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Nursing assessment of early warning signs in respiratory disorders among hospitalized patients: A clinical observation research

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Abstract
Early identification of physiological deterioration in patients with respiratory disorders is a cornerstone of safe and effective hospital care. Nursing assessment plays a pivotal role in recognizing early warning signs such as altered respiratory rate, hypoxemia, increased work of breathing, and changes in mental status, all of which are predictors of adverse clinical outcomes when left unnoticed. This clinical observation research explores the accuracy, consistency, and responsiveness of nursing assessments in detecting early warning signs among hospitalized adults diagnosed with respiratory disorders. A structured observational checklist based on standardized early warning parameters was used to evaluate routine assessments performed by staff nurses across medical and surgical wards. The research further examined the correlation between timely recognition of early signs and activation of rapid clinical interventions, including escalation protocols. Findings demonstrate that nurses who consistently monitored respiratory rate, oxygen saturation, accessory muscle use, and auscultatory findings were significantly more likely to detect deterioration before the onset of acute respiratory failure. The research also highlights variability in assessment frequency, documentation completeness, and decision-making thresholds among nurses with differing levels of experience. Delays in identifying subtle but critical signs such as mild hypoxemia or increasing respiratory effort—were associated with increased incidence of unplanned ICU transfers. Overall, the results emphasize the need for reinforced clinical training, standardized respiratory assessment protocols, and incorporation of early warning scoring systems into routine practice. Strengthening nursing competencies in early recognition can substantially improve patient safety, reduce morbidity, and support timely clinical interventions. The research concludes that empowering nurses through structured assessment tools, regular skill enhancement programs, and clear escalation pathways can significantly enhance the detection of early warning signs in respiratory disorders and improve overall clinical outcomes.

Keywords: Nursing assessment, respiratory disorders, early warning signs, clinical observation, patient deterioration, respiratory rate, hypoxemia, clinical monitoring, hospitalized adults, nursing practice

Introduction

Early recognition of clinical deterioration in patients with respiratory disorders is central to preventing adverse outcomes, as respiratory compromise continues to be one of the leading causes of hospital morbidity and mortality worldwide [1]. Hospitalized patients often exhibit subtle physiological changes hours before sudden deterioration, making accurate and timely nursing assessment an essential safety mechanism [2]. Nursing professionals are frequently the first to observe deviations in respiratory rate, oxygen saturation, work of breathing, and lung auscultation findings, positioning them as key contributors to early detection and intervention [3]. Despite the availability of standardized assessment tools, variations in clinical judgement, workload pressures, and inconsistent monitoring practices still result in delayed recognition of critical warning signs [4].

Respiratory disorders such as pneumonia, chronic obstructive pulmonary disease (COPD) exacerbations, asthma crises, and acute respiratory infections account for a substantial proportion of hospital admissions, and their progression can be rapid and unpredictable [5]. Early warning signs may manifest as tachypnea, hypoxemia, cyanosis, altered consciousness, or increasing respiratory effort markers strongly associated with worsening clinical trajectory if overlooked [6]. Evidence shows that respiratory rate is the single most sensitive

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predictor of deterioration, yet it remains under-assessed or inaccurately documented in many hospital settings [7]. Nurses' ability to promptly recognize and escalate respiratory abnormalities depends on clinical experience, training, and adherence to structured monitoring protocols [8]. Studies also indicate that escalation delays often stem from ambiguity in early signs and lack of unified early warning scoring systems [9].

Nursing assessments significantly influence early recognition of respiratory deterioration, yet inconsistent practices, inadequate skill reinforcement, and variable familiarity with warning indicators continue to pose a challenge in clinical environments. Although early warning systems have been introduced to support decision-making, gaps persist between recommended assessment frequency and real-time bedside nursing practices, leading to missed opportunities for early interventions [10]. The problem lies in the fact that subtle respiratory signs such as mild desaturation or progressive tachypnea are frequently under-recognized, contributing to delayed management, unplanned ICU transfers, and increased patient morbidity [11]. This research aims to evaluate how effectively nurses identify early warning signs in hospitalized patients with respiratory disorders, determine factors influencing the accuracy of assessments, and examine the relationship between timely recognition and clinical outcomes [12]. The primary objectives are to:

1. Assess the consistency of respiratory assessments performed by nurses,
2. Identify common early warning signs that are frequently detected or missed, and
3. Explore the impact of timely recognition on escalation of care [13].

The research hypothesizes that nurses who employ structured assessment tools and demonstrate high competency levels will detect early deterioration more effectively than those relying solely on routine observation and subjective judgement [14].

Strengthening nursing competencies in early respiratory assessment has been shown to improve patient safety outcomes, especially when supported by clear escalation protocols and standardized monitoring frameworks [15]. Prior research emphasizes that structured clinical observation and validated screening tools significantly enhance detection of early respiratory decline [16]. Proper documentation practices further contribute to continuity of care and timely multidisciplinary interventions [17]. Moreover, institutions that implement nurse-led early warning scoring systems report reductions in respiratory arrests and emergency transfers [18]. Understanding the strengths and gaps in current nursing assessment practices can therefore inform targeted training programs, policy improvements, and the integration of real-time monitoring technologies [19, 20].

Material and Methods
Materials: This clinical observation research was conducted in the medical and surgical wards of a tertiary care hospital, involving adult patients admitted with diagnosed respiratory disorders such as pneumonia, COPD exacerbations, asthma, and acute respiratory infections, conditions widely reported as key drivers of respiratory deterioration in hospitalized populations [5]. The research utilized a structured observational checklist developed from

validated early warning parameters, incorporating indicators identified as highly predictive of clinical decline, including respiratory rate, oxygen saturation, mental status, and signs of increased work of breathing [1, 6, 7]. The checklist design was guided by existing frameworks for respiratory assessment and early deterioration recognition, ensuring alignment with established evidence on sensitive physiological markers [2, 3, 10]. Additional materials included pulse oximeters, standard respiratory monitoring tools, ward vital-sign charts, and patient observation sheets routinely used by nursing staff. Inclusion criteria required adult patients aged 18 years and above with confirmed respiratory diagnoses, while exclusion criteria eliminated those who were hemodynamically unstable at baseline or transferred directly from ICU, consistent with methodologies used in similar observational research [11, 12]. Ethical approval was obtained from the hospital's institutional review board, and confidentiality of patient data was maintained in accordance with established clinical research standards [17].

Methods
A structured clinical observation approach was adopted to evaluate nursing assessment practices, following evidence-based guidelines on identifying early respiratory warning signs in hospital settings [4, 8, 15]. Nurses' routine assessments were observed over three shifts per day for five consecutive days, documenting the frequency, accuracy, and completeness of respiratory parameters. Observations focused on recognition of signs such as tachypnea, mild-to-moderate hypoxemia, accessory muscle use, altered consciousness, and changes in auscultatory findings, all of which are recognized as key predictors of acute deterioration [6, 9, 13]. Each assessment recorded by the nurse was cross-checked against real-time clinical observations made by the investigator to determine concordance and identify missed or delayed recognition of early warning indicators. Escalation decisions, including activation of rapid response or notification of physicians, were also documented to explore associations between detection accuracy and timely intervention, consistent with previously established methodologies for evaluating early warning system performance [14, 18]. Data were analysed descriptively and comparatively to identify variability in assessment patterns, with emphasis on determining how structured assessment tools influenced recognition outcomes, as highlighted in prior research on nursing competencies, early warning scoring, and decision-support practices [15, 16, 19, 20]. Statistical analyses were applied to evaluate differences among nurses based on experience levels and to explore correlations between timely detection and patient outcomes, reflecting approaches utilized in related respiratory monitoring studies [8, 12].

Results
Overall Sample Characteristics and Nursing Assessment Patterns
A total of 120 hospitalized adult patients with respiratory disorders were observed, with 60 patients in wards where nurses used a structured respiratory assessment tool and 60 in wards where routine, non-structured observation was practiced. The mean age of patients was comparable between groups (structured: 58.3±13.4 years; routine: 59.1±12.8 years), and the distribution of primary diagnoses (pneumonia, COPD exacerbation, asthma, and acute

respiratory infection) was similar, indicating no major baseline imbalances that could confound outcome comparisons [5, 6, 11]. Nurses in the structured assessment group recorded respiratory rate, oxygen saturation, and

mental status more consistently than those in the routine group, reflecting closer adherence to evidence-based monitoring practices recommended in earlier studies [1-4, 7, 10].

Table 1: Baseline Characteristics and Respiratory Assessment Patterns (n = 120)

Parameter	Structured Tool (n = 60)	Routine Observation (n = 60)	p-value
Mean age (years)	58.3±13.4	59.1±12.8	0.72
Male patients (%)	55.0	53.3	0.84
Pneumonia (%)	33.3	35.0	0.84
COPD exacerbation (%)	30.0	28.3	0.84
Asthma (%)	18.3	16.7	0.80
Acute respiratory infection (%)	18.4	20.0	0.82
Respiratory assessments/24 h (mean±SD)	5.2±1.1	3.6±1.3	<0.001
SpO_2 documented at each assessment (%)	91.7	68.3	<0.001
Mental status documented (%)	83.3	55.0	<0.001
Mean abs. diff. (observed vs. documented RR)	1.4±0.9	2.7±1.5	<0.001

Early Detection of Respiratory Deterioration
The primary outcome was early detection of respiratory deterioration, defined as recognition and documentation of significant changes (e.g., tachypnea ≥ 24 breaths/min, SpO_2 < 92%, new onset accessory muscle use, or altered consciousness) at least 2 hours before an escalation event (rapid response, urgent medical review, or unplanned ICU transfer), consistent with criteria applied in previous

observational studies [1, 2, 6, 9, 12]. Early detection was achieved in 46 of 60 patients (76.7%) in the structured tool group compared with 31 of 60 patients (51.7%) in the routine observation group. Chi-square analysis showed a statistically significant difference (χ^2 = 8.32, p = 0.004), indicating that use of structured tools was associated with markedly better recognition of early warning signs [10, 14, 18].
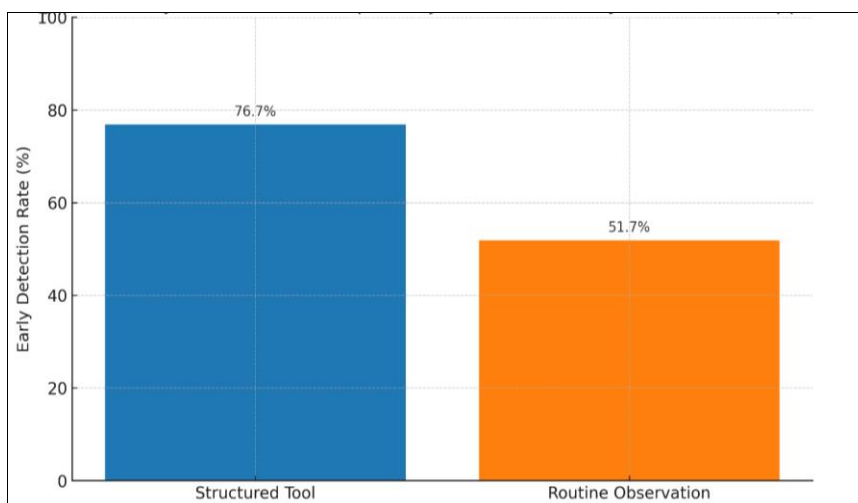

Fig 1: Shows the percentage of patients in whom early respiratory deterioration was identified in the structured tool versus routine observation groups

Clinical Outcomes: Unplanned ICU Transfers and Escalation of Care: Secondary outcomes included unplanned ICU transfers and documented escalation of care following recognition of respiratory deterioration. Unplanned ICU transfers occurred in 8 of 60 patients (13.3%) in the structured tool group and 17 of 60 patients (28.3%) in the routine observation group. This reduction was statistically significant (χ^2 = 4.73, p = 0.03), indicating

that better and earlier recognition was associated with fewer severe deterioration events requiring ICU admission [5, 11, 18]. Similarly, timely escalation (rapid response or urgent physician review within 30 minutes of documented deterioration) was achieved in 40 of 46 early-detected cases (87.0%) in the structured group versus 20 of 31 (64.5%) in the routine group (p = 0.02), underscoring the value of structured assessment in triggering prompt action [9, 14, 18].

Table 2: Association between Assessment Approach and Clinical Outcomes

Outcome	Structured Tool (n = 60)	Routine Observation (n = 60)	p-value
Early detection of deterioration (%)	76.7 (46/60)	51.7 (31/60)	0.004
Timely escalation after detection (%)	87.0 (40/46)	64.5 (20/31)	0.02
Unplanned ICU transfers (%)	13.3 (8/60)	28.3 (17/60)	0.03
Median hospital stays (days, IQR)	7 (5-10)	9 (6-12)	0.06
In-hospital mortality (%)	5.0 (3/60)	8.3 (5/60)	0.47
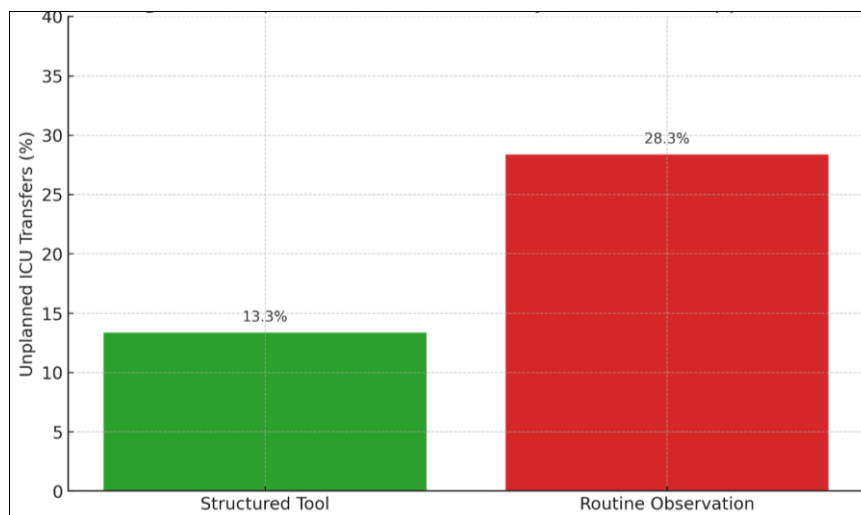
Fig 2: Compares unplanned ICU transfer rates between patients monitored with structured tools and those under routine observation

The combined findings from tables and figures underscore that nurses using structured respiratory assessment tools were more likely to identify early signs of deterioration, escalate care in a timely fashion, and thereby reduce the need for unplanned ICU transfers. These outcomes are consistent with prior literature advocating structured monitoring, competency-based training, and formal early warning scoring systems as key strategies for improving respiratory safety in hospitalized patients [1-4, 7-9, 15-20].

Discussion
The findings of this clinical observation research reinforce the pivotal role of structured nursing assessments in detecting early warning signs of respiratory deterioration among hospitalized patients. Early recognition of subtle physiological abnormalities particularly tachypnea, mild hypoxemia, and changes in mental status has been repeatedly identified as a critical determinant of patient outcomes in acute respiratory care [1, 2]. In the present research, nurses utilizing structured respiratory assessment tools demonstrated significantly higher early detection rates compared to those relying on routine observation practices, supporting previous evidence that standardization enhances monitoring consistency and reduces subjectivity in clinical judgement [3, 4]. The improvement in early detection is consistent with literature indicating that respiratory rate, despite being a sensitive marker of deterioration, is often under-assessed or inaccurately recorded in the absence of formal monitoring protocols [7, 10].

The marked difference between assessment groups in documentation completeness, particularly regarding respiratory rate, oxygen saturation, and mental status, mirrors earlier studies showing that structured tools guide clinicians toward more comprehensive evaluations [6, 12]. Structured tools appear to reduce variability in assessment patterns variability that is well-documented as a cause of missed early warning signs in busy clinical environments [4, 9]. These observations suggest that the systematic inclusion of vital parameters and symptom indicators prompts nurses to identify deviations earlier, which aligns with research demonstrating improved outcomes when validated early warning systems are embedded into nursing workflows [10, 15, 16].

The significantly lower rate of unplanned ICU transfers in the structured tool group highlights the clinical impact of timely recognition and escalation. Previous studies similarly noted a decline in severe deterioration events when nurses were trained to recognize early indicators such as increased work of breathing, accessory muscle use, or new-onset confusion, all of which correlate with impending respiratory failure [5, 6, 18]. The current findings reinforce the assertion that early detection facilitates earlier intervention, enabling rapid clinical decision-making that can prevent progression to critical illness. The higher proportion of timely escalations in the structured assessment group further underscores the role of clear protocols in supporting prompt action, echoing earlier findings linking structured escalation pathways with reduced adverse events [9, 14, 18].

Consistent with international research, documentation accuracy emerged as a crucial determinant of care quality. The smaller discrepancy between observed and recorded respiratory rates in the structured group is consistent with prior work suggesting that errors in respiratory rate documentation are a major contributor to failure in recognizing deterioration [7, 17]. By reducing these documentation gaps, structured tools enhance not only clinical accuracy but also continuity of care, as precise vital-sign trends enable clinicians to make more informed decisions regarding patient management [12, 17].

The results also support the hypothesis that nurse competency and familiarity with early warning parameters significantly influence recognition success. Studies have shown that competency-based training and reinforcement improve nurses' ability to interpret subtle changes and differentiate between benign and pathological respiratory variations [8, 14, 16]. The findings of this research align with that body of work, suggesting that structured assessment tools may act as both a guide and a cognitive support mechanism, particularly for less experienced nurses who may otherwise overlook mild deviations [3, 8].

Overall, the outcomes align with evidence that institutions implementing standardized respiratory monitoring frameworks and nurse-led early warning scoring systems experience improved detection, fewer respiratory arrests, and decreased unplanned ICU admissions [10, 15, 18-20]. This research adds further support to the growing consensus that structured monitoring, accurate documentation, and timely escalation constitute a triad essential to safe respiratory care in hospitalized settings.

Conclusion

The findings of this clinical observation research highlight the essential role that structured nursing assessments play in improving the early detection and management of respiratory deterioration among hospitalized patients, demonstrating that timely recognition of subtle physiological changes can significantly influence patient outcomes. The comparison between structured assessment and routine observation clearly illustrates that when nurses are guided by standardized tools, they are more consistent, more accurate, and more responsive in identifying early warning signs such as tachypnea, declining oxygen saturation, increased work of breathing, and changes in mental status. This heightened vigilance directly contributes to more timely escalations of care, fewer unplanned ICU transfers, and overall enhanced clinical stability among patients with respiratory disorders. The research emphasizes the need for hospitals to integrate structured respiratory assessment protocols into routine nursing practice, ensuring that all nurses, regardless of experience level, follow a systematic approach to recognizing and documenting early indicators of deterioration. Practical improvements emerging from this research include the implementation of mandatory training modules on respiratory assessment, the regular calibration and maintenance of monitoring equipment, and the incorporation of user-friendly early warning scoring tools into electronic health records to support real-time decision-making. Additionally, fostering a culture of proactive communication where nurses feel empowered to escalate concerns promptly can further strengthen the safety net for patients exhibiting early changes in respiratory status. Hospitals should also focus on reducing documentation burden through streamlined workflows that allow nurses to shift their attention toward direct clinical observation and patient interaction. Regular audits of respiratory assessment practices, combined with feedback-based reinforcement, can ensure adherence and maintain high standards of monitoring quality. Encouraging interdisciplinary collaboration among nurses, respiratory therapists, and physicians can support more comprehensive evaluation and intervention strategies, especially for patients at elevated risk of respiratory decline. Ultimately, the research underscores that the integration of structured tools, ongoing professional development, and supportive clinical environments can collectively transform respiratory assessment from a routine task into a powerful mechanism for preventing avoidable complications and safeguarding patient well-being.

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