmacy or store while dispensing SALA medications, it should be doubly checked by another pharmacist.
- In wards, nursing staff should doubly check SALA medication before dispensing.
- In case of any doubt, it is mandatory that before dispensing SALA medications, the generic name of the drug to be dispensed should be confirmed from the doctors.
- The list of SALA medications should be made available in all the area from where drugs are being dispensed.

**How to Administer SALA Drugs**

List of SALA medications should be available (pasted) in all medication rooms for cross reference.

Sound-alike and Look-alike drugs being high-risk medication, the patient should be monitored periodically,

after administration of the drug, as this group of medications has high potential for medication error.<sup>12</sup>

List of look-alike medications is provided in Annexure 1.<sup>9</sup>

List of sound-alike medications is provided in Annexure 2.<sup>13</sup>

**Annexure 1**

<i>Look-alike drugs</i>			
<i>Group 1</i>		<i>Group 2</i>	
<i>Brand name</i>	<i>Generic</i>	<i>Brand name</i>	<i>Generic</i>
Acivir 5 gm Cream	Acyclovir	Acivir Eye Ointment 5 gm Tube	Acyclovir
Adaferin	Adapalene	Clindac A	Clindamycin
Alex syrup	Chlorpheniramine maleate+Dextromethorphan	Alex (Sugar Free)	Chlorpheniramine maleate+Dextromethorphan
Alphagan P Eye Drops	Brimonidine+purine derivatives	Alphagan Eye Drops	Brimonidine
Amantral 100 mg cap	Amantadine	Redotil cap	Racecadrotil
Ambrodil Syrup	Ambroxol Hydrochloride	Ambrodil Plus Syrup	Ambroxol Hydrochloride+Chlorpheniramine maleate
Ambrolite S Syrup	Ambroxol Hydrochloride + Salbutamol+Guaifenesin	Ambrolite D Syrup	Cetirizine+Dextromethorphan+Pseudoephedrine HCl
Adriamycin INJ	Doxorubicin	Farmorubicin INJ	Farmorubicin
Amclox	Ampicillin+Cloxacillin	Ceff 500	Cephalexin
Benzac AC	Benzoylperoxide	Premethrin	Premethrin
Betadine Gargles	Povidine Iodine	Betadine Solution	Povidine Iodine
Betnovate Cream	Betamethasone valerate	Betnovate N Cream	Betamethasone valerate+Neomycin
Bioclox Inj. 500 mg	Cloxacillin	Biocillin Inj. 500 mg	Ampicillin
Bricarex A Syrup	Ambroxol Hydrochloride + Terbutaline+Guaifenesin	Bricarex Syrup	Terbutaline
Buscopan Tab	Hyoscine-N-butylbromide	Dulcolax Tab	Bisacodyl
Candid Mouthpaint	Clotrimazole	Candid Topical Solution	Clotrimazole
Cefmate 1 gm	Cefoperazone+Sulbactam	Piptamate 4.5 gm	Piperacillin+Tazobactam
Ciplox Cream	Ciprofloxacin	Ciplox D Cream	Ciprofloxacin+Dexamethasone
Clearz	Kozic Acid	Clearz Plus	Kozic Acid+ Vitamin C
Clindac A	Clindamycin	Desowen	Desonide
Corex 100 mL Syrup	Codeine phosphate + Chlorpheniramine maleate+Alcohol	Bron Corex 100 mL Syrup	Bromhexine+Terbutaline+Guaiphenesin
Coscopin	Noscapine	Coscopin Plus	Noscapine+Sodium Citrate+Ammonium Chloride+Chlorpheniramine Maleate
Crocin	Paracetamol	Crocin DS	Paracetamol suspension
Cutizone T cream	Mopmetasone Furoate+Terbinafine	Cutizone ointment	Mopmetasone Furoate
Digene Tablets	Dried aluminum Hydroxide+Mg Al Silicate+Mg(OH) <sub>2</sub>	Gelusil Tablets	Aluminium hydroxide+magnesium trisilicate+methyl polysiloxane
Dipeptiven 50 mL	L-Alanine+L-Glutamine	Omegaven 10% 50 mL	EPA+DHA+Palmitic acid+Myristic acid
Duoline	Salbutamol+Ipratropium Bromide	Seroflo 500 rotacaps	Fluticasone
Dutas 0.5 mg	Dutasteride	Eldervit ZC	Vitamin B Complex
Emoderm	White Soft Paraffin Emollient cream with Benzoic Acid	Emolene	Propylene glycol and Diazolidinyl Urea
Emusone Cream	Clobetasone Propionate	Emusone M Cream	Clobetasone butyrate + Miconazole nitrate
Facelin Gel	Clindamycin Phosphate	Facelin A Gel	Clindamycin+Adapalene

(Cont'd...)

(Cont'd...)

Group 1		Group 2	
Brand name	Generic	Brand name	Generic
Foracort Inhaler	Formoterol	Budecort inhaler	Budesonide
Fucidine cream	Fusidic acid	Fucidine Ointment	Fusidic acid
Fuucibet cream	Fusidic acid + betamethasone	Fucidin Cream	Fusidic acid
Genteal Gel	Hydroxypropyl Methylcellulose	Genteal Eye Drops	Hydroxypropyl Methylcellulose+boric acid + KCl + NaCl
Grillinctus Syrup	Dextromethorphan + guiphenesin + ammonium chloride + chlorpheniramine maleate	Grillinctus BM Syrup	Terbutaline+Bromhexine
Halobet Cream	Halobetasol	Halobet S Cream	Halobetasol+Salicylic acid
Ibugesic Syrup	Ibuprofen	Ibugesic Plus Syrup	Ibuprofen+Paracetamol
Inj Magnex	Cefoperazone+Sulbactam	Inj Magnamycin	Cefoperazone sodium
Inj Solu Medrol 40 mg	Methyl Prednisolone succinate	Inj Depo-Medrol 40 mg	Methyl Prednisolone acetate
Inj Stancef 500 mg	Cefazolin Sodium	Inj Spectracef 500 mg	Cefditoren Pivoxil
Inj Supacef 250 mg	Cefuroxime	Inj Fortum 250 mg	Ceftazidime
Inj Taxim 500	Cefotaxim	Inj Taximax 1500	Cefotaxime Sodium +Sulbactam
Inj Xylocaine	Lidocaine Hydrochloride	Inj Xylocard	Lidocaine Hydrochloride
Intralipid 10%	Fat emulsion	Aminofen Infant 10%	Acetaminofen
Liv 52 Syrup	Herbal Preparation (For appetite)	Mentat Syrup	Herbal Preparation (Antiparkinsonism)
Meftal P	Mefenemic acid	Meftal Spas	Dicyclomine
Nadoxin C Cream	Clobetasol propionate + Nadifloxacin	Nadoxin Cream	Nadofloxacin
Nucoxia -p Tablets	Etoricoxib + Paracetamol	Nucoxia Tablets	Etoricoxib
Nizral	Ketoconazole	Surfaz SN	Clotrimazole+ Batamethasone+Neomycin
Polybion Syrup	Nicotinamide+pantothenyl alcohol + vitamin B + vitamin B12 + vitamin B2 + vitamin B6	Polybion SF Syrup	Vitamin b Complex
Riflux Forte	Alginic acid + Dried aluminium hydroxide + magnesium hydroxide + sodium bicarbonate	Riflux	Alginic acid+Dried aluminium hydroxide+magnesium trisilicate + sodium bicarbonate
Rumalaya cream	Herbal preparation for pain	Pilex Ointment	Herbal preparation for pain (anti-hemorrhoid)
Septillin Capsules	Herbal immunostimulant	Liv 52 Capsules	Herbal Preparation (For appetite)
Septillin Syrup	Herbal immunostimulant	Koflet Syrup	Herbal preparation for cough
Shelcal OS	Alphacalcidol	Shelcal 500 mg	Calcium
Syp Bacigyl	Norfloxacn	Syp Bacigyl - N	Metronidazole+norfloxacn
Syp Dilosyn	Methdilazine	Exp Dilosyn	Methdiazine hydrochloride+ Ammonium Chloride +Sodium Citrate
Syp Shelcal	Calcium+Vitamin d3	Syp Shelcal M	Boron+calcium carbonate+copper + magnesium oxide + manganese + vitamin D3 + zinc
Taxim O 200 Tablets	Cefixime	Taxim - O DT 50	Cefixime Dispersible tablet
T-Bact Ointment	Mupirocin	T - Bact cream	Mupirocin
Telma H Tablets	Telmisartan + hydrochlorthiazide	Telma AM	Telmisartan + amlodopine besylate
Tenovate Cream	Clobetasone Propionate	Tenovate G	Clobetasone butyrate + Gentamycin
Tropacyl Plus	Tropicamide + Phenylephrine hydrochloride + Chlorbutol	Tears Plus	Ocular lubricant
Venla XR Tablets	Venlafaxine XR	Roliten OD 2 mg Tablets	Tolterodine l-tartrate
Visyneral Drops	Nutritional supplement	Visyneral Zn Drops	Nutritional supplement+zinc
Zole ointment	Miconazole	Zole F Ointment	Miconazole+Flucinolone acetoneide
Zytee	Choline salicylate + Benzalkonium chloride EPA – Eicosapentaenoic acid DHA – Docosahexaenoic acid	Surfaz SN	Clotrimazole + betamethasone dipropionate + neomycin sulphate + tolnafatate

## Annexure 2

<i>Sound-alike drugs</i>			
<i>Group 1</i>		<i>Group 2</i>	
<i>Brand name</i>	<i>Generic</i>	<i>Brand name</i>	<i>Generic</i>
aceRET 25 mg Cap	Acitretin	aceTEN 25 mg Tab	Captopril
aceteC 25 mg Cap	Acitretin	aceteN 25 mg Tab	Captopril
Acivir 200 mg DT Tab	Acyclovir	VALcivir 500 mg Tab	Valacyclovir
adENOCOR 2 mL Inj.	Adenosine	adRENOR 2 mL Inj.	Noradrenaline
ALLegra 120 mg	Fexofenadine	EDegra 50 mg	Viagra
AMtas 10 mg Tablets	Amlodipine	DUtas 0.5 mg Cap	Dutasteride
angiZEM 60 mg Tablets	Diltiazem	angiSPAN 2.5 mg Tab	Glyceryl trinitrate
ATArax 10 mg Tab	Hydroxyzine	ALPrax 0.5 mg Tablets	Alprazolam
ATORva 20 mg Tab	Atorvastatin	ARAvA 20 mg Tab	Leflunomide
betaLOC 50 mg Tab	Metoprolol	betaTROP 50 mg Tab	Atenolol+nifedepin
busCOPAN 10 mg Tab	Hyoscine-N-butylbromide	busPIN 5 mg Tablets	Buspirone
CellIN 500 mg Tablets	Ascorbic acid	CeEMIN 500 mL IV	Amino acids
celemiN 500 IV	Parenteral nutritional supplement	celemiX 500 IV	Amino acid+fat+sorbitol
ciFRAN 500 mg Tablets	Ciprofloxacin	CiPLAR 10 mg Tablets	Propranolol
ciFRAN 500 mg Tablets	Ciprofloxacin	septRAN	Sulphamethoxazole + Trimethoprim
CIPLACtin Tablets	Cyproheptadine	CALAPtin 40 mg Tablets	Verapamil
clonIL 10 mg Tablets	Clomipramine	clonOTRIL 0.5 mg Tablets	Clonazepam
COLsprin CV 100 mg Tablets	Aspirin low dose	ECOsprin AV 150 mg Cap	Aspirin+atorvastatin
DEPSonil Tab	Imipramine	DAonil 5 mg Tab	Glibenclamide
diCONTIN XL 100 mg Tab	Diltiazem	diANTIN 25 mg Tab	Phenytoin
diLIGAN Tab	Meclizine	diZEM 30 mg tab	Diltiazem
domTAC Tablets	Pantoprazole	domCET Tablets	Domperidone
duOLIN Inhaler	Salbutamol+Ipratropium Bromide	duLANE 30 mg Cap	Duloxetine
ELOCon 5 mL Lotion	Mometasone furoate	EVALon cream 15 gm Tube	Estriol
EMESet 8 mg Tablets	Ondansetron	DOMCet Tablets	Domperidone
ENCorate	Sodium valproate	DICorate	Divalperox sodium
ENzar Forte Tablets	Amylase	VALZaar 40 mg Tab	Valsartan
EPidosin INJ	Valethamate	EPSolin INJ	Phenytoin
FAMOCid 20 mg Tablets	Famotidine	FERTOMid 25 mg Tab	Clomiphene
FESal N Tablets	Pancreatin + bile constituents + hemicellulase	MEFtal Forte Tablets	Mefenemic acid
fungiZONE INJ	Amphotericin B (conventional)	fungiSOME INJ	Amphotericin B (Liposomal)
Genteal 10 gm Gel	Hydroxypropyl methyl cellulose	Zentel 10 mL Syb Bottle	Albendazole
GLImer 1 tab	Glimipride	GALAmer 4 mg Tab	Galantamine
GLYnase 5 mg Tab	Glipizide	ZInase DP Tab	Diclofenac potassium + paracetamol + serratiopeptidase
I kul 10 mL eye drop	Phenyl epherine	I gol 100 gm powder	Isabgol powder
LIBrax 10 mg Tablets	Chlordiazepoxide + Clidinium bromide	LUBrex 10 mL eye drop	Sodium carboxyl methyl cellulose
LARpose 2 mg Tablets	Lorazepam	CALMpose 5 mg Tablets	Diazepam
LOpez	Lorazepam	Topaz	Topiramate
lorFAST 10 mg Tablets	Loratadine	lorVAS 2.5 mg Tab	Indapamide
Malirid 7.50 mg Tablets	Primaquine	alreid Tablets	Cetirizine
meftal FORTE Tablets	Mefenemic caid	meftal SPAS Tab	Dicyclomine
metADAC 25 mg Inj.	Nandrolene decanoate	metOLAR 25 mg Tab	Metoprolol
MICROGest 100 mg capsule	Progesterones + progestogens	MISOPRost 100 mg Tab	Misoprostol
nephroCAP Cap	Vitamin B	nephroSAVE Cap	N-acetylcysteine +taurine
NIMEgesic – OD Tablets	Nimesulide	IBUgesic 60 mL Syb Bottle	Ibuprofen
novaCLOX 500 mg Capsules	Amoxycillin+Cloxacillin	novaMOX Tab	Amoxicillin
NOVELOn Tablets	Progestogen+Estrogen	VOVERAn 50 mg Tablets	Diclofenac Sodium
novOLET MIXTARD 30HM	Human premixed insulin (30% soluble insulin+70% isophane (NPH)	novELON Tablets	Progestogen+Estrogen

(Cont'd...)

(Cont'd...)

Group 1		Group 2	
Brand name	Generic	Brand name	Generic
numLO Tab	Amlodipine	numOL Tab	Diclofenac+Pracetamol
OCid 10 mg Capsules	Omeprazole	ROXid 300 mg Tab	Roxithromycin
Oflox 200 mg Tablets	Ofloxacin	NORflox 400 mg Tablets	Norfloxacin
PACIMOI 650 mg Tablets	Paracetamol	PRIMACAI Tab	Multivitamin+mineral
POTrate 200 mL Syrup	Potassium Citrate	POTklor 200 mL Syp	Potassium Chloride
PElox 400 mg Tablets	Pefloxacin	CIPlax 500 mg Tablets	Ciprofloxacin
R CIFAx 200 mg Tablets	Rifaximin	R-CINEx 450 mg Tablets	Rifampicin + Isoniazid
REXpar 200 mg Tablets	Sparfloxacin	RAClper 40 mg Tablets	Esomeprazole
SATrogyI 300 mg Tablets	Satranidazole	CYCLogyI 5 mL Eye drop	Cyclopentolate
SATrogyI 300 mg Tablets	Satranidazole	METrogyI 400 mg Tablets	Metronidazole
seFDIN 300 mg Capsules	Cefdinir	seBIFIN 250 mg Tablets	Terbinafine
SELOMax 50 mg Tab	Amlodipine+metoprolol	SOLIWax 10 mL Ear Drop	Sodium 1,4-bis(2-ethylhexoxy)-1,4-dioxobutane-2-sulfonate
solET Tab	Sotalol	solITEN 5 mg Tab	Solifenacin succinate
SOLIWax 10 mL Ear Drop	Sodium 1,4-bis(2-ethylhexoxy)-1,4-dioxobutane-2-sulfonate	COLIMEx 10 mL Drop	Dicyclomine
solONEX 300 mg Tab	Isoniazid	solIWAX 10 mL Ear Drop	Sodium 1,4-bis(2-ethylhexoxy)-1,4-dioxobutane-2-sulfonate
sporANOX 100 mg Capsules	Itraconazole	sporIDEX AF 750 mg Tab	Cephalexin
SYSCAn 150 mg Capsules	Fluconazole	SUSTEn 100 mg Cap	Progesterones+progestogens
TOPCid 20 mg Tablets	Famotidine	ROXid 150 mg Tablets	Roxithromycin
TORLactone – 10 Tablets	Torseamide+Spironolactone	ALDactone 100 mg Tablets	Spirinolactone
TRENTal 400 mg Tablets	Pentoxifylline	TEGRItal 400 mg Tablets	Carbamazepine
UROtone 25 mg Tab	Bethanechol Chloride	UTERone 100 mg Cap	Progesterones+progestogens
valANCE 500 mg Tab	Divalproex	valENT 40 mg Cap	Valsartan
xylocARD Inj 50 mL Vial	Lidocaine Hydrochloride	xylocAINE 2% 30 mL Inj.	Lidocaine Hydrochloride
ZEMpred 8 mg Tab	Methylprednisolone	ACTOpred 500 mg Inj	Methylprednisolone Sodium Succinate
ZINconia SYP	Zinc	ZINcovit SYP	Zinc +Multivitamins
zeNTEL 400 mg Tab	Albendazole	zePTOL 100 mg Tab	Carbamazepine
zinCOLAK Capsules	Zinc Sulfate Monohydrate	zinETAC 150 mg Tab	Ranitidine
Zocef 250 mg Tablets	Cefuroxime	MONocef 250 mg Inj	Ceftriaxone
zoCON 150 mg Tablets	Fluconazole	zoBONE Inj	Zoledronic acid
zyrcoF Syrup	Cefadroxil + Ambroxal	zyrcoLD Tab	Cetirizine + Ambroxal
ZYRop 2000 IU Inj	Erythropoietin	ZYRcof syrup	Cefadroxil + Ambroxal

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# Cross-sectional Study on Utilization of Radiology and Imaging Equipment in the District Hospitals of Bangladesh

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## ABSTRACT

A quality diagnosis mostly depends on the availability and proper utilization of radiology and imaging equipments in the modern medical technology. Every year, huge amount of revenue is spent to purchase costly and sophisticated radiology and imaging equipments for the district hospitals of Bangladesh. But radiology and imaging equipments are underutilized in most of the developing Asian and African countries, including Bangladesh. This descriptive cross-sectional study was conducted to find the functional status, workload, utilization, and factors affecting the utilization of radiology and imaging equipments in the district hospitals of Bangladesh. Interviewer-administered questionnaire was used to take interview of relevant human resources. Work time study method was applied where multiple checklists were used to measure consumed time for each procedure and daily actual work time of radiology and imaging equipments. In this study, 46.9% radiology and imaging equipments were found functional, 40.6% radiology and imaging equipments nonfunctional, and 12.5% radiology and imaging equipments functional but not in use. This study revealed that 53% of total radiology and imaging equipments of district hospitals were nonfunctional, and functional but not in use, where 8 equipments became nonfunctional before 10 years due to unavailability of spare parts and inadequate maintenance fund. Work time in radiography identified 83.51% and in ultrasonography (USG) 71.08% among the respondents of radiology and imaging department in the district hospitals. Utilization rate of general radiography equipments was found to be 67.01%, portable radiography equipments 16.5%, and USG equipments 71.08%. Average utilization rate of radiology and imaging equipments was found to be 51.53% in the district hospitals of Bangladesh. Utilization rate of radiology and imaging equipments more than 50% is considered as standard utilization. Current status of utilization rate needs to accelerate to get maximum turnover of the equipments among the district hospitals of Bangladesh. Important factors affecting the utilization of radiology and imaging equipments were observed – shortage of manpower, inadequate physical infrastructure, and less incorporation of advanced technology with existing facility.

**Keywords:** District hospital, Functional status, Radiology and imaging equipments, Utilization, Workload.

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## INTRODUCTION

Radiology and imaging play a vital role in modern medical science, so that medical imaging is considered as the heart of medical practice. It is almost impossible to appropriately diagnose and medicate most health conditions without the use of radiology and imaging equipment. It is one of the most rapid changing technologies in modern medical science. According to studies in India, United States, European Union, Norway, and Ethiopia, spare parts of old equipment become unavailable after a certain period due to rapid technological development and changing modalities. It becomes mostly impossible to maintain the continuous utilization of the existing defective or malfunctioning radiology and imaging equipment.<sup>1-5</sup>

According to Bangladesh Medical Equipment Survey Report 2008 and World Health Organization report on Human Resources for Health, Bangladesh has a severe shortage of allied health professionals mostly in Upazila Health Complex and district hospitals. Many of the hospitals have not adequate manpower to operate the equipments, and a remarkable number of equipments lose their half-life before installation due to inadequate physical infrastructure. Electromedical equipments are not maintained properly due to unavailable biomedical engineer, unavailable maintenance services and spare parts. Follow-through productivity of radiology and imaging equipments becomes poor and finally the utilization of radiology and imaging equipments becomes unsatisfactory within its lifetime. Every year, a lot of revenue is being wasted to operate the lower productive equipment in the district hospitals of Bangladesh.<sup>5-7</sup>

According to Health Facility Survey Report 2014, every year 40 to 50% of total budget of health sector is spent to purchase the medical equipments.<sup>5,6</sup> Radiology and imaging equipment is also costly and sophisticated, so that every year a large amount of revenue is spent to

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purchase the equipments. But the productivity of these costly equipments depends upon proper utilization. Lower utilization denotes higher cost of health care facilities and higher utilization improves the productivity of the equipment, so that health care cost becomes lower and affordable. Improper and inadequate utilization of medical equipment is increasing among many countries of the world. Most of the poor utilizing countries are also situated in South-east Asia and Africa along with Bangladesh. Thus, the objectives of the study were to identify functional status, workload, utilization, as well as factors affecting the utilization of radiology and imaging equipments in the district hospitals of Bangladesh.

## MATERIALS AND METHODS

A cross-sectional descriptive study was conducted in three district hospitals of Bangladesh from September 1 to December 30, 2016. The purposively selected three district hospitals were District General Hospital, Gajipur, District General Hospital, Shirajgonj, and 250-bedded District Shadar Hospital, Kishorgonj. In this study, the respondents were authorized radiology and imaging equipments and relevant human resources working in the radiology department of district hospitals. Work time study method was used to measure actual work time, workload, and actual utilization of radiology and imaging equipments. Interviewer-administered questionnaire was used to take interview with nine human respondents. Different checklists were used to collect data of functional status, installation date, starting date of radiology and imaging equipments, and radiological procedures carried out from June to October 2016 from the record book of district hospitals. Utilization of 9 radiology and imaging equipments in three categories and 232 radiology and imaging procedures was observed during the study period. The quantitative data and identified factors were analyzed by using Statistical Package for the Social Sciences (SPSS) and MS Excel.

## RESULTS

The study was carried out to identify the status of utilization of radiology and imaging equipments in the selected district hospitals of Bangladesh. Data were collected from the District General Hospital, Gajipur (study area 1), District General Hospital, Shirajgonj (study area 2), and 250-bedded District Shadar Hospital, Kishorgonj (study area 3). After completing data analysis, the following results were found from the study.

Table 1 shows that 32 radiological equipments were available in the three district hospitals. Among them were 7 general radiography (GR), 6 portable radiography (PR), 1 digital radiography (DR), 3 dental radiography (Dt.R), 12 ultrasonography (USG), 2 Auto-processor (AP), and 1 computed radiography (CR). These radiology and imaging equipments are authorized by the Directorate General of Health Services for district hospitals in Bangladesh but only three categories of equipments were available in the three study area. Table 1 also indicates that 15 (46.9%) radiology and imaging equipments were functional, 13 (40.6%) equipments were nonfunctional, and 4 (12.5%) equipments were functional but not in use.

Table 2 shows 13 nonfunctioning radiology and imaging equipments in the three district hospitals, where 3 (23.08%) equipments were found nonfunctioning for a long time due to unavailable service engineer of the respective vendor, 6 (46.15%) equipments were found nonfunctioning due to unavailable spare parts, 3 (23.08%) equipments were found nonfunctioning due to unavailable fund for repairing the equipment, 1 (7.69%) equipment was found nonfunctioning which was donated 5 years ago and from the very beginning the equipment remained nonfunctioning.

Table 3 indicates that average of 32 (32.39) GR procedures were done in the district hospitals for which required time was 261.34 minutes, average 7 PR procedures were done for which required working time was 64.35 minutes. The study found average consumed time of 326.9 minutes for average number of 39 radiology and imaging procedures. So that actual work time of human

**Table 1:** Current status of radiology and imaging equipments in the three district hospitals of Bangladesh

List of equipment	No. of FE (%)	No. of NFE (%)	No. of FNU (%)	Total no. equipments (%)
GR	5 (15.63%)	2 (6.25%)	0 (0%)	07 (1.88%)
FR	0 (0%)	0 (0%)	0 (0%)	00 (0%)
PR	3 (9.38%)	1 (3.13%)	2 (6.25%)	06 (18.76%)
DR	1 (3.13%)	0 (0%)	0 (0%)	01 (3.13%)
Dt.R	1 (3.13%)	0 (0%)	2 (6.25%)	03 (0.38%)
USG	4 (12.5%)	8 (25%)	0 (0%)	12 (37.5%)
AP	0 (0%)	2 (6.25%)	0 (0%)	02 (6.25%)
CR	1 (3.13%)	0 (0%)	0 (0%)	01 (3.13%)
Total	15 (46.9%)	13 (40.6%)	4 (12.5%)	32 (100%)

FE: Functional equipments; NFE: Nonfunctional equipments; FNU: Functional but not in use equipments; FR: Fluoroscopy machine; AP: Auto-processor

**Table 2:** Distribution of the reasons of nonfunctioning radiology and imaging equipments

Total	Reasons of NF radiology and imaging equipments				
	NFE	UME	USP	UMF	LAP
13 (100%)	3 (23.08%)	6 (46.15%)	3 (23.07%)	1 (7.69%)	0 (0%)

NFE: Nonfunctional equipments; UME: Unavailable maintenance engineer; USP: Unavailable spare parts; UMF: Unavailable maintenance fund; LAP: Lengthy administrative process

**Table 3:** Distribution of GR, PR, average radiology, and imaging procedure done/day and average consumed time in the three study areas

Type of procedure	Study area 1		Study area 2		Study area 3		Average radiology procedure done/day	Average consumed time (minutes)/day
	No. of procedure	Consumed time	No. of procedure	Consumed time	No. of procedure	Consumed time		
GR	45	298.34	23	203.03	30	283.05	32 (32.39)	261.34
PR	6	45.30	7	62.03	9	86.10	7 (7.19)	64.35
Total	51	344.04	30	265.06	39	369.15	39	326.9

**Table 4:** Distribution of USG done/day and average consumed time/day in the three study areas

Types of procedures	Study area 1		Study area 2		Study area 3		Average procedure done/day	Average consumed time/day
	No. of procedure	Consumed time	No. of procedure	Consumed time	No. of procedure	Consumed time		
USG	36	324.03	25	180.35	51	327.40	37.33 (38)	277.26 minute

resource and radiography equipments identified 83.51% (326.9 minutes) and idle time 16.49% (63.51 minutes). The daily working time was considered 6½ hours (8:00 am to 2:30 pm).

Table 4 shows that average 37 (37.33) USG procedures were done in the district hospitals for which required working time was 277.26 minutes. The actual work time in USG identified 71.08% (277.26 minutes) and idle time 28.92% (112.34 minutes). The daily working time was considered 6½ hours (8:00 am to 2:30 pm) in the district hospitals of Bangladesh.

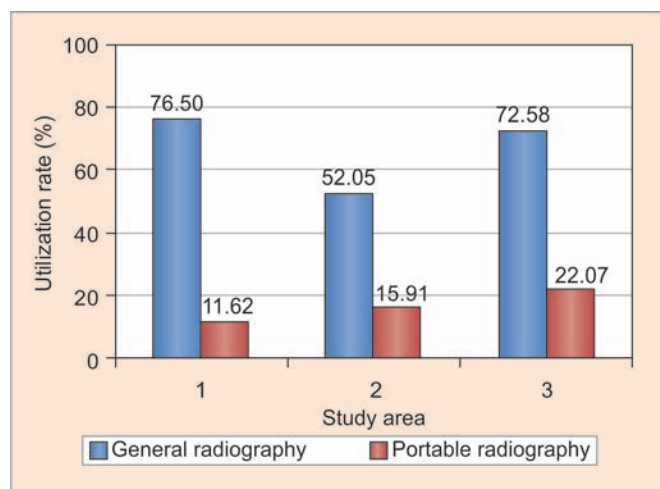
Graph 1 illustrates daily utilization rate of GR and PR equipments in the three district hospitals of Bangladesh. In study area 1, utilization rate of GR was found to be 76.50% and PR 11.62%. In study area 2, utilization of GR

was found to be 52.05% and PR 15.91%. In study area 3, utilization rate of GR was found to be 72.58% and PR 22.07%.

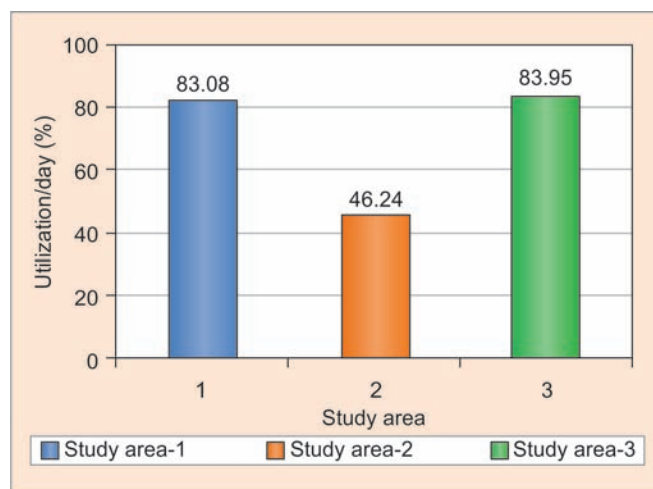
Graph 2 shows daily utilization rate of USG equipments in the three district hospitals of Bangladesh. The utilization rate was found in study area 1 – 83.08%, study area 2 – 46.24%, and study area 3 – 83.95%.

Table 5 shows that average utilization rate of GR equipments – 67.01%, PR equipments – 16.50%, and USG equipments – 71.08%. Finally, our study found the average radiology and imaging equipments utilization rate of 51.53% in the district hospitals of Bangladesh.

Graph 3 shows current status of utilization rate of radiology and imaging equipments as 52% (51.53) and nonutilization rate of 48% (48.47) in the district hospitals of Bangladesh.



**Graph 1:** Distribution of daily utilization rate of GR and PR equipments in the three district hospitals



**Graph 2:** Distribution of daily utilization rate of USG equipments in the three district hospitals

**Table 5:** Actual utilization rate of radiology and imaging equipments

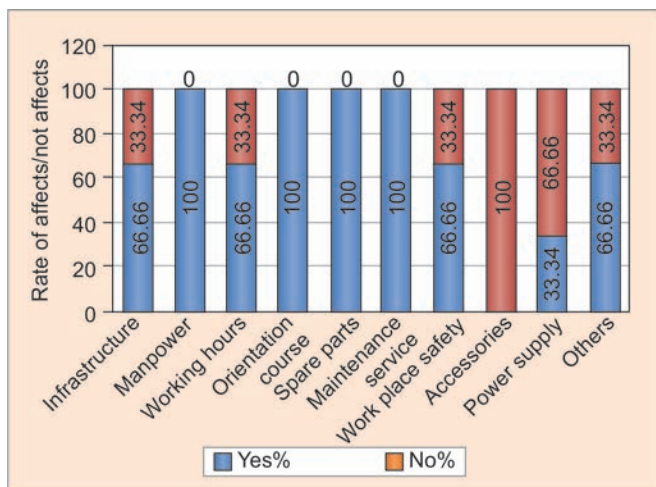
Types of equipment	Study area 1 (%)	Study area 2 (%)	Study area 3 (%)	Average REUR (%)
GR	76.50	52.05	72.58	67.01
PR	11.62	15.91	22.07	16.50
USG	83.08	46.24	83.95	71.08
Av. REUR	57.07	38.07	59.53	51.53

REUR: Radiology and imaging equipments utilization rate

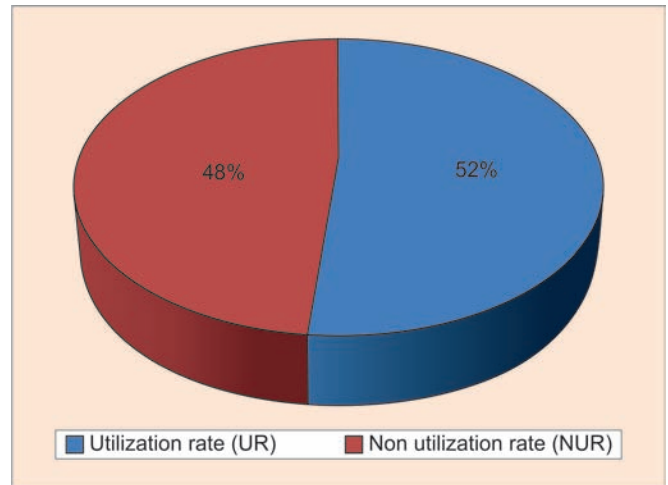
Graph 4 shows the analysis of the perception-based factors affecting the utilization. Perceptions of 100% respondents were shortage of manpower, lack of orientation course, unavailable spare parts, and delayed maintenance services that affect the utilization of radiology and imaging equipments; perceptions of 66.66% respondents were inadequate physical infrastructure, inadequate working hours/day, insufficient radiation safety program, and others (quality of accessories, unavailable servicing fund, and lengthy administrative process) that affect the utilization; perceptions of 33.34% respondents were that inadequate power supply affecting the utilization; and perceptions of 100% respondents were that accessories did not affect the utilization of radiology and imaging equipments in the district hospitals due to 100% availability (Table 6).

**Table 6:** Perception based factors

Factors	Yes (%)	No (%)	Total (%)
Infrastructure	66.66	33.34	100
Manpower	100	0	100
Working hours	66.66	33.34	100
Orientation course	100	0	100
Spare parts	100	0	100
Maintenance service	100	0	100
Work place safety	66.66	33.34	100
Accessories	0	100	100
Power supply	33.34	66.66	100
Others	66.66	33.34	100



**Graph 4:** Analysis of perception-based factors affecting the utilization of radiology and imaging equipments



**Graph 3:** Current status of utilization of radiology and imaging equipments in the district hospitals of Bangladesh

Table 7 shows the distribution of human resources, number of functional radiography, and USG equipments and available physical infrastructure for these equipments. It was observed that, in study area 1, five radiography equipments were installed in one room and manpower was found in one, in study area 2, four radiography equipments were installed in two rooms, but available manpower was also in one, in study area 3, six radiography equipments were installed in a single room and manpower is again one. Two radiography equipments are only utilized and rest of them remain unutilized due to unavailable required room and manpower for each functional equipment.

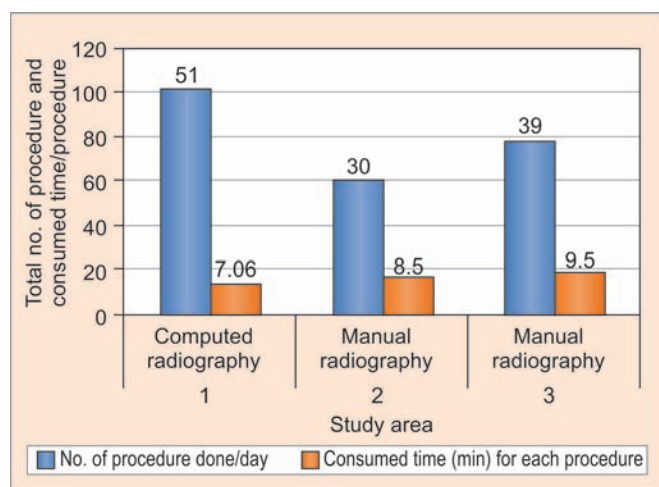
Graph 5 shows that in study area 1 where computed film processing (CR) system was used and 51 radiology and imaging procedures were carried out/day, total consumed time observed was 344.04 minutes (6 hours and 14 minutes) and time consumed for each procedure was 7.06 minutes; in study area 2 where manual film processing was used and 30 radiological procedures were carried out/day, total consumed time observed was 265.06 minutes (4 hours and 41 minutes) and average consumed time for each procedure observed was 8.5 minutes; in study area 3 where manual film processing is used and 39 radiology and imaging procedures carried out/day, total consumed time observed was 369.10 minutes (6 hours and 15 minutes) and average consumed time for each procedure observed was 9.5 minutes.

Graph 6 shows the number of radiology and imaging procedures carried out during last 5 months. The trend of changing the number of radiology and imaging procedure shows that in General Hospital, Gajipur, the utilization rate of radiology and imaging equipments becomes upward consistently in comparison with other two study areas of General Hospital, Shirajgonj and 250-bedded Shadar Hospital, Kishorgonj. While the number

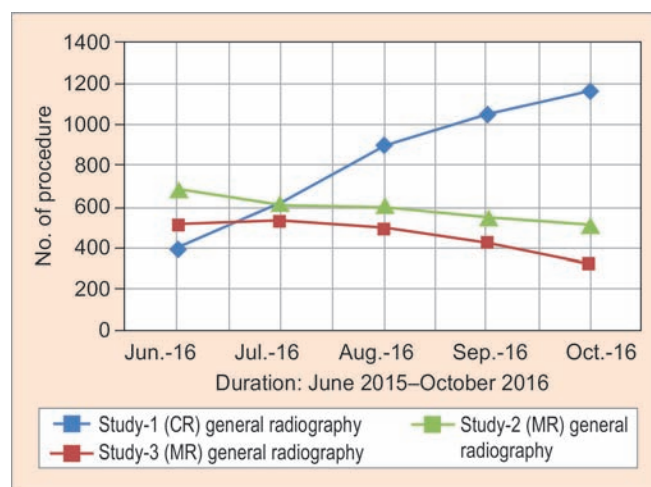
**Table 7:** Distribution of human resources, functional equipments, and available physical infrastructure in the three district hospitals

Types of work	No. of MP			No. of FE			No. of ARE		
	Study area 1	Study area 2	Study area 3	Study area 1	Study area 2	Study area 3	Study area 1	Study area 2	Study area 3
Radiography	1	1	1	5	4	6	1	2	1
USG	2	2	2	2	1	1	1	2	1

MP: Manpower, FE: Functional equipment, ARE: Available room for equipment



**Graph 5:** Comparison between efficiency of manual image and computed image processing method



**Graph 6:** Comparison among the efficiency of radiology and imaging equipments and methods of film processing

of radiology and imaging procedures increased from 398 to 1,170 in General Hospital, Gajipur during June to October 2016, the number of radiology and imaging procedures decreased in the other two hospitals – from 509 to 319 in General Hospital, Shirajonj and from 686 to 509 in 250-bedded District Shadar Hospital, Kishorgonj.

Table 8 shows 66.66% respondents were middle aged, 33.33% respondents were young, 88.89% respondents were married, 100% respondents were adequately qualified, 88.89% respondents were male, 100% respondents were highly experienced, and 66.66% respondents were satisfied with their income. Table 8 also shows that sound professional education is the important sociodemographic status, which is directly related with the utilization of equipment. Though 100% respondents were professionally educated, they have no opportunity of orientation course on newer modalities or changing technologies.

## DISCUSSION

The study was carried out to identify the functional status, workload, utilization, and factors affecting the utilization of radiology and imaging equipments in the district hospitals of Bangladesh. Total 9 equipments and 232 radiological procedures were observed and 9 human respondents were interviewed during the study period. Collected data were analyzed by employing SPSS version 16 and Microsoft Excel.

According to Bangladesh Medical Equipments Survey Report 2008, 53% equipments were functional and in use, 12% functional but not in use, and 35% were fully nonfunctional.<sup>7</sup> The current study found 46.9% radiology and imaging equipments functional, 40.6% equipments nonfunctional, and 12.5% equipments functional but not in use in the district hospitals of Bangladesh. Overall 53.1% radiology and imaging equipments were not utilized. The study also found that 8 (25%) out of 32 equipments became nonfunctional before 10 years. According to American and Canadian standard, minimum lifetime of radiology and imaging equipment is considered 10 years. Life span of greater than 10 years is considered as maximum utilized and lower than 10 years is considered as underutilized.<sup>8-10</sup> More than 46% nonfunctional equipments denote the poor maintenance of radiology and imaging equipments. The reasons of nonfunctioning equipments were found to be unavailable spare parts, inadequate fund for spare parts, and unavailable servicing manpower.

The previous study of United States Agency for International Development (USAID) and National Institute of Population Research and Training (NIPORT) found that only 14.5% equipments are maintained by National Electro Medical Equipments Workshop of Bangladesh. and 29% equipments are maintained by vendor as per after-sales service warranty up to 1 year of installation, but after completion of the warranty

**Table 8:** Frequency distribution of sociodemographic background of human respondents

	Frequency	Percent
<b>Age</b>		
36–45 years	3	33.34
46–55 years	6	66.66
Total	9	100
<b>Sex</b>	Frequency	Percent
Male	8	88.89
Female	1	11.11
Total	9	100
<b>Marital status</b>	Frequency	Percent
Married	8	88.89
Unmarried	1	11.11
Total	9	100
<b>Education</b>	Frequency	Percent
Diploma	3	33.34
Postgraduate	6	66.66
Total	9	100
<b>Experience</b>	Frequency	Percent
11–20 years	3	33.34
21–30 years	6	66.66
Total	9	100
<b>Income satisfaction</b>	Frequency	Percent
Yes	6	66.66
No	3	33.34
Total	9	100
<b>Enough Prof. education</b>	Frequency	Percent
Yes	9	100
No	0	0
Total	9	100
<b>Orien. Prog. opportunity</b>	Frequency	Percent
Yes	0	0
No	9	100
Total	9	100

period, maintenance services become unavailable due to unavailability of fund as per contract agreement.<sup>6</sup> According to Bangladesh Medical Equipments Survey Report – April 2008, 5 to 7% of total capital investment should be reserved for future maintenance services. But this guideline has not been established for some most costly equipments like computed tomography (CT) and magnetic resonance imaging (MRI). The maintenance services are not assured and follow-through life span of radiology and imaging equipments becomes little.<sup>7</sup>

The study measured the actual work time of GR equipment is 67.01%, PR equipment 16.5%, and USG equipments 71.08%. General radiography equipments were idle for 32.99% time and USG equipments were idle for 28.92% time out of daily stipulated work time due to interruption of electricity, calibration, personal times of human resources, and unavailability of patients, but PR equipments become idle for 83.5% time of daily stipulated work time due to unavailability of patients and technologists. According to *Principles of Hospital Administration and*

*Planning* by Sakharkar,<sup>11</sup> two technologists can carry out maximum 54 radiology and imaging procedures by using one equipment in one room, while daily working time is considered 8 hours; thus one technologist is able to carry out maximum 40 radiology and imaging procedures. This study found one technologist carried out average 39 radiology and imaging procedures during 6.5 stipulated working hours/day by using multiple equipments. It was observed that one technologist was working with GR and PR equipments, so that actual daily work time of technologists was 83.51%, which is quite higher in the district hospitals of Bangladesh.

According to the Bangladesh medical equipments survey report – 2008, the utilization rate was 50.3%.<sup>7</sup> According to global standards, the utilization rate of radiology and imaging equipments more than 50% is considered as justified utilization.<sup>1,4,10,12</sup> The current study found that utilization rate of radiology and imaging equipments is 51.53% in the district hospitals of Bangladesh, which is significant in comparison with previous study in many developing countries of Asia and Africa along with Bangladesh. But this utilization rate looks still behind in comparison with many developing and developed countries, such as India and the United States. The current ratio of utilization rate of radiology and imaging equipments among Bangladesh, United States, and India is 52%:53%:60%.

According to reported guidelines of Canadian Society of Radiology and Imaging, the average standard of general radiology and imaging procedure/equipment should be at least 15,000/year, where PR is 4,500/year and USG is 3,000/year, and equipment should be used at least 8 hours/day.<sup>10</sup> In Bangladesh, average GR procedure is 7,500/year and number of PR is 1,020/year, which is underutilized in comparison with international level, and USG is 9,380/year, which is significant in comparison with international standards. Due to short working and accessibility time, service become unavailable for the patients after ending of 6½ hours daily stipulated working time, so that equipments remains idle for 17½ hours/day. The utilization of radiology and imaging equipments is just above the minimum standard level. To accelerate the turnover of radiology and imaging equipments, the utilization should be maximized.

According to Nuclear Safety and Radiation Control rules of Bangladesh Atomic Energy Commission and International Atomic Energy Agency, multiple equipments will not be used in a single room at a time under the consideration of radiation safety of patient and technologist.<sup>13-15</sup> The study found that physical infrastructure was not available in the three district hospitals where multiple equipments were installed in a room, so that while one

equipment was used, other equipments were idle. The utilization of radiology and imaging equipments was reduced due to inadequate physical infrastructure. This study compared the number of human resources, functional radiography, and USG equipments and available infrastructure for these equipments. In study area 1, five radiography equipments were installed in one room, in study area 2, four radiography equipments were installed in two rooms, in study area 3, six radiography equipments were installed in a single room. Two radiography equipments were only utilized and rest of them remained unutilized due to shortage of room. According to analysis of perception-based factors affecting the utilization, inadequate infrastructure was most significant.

The study found that shortage of manpower is an important factor that may affect the utilization. The study found that one post of medical technologist was available in each 100-bedded district hospitals of Bangladesh, so that more than one equipment was not used at a time.<sup>5,16</sup> While a medical technologist used GR equipment and then portable equipment, dental equipment remained unused; again when he/she used portable equipment, the GR equipment became idle, even 4 (12.50%) equipments were found functional but not in use in the three hospitals due to shortage of manpower. This study revealed that in study area 1, functional radiography equipments were found to be five, where manpower was found to be one, in study area 2, functional radiography equipments were found to be four, but available manpower was one, in study area 3, functional radiography equipments were found to be 6 where manpower was one. Only two radiography equipments were utilized and rest of them remained unutilized due to shortage of manpower. According to analysis of perception-based factors affecting the utilization, shortage of manpower was most significant.

Most of the previous studies in India, the United States, and Norway considered rapid technological development as a factor affecting the utilization.<sup>1,4,12</sup> But the previous studies did not mention how digitization or computerization influences the utilization rate. It was a great effort of the current study to identify how computerized image processing system influences the utilization rate. This study found that while a GR procedure consumes 7.06 minutes by using CR, 8.5 minutes (study area 2) and 9.5 minutes (study area 3) is consumed for each procedure by using manual processing system including 25 to 30 minutes drying time. It was observed that, 30 to 45 minutes was required for each manual imaging, while 7–8 minutes was only required for computed method. It was observed that in study area 1 (General Hospital, Gajipur), 51 procedures were carried out by consuming

344.04 minutes with CR, but only 39 procedures were carried out by consuming 369.10 minutes with manual radiography in study area 3 (250 bedded Shadar Hospital, Kishorgonj). The study observed that digitization and computerization influence the utilization of radiology and imaging equipments in the district hospitals of Bangladesh.

The study observed that most of the sociodemographic background of respondents was not correlated with utilization of radiology and imaging equipments in the district hospitals of Bangladesh. The respondents were experienced, professionally qualified, and satisfied with their income. The sociodemographic background, such as age, sex, marital status, income, and experience of all respondents were significant, which may positively influence the utilization rate. This study observed that all respondents are professionally educated but they have no adequate opportunity for orientation program or newer technologies. Different studies in India, United States, Norway, and Ethiopia found that less skilled operating manpower is the key factor affecting the utilization rate of newer modalities.<sup>1,3,4,12</sup> Bangladesh Health Facility Survey Report 2014 revealed that human resources development program was available for only 13% of workforce who are working with high technology, such as CT and MRI. The study of USAID and NIPORT noted that although 7% of total cost of the equipments is mandatory for human resources development, it was not maintained,<sup>6</sup> so that most of the sophisticated equipments are being operated without adequate knowledge and skills.

## CONCLUSION

A study was conducted in the radiology department of three district hospitals based on daily 6½ hours stipulated working time to identify the functional status, workload, utilization, and factors affecting the utilization of radiology and imaging equipments. According to the study results, a significant number (53%) of radiology and imaging equipments in the district hospitals were nonfunctional and functional but not in use. It was found that more than 50% capital investments remained unused in the district hospitals, which reduced the turnover of radiology and imaging equipments. Average daily work time of GR equipments was found to be 67.01%, PR equipments 16.5% and USG equipments 78.08%. Actual work time of radiologists was 71.08% and technologist 83.51%. Average utilization rate of radiology and imaging equipments in the district hospitals was identified as 51.53%, which was more than the standard (50%) and was significant in comparison with many developing countries of Southeast Asia and Africa. The current utilization rate needs to accelerate to increase the turnover of radiology

and imaging equipments in the district hospitals of Bangladesh. Adequate human resources, physical infrastructure, as well as incorporating advanced technology with existing facility may be considered for more utilization of radiology and imaging equipments. Three district hospitals were not enough to generalize 61 district hospitals. A wide range of studies may be considered for more extensive result. Perception-based factors of respondents may also be considered for further evaluation to find out how they influence the utilization rate.

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# Accreditation is not a One-time Process: Quality Assessment of Intensive Care Unit during Post-NABH Accreditation Period in a Tertiary Care Hospital

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## ABSTRACT

Accreditation is an integral part of quality and it is not a one-time process. This study was done to know the extent to which hospitals maintain the standards after obtaining accreditation. This study tries to find out the gaps in standards during the postaccreditation period. The objective of the study was to assess the policies of the intensive care unit (ICU) with reference to standard protocols of the National Accreditation Board for Hospital and Health Care Providers (NABH) and measures taken by the management to maintain the standards. Data was collected from a 285-bedded NABH-accredited hospital that had five ICUs and four recovery rooms by means of nonparticipant observation, semistructured interviews. Data on indicators was collected by using the hospital management information system; the questionnaire on satisfaction was filled by 30 patients/relatives who were admitted in the ICU for more than a week. Quality team was interviewed to know the perception of the management toward quality and accreditation. To know the compliance of the staff to the NABH standards, a surprise check was done in three ICUs of the hospital.

Data analysis showed that the organization was not able to maintain the standards, as it had done at the time of accreditation. The quality team strongly accepted that accreditation helps in maintaining and improving quality, whereas the data from ICUs showed a wide variation in compliance. Three ICUs from the same hospital were having different compliance rates for standards, which shows that staff was not aware about the standard protocol to be followed. The patient-satisfaction questionnaire also showed that the patients were not satisfied with the services given.

**Keywords:** Accreditation, Continuous quality improvement, Postaccreditation, Quality.

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## INTRODUCTION

The concept of accreditation first came into vogue in the USA in 1910 to determine the effectiveness of treatment provided to patients. In 1919, the hospital standardization program came into existence, which was set up by the American College of Surgeons. In 1953, the Joint Commission on Accreditation of Health Care Organization (JCAHO) was founded, which later became the Joint Commission International (JCI) in 2007.<sup>1</sup> In India, the premier accreditation body is the NABH, which constitutes the board of the quality council of India. The aim behind the setting up of the NABH was to enhance the health care system and promote continuous quality improvement and safety for the patients. According to the NABH website, 197 hospitals in India were accredited and 600 hospitals had applied for accreditation.<sup>2</sup> These figures show the important role played by accreditation in the health-care industry. The accreditation process gives an opportunity to assess the existing setup, processes, and activities to turn them around as process maps, standard operating procedures (SOPs), standards, and norms as defined by different accreditation agencies.

Accreditation works as a framework for the quality of care given in a hospital. Accreditation sets a standard for the organization to follow. Performance below that standard is not accepted by the accreditation board. It gives a set of objectives and goals, which help the organization to achieve quality of care, which if not adhered to can lead to the cancellation of accreditation.

## Necessity of maintaining Quality after Accreditation

The postaccreditation period is very crucial, as whatever the organization has strived to attain during the process of getting accreditation should not go in vain. Once the basic structure has been formulated and function and activities finalized and optimized, the continuous quality improvement should become the culture of the organization. If the standards are not maintained as they were at the time of accreditation the quality of care will suffer and the license may be cancelled by the accreditation agency. Getting accreditation is not enough; one has to

go beyond that to maintain the standards at all times post accreditation.

### Rationale of the Study

To help improve the quality of care provided, various accreditation agencies were established worldwide. A set of standards were given by these accreditation agencies, which not only helps one to know where an organization stands in term of quality, but also helps to maintain and continuously improve the standards.

In various hospitals the quality indicators are not monitored once accreditation is achieved; therefore, the graph for quality of care declines which impacts the image of the hospital and in this competitive scenario, no organization can afford this.

Today in India, various accreditation agencies are active which are nongovernmental, nonprofit organizations. Among them, the NABH is one of the important organizations. It has given accreditation to more than 200 hospitals and more than 600 hospitals have applied for it. Accreditation is an important part of maintaining and improving quality. Just getting done the accreditation is not enough; quality has to be maintained and continuous improvement is necessary.

This study was done to check whether an organization was able to maintain the standards and benchmarks set at the time of getting accreditation or was it only a one-time process.

### Reason for selecting the ICU

The ICU was chosen to study quality indicators because:

- It is the area where one needs to be very careful as patients are in a critical condition and staff–patient ratio is sometimes inadequate & standards of care set up by the hospital are not achieved.
- It is very important to follow the standard policies and procedures in every part of the hospital, but it becomes more important in the ICU because the patient care in the ICU is directly related to patient satisfaction and the image of the hospital.
- It helps in generating a major portion of revenue for the hospital.
- It accounts for the major portion of expenses too.

### Scope of the Study

The study was conducted in an NABH-accredited corporate hospital in New Delhi. Data was especially collected for the ICUs. The perception of the hospital staff on accreditation and need of maintaining quality was obtained through a semistructured interview. Quality indicators were collected from the Hospital Information

Management System which were then compared with benchmarks. Questionnaires were used to rate the satisfaction level of the patients who were admitted in the ICU.

### Objective of the Study

- To assess the hospital policies with standard protocols of the NABH in the ICU.
- To assess:
  - Perception of staff toward quality improvement in post accreditation period.
  - The measures taken by the health care organization to maintain quality.
- To assess the satisfaction level of patients and their relatives in the ICU of the NABH-accredited hospital with regard to the quality of care given.

### Review of Literature

Accreditation is an external assessment of any organization's performance against a predetermined set of standards which are measurable to an extent possible.

A study done by the World Health Organization (WHO)<sup>3</sup> describes the structure and activities at the national and international level to promote quality in health care, quality tools used in various countries, and initiatives in health services' accreditation. The summaries stated the status of accreditation in various countries at present. The data helped in knowing the natural history of accreditation in various countries. The survey was done in 47 countries. This worldwide study undertaken by the WHO showed the need and importance of the accreditation in today's scenario and the need of the traditional accreditation agency to adapt to the changing demands and needs in order to survive.<sup>3</sup>

Tabrizi et al<sup>4</sup> did a systemic review of Medline and PubMed using keywords "accreditation model" and "hospital." The articles were searched from January 1985 to December 2010 which resulted in 2,369 articles. The result of the study showed that most cited program is the US-based JCAHO/JCI, which was referred in 91% of articles reviewed in the study. The JCAHO meets all the attributes at the highest level with main focus on quality and emphasis on best practice. The reviewed articles showed the list of attributes that can assist in choosing an accreditation model. According to the study results, the JCAHO is the most comprehensive for reference purposes.<sup>4</sup>

The above two case studies showed the need of accreditation worldwide and its importance. The study done by the WHO revealed the different country's accreditation systems and the structure and improvements necessary in an accreditation program. The second study shows the

advantages and disadvantages of various accreditation models and a reference for the accreditation model.

Gopinathan<sup>5</sup> conducted a study over the period of a month in 2010. The result showed that hospitals only satisfy three standards – access, assessment, and continuity of care (AAC) – and two standards of care of patients. This study documented the gap between actual standards of the NABH and the existing standards in the hospital.<sup>5</sup>

Salmon et al<sup>6</sup> conducted a study in South Africa in October 2003 to know the impact of accreditation on the quality of hospital care. The main question addressed by this study was whether there is any improvement in quality after a hospital goes through accreditation. After 2 years, the hospital's performance that was intervened increased from 38 to 76%, whereas the control hospital did not show any remarkable progress (37–38%). This was the first study done to assess the impact of hospital accreditation.<sup>6</sup>

A similar study was conducted in Lebanon to know the impact of accreditation on quality of care.<sup>7</sup> The objective of the study was to know the views of health care professionals, especially nurses, on quality and accreditation. All the hospitals that passed the national accreditation survey were included. Totally, 1,048 registered nurses from 59 hospitals were selected. The results showed that improvement in quality had been noted by nurses after accreditation, and they felt that accreditation is a good tool for improving quality of care.<sup>7</sup>

## MATERIALS AND METHODS

### Research Design

#### *Type of the Study*

A mixed-method study (quantitative and qualitative) was undertaken. Emphasis was given on current practices followed by hospital, management views on quality, patient satisfaction, and quality indicators maintained by the hospital. Nine quality indicators and the NABH checklist were used. In this study, the quality team staff were interviewed with the help of semistructured interviews to know their views on quality and accreditation. Patient satisfaction data was collected through questionnaires.

#### *Area of Study*

Delhi is the capital of India with a population of 22 million in 2011 – the world's second most populated and India's largest city in terms of area. The total number of hospitals in Delhi was 94, among which 38 were accredited.<sup>4</sup>

#### *Frame of the Study*

A corporate NABH-accredited hospital, which had the maximum number of ICU beds out of the sample selected

was considered for this study. The ICU was assessed for quality indicators and procedures and policies followed over a period of time. Data was collected from three ICUs of the hospital. Each ICU was 15 bedded, and data was collected in three phases. In the first phase, the quality team was interviewed; in the second phase, a surprise check was done on staff of the ICU with the help of checklist, which included NABH standards; and in the third phase, the data related to quality indicators was collected for 1 year (Jan 2012–Dec 2012).

### Sampling Design

#### *Sample Selection*

Delhi had 38 accredited hospitals at that time. A list of all these hospitals was prepared, and all the corporate hospitals that were NABH accredited were selected. Further, these hospitals were shortlisted based on the availability of ICUs and number of ICU beds. The hospitals with a minimum of 3 ICUs and 10 beds in each ICU were selected for better results from the study. As quality-related data is highly confidential, the study was started after obtaining permission from one of these hospitals.

#### *Setting for the Study*

The hospital was a corporate hospital established in 1988. It had a strength of 285 beds, among which there were five ICUs and four recovery rooms other than wards. The hospital got NABH accreditation in 2008, and after that continuous renewal was done. The recent renewal was done in 2011, where it successfully met all the criteria. In 2010, the hospital also got the JCI accreditation. The hospital serves not only the population of Delhi and National Capital Region, but also that from around the country and foreign patients.

### Data Collection Method

Data was collected over a period of a month (April–May 2013), which included primary as well as secondary data. Primary data was collected by means of direct nonparticipatory observation. Interviews were conducted with six quality control officers, who were directly or indirectly responsible to maintain the quality in the ICU. The nine indicators were collected from hospital management information system (HMIS) for 1 year. To know the patient satisfaction, a close-ended questionnaire was used, which was filled by 30 respondents.

#### *Quantitative Data*

The quantitative data was collected as follows.

## Quality Indicators in ICU

There were 35 quality indicators pertaining to the NABH; out of them, 11 were mandatory for the NABH and the Quality Council of India for reporting purposes. The purpose of selecting the indicators was to collect the data for a year and compare those data at the time of accreditation.

Nine indicators, applicable to the ICU were

1. Needle stick injury (NSI);
2. Central line-associated blood stream infection;
3. Incidence of pressure sores;
4. Catheter-associated urinary tract infection (CAUTI);
5. Ventilator-associated pneumonia (VAP);
6. Surgical site infection (SSI);
7. Fall rate;
8. Reintubation rate within 48 hours of extubation; and
9. Return to ICU within 24 hours of discharge.

*Questionnaire* was filled on patient satisfaction by 30 respondents.

*Inclusion criteria:* Questionnaire was given to only patients/relatives who were admitted in the ICU for more than three weeks. Data was collected for a period of 1 month.

A *checklist* was prepared for a surprise check of the ICU to check whether staff were following the criteria or not. The checklist was based on the NABH standards, which are related to the ICU. The criteria applicable to the ICU were selected.

The standards on which the checklist was made are as follows:

- *Care of patient (COP) 4:* Documented policies and procedures guide the care of patients requiring cardiopulmonary resuscitation.
- *COP 6:* Documented procedure guides the performance of various procedures.
- *COP 8:* Documented policies and procedures guide the COP in the intensive care and high-dependency units.
- *COP 16:* Documented policies and procedures guide appropriate pain management.
- *COP 20:* Documented policies and procedures guide the end-of-life care.
- *Hospital Infection Control 9:* The infection control program is supported by the management and includes training of staff.

### Qualitative Data

Primary data was collected in the form of face-to-face interviews. Semistructured interviews were conducted based on the availability of members of the quality team. Before taking the interview, verbal and written consent was taken from the respondents.

**Table 1:** Objective and methodology used for data collection

Objectives	Methodology
To assess the policies with standards of the NABH in the ICU	Indicator checklist and policy of the ICU
To assess management perception toward quality management in post-NABH accreditation period	Semistructured interview
To assess the measures taken by the hospital to maintain the quality	Semistructured interview
To assess patients'/relatives' satisfaction level	Patient satisfaction questionnaire

- Quality team members – The staff, who were part of the quality team and responsible for maintaining quality and accreditation standard in the ICU, were interviewed.
- Patients/relatives – 30 patients/relatives who were admitted in the ICU for more than 3 weeks were asked to fill the questionnaire to know the satisfaction level.

### Objectives and Methodology used

The objectives and the methodology used for data collection is given in Table 1

## RESULTS AND FINDINGS

### Quantitative Methods

#### *Patient Satisfaction Questionnaire Analysis*

The questionnaire contained 19 questions related to satisfaction of services. Questionnaires were filled by the 30 patients/relatives, who are admitted in the ICU for more than 3 weeks. The questions were further classified for the ease of analysis into three categories (Table 2).

Satisfaction related to

- Services
- Hygiene
- Information

Services include care provided by staff, nursing care, attitude of staff toward patients, and charges of services provided. In the hygiene category, questions that were asked related to sanitation facilities in the hospital. Information included whether patients were given all the necessary information regarding procedure, charges, and duration of treatment. The patient satisfaction questionnaire is given in Table 3.

The questions in various categories were as follows.

**Table 2:** Categorical analysis of patient satisfaction questionnaire

Categories	Yes	No	Sometimes
Services	172 (63.70%)	55 (20.37%)	33 (12.22%)
Hygiene	90 (100%)	0	0
Information	113 (53.80%)	77 (36.66%)	20 (9.52%)

**Table 3:** Patient satisfaction questionnaire analysis

Categories	Questions	Yes	No	Sometimes
Hygiene	Staff are professional and neat in appearance	30	0	0
	Clean and comfortable environment in hospital	30	0	0
	Are you satisfied with the cleanliness of the hospital?	30	0	0
Service	Up-to-date and well-maintained medical facilities and equipment	25	5	0
	Service provided, whenever needed	18	3	9
	Consistency of charges in services provided	23	5	2
	Responsiveness is displayed by staff	22	6	2
	Patient is treated with dignity and respect	24	5	1
	Privacy is provided during treatment	23	6	1
	Affordable charges payable for services rendered	17	6	7
	Are you satisfied with services provided?	3	13	4
	Are you satisfied with continuity of care (follow-up) provided by organization?	17	6	7
Information	Consent form is filled and explained before any procedure done	20	6	4
	Information is provided regarding services available	21	7	2
	Thoroughness of explanation of medical condition of the patient	8	20	2
	Every procedure done is explained well	14	14	2
	You were given a chance to ask questions and make choice of treatment	9	17	4
	Last decision of treatments depends on you	20	7	3
	Obtain feedback and patient kept informed	21	6	3

### Services

- Up-to-date and well-maintained medical facilities and equipment.
- Services provided, whenever needed.
- Consistency of charges in services provided.
- Responsiveness displayed by staff.
- Patient treated with dignity and respect.
- Privacy was maintained during treatment.
- Affordable charges payable for services rendered.
- Satisfaction with the services provided.
- Satisfaction with the continuity of care (follow-up) provided by the organization.

### Hygiene

- Clean and comfortable environment in hospital.
- Staff were professional and neat in appearance.
- Satisfaction with cleanliness of the hospital.

### Information

- Consent form was filled and explained before any procedure done.
- Information was provided regarding services available.
- Thoroughness of explanation of medical condition of patient.
- Every procedure done was explained well.
- Chance was given to ask questions and make choice of treatment.
- Last decision of treatment depends on patient.
- Feedback was obtained and patient kept informed.

### Analysis of Questionnaire

The categorical analysis of the patient questionnaires (Table 2) showed the patient satisfaction level in different categories. Patients were highly satisfied with hygiene and cleanliness, whereas satisfaction level was very low for services (63.70%) and information (53.80%) provided to patients.

Percentage of respondents satisfied with services provided in the hospital was 63.70%, whereas 20.37% patients were not satisfied with the services provided in the hospital and 12.22% people were sometimes satisfied. Respondents were highly dissatisfied with information provided to them regarding services available to them, such as treatment available and information regarding best treatment available. Only 53.80% respondents said that they were given proper information regarding treatment available, patient's condition, and best possible treatment for patient.

The analysis of the patient satisfaction questionnaire (Table 3) revealed that the area for dissatisfaction was different for every patient/relative(s). For instance, 9 out of 30 patient/relatives said they were not/sometimes given information regarding services available in the hospital and the last choice of treatment was decided by the doctors. Information regarding procedure performed was given to 14 patients, whereas 14 patients said it was not explained. In case of explaining the patient's medical condition, only 8 relatives said it was explained well; 20 relatives were not informed about patient's condition.

The major area where patients were not satisfied with services was follow-up care. Among 30 respondents, 6 said they were not given proper care while doing follow-up. Only 17 patient/relatives said they were given full attention at the time of follow-up. Out of 30 patients, only 3 patients said they were satisfied with services provided to them.

On the contrary, 25 patients/relatives said that they were satisfied with technology available in the hospital. Most of the patients/relatives accepted that they were given a chance to ask questions regarding treatment.

*Analysis of checklist:* The checklist that was made on the NABH standards was further categorized into three:

- Patient care-centered standards
- Continuous quality improvement standards
- Hospital infection control standards.

The checklist was analyzed based on of responses recorded by nonparticipatory observations. The data was collected in three different ICUs of the same hospital and compared. The checklist is given in Table 4.

The surprise check was done in three ICUs of the hospital based on the checklist; the results are shown in Table 5.

The checklist, which was used for surprise check in the ICUs, was based on the NABH standards, which were divided into three categories based on objectives illustrated by the NABH. The three ICUs, where surprise checks were done, showed variations in similar objectives and standards. The ICU A and B followed 60% patient-centered care, whereas in ICU C, it was followed only by 35%. There was wide variation in the same organization in following the procedures and policies. Similarly, for hospital infection control, it was different for all the three ICUs. The continuous quality improvement (CQI) standards were followed similarly in all the three ICUs. No ICU followed any standard by 100%. The compliance was very less and different in all the three ICUs.

Analysis showed 60% patient care standards were followed in ICU A and ICU B, whereas ICU C followed only 35%. In case of continuous quality improvement standards, the standards were followed by 42.85%, which

**Table 4:** Checklist

Standards	Yes	No
Patient Care Standards		
Standard operating procedure is available in the ICU		
Documented procedure to guide the patient care		
Standard operating procedure includes how the care is organized		
Standard operating procedure includes what is to be monitored in a patient with reference to specific situation		
The hospital has criteria for admission in the ICU		
The staff are aware about the criteria for admission of the patient in the ICU		
Organization has criteria for transferring the patient to the other hospital from ICU		
Staff working in the ICU are aware of criteria about shifting the patient to other hospital		
Number of equipment available in the ICU is adequate in comparison to service provided		
There is defined procedure followed in case of bed shortage in the ICU		
Staff are aware of what needs to be done in case of shortage of bed in the ICU		
Patients are screened for pain		
Detailed and periodic assessment is done of patients suffering from pain		
Intensive care unit has documented policies and procedure to guide the end-of-life care		
The department also addresses the identification of the unique needs of such patients and family		
Staff are educated and trained in end-of-life care		
Documented policies and procedures to guide the monitoring of the patients after medication administration		
Close monitoring situations are defined by organization		
Monitoring of the patient after medication is done in a collaborative manner		

**Table 5:** Categorical analysis of checklist

Categories	ICU A		ICU B		ICU C	
	Following	Not following	Following	Not following	Following	Not following
Patient care-centered standards	12 (60%)	8 (40%)	12 (60%)	8 (40%)	7 (35%)	13 (65%)
Continuous quality improvement standards	3 (42.85%)	4 (57.14%)	3 (42.85%)	4 (57.14%)	3 (42.85%)	4 (57.14%)
Hospital infection control standards	8 (80%)	2 (20%)	5 (50%)	5 (50%)	6 (60%)	4 (40%)

was same for all three ICUs. Hospital infection control standards showed wide variations in the three ICUs. ICU A showed 80% compliance, whereas ICU B and ICU C showed compliance respectively, by 50 and 60%.

The possible reason for this wide variation was lack of knowledge of staff about SOPs and lack of motivation for following the standard procedures.

**Analysis of NABH Indicators**

The nine indicators were selected specifically for the ICU. The data was collected on these nine indicators for the year 2012 (Jan–Dec) and compared with the benchmark set by the hospital itself, at the time of the first accreditation in 2008.

**Needle Stick Injury**

The NSI data was collected and calculated in the hospital by the below formula:

$$\frac{\text{Number of NSIs reported in a month}}{\text{Total number of inpatient days in a month}} \times 100$$

The chart and table (Graph 1) clearly show that the incidence of NSI was very high from the benchmark set for the hospital. Only in the month of October, the rate was below the standard. The possible reason illustrated by the quality team officer was ignorance by health care workers in handling sharps.

**Central Line-associated Blood Stream Infection**

According to the hospital’s policy, Central Line Associated Bloodstream Infection (CLABSI) is “A laboratory confirmed bloodstream infection where central line or umbilical catheter was in place for > 2 calendar days when

all elements of the Laboratory-confirmed Blood Stream Infection (LCBI) infection criteria were first present together, with day of device placement being day 1.”

The CLABSI cases in ICU were recorded through HMIS and calculated by below formula:

$$\frac{\text{Number of central line – associated blood stream infections in a month}}{\text{Number of central line days in a month}} \times 100$$

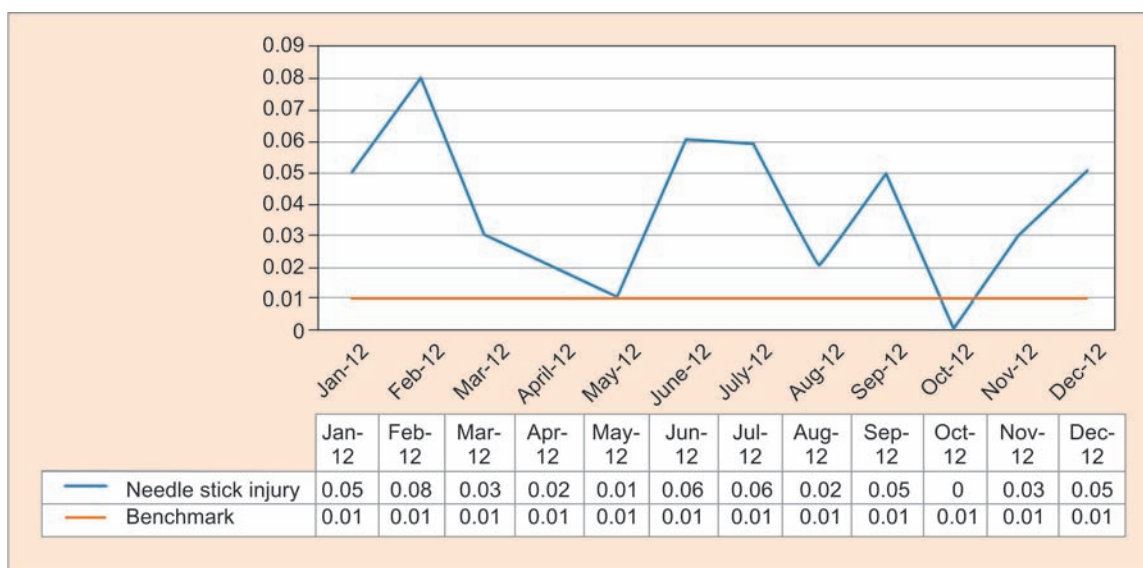
The CLABSI rates were highest in May and June (Graph 2). Possible reason illustrated was not maintaining the aseptic conditions while doing the procedure. One more reason noted was lack of central line/intravenous line care by doctors and nurses. After noticing the wide variation, measures were taken to reduce it. The measures were effective, which can be seen by the trend; there was decrease in the CLABSI rate. Overall, the organization needed to control the rates as over a period of time rates were high. This clearly showed that organization was not able to maintain the standards set by it.

**Incidence of Pressure Sores**

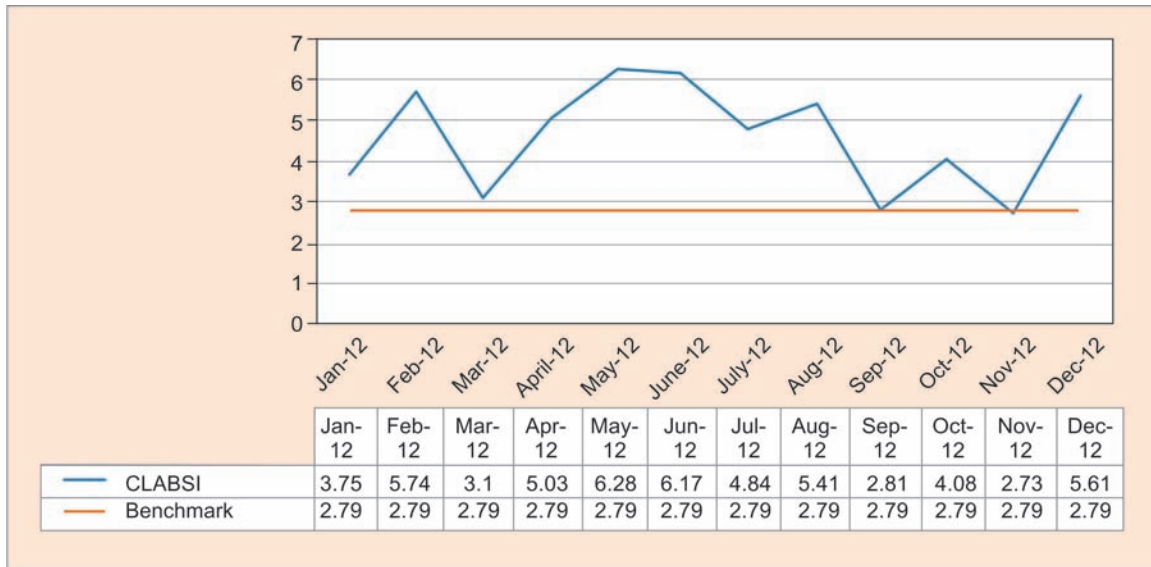
Incidence of pressure sores was calculated in the ICU and compared with the benchmark. The formula that was used is given below:

$$\frac{\text{Number of incidence of pressure scores developed after admission to the hospital}}{\text{Patient days}} \times 100$$

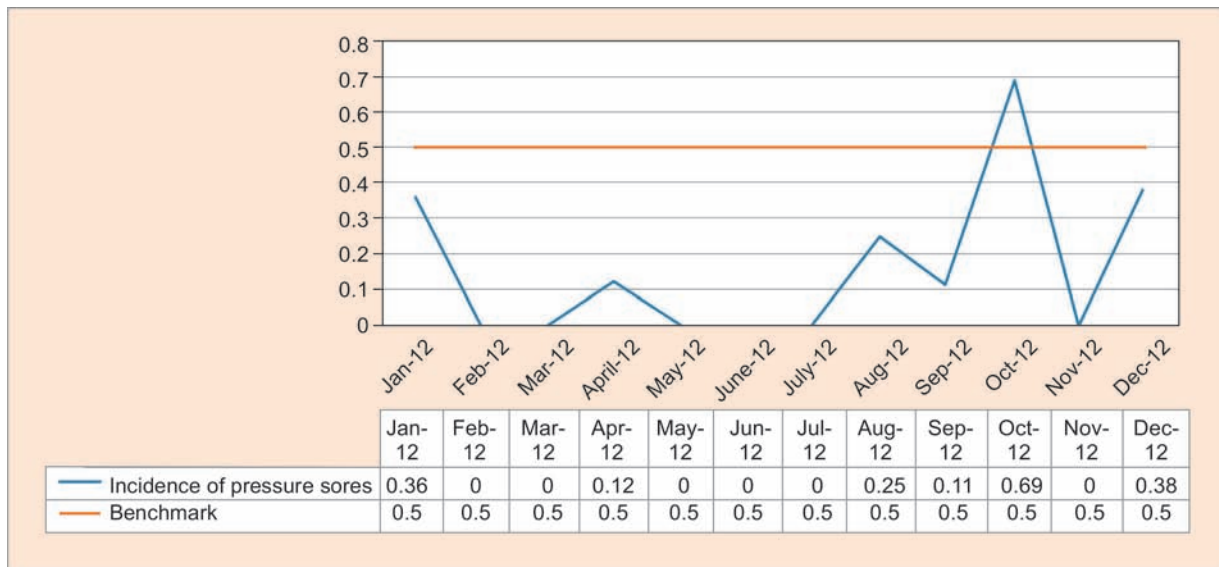
Hospital was able to maintain the trend for a period of time (Graph 3). Only in the month of October, there was slight deviation from standard. The possible reason stated was lack of proper nursing care in the ICU as illustrated by management.



Graph 1: Comparison of annual NSI data with benchmark



Graph 2: Comparison of annual CLABSI data with benchmark



Graph 3: Comparison of annual incidence of pressure sores data with benchmark

### Catheter-associated Urinary Tract Infection

Catheter-associated urinary tract infection was another indicator that was very important to monitor in patients admitted to the ICU for more than a week, and if it is not taken care of this results not only in increase of the length of stay but also decrease in the revenue of the hospital. The CAUTI in the department was calculated based on the formula given below:

$$\frac{\text{Number of CAUTI}}{\text{Number of catheter days}} \times 100$$

Though the benchmark kept was 4.02, any value from 0 to 4.82 was considered good (Graph 4). The values were less than 4.02, which is already a high benchmark given by the national health care safety, and the organization was able to maintain it.

### Ventilator-associated Pneumonia

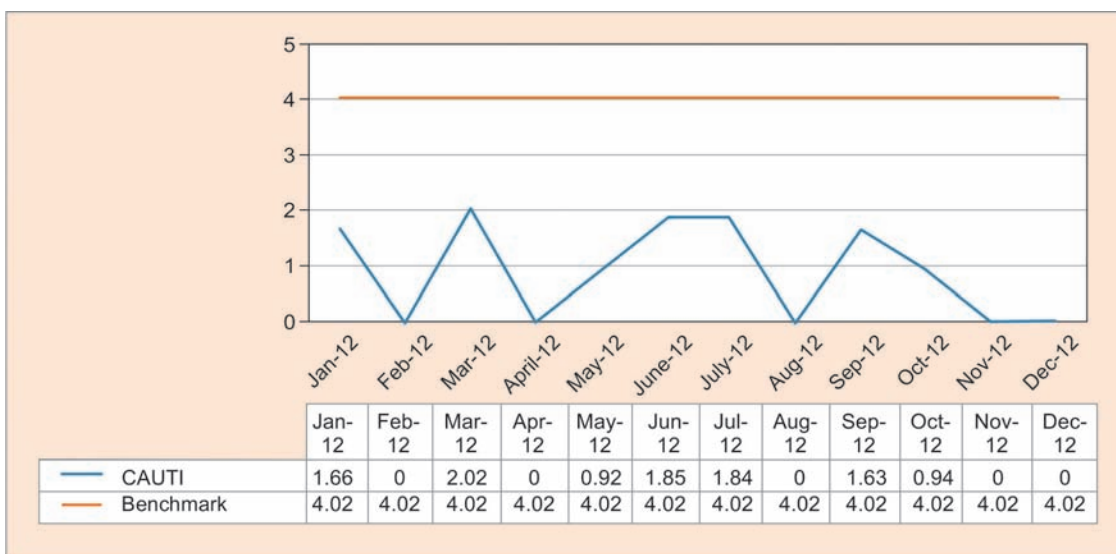
In a mechanically ventilated patient, pneumonia is identified by using a combination of radiologic, clinical, and laboratory criteria.

$$\frac{\text{Number of VAP}}{\text{Number of ventilator days}} \times 100$$

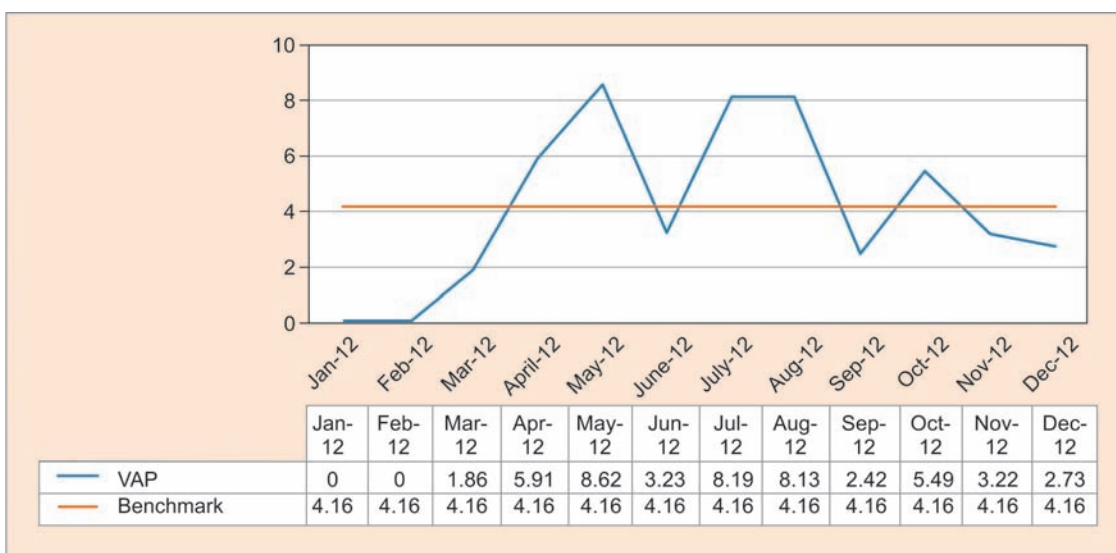
The highest deviation was observed in April, May, July, and August (Graph 5), where the rates were double from the standard set by the organization, which was due to lack of ventilator maintenance after patient was discharged and in some cases it was long device days. It was noticed by the infection control committee and measures were taken to reduce it; the trend shows that measures were effective too.







Graph 4: Comparison of annual CAUTI data with benchmark



Graph 5: Comparison of annual VAP data with benchmark

**Surgical Site Infection (SSI)\***

*Incisional*

*Superficial Incisional SSI:* Infection occurs within 30 days after the operation, and infection involves only skin or subcutaneous tissue of the incision and at least *one* of the following:

- Purulent drainage from the superficial incision.
- Organisms isolated from an aseptically obtained culture of fluid or tissue from the superficial incision.
- Superficial incision was deliberately opened by surgeon, and is culture positive or not cultured. The patient has at least one of the following signs or symptoms of infection: Pain or tenderness, localized swelling, redness, or heat. A culture-negative finding does not meet these criteria.

- Diagnosis of superficial incisional SSI by the surgeon or attending physician.

*Deep Incisional SSI:* Infection occurs within 30 to 90 days after the operative procedure and involves deep soft tissues of the incision (e.g., fascial and muscle layers) and patient has at least one of the following:

- Purulent drainage from the deep incision, but not from the organ/space component of the surgical site.
- A deep incision spontaneously dehisces or is deliberately opened by a surgeon and is culture positive or not cultured, and patient has at least one of the following signs or symptoms: Fever (38°C), localized pain, or tenderness. A culture-negative finding does not meet these criteria.
- An abscess or other evidence of infection involving the deep incision is found on direct examination,

\*CDC Definitions

during invasive procedure, or by histopathological or imaging test.

- Diagnosis of a deep incisional SSI by a surgeon or attending physician.

**Organ/Space SSI**

An organ/space SSI involves any part of the body, excluding the skin incision, fascia, or muscle layers, i.e., opened or manipulated during the operative procedure limited to the following infections:

- Osteomyelitis
- Mediastinitis

An organ/space SSI must meet the following criterion:

Infection occurs within 30 to 90 days after the operative procedure and patient has at least one of the following:

- Purulent drainage from a drain, i.e., placed through a stab wound into the organ/space
- Organisms isolated from an aseptically obtained culture or fluid or tissue in the organ/space
- An abscess or other evidence of infection involving the organ/space, i.e., found on direct examination, during invasive procedure, or by histopathologic or imaging test 4 diagnosis of an organ/space SSI by a surgeon or attending physician

The SSI rate in hospital is calculated by below given formula:

$$\frac{\text{Number of SSI cases}}{\text{Total number of surgeries}} \times 100$$

The mean for SSI was 1.16, which was less than the benchmark set (Graph 6). The deviation was observed only in the month of January. The reason could not be

tracked. So, all possible measures were taken and trend was maintained for the rest of the year. The rate was less than the benchmark set.

**Fall Rate**

Fall rate was calculated specifically for the ICU by the formula given below:

$$\frac{\text{Number of episodes of fall of patients without injury}}{\text{Total number of patient discharged/death}} \times 100$$

The mean for fall rate in ICU was 0.05, which was slightly higher than the benchmark set (Graph 7). The minimum fall observed in ICU was due to patient drowsiness. Measures were taken by the organization and trend shows that it was quite effective. The benchmark set by organization was the minimum, and hospital was able to maintain that.

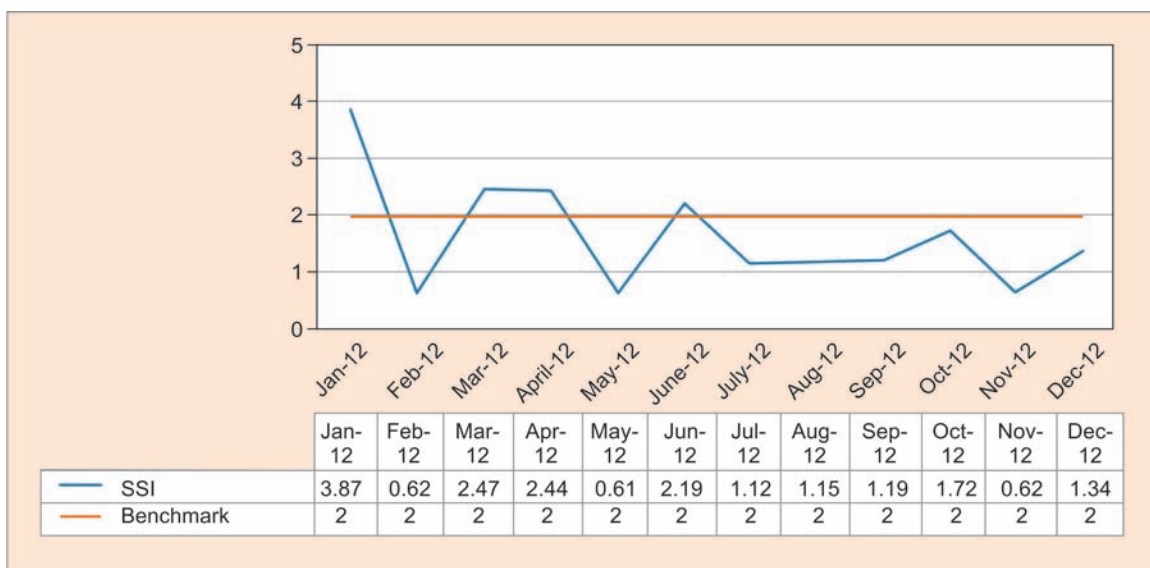
**Reintubation Rate**

Reintubation of patients leads to prolonged stay, longer ventilation, and higher nosocomial infection.

Reintubation was calculated by below formula:

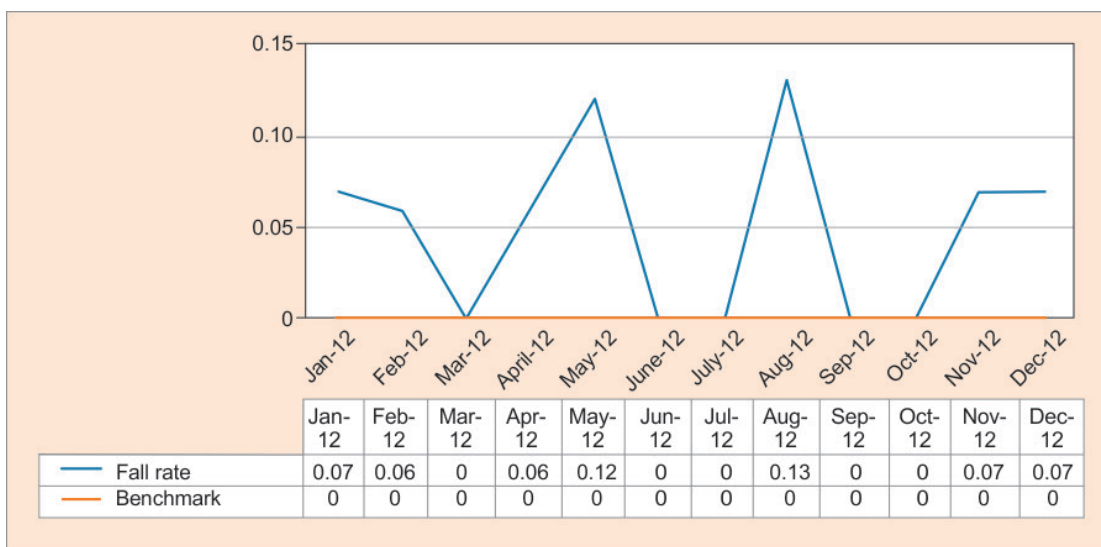
$$\frac{\text{Number of patients reintubated}}{\text{Number of patients extubated}} \times 100$$

The benchmark set was very high (Graph 8). According to the Indian Society of Critical Care Medicine (ISCCM), the benchmark for reintubation rate is 12% of total extubated patients, whereas the hospital kept it as 0, which was good; however, to maintain that requires a lot of effort. Though the rates were little higher than the benchmark, efforts were taken to reduce it further.

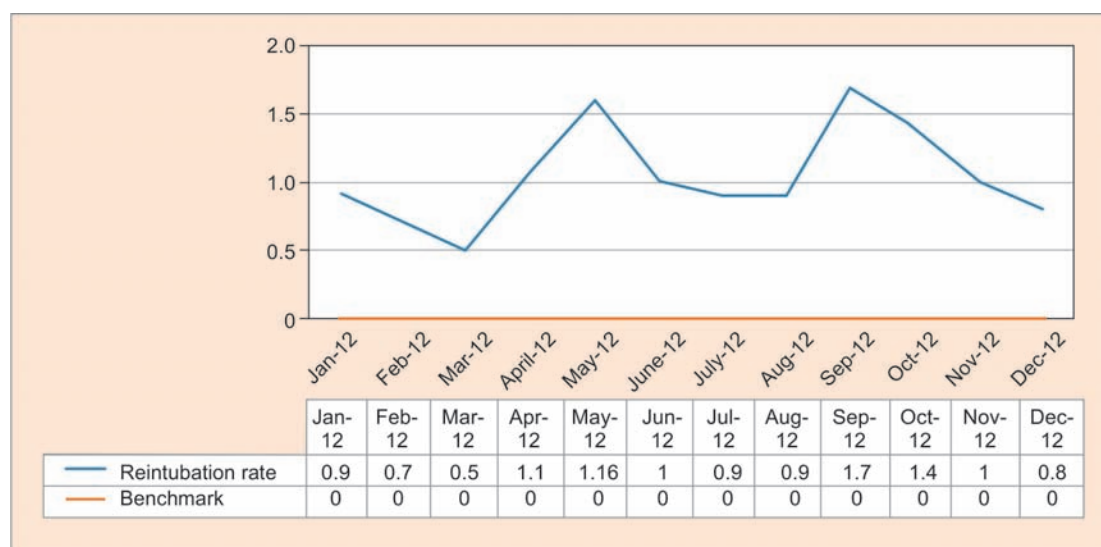


**Graph 6:** Comparison of annual SSI data with benchmark





Graph 7: Comparison of annual fall rate data with benchmark



Graph 8: Comparison of annual data of reintubation rate with benchmark

**Rate of Return to the ICU within 48 Hours**

The rate of return to ICU was calculated by below formula:

$$\frac{\text{Number of cases return to ICU within 48 hours}}{\text{Number of patients shifted out to ICU in a month}} \times 100$$

According to the ISCCM, the benchmark for return to ICU is 5% of the total patients shifted out from the ICU (Graph 9). The organization kept the benchmark as 0, which, to an extent, the organization was able to follow.

The mean for return to ICU was 0.68, whereas the benchmark set was 0. Very less variation from benchmark was observed.

**Mean, Median, and Standard Deviation of Indicator**

The statistical analysis showed the variation from benchmark (Table 6). The table clearly showed that CAUTI and

CLABSI had maximum deviations from benchmark. The reason for deviation has been discussed earlier.

Incidence of pressure sores and fall rate has minimal deviation from the benchmark, as the increase in rates was detected in early phase and measures were taken.

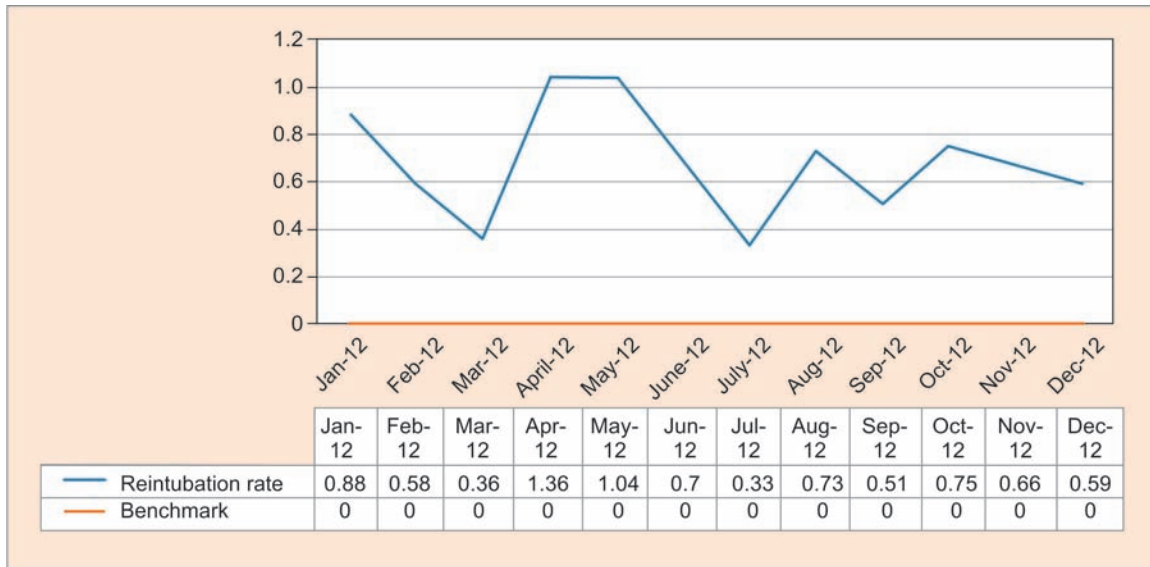
**Qualitative Methods**

The quality team was interviewed for achieving objectives 2(a) and 2(b). All the members of the quality team were interviewed on quality and accreditation. The interview was semistructured; the summary of each question is written below.

**Semi-structured Interview**

*For Quality Executives and Doctors*

- What does quality in health care mean to you?
- How does it affect the image of the hospital?



Graph 9: Comparison of annual data of return to ICU with benchmark

Table 6: Statistical analysis of NABH indicators

Indicator	Mean	Median	Standard deviation	Benchmark
Needle stick injury	0.04	0.04	0.000237	0.01
CLABSI	4.62	4.93	1.2	2.79
Incidence of pressure sore	0.15	0.055	0.2205	0.5
CAUTI	0.905	0.93	0.863	4.02
VAP	4.15	3.225	3.0662	4.16
SSI	1.16	1.27	0.0097	2
Fall rate	0.05	0.06	0.000478	0
Reintubation rate	1.04	0.95	0.003	0
Return to ICU	0.68	0.68	0.0022	0

- How accreditation helps in maintaining the quality?
- Why do you think—is it necessary to maintain quality standards after accreditation?
- What all measures are taken by organization for continuous quality improvement after accreditation?
- What are your suggestions to improve the quality standards in ICU?

**Meaning of Quality in Health Care**

The interview data analysis showed that the answers were very common among the quality team, which can be summarized as achieving excellent standard of care and patient satisfaction.

**Suggestions to Improve Quality in the ICU**

The answers were very different from different members. For instance, the nursing educator insisted on continuous medical education, whereas the head of the microbiology department insisted to keep an eye on infection rates of the ICU. Continuous medical education, team work, and

staff involvement are basic aspects, which were narrated by the quality officers. Other than these, protocols and policies for the ICU are necessary and it must be made mandatory for the staff to read and to follow them.

Patient feedback was one common answer given by all the members. Patient feedback on services will improve the quality of care given. Regular internal audits, surprise checks, maintaining records of all NABH indicators, and documentation will be of great help.

**CONCLUSION**

*Objective 1:* To assess the policies of the hospital with the standards of NABH in the ICU.

**Checklist**

The surprise checks in the three ICUs of the hospital showed that standard procedures were not followed in the hospital. The wide variations in standard compliance showed that the staff were not aware of the standard procedures to be followed in the ICU. This clearly depicts that organization was not able to maintain the standards required for accreditation. Lack of awareness of staff regarding SOPs, lack of motivation to follow the standard procedure, excess workload, and shortage of staff in the ICU were few reasons for noncompliance. If a hospital is accredited, it should maintain and follow the standards, and efforts should be made for continuous improvement.

**National Accreditation Board for Hospital and Health Care Providers Indicators**

Analysis of indicators showed that only four of nine indicators were having a mean of less than benchmark; other five indicators showed huge variations from benchmark



decided by hospital. The SSI, pressure sores, and CAUTI were lower than the benchmark set. It showed that organization was making continuous efforts to improve the standards.

In a few cases, the hospital was not able to maintain the predefined values. The reason was different in all cases, but few were common for all, which include:

- Standard operating procedures were not available in every department.
- Staff was not aware about policy and procedures.
- Lack of motivation for following standard policies and procedures.
- Lack of continuous education for staff regarding continuous quality education.
- Staff shortage in the ICU.
- High attrition rate in the ICUs.
- Absence of clear communication between departments.
- Increased patient stay.

*Objective 2(a):* To assess management perception toward quality management in post-NABH accreditation period.

*Objective 2(b):* To assess the measures taken by the hospital to maintain the quality.

The interview was conducted to know the management's perception toward accreditation, quality, and patient satisfaction. Management showed a positive attitude toward quality and accreditation. According to them, accreditation plays a vital role in maintaining quality in an organization, but organization was not able to maintain the standard as expected. According to management, various measures were taken to maintain and continuously improve the standards.

The measures taken by organization were continuous medical education, employee engagement, ICU incentives for staff, making SOPs for departments, internal audits, etc.

By looking at the data analysis, it is very clear that the organization knows the need of maintaining the standards but was not able to maintain for various reasons.

*Objective 3:* To assess patient/relative satisfaction in the ICU of an NABH-accredited hospital toward quality of care given.

The analysis of patient satisfaction questionnaire showed that patients were highly satisfied with cleanliness and hygiene services of the hospital. All the patients' responses were positive regarding the entire gamut of questions related to hygiene and sanitation. The questionnaire analysis showed that patient satisfaction level was 60 to 65% in case of services, 100% for hygiene, and 53.80% for information given regarding treatment choice.

When a hospital goes for accreditation, the quality of care given and patient satisfaction level increase, whereas the analysis shows that patients were not satisfied with services provided and information shared, but highly satisfied with hygiene and cleanliness. Accreditation increases satisfaction level in patients, but, in this case, the patients were not satisfied with the services and information given to them.

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# Patient Satisfaction in Tertiary Private Hospitals in Najran, Kingdom of Saudi Arabia

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## ABSTRACT

**Aim:** This study is aimed to assess the level of satisfaction of patients in tertiary private hospitals in Najran, Kingdom of Saudi Arabia.

**Materials and methods:** This study used descriptive cross-sectional design through a survey questionnaire.

**Results:** A great majority (57%) of respondents are male. Almost half (46.7%) of the respondents are 26 to 35 years old, some (30.3%) are more than 35 years old. The majority (54.5%) of hospitalized patients are married. Some (35.8%) of them reached the secondary level and some (31.5%) completed college. A great majority (57.6%) of the respondents' salary was below 5,000 SR. A great majority pay their hospitalization by themselves (60.6%). Mean scores revealed: For facilities, the mean was 4.12, standard deviation (SD) = 0.85. For general services, the mean was = 4.13, SD= 0.77. The physician services scored mean = 4.06, SD= 0.88. The highest level of satisfaction according to mean is nursing services with mean= 4.22, SD= 0.80 and the lowest among the variables is convenience with mean= 4.05, SD= 0.84. The overall level of patient satisfaction with the services they received indicated by the mean is 3.91, SD= 1.1.

**Conclusion:** Researchers conclude that patients catered by the private tertiary hospitals in Najran Saudi Arabia are more of males, at middle adulthood, and are married who reached the secondary level and have an income of below 5,000 SR and have no health insurance. The level of satisfaction of patients in the private tertiary hospitals is satisfactory and that nursing service has the highest satisfaction level, which is very satisfactory.

**Clinical significance:** The findings of this study are beneficial to the success of the organization. A patient who is satisfied will spread his experience to other people. A satisfied patient will also equate to return of investment. Meeting satisfaction of patients will also decrease the risk of malpractice lawsuits.

**Keywords:** Malpractice lawsuits, Patient satisfaction, Tertiary private hospitals.

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## INTRODUCTION

Patient satisfaction is how patients perceived the quality of service they are receiving. In health care, this is very important, because health care organizations deal more with people. Patient satisfaction is a serious question for health care providers.<sup>1</sup> It is also an important and commonly used indicator for measuring the quality of health care.<sup>2</sup>

A satisfied patient can bring a number of advantages; some of these are as follows: Increase in patient loyalty, improved patient retention, patients complain less if there is an increase in price, stable income flow, increases the self-esteem of staffs, reduced malpractice cases, and increased professional and personal satisfaction.<sup>2</sup> With this, it is really important that health care organizations should satisfy the needs of their patients. On the contrary, dissatisfied patients can lead to drop in patient loyalty; problems with this will push patients away and unhappy customers spread the word.<sup>3</sup> Dissatisfied patients can really hurt a health care organization. Tertiary hospital or medical center caters to patients and provide subspecialty expertise, meaning that these hospitals are state of the art and should give quality service to its patients.

The primary goal of tertiary care hospitals is to provide best possible health care to the patients. In the modern era, it is the right of every patient to demand the best possible care in hospitals, and it is the duty of every staff member of the hospital to deliver his/her optimum efforts to the entire satisfaction of the patient,<sup>1</sup> and its assessment will give an opportunity to find loopholes in services of the hospitals for future ratification.<sup>4</sup>

In the study of Ham et al,<sup>5</sup> wherein they studied predictors of patient satisfaction, they found that convenient check-in and check-out processes, nurse professional appearance, doctors' respect and courtesy for the patient, technician's friendly manner, and the presence of a comfortable waiting area are the strongest predictors of patient satisfaction. Positive reports are also seen in other studies like the study of Adekanye et al,<sup>6</sup> where they studied a tertiary hospital in north central Nigeria and found that a great majority of their respondents were satisfied with the hospital services and met their expectation.

Further, satisfaction was lowest in the revenue section and highest at the maternity section. In India, Shekhawat et al<sup>7</sup> studied the level of satisfaction of inpatients in Mahatma Gandhi Medical College and Hospital, a tertiary hospital, and found that satisfaction was good regarding the quality of health care services. Areas where patient satisfaction was found to be lowest were patience shown by the nursing staff while communicating with patients and hospital ambiance in terms of peacefulness; both of these are important aspects of health care and there is an imperative need to address these problems effectively and urgently in order to improve the quality of care. With these data in mind, hospitals in Asia are delivering well to excellent care to its patients.

Although there are a lot of studies about the level of satisfaction of patients, it is rarely done in Najran, Saudi Arabia. This study may be the pioneer of its kind in this area. This study is of significance to the people in Najran for them to know the satisfactory level of private tertiary hospitals in the area; it is also beneficial to the hospitals so that they could look into things that they could and should improve. Further, this could also be beneficial to the Ministry of Health of Saudi Arabia as a monitoring tool and could be a data for their evaluation of private tertiary hospitals in Najran.

## MATERIALS AND METHODS

### Study Design

This study is aimed to assess the level of satisfaction of patients in tertiary private hospitals in Najran, Saudi Arabia. This study used descriptive cross-sectional design through a survey questionnaire.

### Respondents

The respondents of this study are patients from three tertiary private hospitals in Najran, Saudi Arabia. Patients registered in these hospitals from Najran agreed to participate in the study; excluding out-patients, newly registered in-patients and are not hospitalized for the period of February to March 2017. The three hospitals have a total of 290-bed capacity using sample size calculator (2012), 165 inpatients are calculated to be the study sample based on calculation at a confidence level of 95%. The study used purposive sampling.

Further, the researchers based the distribution of the respondents by the bed capacity of the hospitals. The bed capacities of the three hospitals are as follows: Hospital A – 140, hospital B – 100, and hospital C – 50. The formula for obtaining the number of respondents from the three hospitals is  $\left( \frac{\text{Number of beds per hospital}}{\text{Total number of beds of the 3 hospitals}} \right) \times 100$ .

Thus, hospital A has 74 respondents, hospital B has 56 respondents, and hospital C has 35 respondents.

### Ethical Considerations

Prior to the conduct of the study, approval was obtained from all the hospital administrators. Before data collection commenced, patients were approached and requested permission to complete the survey, and patients had the right to withdraw at any time. The participants were provided a cover sheet that included an explanation of the purpose of this study, directions for completing the survey, expected time to complete the survey, potential benefits and risks; privacy of participants was respected and the answers were treated confidentially.

### Instrumentation

A questionnaire was the main instrument of this study. It was adapted and modified from Patient Satisfaction in Private Hospitals available in SurveyMonkey.com; the questionnaire was used because of financial constraints and it is readily available. The instrument has two parts. Part I covered the profile of the respondents: Sex, age, marital status, educational attainment, salary, the source of payment. Part II is the satisfaction survey, which is further divided into subscales; specific item answers the following: Facilities (1, 33, 36, 38, 45); general service (3 to 18, 30, 31, 35, 37, 39, 40, 41, 42, 44); physician service (19, 20, 21, 22, 23, 24, 27); nursing service (25, 26, 27, 28, 29); convenience (2, 32, 34, 43); and overall satisfaction (46).

Before the conduct of the study, the researchers ran a pilot study to check the internal consistency of the instrument; the respondents for this were students and faculty members from a college in Najran who were confined in other medical facilities. Cronbach's alpha result was 0.95, which means the questionnaire has relatively high consistency and it can be used in Saudi Arabia.

### Tools for Data Analysis

Statistical Package for the Social Sciences version 22 was used to analyze the data. To describe the demographic profile, frequency and percentage were used. To know the level of satisfaction of the patients, weighted mean was utilized. Table 1 summarizes the measurement of the level of satisfaction of the patients.

**Table 1:** Measurement of patient satisfaction

Scale	Range	Descriptive equivalent
5	4.21–5.00	Very satisfied
4	3.41–4.20	Satisfied
3	2.61–3.4	Neither satisfied nor dissatisfied
2	1.81–2.60	Dissatisfied
1	1.00–1.80	Very dissatisfied

**RESULTS**

Graph 1 shows that a great majority (57%) of respondents are male, and many (43%) are females with standard deviation (SD) = 0.5. This implicates that more males are hospitalized in Najran. This may be associated with the culture of Saudi Arabia wherein it is a male-dominated country. The present finding is parallel to the findings of Mirić et al,<sup>8</sup> wherein males are hospitalized more due to cardiovascular problems.

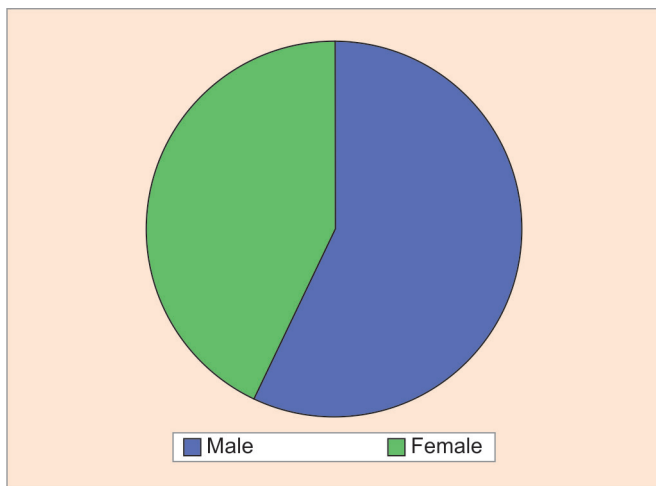
Graph 2 displays that almost half (46.7%) of the respondents are 26 to 35 years old, some (30.3%) are more than 35 years old, and few (23%) are less than 25 years old. This finding implicates that a great majority of hospitalized patients in Najran comprise middle-age adults. This is parallel to the report of Health Research Board,<sup>9</sup> wherein in their data, the highest admission rate is from 24 years up to 35 years.

Graph 3 shows that majority (54.5%) of hospitalized patients are married and almost half (45.5%) are not married. This implicates that there is a greater number of

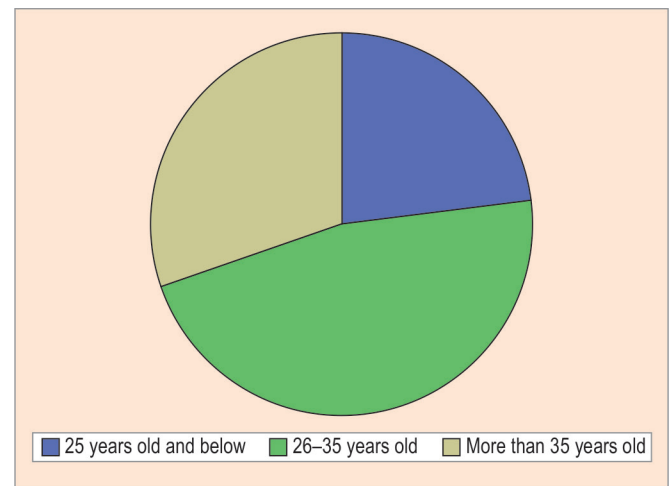
married patients who are hospitalized; this is contrasting to the finding of Butler and Morgan<sup>10</sup> where they found that higher rates of bed use for inpatients are used by nonmarried patients. This may be due to the changing trend in health care, and there are little to no data regarding marital status and admission.

Graph 4 shows the educational attainment of respondents, some (35.8%) of them reached the secondary level and some (31.5%) completed college. Few (15.8%) of the respondents are college educated and very few (7.9, 9.1%) reached elementary and postcollege respectively. This implicates that a greater number of people hospitalized in Najran reached secondary level and college level. This is parallel to the report of General Authority for Statistic, KSA,<sup>11</sup> wherein in their data, the majority of the population in Najran reached secondary level.

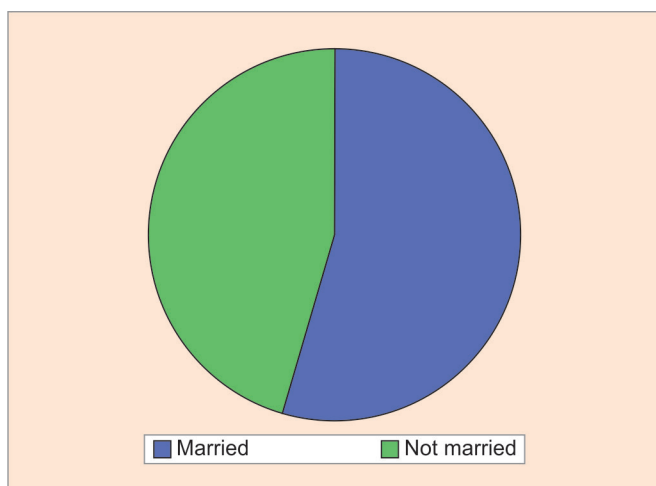
Graph 5 displays the distribution of respondents according to their salary. A great majority (57.6%) of the respondents' salary was below 5,000 SR and few (23.6%) have a salary range of 5,001 to 8,000 SR, very few (12.1,



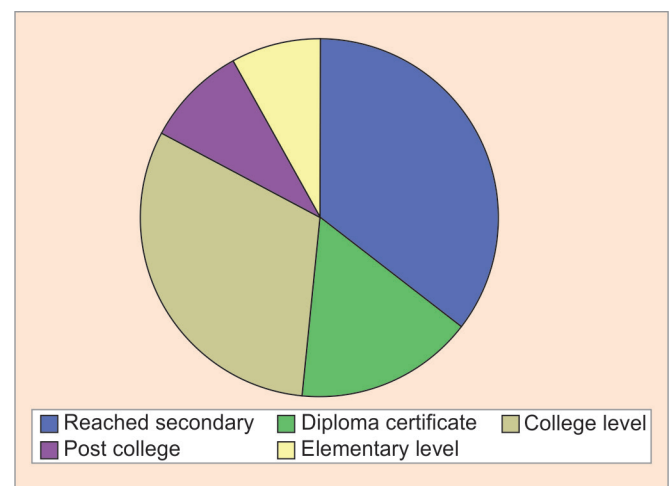
**Graph 1:** Distribution of respondents according to their sex



**Graph 2:** Distribution of respondents according to age

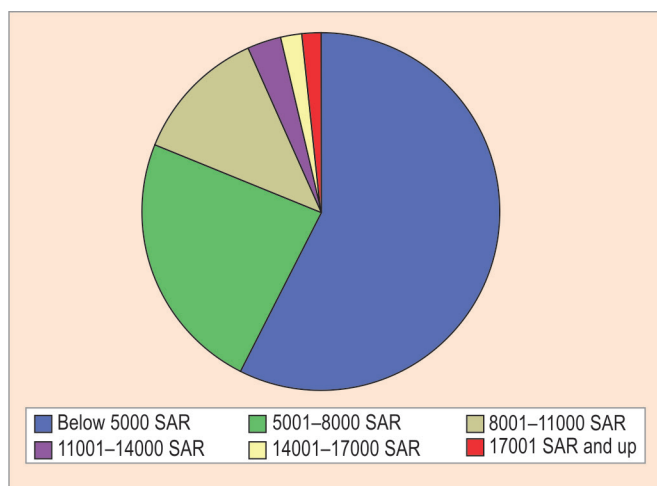


**Graph 3:** Distribution of respondents according to their marital status

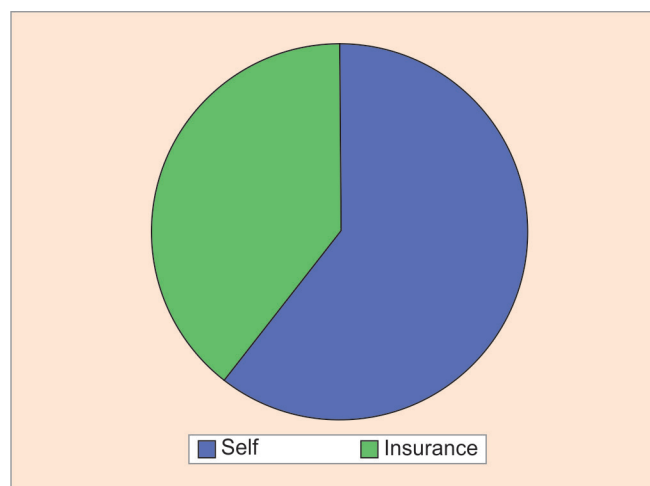


**Graph 4:** Distribution of respondents according to their educational attainment





Graph 5: Distribution of respondents according to salary



Graph 6: Distribution of respondents according to their source of payment

3.0, 1.8, 1.8%) have salary range of 8,001 to 11,000, 11,001 to 14,000, 14,001 to 17,000, and >17,001 SR respectively. This implicates that most of the hospitalized people in Najran belong to the minimum wage workers group.<sup>12</sup>

Graph 6 delineates that a great majority pay their hospitalization by themselves (60.6%), and some (39.4%) are getting payment from insurance companies. This implicates that a greater number of people hospitalized in Najran do not have health insurance. This is parallel to the study of Yan et al,<sup>13</sup> where they found that patients without insurance have a higher risk for hospitalization.

Table 2 represents the level of satisfaction of patients for all variables. For facilities, the mean was 4.12, SD= 0.85; patients of the private tertiary hospitals are satisfied. For general services, the mean was = 4.13, SD= 0.77; this means that patients are satisfied with what they are receiving. The physician services scored mean = 4.06, SD= 0.88, also the patients were satisfied. The highest level of satisfaction according to mean is nursing services with mean= 4.22, SD= 0.80, where the patients were very satisfied and the lowest among the variables is convenience with mean = 4.05, SD= 0.84, but patients are still satisfied.

The overall level of patient satisfaction with the services they received indicated by the mean is 3.91, SD= 1.1, this means that patients were satisfied with the services provided by the tertiary care private hospitals.

Table 2: Level of satisfaction of patients

Variables	Mean score	SD	Interpretation
Facilities	4.12	0.85	Satisfied
General services	4.13	0.77	Satisfied
Physician services	4.06	0.88	Satisfied
Nursing services	4.22	0.80	Very satisfied
Convenience	4.05	0.84	Satisfied
Overall	3.91	1.1	Satisfied

## DISCUSSION

Private tertiary hospitals cater to male patients more than females; this may be related to health practices of males specifically linked to cigarette smoking, risk taking in recreation and driving, and employment in hazardous occupations.<sup>14</sup> The hospitals also cater more to middle adults, because they are more susceptible to certain diseases and conditions. According to Papalia et al,<sup>15</sup> hypertension, stress, occupational conflict, and unemployment affect the health of middle-age adults. Further, the leading causes of death during this stage are diabetes, cancer, heart disease, liver disease, and stroke. People who are married have a higher percentage of admission than those who are not married in the tertiary hospitals; this finding is contrasting to many pieces of research that say that married couples tend to be more healthier. According to Harvard Men's Health Watch,<sup>16</sup> loneliness is another factor, i.e., linked to marriage and health; happier couples tend to be healthier. Respondents who reached secondary education account for the most number of admissions in private tertiary hospitals. Education impacts health through the development of diverse personality traits, cognitive skills, and problem-solving.<sup>17</sup> This means that higher the education, the healthier the person is. Respondents with below 5,000 SR dominated the admission in the private tertiary hospitals; according to Archibald,<sup>18</sup> feeling crappy about yourself can obviously lead to stress. Further, she claimed that salary is an important factor for general well-being. In terms of health insurance, there are lesser number of patients in private tertiary hospitals with a health insurance. According to Papalia et al,<sup>15</sup> lack of health insurance leads to poorer health.

Nursing service garnered the highest mean score among the variables in patient satisfaction in tertiary

hospitals in Najran, Saudi Arabia. This is very important because nurses are the front-liners in health care; they stay with patients more than the other members of the health care team, and as claimed by Needleman and Hassmiller,<sup>19</sup> nurses have a critical role in the delivery of high-quality, efficient care that will overall affect the patient satisfaction. All other variables including the overall satisfaction garnered a satisfactory score, which is good and acceptable for tertiary hospitals.

Major limitations of this study are the lack of a causal relationship among variables by the use of a cross-sectional design; it is therefore, recommended to conduct a longitudinal study and use advanced statistics to look deeper into the relationship of variables. It is also recommended to include other tertiary hospitals in the area, especially those that are run by the government.

## CONCLUSION

In light of the findings of the study, researchers conclude that patients catered to by the private tertiary hospital in Najran, Saudi Arabia, are more of males, at middle adulthood, and are married; they are educated till the secondary level, have an income of below 5,000, and have no health insurance.

The level of satisfaction of patients in the private tertiary hospital is satisfactory and that nursing service has the highest satisfaction level, which is very satisfactory.

## CLINICAL SIGNIFICANCE

The findings of this study are beneficial to the success of the organization. A patient who is satisfied will spread his experience to other people. A satisfied patient will also equate to return of investment. Meeting satisfaction of patients will also decrease the risk of malpractice lawsuits.

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# Analyzing Competencies of Indian Health Care Leaders: Way Forward for Next Generation

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## ABSTRACT

**Introduction:** Indian health care is experiencing a paradigm shift in terms of requirement of resources and changing demographic patterns. The customer-oriented and quality-conscious competitive environment has intensified the need for health care organizations to attain higher levels of organizational performance. Competencies of health care leaders play a pivotal role in deciding the organizations' way forward and competencies are the cornerstone of organizational performance and quality standards. A cross-sectional study of select health care leaders of India was done from various hospitals and other health delivery agencies to identify and analyze the gaps in competencies.

**Materials and methods:** A cross-sectional study was planned amidst health care leaders of India so as to assess their leadership competencies. Health care leaders of India were identified after focused group discussion and senior health care leaders, such as directors, deans, CEOs, and principals were shortlisted for this study. Two structured questionnaires were administered to health care leaders of various hospitals in India. The ratings in the questionnaire were on a Likert scale ranging from very poor to excellent. Respondents were asked to self-evaluate various competencies and the same were analyzed using Statistical Package for the Social Sciences statistical software. Interpretation of results of data analysis was done.

**Results:** A total of 300 questionnaires were sent of which 106 questionnaires were completed and returned by select health care leaders. About 78 were doctors and 28 were nursing executives. The study has been able to identify deficiencies in the perceived "existing competency" and "required competency" levels in the selected competencies.

**Conclusion:** The findings of this study suggest that there is deficiency in perceived "existing competency" and "required competency" levels in the selected competencies of health care leaders. Indian health care leaders are operating at operational levels and have not graded themselves highly in transformational roles. There is a need for training to bridge the competency gap of Indian health care leaders.

**Keywords:** Accountability, Competencies, Health care, Health leaders, Medical technology, Process management, Strategic orientation.

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## INTRODUCTION

The health sector in India is undergoing a paradigm shift. Medical tourism, public-private partnership, medical technology, and mobile outreach services are some of the factors responsible for changing the health care delivery facet. In the metamorphosing environment, Indian health care leaders have to face fresh challenges everyday. Thus, it is important to assess their leadership competencies, which can help Indian health care leaders attain their objective. These objectives, when attained, will help India propel into a country where wellness will be the guiding factor and the health sector will reach out to the deep interiors of our country. To achieve the various health care goals and plans as designed by the leaders, their role in redefining delivery is of utmost importance. All managers, irrespective of where or what they manage, perform four generic tasks. These include planning, organizing, leading, and controlling.<sup>11</sup> Planning involves defining goals and mapping out ways to reach them; organizing entails arranging and coordinating human, material, and information resources aimed at achieving desired goals; leading involves motivating others to achieve organizational goals; and controlling involves measuring performance and monitoring progress relative to objectives.<sup>1</sup>

There are three well-known styles of leadership: Transformational leadership, transactional, and laissez-faire.

Transformational leaders encourage subordinates to adopt the organizational vision as their own, through inspiration, thus adopting a long-term perspective and focus on future needs. Transformational leaders tend to have a holistic perspective of organizational factors.

Transactional leaders identify and clarify job tasks for their subordinates and communicate how successful execution of those tasks will lead to receipt of desirable

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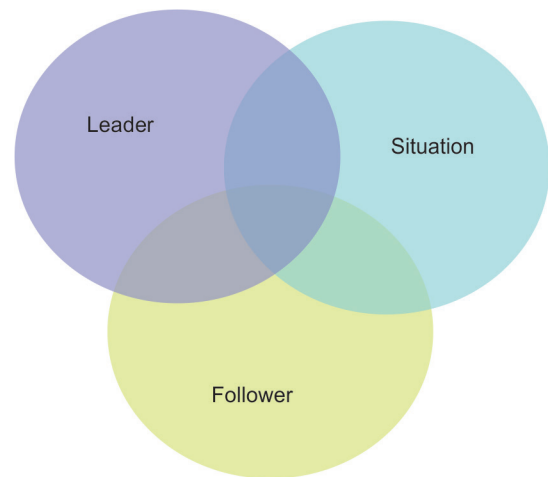
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Fig. 1: Möbius strip



Graph 1: Leader-follower relationship

job rewards (Bass). According to Avolio et al,<sup>2</sup> a transactional leader determines and defines goals for their subordinates and suggests how to execute tasks.

Laissez-faire leaders abandon their responsibility, leaving their subordinates to work relatively on their own and avoid making decisions.

It is clear from the definitions that leadership can be viewed in terms of multiple perspectives, and that it can be represented as existing as an act, behavior, or process.

Leadership is a social influence process shared among all members in a group. Leadership is not restricted to the influence exerted by someone in a particular position or role; followers are part of the leadership process. In recent years, both practitioners and scholars have emphasized the relatedness of leadership and followership.

Thus the question “what is leadership” cannot be separated from “what is followership?” There is no simple line dividing them, they merge. The relationship between leadership and followership can be represented by borrowing a concept from topographical mathematics: The Möbius strip (Fig. 1).

Möbius strip is a strip of paper folded and connected in a manner that it proves to have only one side. Thus, leadership and followership written on either side merge into one another and become indistinguishable.

## LEADER–FOLLOWER RELATIONSHIP

Fred Fiedler was perhaps the first researcher who formally recognized the importance of leader, follower, and situation in the leadership process. Leadership is an interaction of three elements—the leader, the follower, the situation (Graph 1).

Thus leadership is  $L = f(l, f, s)$ <sup>3</sup>

It is important to understand here that when this definition refers to leaders and followers, one should not assume that it refers to only a hierarchical relationship. Any time an individual is attempting to influence the behavior of someone else, that individual is the potential

leader and the person subject to the influence attempt is the potential follower.<sup>4</sup>

Leadership is the result of a complex set of interactions among leaders, followers, and situations. An example of one such interaction between leaders and followers is evident in what has been called in-groups and out-groups. Sometimes, there is a high degree of mutual influence and attraction between the leader and few subordinates, these subordinates belong to the in-group. Other subordinates belong to the out-group. Leader member exchange theory describes these two kinds of relationships and how they affect the types of power and influence tactics leaders use. Followers’ expectations, personality trait, maturity levels, levels of competence, and motivation affect the leadership process. The situation is the third critical part of the leadership equation. Concept of leadership and their interaction with follower are highly dependent on situations.<sup>5</sup>

## Competency

Competency is defined as the minimum standards required to perform a job. A competent individual has the requisite skills and abilities to perform a job satisfactorily. Competency assessment ensures that every employee performs at least at minimal acceptable level. Competency assessment also gives us an insight into why some perform exceedingly well whereas others fail under similar situations.

## WHY ARE COMPETENCIES IMPORTANT?

Competencies<sup>6</sup> are a critical lever to produce leadership brand within an organization for at least five reasons as they:

1. Guide direction
2. Are measurable
3. Can be learnt
4. Can distinguish and differentiate the organization
5. Can help integrate management practices.

It is essential to endow health care leaders in India with requisite competencies to handle situations arising out of the changing scenario of health care sector. Health leaders are especially challenged to create work climates that motivate high-quality, patient-centered care and retain high-demand talent in a very competitive marketplace.<sup>7</sup>

Now the cause of concern is to find if health care leaders of India at various levels of management have the required skills to lead their teams in trying times. It is imperative to assess the presence of critical competencies of health care leaders, which they can gainfully utilize for optimal health care delivery. Competencies of health care leaders in India need to be identified without which the process of leading and ultimate vision of realizing health care goals may be compromised.

## MATERIALS AND METHODS

The National Centre for Health Care Leadership (NCHL) (2006) defined three domains—transformation (strategic), execution (organizing and controlling), and people (leadership)—comprising 26 competencies which encapsulates health management today. This study utilized the NCHL model to generate a questionnaire that aimed to assess the perceived and the required skills and competencies of Indian health care leaders so as to analyze the gaps and the need for augmenting specific skills.

Two questionnaires, scaled on Likert scale, were framed out of selected competencies from various health care models and distributed amidst the selected sample of health care leaders who were doctors and nursing executives.

The first questionnaire elicited response to Please rate your level of competency.

The second questionnaire elicited response to How important do you think the following competencies are

for you to perform your duties efficiently and effectively?

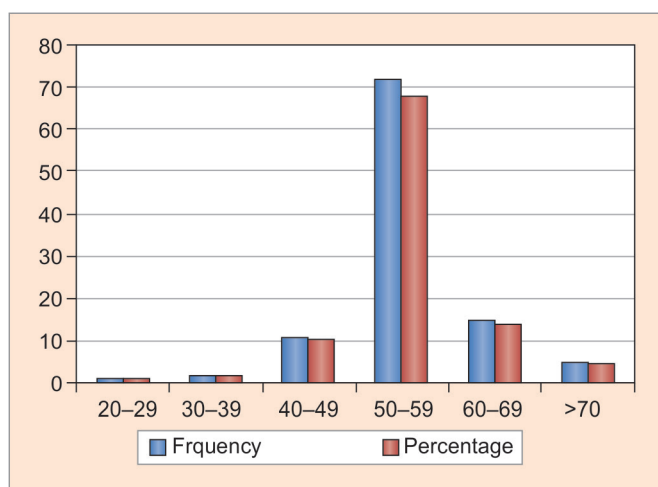
The first questionnaire elicited the perceived level of the individual health care leader's competencies and the second questionnaire elicited the perceived need for same competencies for effective execution of their task.

Structured questions were quantified and were tabulated on an Excel sheet. The data collected from both questionnaires were tabulated in various combinations and were analyzed using Statistical Package for the Social Sciences version 15. Data were described with mean, standard deviation (SD), and frequency with percentage. The data were subjected to paired t-test and independent t-test for evaluation. Student's t-tests were carried out to measure the significance of the difference between the means of self-assessed proficiency levels and perceived importance levels. The scales of each competency level were administered reliability tests in form of Cronbach's alpha and tested. These were then subjected to analysis and further inferences were drawn. Inferences were drawn about health care leaders' competencies from the questionnaires. Evaluation of questionnaires was also drawn to analyze competencies between trained, untrained health care leaders, and public, private sector health care leaders.

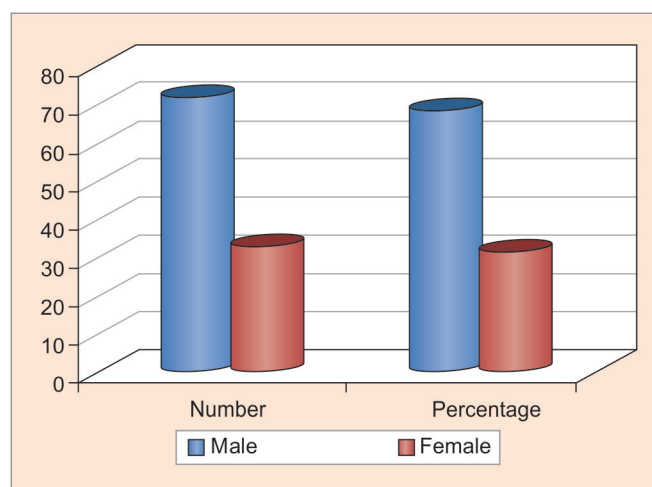
## RESULTS

### Respondent Data

Respondent data revealed that most health care leaders are in the age group of 50 to 59 (Graph 2 and Table 1). Males outnumber the females in gender distribution (Graph 3). A total of 82 respondents were in their current position for less than 10 years (79.61%). A total of 45 (43.27%) respondents were in management position for less than 10 years. A total of 93 (87.74%) respondents were specialists and 13 (12.26%) were nonspecialists. This is evident of the fact that the specialists take on the



Graph 2: Age distribution



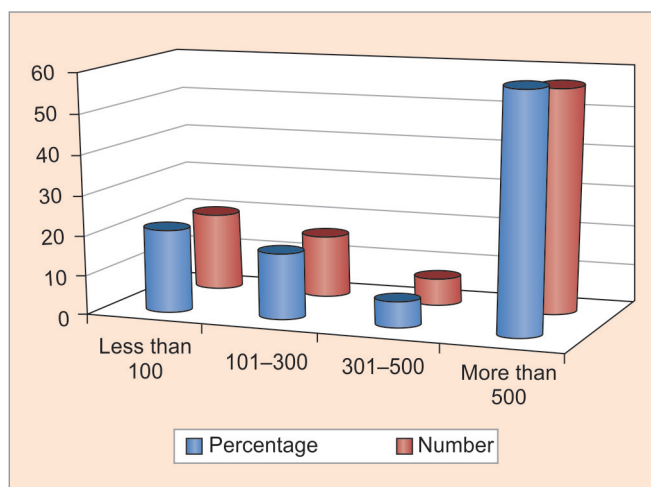
Graph 3: Gender distribution

**Table 1:** Respondent profile analysis

	Frequency	Percentage
<i>Age in years</i>		
20–29	1	0.94
30–39	2	1.89
40–49	11	10.38
50–59	72	67.92
60–69	15	14.15
70 more	5	4.72
<i>Sex</i>		
Male	72	68.57
Female	33	31.43
<i>Clinical experience (years)</i>		
Less than 10	25	23.81
10–20	33	31.43
21–30	27	25.71
31–40	18	17.14
More than 40	2	1.90
<i>Years in management position</i>		
Less than 10	45	43.27
10–20	36	34.62
21–30	14	13.46
31–40	8	7.69
More than 40	1	0.96
<i>Years in current position</i>		
Less than 10	82	79.61
10–20	16	15.53
21–30	4	3.88
31–40	1	0.97
More than 40	–	–
<i>Primary academic qualification</i>		
Medical	78	73.58
Nursing	28	26.42
<i>Specialization</i>		
Specialists	93	87.74
Nonspecialists	13	12.26
<i>Type of specialization</i>		
MCh, DM, PhD	15	14.15
MD, MS, MHA	51	48.11
Nursing PG	10	9.43
Diploma	24	22.64
Others	6	5.66
<i>Exposure to training in health administration</i>		
Trained	88	83.02
Untrained	18	16.98
<i>Formal training</i>		
Degree	39	38.24
Certificate	31	30.39
Others	32	31.37
<i>Informal training</i>		
Mentored	19	18.27
Coached	3	2.88
In-house programme	24	23.08
Job shadowed	22	21.15
Others	36	34.62
<i>Sector</i>		
Public	81	76.42
Private	25	23.58

(Cont'd...)

	Frequency	Percentage
<i>Hospital size</i>		
Less than 100	21	20
101–300	17	16.19
301–500	7	6.67
More than 500	60	57.14
<i>Number of employees</i>		
Less than 100	18	17.14
101–500	16	15.24
501–1000	21	20.00
More than 1000	50	47.62

**Graph 4:** Size of hospitals in relation to hospital beds

administrative responsibilities in the later part of their career. A total of 88 (83.02%) respondents had training in health and nursing administration. Formal training in the form of awarded degree was received by 39 (38.24%) and certificate training was received by 31 (30.39%). The number of respondents from public sector were 81 (76.2%) and from private sector were 25 (23.58%). A total of 60 (57.14%) respondents were from hospitals, which are 500 bedded or more (Graph 4).

### Evaluation of Competencies of Health Care Leaders

Analysis of competencies of 106 health leaders was done. The statistical details are shown in Table 2. The questionnaire had more than 7 pages, which made it a long questionnaire. As per a study done by Iglesias and Trogreson in 2000,<sup>8</sup> the response rate of a long questionnaire is 40.5%. According to a study done by Trogreson,<sup>9</sup> the response rate of 40% is modest, it confirms the views of Hill and Winfrey that it is increasingly difficult to achieve desirable response rates in surveys of physicians. It is also consistent with rates commonly obtained among elite professionals.<sup>10</sup> The scales of the competencies were subjected to Cronbach's alpha, and it has been found that in both the questionnaires, the Cronbach's alpha is more than 0.6 for all competencies.

**Table 2:** Competencies of health care leaders

Competency <i>n</i> = 106, health leaders	Q1 mean $\pm$ SD	Q2 mean $\pm$ SD	<i>p</i> -value*
Accountability	17.91 $\pm$ 3.65	18.87 $\pm$ 3.80	0.001
Achievement orientation	21.92 $\pm$ 4.099	22.88 $\pm$ 4.56	0.005
Analytical thinking	14.47 $\pm$ 2.74	14.66 $\pm$ 3.990	0.610
Change leadership	21.76 $\pm$ 4.074	22.19 $\pm$ 4.378	0.146
Collaboration	19.07 $\pm$ 3.84	19.39 $\pm$ 3.883	0.198
Communication skills	14.96 $\pm$ 3.123	14.79 $\pm$ 3.060	0.463
Community orientation	21.91 $\pm$ 4.712	22.42 $\pm$ 4.30	0.104
Financial skills	16.10 $\pm$ 4.021	16.94 $\pm$ 4.10	0.018
Human resources management	13.06 $\pm$ 2.70	3.71 $\pm$ 2.50	0.013
Impact and influence	19.60 $\pm$ 3.84	19.87 $\pm$ 3.72	0.383
Information seeking	18.07 $\pm$ 3.45	18.68 $\pm$ 3.62	0.020
Information technology management	14.30 $\pm$ 2.91	14.59 $\pm$ 2.84	0.194
Initiative	17.77 $\pm$ 3.7218	13 $\pm$ 3.56	0.168
Innovative thinking	18.12 $\pm$ 3.35	18.47 $\pm$ 3.57	0.168
Interpersonal understanding	18.33 $\pm$ 3.64	18.35 $\pm$ 3.41	0.938
Organizational awareness	17.08 $\pm$ 3.63	17.59 $\pm$ 3.61	0.069
Performance measurement	10.19 $\pm$ 2.24	10.89 $\pm$ 2.33	0.001
Process management	13.75 $\pm$ 3.17	14.58 $\pm$ 3.008	0.001
Professionalism	15.11 $\pm$ 3.096	15.21 $\pm$ 2.96	0.668
Project management	10.75 $\pm$ 2.272	10.75 $\pm$ 2.441	0.959
Relationship building	17.78 $\pm$ 3.77	18.45 $\pm$ 3.82	0.019
Self-confidence	19.03 $\pm$ 3.74	19.19 $\pm$ 3.772	0.549
Self-development	14.76 $\pm$ 2.76	15.13 $\pm$ 3.16	0.084
Strategic orientation	13.42 $\pm$ 2.91	14.06 $\pm$ 3.02	0.008
Talent development	21.92 $\pm$ 4.60	22.29 $\pm$ 4.28	0.241
Team leadership	22.89 $\pm$ 4.92	23.15 $\pm$ 4.94	0.395

\*Paired t-test

In most of the competencies, it is more than 0.8, which means that the scales are reliable. The study suggests that there is a definite gap between the perceived self-competency level and the perceived required competency for executing the task. There is a requirement of more training for health care leaders in all the competencies, so that their competency level is augmented.

### Statistically Significant Competencies

Of the 26 competencies, there are 8 competencies that are statistically significant. Indian health leaders require training in all the 26 competencies that have been studied in this research work. It is evident that the perceived level of competency is definitely less than perceived required level of competency.

The statistically significant competencies are:

- Financial skills
- Human resource management
- Performance measurement
- Process management
- Strategic orientation
- Accountability
- Achievement orientation
- Relationship building.

The first five competencies from the above are technical competencies, which can be augmented by training.

The competencies have been grouped as technical competencies and nontechnical competencies. Technical competencies are defined as those competencies in which training can be imparted to augment existing levels. Nontechnical competencies have to be acquired and can be learnt by behavioral modifications.

### TECHNICAL COMPETENCIES

#### Financial Skills

Financial skills means the ability to understand and explain financial and accounting information, prepare and manage budgets, and make sound long-term investment decisions.<sup>11</sup> As per a study done by Schultz and Pal,<sup>11</sup> it has been found that most health care CEOs need financial skills. Indian health care leaders in private sector have shown significant interest and expressed the need for better augmentation of this competency.

#### Human Resource Management

Human resource management is the ability to implement staff development and other management practices that represent contemporary best practices, comply with legal and regulatory requirements, and optimize the performance of the workforce, including performance assessments, alternative compensation, and benefit methods,

and the alignment of human resource practices and processes to meet the strategic goals of the organization. As per a study done by Greene,<sup>12</sup> it is found that leaders make people around them to succeed. They recruit people, develop people, and get rid of inappropriate people. The high self-assessment of people management competencies is found to be consistently important for senior leaders across general management.<sup>13</sup>

### **Performance Management**

Performance management is the ability to understand and use statistical and financial methods and metrics to set goals and measure clinical as well as organizational performance; commitment to and employment of evidence-based techniques. Schultz aptly notes that many elements of quality leadership have appeared separately in fads that swept through business schools and organizations, such that many are unfamiliar with a comprehensive approach to performance improvement, which has been termed as a "new way of doing business."<sup>11</sup>

### **Process Management**

Process management means the ability to analyze and design or improve an organizational process, including incorporating the principles of quality management as well as customer satisfaction.

Indian health care leaders can augment this competency by identifying key decision points, understanding customer service and satisfaction drivers, and continuum of care across different delivery sites (e.g., outpatient, acute care, specialty clinic), etc., and by organizing structure to design and improve performance. Clinical process redesign means the effective design of the continuum of care to satisfy customers, improve patient outcomes, maximize efficiencies, and improve organizational climate. Given the long tradition of research-based care, the physician leaders showed interest in using research evidence to guide care decisions and develop protocols.<sup>14</sup>

### **Strategic Orientation**

Strategic orientation is the ability to consider the business, demographic, ethnocultural, political, and regulatory implications of decisions and develop strategies that continually improve the long-term success and viability of the organization. Health care leaders can do strategic planning by assessments of internal and external environments, doing a strengths, weaknesses, opportunities, and threats analysis, development of strategic initiatives, and periodic evaluation of results to check progress and verify final outcomes.<sup>15</sup> In health care management literature, little attention is paid to the quality and impact

of strategic decisions made by top executives.<sup>11</sup> This lack of research is of concern given the unique performance criteria of health care organizations.

## **NONTECHNICAL COMPETENCIES**

### **Accountability**

The ability to hold people accountable to standards of performance or ensure compliance using the power of one's position or force of personality appropriately and effectively, with the long-term good of the organization in mind. The way in which accountability is created, negotiated, communicated, and evaluated lies at the heart of organizational operations.

### **Achievement Orientation**

It is a concern for surpassing a standard of excellence. The standard may be one's own past performance (striving for improvement); an objective measure (results orientation); outperforming others (competitiveness); challenging goals; or something that has not been done previously (innovation).

Indian health care leaders have a strong will of achieving and delivering expected results in line with job requirements. Individuals with higher achievement orientation scores set higher goals for themselves and put in necessary time and effort in that process. Studies prove that all things being equal, people with higher levels of achievement orientation are more likely to do better in school, pursue postgraduate courses, and get promoted more quickly and earn higher salaries.<sup>16</sup> Atkinson<sup>17</sup> proposed that an individual's tendency to exert effort toward accomplishment depended partly on the strength of his or her motive to achieve success or achievement orientation.

### **Relationship Building**

Relationship building is the ability to establish, build, and sustain professional contacts for the purpose of building networks of people with similar goals and that support similar interests. Highly effective leaders are very selective with whom they develop informal power relationship. They seek out individuals most likely to be helpful to them in the future. In every organization, an informal network, frequently called the shadow system, exists and often works better than formal systems of meetings and councils.<sup>18</sup> Everything is built on good and sustainable relationships. The leader continually tests, challenges, and extends personal and collective relationships with stakeholders throughout the process of changing behavior. When things get tough or stuck, the only resource may be the personal relationship.<sup>19</sup> Thus, Indian health care leaders can develop informal



**Table 3:** Domain analysis

Domain	Question 1	Question 2	p-value (paired t-test)
	Mean $\pm$ SD	Mean $\pm$ SD	
Transformation	2.91 $\pm$ 0.52	3.01 $\pm$ 0.55	0.012
People	3.66 $\pm$ 0.66	3.73 $\pm$ 0.68	0.108
Execution	3.65 $\pm$ 0.63	3.64 $\pm$ 0.65	0.028

contacts, sustain formal contacts, and establish important relationships with key leaders.

## DOMAIN ANALYSIS

Domain analysis of three domains, namely transformation, people, and execution was done with the help of both the questionnaires (Table 3). Domain analysis was done by taking the mean of various competencies of each domain. A paired t-test was done to assess the statistical significance. The results are as follows (Table 3):

- In Indian health care leaders, the perceived competency level of transformation domain is least compared with other two domains. Any leadership program, i.e., to be planned should concentrate on this domain, so as to improve the competency levels of Indian health care leaders.
- In Indian health care leaders, the perceived competencies level of the people domain and execution domain are almost at par and Indian health care leaders need more training to bridge the evident competencies gap.
- Both the transformation and execution domains are statistically significant, i.e., the p value is less than 0.05, which means that the findings are not by chance.

In the analysis of domains, it was found that the transformation domain, which should be maximum in senior leaders of health sector is found wanting. It appears that the Indian health care leaders are working at operational level and decentralization of decision making is not practiced much. A training program focusing on the transformational skills will benefit the Indian health care leaders.

## CONCLUSION

The study has found deficiencies in the perceived “existing competency” and “required competency” levels in all the 25 competencies except communication skills of health care leaders. The study reveals a scope for leadership training in the health sector. The areas in which lack of knowledge or skills was most significant were identified. This will help us identify the competencies required for various levels of leadership position.

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