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CLINICAL AUDIT ON COMPLIANCE TO SEQUENTIAL ORGAN FAILURE ASSESSMENT (SOFA) SCORING OF CRITICALLY ILL PATIENTS

Mr. Jagdish Suthar

MSc. Nursing First Year Student (Nurse Practitioner in Critical Care), MGM New Bombay College of Nursing, Navi Mumbai, India

Dr. Trupti Mhatre

Associate Professor, MGM New Bombay College of Nursing, Navi Mumbai, India

ABSTRACT

A clinical audit was conducted to assess compliance with Sequential Organ Failure Assessment (SOFA) scoring among nurses and nurse practitioners in Intensive Care Units (ICUs) of a tertiary care hospital in Navi Mumbai.

Objectives:

1. To assess timely scoring of SOFA among critically ill patients.
2. To compare app-based and manual scoring of SOFA.

Introduction:

The Sequential Organ Failure Assessment (SOFA) score is a critical tool widely used in ICU settings to assess organ dysfunction and predict mortality in critically ill patients. Accurate and timely compliance with SOFA scoring protocols by nursing staff is essential for effective clinical decision-making and improved patient outcomes. This audit evaluated the level of compliance among ICU nursing professionals and compared two scoring methods.

Methodology:

A quantitative, non-experimental descriptive clinical audit design was adopted. The study was conducted in five ICUs (MICU, EMSICU, SICU, RICU, CVTS ICU) of a tertiary care hospital in Navi Mumbai. A total of 100 nursing professionals were selected using total enumeration sampling. Data were collected using a structured audit checklist based on standard SOFA scoring guidelines. Descriptive statistics (frequency and percentage) and inferential statistics (Fisher's exact test) were used for analysis, with significance set at $p < 0.05$.

Result:

The study assessed SOFA scoring compliance among 100 nursing professionals. The majority (97%) demonstrated high compliance with timely SOFA scoring. Most components showed compliance rates above 95%. However, reassessment after changes in patient condition showed comparatively lower compliance (86%). A majority (89%) used app-based scoring. No significant difference was found between app-based and manual methods ($p > 0.05$).

Conclusion:

The findings highlight high overall compliance with SOFA scoring protocols among ICU nursing professionals, reflecting strong clinical practices. Minor gaps in reassessment and calculation accuracy indicate the need for continuous training and supervision. Both app-based and manual scoring methods were found equally effective. Strengthening education, regular competency assessments, and ensuring adequate digital infrastructure will further enhance SOFA scoring compliance and patient safety in critical care settings.

Keywords: SOFA score, ICU, clinical audit, compliance, critically ill patients, nursing practice, organ dysfunction, patient safety, evidence-based practice

I. INTRODUCTION

The Sequential Organ Failure Assessment (SOFA) score is a standardized clinical tool originally developed by the Working Group on Sepsis-Related Problems of the European Society of Intensive Care Medicine (ESICM) in 1994 and published in 1996. It was designed to objectively quantify the severity of organ dysfunction in critically ill patients across six systems: respiratory, cardiovascular, hepatic, coagulation, renal, and neurological. Each organ system is scored from 0 to 4 based on severity, with higher total scores indicating greater illness severity and mortality risk.
A key strength of the SOFA system lies in its dynamic, sequential nature. Unlike single-point scoring systems, SOFA allows repeated assessments over time to monitor disease progression. Studies have demonstrated that both the initial SOFA score and trends over time are strong predictors of patient outcomes. An increasing SOFA score is associated with worsening organ function and higher mortality, while a decreasing score indicates clinical improvement.

The importance of SOFA scoring was further reinforced by the Sepsis-3 definition, which uses an increase of two or more points in the SOFA score to identify organ dysfunction in patients with suspected infection. Since sepsis remains a leading cause of mortality in ICUs worldwide, accurate and timely SOFA scoring plays a crucial role in early diagnosis, timely intervention, and improved patient outcomes.

Despite its proven clinical utility, the implementation of SOFA scoring in routine practice remains inconsistent. In busy ICU environments, nurses and nurse practitioners face challenges such as heavy workload, time constraints, and limited resources, which may lead to errors in calculation, incomplete documentation, and failure to adhere to scoring protocols. Nurses are primarily responsible for patient monitoring, data collection, SOFA score calculation, documentation, and communication with the healthcare team. Any error or inconsistency in these processes can lead to misinterpretation of patient condition and inappropriate clinical decisions.

Evaluating compliance with SOFA scoring through a clinical audit is essential to identify gaps in practice, assess adherence to protocols, and provide evidence-based recommendations for improvement. Clinical audit is a systematic process that evaluates current practices against established standards and identifies areas for improvement. It is widely recognized as an effective method for enhancing quality of healthcare services, improving documentation, and promoting evidence-based practice.

II. MATERIAL AND METHOD

Objectives of the Study:

- To assess timely scoring of SOFA among critically ill patients.
- To compare app-based and manual scoring of SOFA.

Research Question:

What is the level of compliance with SOFA scoring among critically ill patients in ICU settings?

Operational Definitions:

Clinical Audit: A systematic review of medical care against explicit criteria and the implementation of change; in this study, refers to evaluation of SOFA score implementation in critically ill patients. Compliance: The extent to which ICU staff members follow recommended SOFA scoring guidelines and protocols.

SOFA: A clinical tool to identify organ dysfunction and predict mortality in critically ill patients, involving six organ system components.

Critically Ill Patients: Patients admitted to intensive care units (EMSICU, RICU, MICU, SICU, CVTS ICU) where SOFA scoring is performed as initial assessment.

Research Approach and Design:

A quantitative, non-experimental descriptive clinical audit design was used. The study was conducted in the ICUs of a tertiary care hospital in Navi Mumbai across five units: Medicine ICU (MICU), Emergency Medicine ICU (EMSICU), Surgical ICU (SICU), Respiratory ICU (RICU), and Cardiovascular Thoracic Surgery ICU (CVTS ICU).

Sample:

A total of 100 nursing professionals including staff nurses, nurse practitioners, and DNP scholars involved in SOFA score recording were included using total enumeration sampling. Inclusion criteria: registered nurses deployed in the specified critical care units, available during data collection, and willing to participate. Exclusion criteria: nurses not regularly posted in designated ICUs, those on leave or unavailable during data collection.

Data Collection Tool:

A structured audit checklist was developed based on standard SOFA scoring guidelines. The tool was divided into sections covering demographic variables (age, gender, qualification, experience, clinical area, SOFA usage duration, scoring method) and a SOFA Score Compliance Checklist (23 items) assessing: timeliness of scoring, completeness of all six organ system components, accuracy of scoring, completeness of documentation, and communication. Each correctly recorded parameter was scored 1, non-compliance scored 0. Overall compliance: >80% = High, 60–79% = Moderate, <60% = Low. Content validity was established by expert review. Inter-rater reliability was r = 0.7.

III. ANALYSIS

Section 3.1: Demographic Characteristics of Healthcare Professionals

Table 1: Demographic Characteristics of Health Professionals (N=100)

Demographic Variable	Frequency	Percentage (%)
Age		
20–25 years	28	28%
26–30 years	54	54%
31–35 years	18	18%
Gender		
Male	25	25%
Female	75	75%
Qualification		
Diploma in Nursing	23	23%
B.Sc. Nursing	35	35%
MSc Nursing	7	7%
Master's NP	23	23%
DNP	12	12%
Experience		
<6 months	36	36%
1–3 years	43	43%

4–6 years	13	13%
>6 years	8	8%
Clinical Area		
EMSICU	18	18%
MICU	19	19%
SICU	33	33%
CVTS ICU	18	18%
RICU	12	12%
SOFA Usage Duration		
<6 months	44	44%
1 year	31	31%
>1 year	25	25%
Scoring Method		
App-based	89	89%
Manual	11	11%

Table 1 shows that the majority of participants were aged 26–30 years (54%), female (75%), and held B.Sc. Nursing qualifications (35%). Most had 1–3 years of experience (43%) and worked primarily in SICU (33%). A large proportion (44%) had less than 6 months of SOFA scoring experience, and 89% used app-based scoring methods.

Section 3.2: Timely Scoring of SOFA among Critically Ill Patients

Table 2: Timely Scoring of SOFA among Critically Ill Patients (N=100)

Compliance Level	**Frequency**	**Percentage (%)**
Low	1	1%
Moderate	2	2%
High	97	97%

Table 2 shows that 97% of nursing professionals demonstrated high compliance, 2% had moderate compliance, and only 1% had low compliance for timely SOFA scoring among critically ill patients.

Section 3.3: SOFA Scoring Compliance – Item-wise Analysis

Table 3: SOFA Scoring Compliance – Item-wise (N=100)

SOFA Scoring Compliance Item	Frequency	% Compliance
SOFA score assessment started on patient's admission	98	98%
Blood collected and sent for ABG analysis	100	100%
Blood collected for serum bilirubin, platelet count and serum creatinine	100	100%
Respiratory parameter PaO2 checked and documented	99	99%
Respiratory parameter FiO2 checked and documented	100	100%
Platelet count checked in report and documented	100	100%
Serum bilirubin checked in report and documented	98	98%
Blood pressure checked and MAP documented	98	98%
Serum creatinine checked in report and documented	99	99%
SOFA score clearly recorded in patient chart/app	98	98%
Assessment completed within 24 hours of admission	100	100%
Assessment of SOFA scoring done as per hospital policy	99	99%
Reassessment of SOFA done after significant changes in patient condition	86	86%
SOFA score assigned correctly	97	97%
Total SOFA score calculated accurately	93	93%
Organ failure risk correctly identified	97	97%
Risk correctly aligned with preventive measures	94	94%
SOFA score documented correctly	96	96%
Score recorded in particular chart	98	98%
Nurse sign and designation	96	96%
Date and time management	93	93%
Score reported/communicated to concerned physician/intern	97	97%
Preventive measure conducted and documented	98	98%

Table 3 reveals that compliance was 100% for ABG collection, lab investigations, FiO2 documentation, platelet documentation, and 24-hour assessment completion. The lowest compliance was observed in reassessment after significant patient condition changes (86%) and accurate total SOFA score calculation (93%). All other parameters maintained compliance above 93%, demonstrating strong overall adherence to SOFA scoring protocols.

Section 3.4: Comparison of App-based and Manual SOFA Scoring

Table 4: Comparison of App-based and Manual Scoring of SOFA (N=100)

Compliance Level	App-based (n=89)	Manual (n=11)	p-value
Low	1	0	
Moderate	2	0	1.000
High	86	11	

Table 4 shows that all nursing professionals using manual SOFA scoring had high compliance, while 86 out of 89 app-based users demonstrated high compliance. Fisher's exact test revealed a p-value of 1.000 ($p > 0.05$), indicating no statistically significant difference between the two methods. Both app-based and manual scoring methods were equally effective in ensuring SOFA scoring compliance.

DISCUSSION

The present study assessed compliance with SOFA scoring among 100 ICU nurses and nurse practitioners at a tertiary care hospital in Navi Mumbai. The findings revealed an overall high compliance rate of 97%, indicating strong adherence to clinical protocols. This may be attributed to proper institutional training, established hospital policies, and a high level of awareness among healthcare professionals. These findings are consistent with previous studies highlighting the growing emphasis on standardized clinical tools in ICU practice.

The majority of participants were young adults aged 26–30 years with moderate experience (1–3 years), reflecting the typical demographic of ICU nursing staff. The predominance of female participants (75%) is consistent with nursing demographics globally. High usage of app-based scoring (89%) indicates an increasing integration of technology in critical care practice, aligning with the global trend towards digital health tools in ICU settings.

While overall compliance was high, minor gaps were identified in reassessment after significant changes in patient condition (86%) and accurate total SOFA score calculation (93%). These gaps may be attributed to increasing workload, inadequate nurse-to-patient ratios, limited availability of electronic devices (tablets) with proper internet connectivity, and gaps in knowledge regarding the importance of reassessment. Similar findings have been reported in previous studies where continuous monitoring practices were adversely affected by ICU workload.

Regarding the comparison of scoring methods, no statistically significant difference was found between app based and manual scoring ($p = 1.000$). This suggests that accuracy in SOFA scoring depends more on the competency and training of healthcare professionals rather than the method employed. However, app-based scoring offers advantages of reduced calculation time and cost-effectiveness, supporting its continued adoption in clinical settings.

CONCLUSION

The majority of nursing professionals demonstrated high compliance with SOFA scoring protocols (97%), indicating efficient utilization of SOFA scoring as per hospital standards. Both app-based and manual scoring methods were equally effective in ensuring compliance, with app-based scoring additionally offering advantages of time efficiency and cost-effectiveness. Strong adherence was observed in assessment, documentation, and communication of SOFA scores, which are essential for risk assessment and prevention of future complications among critically ill patients.

Minor gaps were identified in reassessment practices (86%) and score calculation accuracy (93%), primarily due to increasing workload, inadequate nurse-to-patient ratios, limited digital infrastructure, and knowledge gaps regarding

the significance of reassessment. These findings highlight the need for regular training programs, competency assessments, adequate staffing ratios, and improved digital infrastructure in ICU settings. Strengthening these areas will further enhance SOFA scoring compliance, support evidence-based clinical decision-making, and ultimately improve patient safety and outcomes in critical care.

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