

# A Study of Quality Assessment and Quality Control in an Intensive Care Unit in a Tertiary Care Hospital

Sumreen Bhatia<sup>1</sup> , Seep Sonali<sup>2</sup>

Received on: 09 December 2023; Accepted on: 03 January 2024; Published on: 26 March 2024

## ABSTRACT

**Introduction:** Quality management is the act of supervising all activities and tasks required to maintain a target degree of excellence. The degree of conformance to established standards and criteria is demonstrated by data gathering and analysis. Quality control is a technique designed to ensure that the performance of services conforms to a predefined set of quality criteria in order to meet the patient's requirements. Despite an array of improvement initiatives in hospitals, the quality of care delivered remains open to question. The purpose of this study was to assess the satisfaction level of patients and their attendants, evaluate the quality of care provided in intensive care unit (ICU) and knowledge regarding quality management among ICU staff.

**Materials and methods:** The efficiency of any healthcare unit is judged by its quality indicators. In this study, various quality indicators used in ICU were used. A self-structured questionnaire was filled by the ICU staff members. The Chi-square test was used to determine the association between the score levels and selected demographic variables which showed significance association between the score level and demographic variables such as age, designation, qualification, and experience.

**Results:** Data revealed that 34.3% of patients and their attendants said that the services provided in the ICU were excellent, 42.1% of the patients and their attendants said that they were always satisfied with the services provided in the ICU. The age of the staff, their designation, qualification, and experience were found to be significant, which means that they had effect on the working standards of the ICU staff. Whereas the variables such as gender and marital status had no effect on the working standards of the staff in ICU as they were found to be insignificant. A total of 66.2% of the staff always had the knowledge regarding the working standards in ICU. To sum up it was concluded that that 94.6% practices followed in ICU were good, 5.4% practices followed in ICU were average, and 0% practices followed in ICU were poor.

**Conclusion:** There were various determinants through the result was calculated. The quality of the ICU according to the patients and their attendants was assessed in which 66.7% of the patients and their attendants said the ICU quality was good. The services provided to the patients and their attendants were assessed. The satisfaction level of the patients and their attendants admitted in ICU and assessing the knowledge of the staff working in the ICU was also seen.

**Keywords:** Intensive care unit, Quality assessment, Quality control, Quality indicators, Quality management.

AMEI's Current Trends in Diagnosis & Treatment (2023): 10.5005/jp-journals-10055-0170

## INTRODUCTION

Hospitals in the twentieth century were tremendously advanced, with a large workforce, innovative technologies, and doctors with super specializations. These are the factors that have an impact on the healthcare industry. However, in our country monitoring the outcome through quality indicators is not yet institutionalized because of many reasons including the fact that most of intensive care units (ICUs) in India are being run as open or semi-close units, with unaccountable custodians. Dependency on the key performance indicators practiced by the developed countries, therefore, becomes inevitable wherever some degree of total quality management system is being adhered to.<sup>1</sup>

## Quality Management

Growing concerns about healthcare quality have resulted in the development and implementation of numerous new technologies aimed at monitoring, comparing, and improving healthcare providers' clinical performance. One of the newest and most contentious of these approaches is industrial quality management science (IQMS), also known as continuous quality improvement (CQI), the quality improvement process (QIP), and total quality management (TQM).<sup>2</sup>

<sup>1,2</sup>MYAS-GNDU Department of Sports Sciences and Medicine, Guru Nanak Dev University, Amritsar, Punjab, India

**Corresponding Author:** Seep Sonali, MYAS-GNDU Department of Sports Sciences and Medicine, Guru Nanak Dev University, Amritsar, Punjab, India, Phone: +91 9622329797, e-mail: seep.myas@gndu.ac.in

**How to cite this article:** Bhatia S, Sonali S. A Study of Quality Assessment and Quality Control in an Intensive Care Unit in a Tertiary Care Hospital. AMEI's Curr Trends Diagn Treat 2023;7(2):45–50.

**Source of support:** Nil

**Conflict of interest:** None

## Quality Assessment

A quality indicator is a screening tool to identify potential suboptimal clinical care.<sup>3</sup> The success of quality-improvement projects is heavily dependent on both project design and the metrics used to evaluate change. As Avedis Donabedian detailed half a century ago, defining metrics in healthcare can be difficult; algorithmic selection of the best type of metric (outcome, process, or structure) can assist ICU managers in starting this process. Choosing appropriate graphical data displays (e.g., run charts)

can spark discussions and encourage quality improvement. Similarly, dashboards/scorecards are useful for visually presenting performance improvement data, whether publicly or privately. To have compelling data to show, ICU managers must plan quality-improvement projects carefully. Various quality-improvement tools are checklists, Six Sigma methodology, lean thinking, and Kaizen. Checklists have become commonplace in many ICUs to improve care quality; maximizing their effectiveness is now a top priority. Six Sigma methodology, lean thinking, and Kaizen are techniques that use multidisciplinary teams to organize thinking about process improvement, formalize change strategies, carry out initiatives, and track progress. None of them originated in healthcare, but they have all been used successfully in hospitals.<sup>4</sup>

### Quality Indicators

Quality indicators in ICUs maintain an order of uniformity and standard care of delivery across ICUs.<sup>5</sup> To create the best quality treatment for our critically ill patients, hospital staff must develop appropriate key performance indicators that reflect the aspirations of patients, relatives, and intensivists. Creating key performance indicators and monitoring, auditing, and improving those parameters is a dynamic process that necessitates standardization, improvement, and innovation – the three pillars of any improvement process in industry or service delivery.<sup>1</sup> While standardization means removing the outliers, i.e., lowering the standard deviation, improvement means gradually improving a parameter from its previous level with a degree of irreversible consistency. However, innovation is sporadic and frequently necessitates a thinking cap, which while maintaining the speed of standardization and improvement, rapidly raises the parameters to new heights. According to total quality management (TQM), the first two are part of or products of daily management, while the last is part of or product of policy management.<sup>6</sup>

### Total Quality Management

Total quality management is one of the most significant developments in management over the last two decades. The TQM began in Japan in the early 1980s and later spread to Western countries and Australia. The TQM topics became increasingly important in the 1990s, and many businesses sought to implement and improve TQM.<sup>7</sup> Total quality management is defined as “a management philosophy concerned with people and work processes that focuses on customer satisfaction and improves organizational performance.”<sup>8</sup> These days, health organizations face many challenges that can be classified into four major areas: Increases in the cost of health services, rapidly growing technology dependence, pressure on health organizations to decrease costs, and improve quality to cope with the international organizations that establish standards and issue licenses.<sup>9,10</sup>

Hospitals use all practices, rules, and regulations for efficient operation in order to meet the needs of the public. The hospitals are working hard every day to maintain the highest levels of quality in all aspects of their operations.

The healthcare system is working smartly to meet the international quality standards required by the clients by adhering to TQM. The TQM is a process in which both internal and external factors have a regular influence on the ground of the organization. Implementing TQM practices can improve an organization's quality and productivity. Its trajectory is influenced by a variety of social, economic, and environmental factors, making it a dynamic target.<sup>9</sup>

There are four basic principles on which quality assurance operates:

- **Client focus:** Services should be designed on the basis of clients' needs and provide satisfaction to their souls.
- **Understanding work as processes and systems:** Providers should understand about their work process and system to improve further and achieve their goals.
- **Testing changes and emphasizing the use of data:** Changes are tested in order to determine whether they yield the required improvement. Data are used to analyze processes, identify problems, and to determine whether the changes have resulted in improvement.
- **Teamwork:** Improvement is achieved through the team approach to identifying problem, solving and quality improvement.<sup>11</sup>

For the success of the healthcare industry, medical directors, nursing supervisors, paramedics, quality managers, infection control nurses, nurses in charge, and other specialized staff should all be included in quality assurance programs and training. An audit system should be implemented to learn about work efficiency and errors encountered by employees and the general public in order to improve the organization's progress. Employees should use this audit system, which was designed in accordance with the requirements and protocols, to identify areas of development and inadequacy. The majority of departments rely on quality assurance procedures to keep things under control and to detect errors. Working as a team can assist in ensuring that rules are properly understood and followed. To measure compliance, data are used to create monitoring or auditing systems. Performance standards are used as a standard for audits in quality assurance programs, and each point of compliance has a corresponding performance standard. If flaws are discovered, the quality assurance program will assign performance improvement initiatives to bring the region into compliance.

In healthcare industry quality assurance programs help in maintain the work flow, reduce costs, improve standards, increase profits, etc.

### Need for Focusing on Quality Care – A Need of the Hour

The importance of focusing on quality care cannot be overstated. For both patients and their families, an ICU is a place of uncertainty and stress. Many researchers have suggested that relatives of ICU patients require accessibility, support, and information. Nurses typically respond to these needs intuitively, based on personal experience, rather than in an evidence-based manner.<sup>11</sup> As a World Health Organization (WHO) report on quality of care – A process for making strategic decisions in the health system illustrates, there has been a wealth of information and experience gained globally over many decades. Despite this wealth of knowledge, policymakers in both high- and low-income countries still face difficulties. These countries biggest issue is to figure out which high-quality strategies add to already-existing strategic efforts and how to do it seamlessly. In terms of health outcomes, this would have the largest impact. Using this guidance, policymakers and planners may make better decisions on how to drive quality improvement in healthcare systems.

### Quality Indicator in ICU

Medical quality indicators (QI) are important tools in the evaluation of medical quality.<sup>12</sup> Quality of care in medical practice and critical

**Table 1:** Quality indicators in ICU

S. No.	Indicators	Parameters
1	Patient care	Emergency delays due to lack of ICU beds Readmission within 48 hours Delayed admission Patient privacy Proper dressing/day
2	Safety protocol	Standard operating procedures on biomedical waste Helpers well trained Hand hygiene and personnel protective equipment use Fire handling Sterilization and disinfection
3	Procedure and training	Training on cardio pulmonary resuscitation Training on NSI, BBF Maintenance of crash cart Procedures on end-of-life care Proper documentation
4	Patient satisfaction	With the services Proper explanation of the procedures Admission/discharge criteria Diet, cost of treatment
5	Equipment handling	Working condition of machines Timely repair of machines Regular supply of oxygen cylinders and blood
6	Morbidity	Hospital acquired infection ICU readmission within 48 hours New infection with multi drug resistant organisms
7	Intra department communication	Communication gaps among workers

care in particular is the responsibility of the healthcare professional who is providing it. As a result, clinicians involved in the delivery of care have a moral and ethical obligation to improve the standard of care. Each ICU has a different level of care. Patients' outcomes and the quality of care can both benefit from even minor improvements. Care before and after improvement activities can be quantified if the attributes to measure the care are predefined.<sup>13</sup> It is difficult to quantify ICU performance because it involves a wide range of factors, including medical expertise, ethics, economics, systems, engineering, sociology, and philosophy, all of which must be taken into consideration.<sup>1</sup> It takes a lot of time and effort to do routine parameter monitoring. Quality indicators should be prioritized to have the greatest impact with minimal data collection.<sup>14</sup>

It is necessary to keep track of quality indicators throughout time in order to figure out how well a patient is being treated. Analyzing historical trends in this type of data can assist to determine the quality of care provided in a certain setting and then compare that to other benchmarks. As a result, steps are taken to close the gap between the current state and the benchmark state (Tables 1 to 7).<sup>15,16</sup>

**Aim**

The purpose of this study was to assess the satisfaction level of patients and their attendants, evaluate the quality of care provided

**Table 2:** Services provided in the ICU

Grades	Very poor	Poor	Average	Good	Excellent
Services provided in the ICU	0.5%	6.9%	20.8%	37.5%	34.3%

**Table 3:** Satisfaction level of patients and their attendants

	Never	Rarely	Sometimes	Always
Satisfaction	9.0%	14.6%	34.3%	42.1%

**Table 4:** Table showing level of scores

Criteria measure of ICU quality score			
Level of scores N = 72	Percentage	Frequency	
Good ICU quality (37–54)	66.7%	48	
Average ICU quality (19–36)	30.6%	22	
Poor ICU quality (0–18)	2.8%	2	
Maximum = 54, Minimum = 0			

**Table 5:** Showing knowledge regarding working standards among ICU staff

Scale	Excellent (%)	Good (%)	Average (%)	Poor (%)
Knowledge regarding working standards among ICU staff	66.2%	19.9%	8.2%	5.7%

in ICU and knowledge regarding quality management among ICU staff.

**MATERIALS AND METHODS AND RESULTS**

A total population of 165 participants was taken into consideration in the study. The participants that were included were doctors, nurses, patients, and their attendants in ICU. A qualitative research study was conducted and 2 questionnaires (one for staff and other for patients) was prepared. In total three ICU were taken into consideration – GICU, MICU, neuro ICU. The data collection was done in a span of 2 months (Figs 1 to 5).

**Assessment of the Quality of Care Provided in ICU**

Interpretation: A total of 34.3% of the patients and their attendants were fully satisfied and found that the services provided in the ICU were excellent while 37.5% of patients and their attendants found good, 20.8% found services as average and 6.9% found out poor services provided in ICU.

Interpretation: A total of 42.1% of the patients and their attendants were always satisfied and 34.3% were sometimes satisfied and 14.6% while 9.0% never satisfied from the services provided in the ICU.

**Assessment of the Knowledge Regarding Working Standards among ICU Staff**

*Assessment of the Factor Affecting Quality of Care Provided in ICU*

This section deals with the findings related to the association between score and selected demographic variables. The Chi-square test was used to determine the association between the score levels and selected demographic variables.

**Table 6:** Showing association of scores and demographic variables

Demographic data		Levels (N = 93)			Association with practice score				
Variables	Options	Good practice	Average practice	Poor practice	Chi test	p-value	df	Table value	Result
Age	20–25 year	34	0	0	11.752	0.019	4	9.488	Significant
	26–30 year	42	3	0					
	31–35 year	4	2	0					
	36–40 year	5	0	0					
	41–45 year	3	0	0					
Gender	Male	11	1	0	0.237	0.627	1	3.841	Not significant
	Female	77	4	0					
Designation	Medical officer	11	2	0	13.501	0.027	4	9.488	Significant
	Nursing officer	13	1	0					
	Consultant	2	0	0					
	Physiotherapist	5	0	0					
Qualification	Staff Nurse	57	2	0	14.563	0.044	6	12.592	Significant
	M.B.B.S.	11	2	0					
	M.D.	2	1	0					
	G.N.M.	33	2	0					
	BPT	4	0	0					
	MPT	1	0	0					
	BSc Nursing	30	0	0					
	Post BSc. Nursing	7	0	0					
Marital status	Married	29	2	0	0.106	0.745	1	3.841	Not significant
	Unmarried	59	3	0					
Experience	Upto 1 year	9	1	0	10.795	0.015	4	9.488	Significant
	1–5 year	57	2	0					
	5–10 year	15	1	0					
	10–15 year	2	1	0					
	>15 year	5	0	0					

**Table 7:** Table showing level of scores

Level of scores N = 93	Criteria measure of practice score	
	Percentage	Frequency
Good practice (45–66)	94.6%	88
Average practice (23–44)	5.4%	5
Poor practice (0–22)	0%	0

Maximum = 66, Minimum = 0

The Chi-square value shows that there is significance association between the score level and demographic variables such as age, designation, qualification and experience (<0.05) and non-significant variables such as gender and marital status (>0.05).

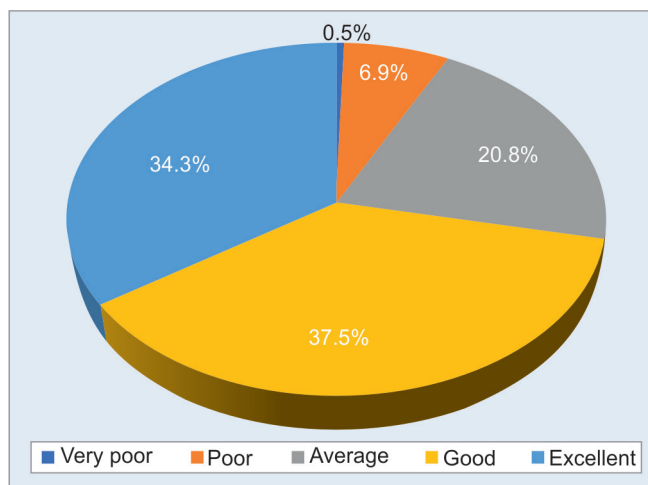
## DISCUSSIONS

The study's statistical population consisted of 165 members, which included the clinical staff like doctors, nurses, and paramedical staff, the patients and their attendants in ICU in a tertiary care hospital.

Out of 165 participants, 93 participants were doctors and nurses and 72 participants were patients and their attendants.

In detail, this study involved 25 patients, 47 attendants, 15 doctors, 5 physiotherapists, and 73 nurses.

The quality of the ICU according to the patients and their attendants was as follows: 66.7% of the patients and their



**Fig. 1:** Figure showing services provided to patients and their attendants

attendants said the ICU quality was good, 30.6% of the patients and their attendants said that the ICU quality was average and 2.8% of the patients and their attendants said the ICU quality was poor.

The services provided to the patients and their attendants was as follows: 34.3% of the patients and their attendants said that the services provided in the ICU were excellent, 37.5% of the patients and their attendants said that the services provided in the ICU were good, 20.8% of the patients and their attendants said that

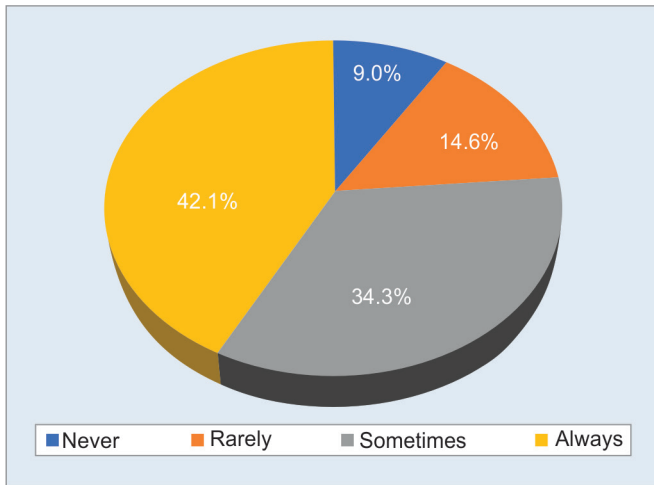


Fig. 2: Figure showing satisfaction level of patients and their attendants

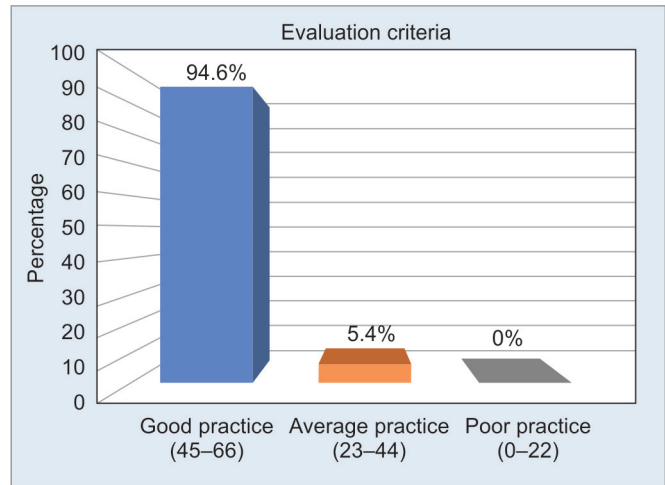


Fig. 5: Diagram showing level of scores

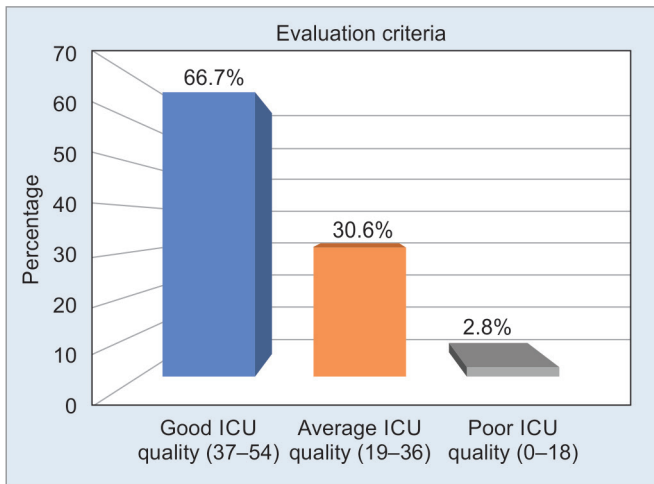


Fig. 3: Diagram showing level of scores

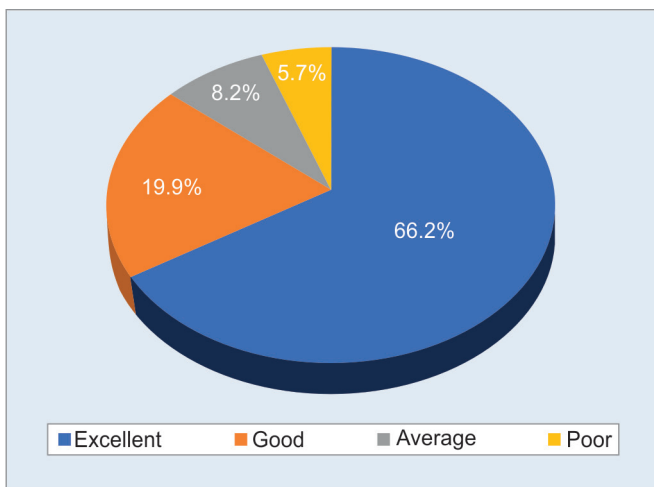


Fig. 4: Figure showing knowledge of ICU staff

the services provided in the ICU were poor and 0.5% of the patients and their attendants said that the services provided in the ICU were

very poor. From this data, it can be seen that maximum number of patients and their attendants were satisfied by the services being provided to them in the ICU and only a few percentage of the patients were unsatisfied by the services given to them.

The satisfaction level of the patients and their attendants in ICU was as follows: 42.1% of the patients and their attendants responded as they were always satisfied by the services given to them, 34.3% of the patients and their attendants responded as they were sometimes satisfied by the services given to them, 14.6% of the patients and their attendants responded as they were rarely satisfied by the services given to them and 9% of the patients and their attendants responded as they were never satisfied by the services given to them. Therefore, it can be seen that maximum number of patients and their attendants were satisfied by the services given to them in the ICU.

The ICU and only a few percentage of them were unsatisfied with the services. The reason for dissatisfaction was death of the patient of patients in the ICU.<sup>17</sup>

Regarding the knowledge of the staff working in the ICU it was seen that 66.2% of the staff had excellent knowledge regarding the working standards in ICU, 19.9% of the staff comparatively had lesser knowledge, 8.2% of the staff had average knowledge and 5.7% of the staff had poor knowledge regarding their working standards. This clearly shows that majority of the clinical staff working in the ICU had good knowledge of their working standards and only a few percentage of the staff was unaware about the working standards in the ICU.

Association was seen between ICU practice work and demographic variables by using Chi-square test. It was found that the variables like age, qualification, and experience were significant which means that they have an effect on the working standard of the staff working in the ICU. The variables like marital status and gender were found to be insignificant which means that they have no significant effect on the working standards.

It can be concluded that 94.6% of the practices done by the ICU staff is good and 5.4% of the practices done by the ICU staff is average. No poor practices followed by the staff working in the ICU was seen.

The overall quality maintained in the ICUs was commendable, but there are a few areas which can be looked into to further improve the quality.

## CONCLUSION

Data revealed that 34.3% of patients and their attendants said that the services provided in the ICU were excellent, 37.5% said that the services were good, 20.8% said that the services were average, 6.9% said as poor and 0.5% said that the services provided were very poor. A total of 42.1% of the patients and their attendants said that they were always satisfied with the services provided in the ICU, 34.3% as sometimes satisfied, 14.6% as rarely satisfied, and 9% as never satisfied with services being provided to them in the ICU.

The age of the staff, their designation, qualification, and experience were found to be significant, which means that they had effect on the working standards of the ICU staff. Whereas the variables such as gender and marital status had no effect on the working standards of the staff in ICU as they were found to be insignificant.

A total of 66.2% of the staff always had the knowledge regarding the working standards in ICU, 19.9% sometimes had the knowledge, 8.2% as rarely and 5.7% of the staff never had the knowledge regarding the working standard in ICU.

To sum up, it was concluded that that 94.6% practices followed in ICU were good, 5.4% practices followed in ICU were average and 0% practices followed in ICU were poor.

The main project outputs for improving performance include improved infrastructure, state-of-the-art equipment, well-maintained facilities, IT-based communication, motivated doctors, nurses, and support staff, improved patient care, and increased drug availability. The proposed framework is currently being used as a continuous quality improvement tool, providing a framework for long-term planning, implementation, monitoring, and evaluation of quality improvement measures.<sup>18</sup>

## ORCID

Sumreen Bhatia  <https://orcid.org/0000-0002-6585-7764>

## REFERENCES

1. Ray B, Samaddar DP, Todi SK, et al. Quality indicators for ICU: ISCCM guidelines for ICUs in India. *Indian J Crit Care Med* 2009;13(4):173–206. PMID: 20436688.
2. Blumenthal D. Total quality management and physicians' clinical decisions. *JAMA* 1993;269(21):2775–2778. DOI: 10.1001/jama.1993.03500210075035.
3. Maartje de Vos M, Graafmans W, Keesman E, et al. Quality measurement at intensive care units: Which indicators should we use? *J Crit Care* 2007;22(4):267–274. DOI: <https://doi.org/10.1016/j.jcrc.2007.01.002>.
4. Gershengorn HB, Kocher R, Factor P. Management strategies to effect change in intensive care units: Lessons from the world of business. Part II. Quality-Improvement strategies. *Ann Am Thorac Soc* 2014;11(3):444–453. DOI: 10.1513/AnnalsATS.201311-392AS.
5. Kartik M, Gopal PBN, Amte R. Quality indicators compliance survey in Indian Intensive Care Units. *Indian J Crit Care Med* 2017;21(4):187–191. DOI: 10.4103/ijccm.IJCCM\_164\_15.
6. Warade J. Outline of Quality Indicator in Clinical Laboratory. *Int J Biol Med Res* 2015. *International journal of basic and applied medical sciences* 2014;4(2):275–287. An open access, online international journal. Available from: <http://www.cibtech.org/jms.htm>. ISSN: 2277-2103 (Online).
7. Pourrajab M, Basri RB. The relationship between level of total quality management (TQM) and the level of culture of teaching and learning (COTL) in school. *Int J Res Manag Technol* 2012;2(3):319. Available from: [https://www.researchgate.net/publication/258860126-The\\_Relationship\\_between\\_Level\\_of\\_Total\\_Quality\\_Management\\_TQM\\_and\\_the\\_Level\\_of\\_Culture\\_of\\_Teaching\\_and\\_Learning\\_COTL\\_in\\_School](https://www.researchgate.net/publication/258860126-The_Relationship_between_Level_of_Total_Quality_Management_TQM_and_the_Level_of_Culture_of_Teaching_and_Learning_COTL_in_School).
8. Sadikoglu E, Olcay H. The effects of total quality management practices on performance and the reasons of and the barriers to TQM practices in Turkey. *Adv Decision Sci* 2014;1–17. Available from: [https://www.researchgate.net/publication/270628938-The\\_Effects\\_of\\_Total\\_Quality\\_Management\\_Practices\\_on\\_Performance\\_and\\_the\\_Reasons\\_of\\_and\\_the\\_Barriers\\_to\\_TQM\\_Practices\\_in\\_Turkey](https://www.researchgate.net/publication/270628938-The_Effects_of_Total_Quality_Management_Practices_on_Performance_and_the_Reasons_of_and_the_Barriers_to_TQM_Practices_in_Turkey).
9. McClellan M, Schaeffer L. Improving health while reducing cost growth: What is possible. *Engelberg Center for Health Care Reform at Brookings* 2014;201:1–11.
10. Al-Shdaifat EA. Implementation of total quality management in hospitals. *J Taibah University Med Sci* 2015;10(4):461–466. DOI: <https://doi.org/10.1016/j.jtumed.2015.05.004>.
11. Chelluri LP. Quality and performance improvement in critical care. *Indian J Crit Care Med* 2008;12(2):67–76. DOI: 10.4103/0972-5229.42560.
12. Kumpf O, Nothacker M, Jan Braun J, et al. The future development of intensive care quality indicators – A methods paper. *Ger Med Sci* 2020;18:Doc09. DOI: 10.3205/000285.
13. Durch JS, Bailey LA, Stoto MA. Improving health in the community: A role for performance monitoring (1997). Institute of Medicine (US) Committee on Using Performance Monitoring to Improve Community Health. DOI: 10.17226/5298.
14. De Roo ML, Leemans K, Claessen SJJ, et al. Quality indicator for palliative care: Update of a systematic review. *J Pain Symptom Manage* 2013;46(4):556–572. DOI: 10.1016/j.jpainsymman.2012.09.013.
15. Shirley ED, Sanders JO. Patient satisfaction: Implications and predictors of success. *J Bone Joint Surg Am* 2013;95(10):e69. DOI: 10.2106/JBJS.L.01048.
16. Huijben JA, Wieggers EJA, de Keizer NF, et al. Development of a quality indicator set to measure and improve quality of ICU care for patients with traumatic brain injury. *Crit Care* 2019;23(1):95. DOI: 10.1186/s13054-019-2377-x.
17. de Carvalho AGR, de Moraes APP, Tanaka LMS, et al. Quality in intensive care units: Proposal of an assessment instrument. *BMC Res Notes* 2017;10:222. DOI: 10.1186/s13104-017-2563-3.
18. Hariharan S, Dey PK. A comprehensive approach to quality management of intensive care services. *Int J Health Care Qual Assur* 2010;23(3):287–300. DOI: 10.1108/09526861011029352.