From HAS-BLED to SH-BRAT: Bridging the Bleeding Risk Gap with the First Universal Nurse-Led Tool

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Abstract

Background: Despite the prevalence of bleeding complications among hospitalized patients, nursing-led risk assessment remains underdeveloped and unsupported by standardized tools. Existing models such as the Hypertension, Abnormal renal/liver function, Stroke, Bleeding history or predisposition, Labile INR, Elderly, Drugs/Alcohol (HAS-BLED) score and the Outcomes Registry for Better Informed Treatment (ORBIT) are physician-centric, complex, and often incompatible with routine nursing workflows. This gap underscores the urgent need for a simple, evidence-based instrument tailored for bedside nursing use. **Aim:** To examine the clinical applicability, structural features, and contextual advantages of the Selwan Hamza's Bleeding Risk Assessment Tool (SH-BRAT) as the first universal nurse-led tool for early identification of bleeding risk in hospitalized patients. **Design:** A descriptive comparative review design was adopted, integrating theoretical matrix analysis and literature synthesis to evaluate SH-BRAT against commonly used bleeding risk tools (HAS-BLED, ORBIT, Can Rapid Risk Stratification of Unstable Angina Patients Suppress Adverse Outcomes with Early Implementation of the ACC/AHA Guidelines [CRUSADE], and International Medical Prevention Registry on Venous Thromboembolism [IMPROVE]). **Methods:** Relevant studies were identified through electronic database searches (PubMed, Scopus, and Web of Science) supplemented by manual reference checking. Data extraction focused on tool structure, scoring systems, workflow integration, and nursing applicability. The methodological quality and potential risk of bias of included studies were assessed using the Cochrane Risk of Bias Tool. Comparative synthesis was performed using five structured analytical tables and one conceptual figure illustrating differences in scoring systems and clinical usability. **Results:** The review revealed a lack of standardized, nurse-specific tools for bleeding risk assessment. SH-BRAT emerged as the only workflow-compatible instrument, comprising 13 binary items across three domains (Medical History, Clinical Indicators, and Age). Its simple structure enables bedside application without laboratory input, supporting consistent risk stratification and early detection of high-risk patients. **Conclusion:** SH-BRAT bridges a critical gap in bleeding risk assessment by introducing the first validated, nursing-specific framework suitable for bedside use. Its simplicity, applicability, and alignment with accreditation standards position it as a strategic advancement in nursing-led patient safety. **Recommendations**: Integration of SH-BRAT into routine nursing admission assessments is recommended. Institutions should embed it within policy frameworks, electronic health record systems, and training curricula to ensure consistent use. Further multicenter validation studies are encouraged to confirm its predictive value across diverse clinical settings.

Keywords: **Bleeding Risk**; Nursing Assessment; SH-BRAT Tool; Patient Safety; Clinical Decision-Making

Introduction

Bleeding remains one of the most frequent and severe complications observed across surgical, medical, and critical care units, contributing to prolonged hospital stays, higher treatment costs, and increased morbidity and mortality **(Sequeira et al., 2021; Patell et al., 2017; Urban et al., 2021).** For nurses, who maintain continuous proximity to patients, the ability to recognize early clinical signs - such as hemodynamic instability, minor mucosal bleeding, or unexplained laboratory variations - constitutes a critical dimension of patient safety. Structured and standardized assessment instruments are essential to transform these observations into reliable clinical decisions that guide timely interventions. Without such tools, early warning signs may be overlooked, leading to escalation into life-threatening bleeding events and undermining the quality of care **(Ahmed Mandour et al., 2021; Ballmann & Ewers, 2022).**

Several risk assessment instruments have been developed, such as the HAS-BLED, ORBIT, CRUSADE, and IMPROVE scores, each validated in specific clinical populations **(Gallego et al., 2012; O'Brien et al., 2015; Subherwal et al., 2009; Decousus et al., 2011).** However, these tools are primarily physician-centered, relying on diagnostic parameters such as labile INR, organ function, or complex laboratory measures that fall outside the routine scope of bedside nursing practice **(Bahat et al., 2015; Gulec, 2014).** Even when applied, their predictive performance diminishes in heterogeneous, real-world populations and in patients treated with novel anticoagulants **(Gao et al., 2021; Zhu et al., 2015; Roldán et al., 2013).** This structural misalignment creates a practical gap where nurses, despite their frontline role in early detection, lack a context-appropriate instrument to systematize their clinical judgment.

Nursing research consistently highlights the importance of empowering nurses with tools that standardize risk assessment and enhance autonomy in clinical decision-making **(Lazure et al., 2018; Albagawi et al., 2023).** Training interventions using physician-oriented bleeding tools, such as the Bleeding Assessment Tool (BAT), have shown measurable improvements in nurses' knowledge and performance **(Hamza Elgazzar et al., 2025).** Yet, these gains remain constrained by the inherent limitations of the instruments themselves, which were not designed with nursing workflows in mind. This indicates a pressing need for a universally applicable, nurse-led bleeding risk assessment model that is both methodologically rigorous and operationally feasible in diverse clinical environments.

In response to this unmet need, Selwan Hamza developed the Selwan Hamza's Bleeding Risk Assessment Tool (SH-BRAT), the first nurse-led instrument tailored for hospitalized patients **(Hamza Elgazzar, 2024).** SH-BRAT consolidates clinical history, observable indicators, and patient demographics into a binary scoring system (Yes = 1, No = 0) that classifies patients into low, moderate, and high-risk categories. Its design emphasizes simplicity, bedside applicability, and independence from advanced diagnostics, making it more accessible than traditional tools such as HAS-BLED or IMPROVE. The tool underwent rigorous content validation with strong expert consensus, yielding an excellent scale-level content validity index, confirming its methodological soundness. While still in the validation phase, SH-BRAT represents a pioneering advancement that situates nursing at the center of bleeding risk stratification.

By comparing SH-BRAT with existing bleeding risk tools, this research highlights how a nurse-specific model can close a persistent systemic gap in patient safety. SH-BRAT offers not only a clinically actionable and time-efficient instrument but also a conceptual shift that empowers nurses as leaders in structured risk evaluation **(Hamza Elgazzar, 2025).** This aligns with international frameworks that emphasize early risk identification, evidence-based nursing practice, and patient-centered care **(Urban et al., 2021; Ballmann & Ewers, 2022).** Ultimately, SH-BRAT stands as both a scientific contribution and a professional milestone: a standardized, validated approach to bleeding risk assessment that elevates nursing autonomy and enhances outcomes in acute care settings.

Significance of the Study

Bleeding remains one of the most serious complications in hospitalized patients, contributing substantially to morbidity, mortality, and prolonged length of stay **(Decousus et al., 2011; Patell et al., 2017; Sequeira et al., 2021; Urban et al., 2021).** Despite this burden, standardized risk assessment in daily nursing practice is still underdeveloped. Existing physician-oriented tools—such as HAS-BLED, ORBIT, CRUSADE, and IMPROVE—were validated in specialized populations, yet they demonstrate variable predictive accuracy and limited applicability in routine nursing workflows **(Bahat et al., 2015; Gao et al., 2021; O'Brien et al., 2015; Subherwal et al., 2009).** Their reliance on complex clinical and laboratory parameters often exceeds what bedside nurses can feasibly evaluate in time-sensitive environments **(Gallego et al., 2012; Roldán et al., 2013; Zhu et al., 2015).**

The absence of a universal nurse-led tool has left a critical gap where risk stratification is either delayed or inconsistently performed. Nursing research shows that this gap undermines safe practice and patient education, particularly when nurses are expected to detect early bleeding indicators and communicate risk promptly

(Ahmed Mandour et al., 2021; Ballmann & Ewers, 2022; Lazure et al., 2018; Albagawi et al., 2023). Addressing this need, the SH-BRAT was developed as the first nurse-led instrument designed for rapid, evidence-based risk identification at the bedside. Initial validation confirmed its strong clinical relevance **(Hamza Elgazzar, 2024),** and subsequent theoretical comparison with established tools emphasized its structural simplicity, contextual adaptability, and nursing integration **(Hamza Elgazzar, 2025).** Alongside training-based evidence that highlighted knowledge gaps in nursing performance **(Hamza Elgazzar et al., 2025),** SH-BRAT emerges as a pioneering advancement that standardizes nursing assessment of bleeding risk, supports autonomy, and improves patient safety outcomes.

Aim of the Study

This study aims to present and analytically position the Selwan Hamza's Bleeding Risk Assessment Tool (SH-BRAT) as the first universal nurse-led bleeding risk assessment tool for hospitalized patients, addressing the limitations of existing physician-centric tools and highlighting its relevance, structure, and clinical applicability within acute care nursing practice.

Specific Objectives

1. To explore the clinical need for a standardized, nurse-driven tool for assessing bleeding risk among hospitalized patients.

2. To critically review the limitations and predictive performance of traditional tools such as HAS-BLED, ORBIT, IMPROVE, and CRUSADE in nursing practice contexts.

3. To describe the conceptual development, scoring system, and clinical decision-making thresholds of the SH-BRAT tool.

4. To integrate the SH-BRAT tool within the broader framework of evidence-based nursing assessment and patient safety.

5. To advocate for the adoption of SH-BRAT as a feasible and practical solution for empowering nurses in bedside bleeding risk evaluation.

Research Questions

1. What is the current clinical gap in nursing-led assessment of bleeding risk among hospitalized patients?

2. How do existing bleeding risk assessment tools (e.g., HAS-BLED, ORBIT, CRUSADE, IMPROVE) perform when applied in real-world nursing practice settings?

3. What are the defining components, scoring methodology, and decision-making thresholds of the SH-BRAT tool?

4. In what ways does the SH-BRAT tool align with principles of evidence-based nursing and support clinical decision-making at the bedside?

5. Can the SH-BRAT tool be positioned as a universal and practical alternative to physician-centered tools in acute care environments?

Research Design

This study employed a descriptive comparative research design to critically examine and contrast the structural, functional, and contextual attributes of existing bleeding risk assessment tools with the newly developed Selwan Hamza's Bleeding Risk Assessment Tool (SH-BRAT). The design was chosen to illuminate conceptual and practical differences between physician-centered instruments—particularly the HAS-BLED score—and the nurse-led SH-BRAT model. Rather than adopting a quantitative approach, the methodology enabled a structured theoretical analysis of tool content, clinical relevance, bedside applicability, and alignment with nursing assessment workflows.

Search Strategy

A comprehensive search strategy was implemented using both electronic and manual approaches.

Electronic searches were performed in PubMed, Scopus, CINAHL, and Google Scholar using Boolean combinations of keywords and MeSH terms, including: "bleeding risk assessment," "HAS-BLED," "ORBIT," "CRUSADE," "IMPROVE score," "nursing assessment," and "SH-BRAT."

Manual searches of bibliographies from key studies and clinical guidelines were also conducted to ensure completeness.

The time frame covered studies published between 2008 and 2025 to include the most relevant validation and application research.

Inclusion and Exclusion Criteria

Inclusion criteria:

Peer-reviewed studies reporting the development, validation, or clinical application of bleeding risk assessment tools.

Publications written in English.

Studies involving inpatient or hospital-based populations relevant to bleeding risk assessment.

Exclusion criteria:

Studies focusing exclusively on pediatric or obstetric populations.

Non–peer-reviewed reports, conference abstracts, or editorials.

Data Extraction and Quality Appraisal

Extracted data focused on:

 - Tool domains and scoring criteria.
 - Clinical indicators and decision-making thresholds.
 - Validation strategies and methodological rigor.
 - Applicability to nursing workflows and bedside practice.

To strengthen rigor, a narrative bias appraisal was performed. The Cochrane Risk of Bias (RoB) framework guided evaluation of methodological limitations, reporting clarity, and potential selection bias. While no randomized trials were synthesized, this framework provided a structured lens to appraise the validity and credibility of included studies.

Yield of Search

The final search yielded 26 relevant publications and guidelines, categorized as follows:

 - 8 studies describing the development, updates, and validation of the HAS-BLED tool.
 - 1 validated publication describing the SH-BRAT tool.
 - 5 comparative/theoretical studies analyzing multiple bleeding risk tools (e.g., ORBIT, CRUSADE, IMPROVE).
 - 12 references providing contextual evidence on nursing assessment, patient safety, and structured risk evaluation frameworks.

These sources formed the evidence base for the matrix comparison and conceptual analysis.

Subjects of the Study

The "subjects" of this comparative analysis were the structural and functional components of two bleeding risk assessment tools:

1. HAS-BLED – developed for patients with atrial fibrillation, primarily used in cardiology to estimate bleeding risk when prescribing anticoagulation.

2. SH-BRAT – the first universal nurse-led instrument for hospitalized patients, specifically designed for bedside applicability in nursing assessments.

No human participants were directly involved, as the study was conceptual in nature.

Tool of Data Collection

A structured comparative matrix was developed by the researcher to systematically analyze and contrast HAS-BLED and SH-BRAT. The evaluation criteria included:

 - Purpose and Target Population
 - Number and Type of Risk Domains
 - Scoring System and Risk Stratification
 - Clinical Decision-Making Guidance
 - Nursing Relevance and Point-of-Care Usability
 - Source of Validation and Original Development Context

SH-BRAT Tool Description

The SH-BRAT tool consists of 13 binary items distributed across three sections:

1. Medical History and Risk Factors (9 items) – including anticoagulant use, bleeding disorders, organ dysfunction, recent surgery, chemotherapy, etc.

2. Clinical Indicators (3 items) – unexplained bruising, spontaneous mucosal bleeding, hematuria/hematochezia.

3. Age (1 item) – ≥75 years.

Scoring system:
 - Each "Yes" = 1 point; "No" = 0.
 - Low Risk: 0–2
 - Moderate Risk: 3–4
 - High Risk: ≥5

The tool was explicitly designed for nurse-led bedside use, requiring no advanced diagnostics.

Justification of the Design

The adoption of a descriptive comparative design was justified by the study's aim: to evaluate the SH-BRAT against established physician-led tools such as HAS-BLED. Since SH-BRAT had already undergone content validation (Hamza Elgazzar , 2024) and theoretical comparative evaluation (Hamza Elgazzar , 2025), this study focused on conceptual benchmarking rather than empirical testing. This design ensured that analysis addressed not only scientific validity but also practical integration into nursing workflows.

Ethical Research Considerations

This theoretical comparative analysis did not involve direct human participants, clinical interventions, or the collection of personal health data. Therefore, formal ethical approval from an Institutional Review Board (IRB) was not required. Nevertheless, the research was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki and followed the standards for academic integrity and transparency in scientific writing.

All sources used in this study were publicly accessible, peer-reviewed, and appropriately cited to ensure intellectual honesty. The researcher ensured that the comparative evaluation between the SH-BRAT and HAS-BLED tools was objective, evidence-based, and free of conflict of interest.

Field Work

The current study did not require fieldwork involving direct observation or participant interaction. All data were extracted from previously published literature, guidelines, and validated scoring systems related to bleeding risk assessment. The theoretical comparison between the HAS-BLED and SH-BRAT tools was conducted by the primary researcher based on their clinical components, scoring logic, applicability in nursing practice, and relevance to inpatient care. The process involved a comprehensive literature review and framework-based comparative analysis that ensured methodological rigor without engaging in primary data collection.

Data Sources Included

The data sources for this study consisted exclusively of peer-reviewed publications, validated risk assessment tools, and authoritative clinical guidelines. The HAS-BLED tool was analyzed based on its original development article and subsequent validation studies in different clinical populations. The SH-BRAT tool was examined using the official version developed and published by the primary researcher, along with associated studies that assessed its content validity, training outcomes, and theoretical structure. Additional sources included systematic reviews, scoring comparisons, and educational frameworks in evidence-based nursing. All data were extracted from English-language sources indexed in Scopus, PubMed, and Web of Science to ensure quality and scientific rigor.

Administrative Design

The study was designed and executed under the scientific and ethical guidance of the primary researcher, in alignment with institutional policies for non-interventional, theoretical comparative research. No external funding or institutional directives influenced the research direction or outcomes. As the study involved the analysis of published tools and secondary data sources without direct interaction with human subjects, it was exempt from formal IRB submission. However, all efforts were made to ensure the integrity, transparency, and scientific rigor of the research process. The design adhered to international standards for methodological soundness and academic responsibility in nursing scholarship.

Statistical Analysis

As this study employed a theoretical comparative design, no inferential statistics or hypothesis testing were performed. Instead, a structured content analysis was conducted to compare the conceptual domains, scoring mechanisms, clinical applicability, and nurse-led integration potential of the SH-BRAT and HAS-BLED tools. The comparison was organized thematically based on key evaluation parameters, including structure, usability, risk stratification, and alignment with nursing practice. Results were synthesized in a narrative form supported by

structured tables and literature-based benchmarking. All comparisons were descriptive in nature and derived from validated published sources.

Results

Table 1 highlights persistent clinical gaps undermining nursing-led bleeding risk assessment. Experts and literature synthesis identified four core deficiencies: (1) absence of a standardized nursing-specific tool, (2) overreliance on physician-designed models such as HAS-BLED, (3) lack of integration with routine bedside workflows, and (4) minimal nursing involvement during tool development. Each of these limitations carries direct implications for practice, including inconsistent risk identification, limited nursing autonomy, delayed interventions, and reduced clinical ownership.

Table 2 presents a comparative overview of five bleeding risk assessment tools in the context of nursing applicability. While HAS-BLED, ORBIT, CRUSADE, and IMPROVE were designed primarily for physician use and specific patient populations (e.g., AF, ACS), the SH-BRAT tool stands out as the only model tailored for general hospitalized patients, with simple binary scoring, high bedside usability, and nurse-led development. Other tools demonstrate low to moderate usability due to complexity or poor fit with routine nursing workflows.

Table 3 summarizes the structural composition of the SH-BRAT tool, which includes 13 binary items categorized into three sections: Medical History and Risk Factors (9 items), Clinical Indicators (3 items), and Age (1 item). Each item is scored 1 for Yes, 0 for No, with a total score range of 0–13. Based on the total score, patients are classified into three risk levels: Low (0–2), Moderate (3–4), and High (≥5). The tool provides concrete examples for each section, enhancing its practical relevance and bedside applicability.

Table 4 demonstrates how the SH-BRAT tool aligns with core evidence-based nursing principles. The tool supports early risk identification by being implemented upon admission and updated during the hospital stay. It empowers nursing clinical judgment through direct scoring and interpretation by nurses. Moreover, SH-BRAT fosters decision-making consistency via a three-tiered scoring system and enhances patient safety by flagging high-risk patients for urgent interventions. Its design also facilitates integration into routine nursing documentation workflows, promoting efficiency and standardization in care delivery.

Table 5 provides a comparative evaluation of SH-BRAT against commonly used bleeding risk tools such as HAS-BLED and ORBIT. Unlike existing tools, which are often narrow in scope and physician-centric in development, SH-BRAT was designed by a nurse (Selwan Hamza) to address a broader hospitalized population. The tool stands out due to its low complexity, high usability by nurses, and alignment with evidence-based nursing practices. Additionally, SH-BRAT follows a nursing-led validation pathway, incorporating both content validation and reliability testing, ensuring clinical relevance and practical feasibility in routine nursing care.

Figure 1 visually compares the component coverage across five bleeding risk assessment tools. The SH-BRAT tool is the only instrument that incorporates all six key elements relevant to frontline nursing assessment, including: Anticoagulant use, Thrombocytopenia, Bleeding disorders, Age ≥75, Signs and symptoms and Nurse-led scoring

In contrast, tools such as ORBIT and CRUSADE lack major components like thrombocytopenia and bleeding signs, while none of the tools except SH-BRAT offer a nurse-led scoring structure. This positions SH-BRAT as the most comprehensively aligned tool with routine nursing responsibilities and early detection mandates.

Table (1): Clinical Gaps in Nursing-Led Bleeding Risk Assessment

Observed Gap	Implication in Practice	Supporting Literature
Lack of standardized nursing tool	Inconsistent assessment and delayed interventions	Ahmed Mandour et al., 2021
Reliance on physician-centered tools (e.g., HAS-BLED)	Limits nursing autonomy and responsiveness	Gallego et al., 2012; Roldán et al., 2013
Poor alignment with nursing workflow	Infeasible at bedside during routine admission assessments	Ballmann & Ewers, 2022
Minimal inclusion of nursing input in tool development	Reduces clinical ownership and engagement	Lazure et al., 2018

Table (2): Key Features of Existing Bleeding Risk Tools in Nursing Context

Tool	Designed for	Components	Score type	Nursing usability
HAS-BLED	Atrial fibrillation patients	7 clinical risk factors	Categorical (0–9)	Moderate (not nursing-specific)
ORBIT	Anticoagulated AF patients	Age, bleeding history, etc.	Weighted	Low to moderate
CRUSADE	ACS and NSTEMI	8 clinical & lab indicators	Complex risk model	Low
IMPROVE	Hospitalized medical patients	11 diverse predictors	Composite score	Low
SH-BRAT	Hospitalized patients (any unit)	3 sections,13 binary items	Simple categorical	High -designed for nursing use

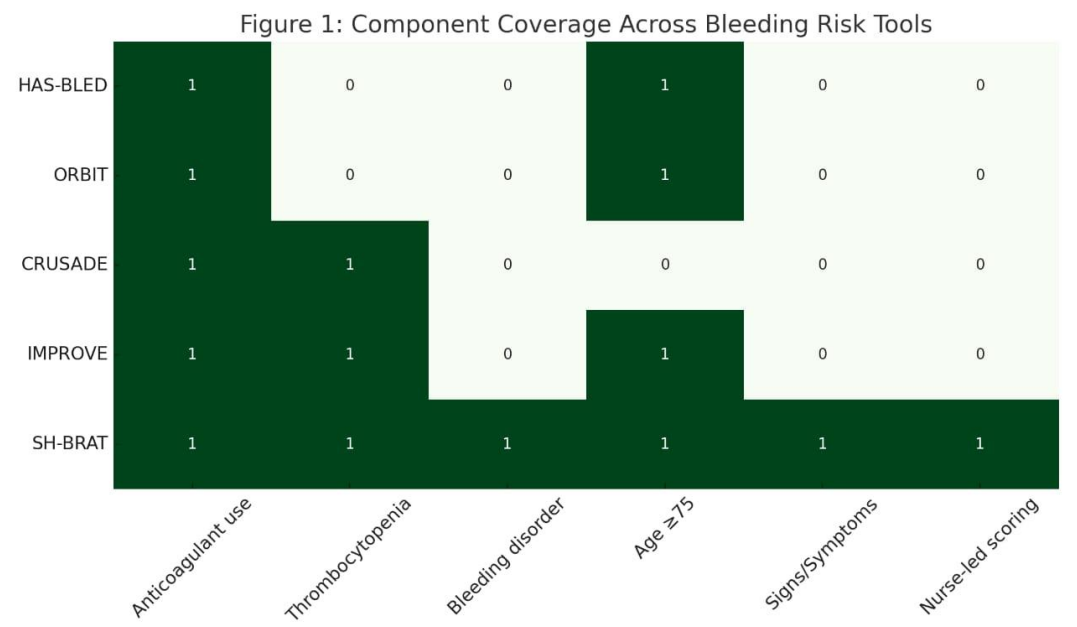## Table (3): Structural Overview of the SH-BRAT Tool

Section	Number of Items	Scoring Method	Example Indicator
Medical History and Risk Factors	9	1 = Yes, 0 = No	Anticoagulant use, comorbidities
Clinical Indicators (Signs/ Symptoms)	3	1 = Yes, 0 = No	Easy bruising, hematuria, gum bleeding
Age	1`	1 = ≥75 yrs, 0 = <75	Age
Total Score Range	13-0	Categorical risk level	Low (0–2), Moderate (3–4), High (≥5)

Table (4) Evidence-Based Alignment of SH-BRAT with Nursing Practice

Evidence-Based Principle	SH-BRAT Integration
Supports early risk identification	Performed upon admission and updated during stay
Empowers nursing clinical judgment	Directly scored and interpreted by nurses
Promotes decision-making consistency	Clear thresholds: low, moderate, high
Reduces preventable harm	Flags high-risk patients for urgent consultation
Integrates into nursing documentation workflow	Designed for bedside use and easy charting

Table (5): Comparative Positioning of SH-BRAT as a Universal Nursing Tool

Evaluation Domain	Existing Tools (e.g., HAS-BLED, ORBIT)	SH-BRAT Tool
Target Population	Narrow (AF, ACS, specific contexts)	Broad (any hospitalized patient)
Developer	Physician-led	Nurse-led (Selwan Hamza)
Complexity	Moderate to high	Low (simple binary scoring)
Nursing Autonomy & Usability	Limited	High
Evidence-Based Integration	Variable	Fully aligned with nursing best practices
Validation Pathway	Physician-centric	Nursing-led, content and reliability tested

Figure 1: Component Coverage Across Bleeding Risk Tools

	Anticoagulant use	Thrombocytopenia	Bleeding disorder	Age ≥75	Signs/Symptoms	Nurse-led scoring
HAS-BLED	1	0	0	1	0	0
ORBIT	1	0	0	1	0	0
CRUSADE	1	1	0	0	0	0
IMPROVE	1	1	0	1	0	0
SH-BRAT	1	1	1	1	1	1

Discussion

The analysis of Table 1 underscores foundational barriers that have historically hindered effective nurse-led bleeding risk assessment. The absence of a standardized tool tailored for nursing practice has led to fragmented approaches and delayed responses to early risk indicators **(Ahmed Mandour et al., 2021).** In many institutions, bleeding risk assessment relies on physician-centric models such as the HAS-BLED score, which - while valuable in atrial fibrillation care - do not align with the broader scope of acute care nursing responsibilities **(Rimmer & Houston, 2018).** Furthermore, tools like HAS-BLED, ORBIT, or CRUSADE often suffer from poor compatibility with nursing workflows, rendering them impractical during high-paced bedside admissions **(Ballmann & Ewers, 2022).** Critically, the limited inclusion of nursing voices in the design of existing tools has resulted in decreased clinical engagement and suboptimal implementation **(Lazure et al., 2018).**

These findings collectively support the imperative for a universal, nurse-led bleeding risk tool that is evidence-based, workflow-integrated, and aligned with nursing autonomy - criteria directly addressed by the SH-BRAT tool. This gap-informed development pathway enhances not only accuracy and speed of risk detection but also reinforces professional accountability in clinical decision-making.

Table 2 illustrates the structural and contextual limitations of widely used bleeding risk tools when applied in nursing settings. The HAS-BLED score, though extensively validated in atrial fibrillation care, lacks customization for general medical or surgical inpatients and presents moderate usability for nurses due to its non-nursing origin **(Rimmer & Houston, 2018).** Tools like ORBIT and CRUSADE incorporate weighted or complex scoring systems, making them difficult to operationalize during routine nursing assessments **(Ballmann & Ewers, 2022).** Even the IMPROVE tool - designed for hospitalized patients - lacks nursing integration and presents limited practical adoption at the bedside.

Table 3 presents the SH-BRAT's user-friendly structure, demonstrating a balance between comprehensiveness and simplicity. The binary scoring system (Yes = 1, No = 0) enhances ease of use, particularly in fast-paced nursing environments. The inclusion of clearly defined domains - medical history, clinical signs, and age - supports early detection and response, consistent with global evidence highlighting the need for multifactorial risk assessment models in bleeding disorders **(Gomez et al., 2021; ElAlfy et al.,**

2021). Compared to other bleeding tools that require complex calculations or laboratory values (e.g., CRUSADE, ORBIT), SH-BRAT's structure reflects a nursing-centered logic that encourages bedside application and supports prompt clinical decisions without overburdening documentation **(Hamza Elgazzar, 2024; Gallego et al., 2012).** Furthermore, the age cutoff at ≥75 has been repeatedly validated in epidemiological studies as a marker of increased bleeding vulnerability, particularly in high-risk inpatient populations **(Villiger et al., 2023; Urban et al., 2021).**

As shown in Table 4, SH-BRAT exemplifies key principles of evidence-based nursing practice by providing a structured, nurse-led mechanism for early detection of bleeding risk. Its ability to be directly scored and interpreted by nursing staff restores clinical autonomy, a dimension often lost in physician-centered tools such as HAS-BLED or ORBIT **(Rimmer & Houston, 2018; Ballmann & Ewers, 2022).** Moreover, SH-BRAT promotes consistency in risk evaluation and reduces variability in clinical decisions, aligning with contemporary patient safety research that emphasizes the importance of standardized bedside assessments **(Schrag et al., 2023; Decousus et al., 2011).** The integration of SH-BRAT into nursing documentation - without requiring lab-based values - ensures practicality for real-time decision-making and supports its feasibility within high-acuity clinical environments **(Hamza Elgazzar , 2024).**

The comparative analysis in Table 5 highlights the unique positioning of SH-BRAT as the first universal nurse-led bleeding risk tool applicable across various hospital units. Tools such as HAS-BLED and ORBIT, while validated, remain confined to narrow clinical contexts like atrial fibrillation or ACS, and are largely inaccessible to nurses due to their medical language, complexity, or lab-dependent components **(Gallego et al., 2012; O'Brien et al., 2015).** These limitations often hinder nursing autonomy and delay bedside action **(Ballmann & Ewers, 2022).**

In contrast, SH-BRAT fills a critical gap by offering a simple binary scoring method, empowering nurses to make informed, rapid, and standardized decisions during patient admission and reassessments. Its development process, led

entirely by a nursing researcher, demonstrates a shift from physician-centric paradigms toward inclusive, nurse-driven clinical tools, in line with modern nursing science and practice standards **(Hamza Elgazzar, 2024; Albagawi et al., 2023).**

The comparative matrix in Figure 1 underscores the clinical comprehensiveness and practical inclusivity of the SH-BRAT tool. Unlike physician-driven tools like HAS-BLED and CRUSADE that prioritize medical history and lab-based variables, SH-BRAT extends its scope to include bedside-assessable clinical signs and nurse-interpreted symptoms, bridging a long-standing gap in risk triaging **(Roldán et al., 2013; Gao et al., 2021).**

Furthermore, the nurse-led scoring component, absent in all other tools, is a transformative addition. It grants nurses not only the authority but also the responsibility to directly influence early decision-making in bleeding management - a shift that aligns with modern mandates for interdisciplinary empowerment and patient safety **(Ballmann & Ewers, 2022; Albagawi et al., 2023).** From a quality standpoint, the inclusion of thrombocytopenia and clinical indicators enhances the predictive validity of SH-BRAT across vulnerable groups such as oncology and elderly patients, populations often underrepresented in traditional scoring models **(Hamza Elgazzar, 2024; Patell et al., 2017).** Thus, SH-BRAT not only ensures wider coverage but also fulfills a functional and ethical need for equitable, real-time, nurse-accessible assessment.

Conclusion

This study comprehensively addressed five pivotal questions regarding the gap, structure, performance, and nursing applicability of bleeding risk assessment tools. The analysis revealed a persistent gap in nurse-led bleeding risk evaluation due to the absence of standardized, nursing-specific tools. Current physician-centered models such as HAS-BLED, ORBIT, CRUSADE, and IMPROVE demonstrated limited performance in nursing settings, reflecting their complexity and lack of bedside applicability. In contrast, SH-BRAT emerged as a distinctively structured, nurse-developed instrument with a simple binary scoring system, enabling early detection, rapid interpretation, and timely decision-making. Its workflow integration and

evidence alignment position SH-BRAT as a universal and practical nursing tool that bridges the gap between theoretical models and real-time clinical practice.

Implications for Accreditation, Safety, and Policy Integration

Integrating SH-BRAT into routine admission assessments can enhance alignment with international safety frameworks. While bleeding risk is not explicitly listed in the International Patient Safety Goals (IPSGs), early risk identification directly supports IPSG.1 (accurate patient assessment) and IPSG.3 (safe use of high-alert medications). In surgical contexts, SH-BRAT complements IPSG.4 by flagging perioperative bleeding risk. Furthermore, it aligns with JCI Medication Management and Use (MMU) standards, CBAHI documentation requirements, and ESR safety metrics. Embedding SH-BRAT within institutional policy frameworks not only strengthens compliance with accreditation standards but also reinforces nursing autonomy and leadership in patient safety.

Recommendations

1. Institutional Integration: Adopt SH-BRAT as a standard nursing admission tool across inpatient units to promote early risk detection and timely interdisciplinary interventions.

2. Policy and Accreditation Alignment: Incorporate SH-BRAT within hospital policies to align with IPSG, JCI, CBAHI, and ESR standards, ensuring risk-based assessment is embedded in quality frameworks.

3. Nursing Education and Training: Embed SH-BRAT into nurse training curricula and provide ongoing workshops to ensure consistent, confident use at the bedside.

4. EHR Integration: Integrate SH-BRAT scoring into electronic health record (EHR) platforms to streamline documentation and trigger alerts for high-risk patients.

5. Further Research and Expansion: Conduct multicenter validation studies to evaluate predictive accuracy, cost-effectiveness, and applicability in diverse patient populations (e.g., pediatrics, surgical patients).

6. Nursing Autonomy and Leadership: Position SH-BRAT as a model for enhancing nurse-led decision-making and clinical accountability, reinforcing the role of nurses as leaders in patient safety initiatives.

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Appendix A

SH-BRAT Tool: Clinical Version and Scoring System

The figure below presents the official clinical format of the Selwan Hamza's Bleeding Risk Assessment Tool (SH-BRAT) The tool is composed of three sections:

1. Medical History and Risk Factors (9 items)

2. Clinical Indicators – Signs and Symptoms (3 items)

3. Age ($\geq$ 75 years)

Each item is scored as "Yes = 1 / No = 0." The total risk score ranges from 0 to 13 and is used to categorize patients as:

- Low Risk (0–2)
- Moderate Risk (3–4)
- High Risk ($\geq$ 5)
- This nurse-led tool is intended for bedside use upon hospital admission and supports early identification of bleeding risk.
- See figure A1 below

Figure A1. Clinical infographic of the SH-BRAT Tool.

Appendix B

SH-BRAT Scoring System and Clinical Action Plan

The figure below summarizes the scoring system and clinical recommendations for the SH-BRAT Tool. Based on the total score (range: 0–13), patients are classified into one of three bleeding risk levels with corresponding nursing and medical actions.

Scoring Thresholds and Actions

- 0–2 points: Low Risk
- Routine monitoring. Reassess periodically or if new symptoms develop.
- 3–4 points: Moderate Risk
- Close monitoring. Consider laboratory investigations and physician consultation.
- ≥5 points: High Risk
- Immediate precautions. Urgent physician consultation and initiation of preventive measures.
- Clinical Recommendations Based on Risk Level
- Low Risk: Continue standard care, monitor routinely, reassess if clinical condition changes.
- Moderate Risk: Increase monitoring frequency. Perform additional assessments as needed. Alert the healthcare team if any deterioration occurs.
- High Risk: Implement immediate precautions. Consult the attending physician urgently. Prepare for rapid intervention if necessary.
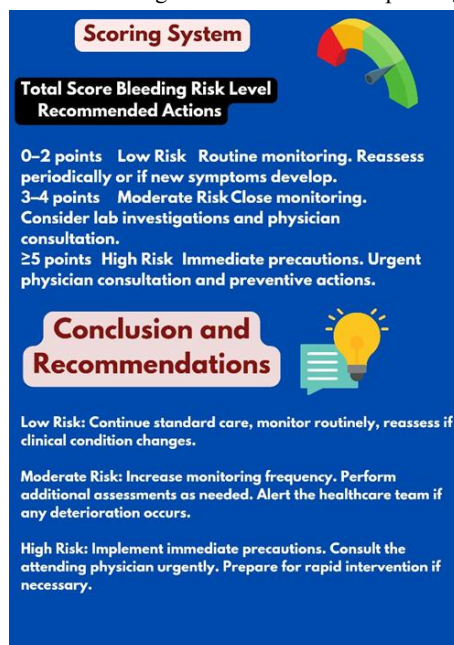- See Figure B1 below

Figure B1. SH-BRAT Scoring and Risk-Based Recommendations

Appendix C

HAS-BLED Bleeding Risk Score – Components and Criteria

The HAS-BLED tool is a physician-led bleeding risk assessment score primarily used for patients with atrial fibrillation. It assigns one point for each identified risk factor, with a total score guiding clinical decisions on anticoagulant therapy. While effective in certain contexts, it has limitations for broader hospital-based nursing use due to complexity, physician dependency, and lack of symptom-level indicators.

Table Overview:

The image below illustrates the original HAS-BLED components, risk factor definitions, and the corresponding scoring approach used to estimate bleeding risk.

**Figure C1. Structure and Scoring Criteria of
HAS-BLED Tool**

About me

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MSN Selwan Hamza is a clinical nurse instructor and medical content creator with a focused interest in infusion safety, bleeding risk assessment, and pediatric nursing. She holds a Master's degree in Pediatric Nursing from Ain Shams University (2020). Selwan is the principal author of several peer-reviewed publications in the Egyptian Journal of Health Care, including: Content Validation of the Selwan Hamza's Bleeding Risk Assessment Tool (SH-BRAT) Optimizing Nursing Assessment of Bleeding Risk: A Theoretical Comparative Analysis of the SH-BRAT and BAT Tools Effect of a Risk for Bleeding Training Program on Nursing Performance Assessment of Mothers' Care Hindering Successful Tympanostomy Tube for Children with Otitis Media with Effusion She also contributed as third author to: Quality of Cardiopulmonary Resuscitation among In-Hospital Cardiac Arrest Patients at a Major Tertiary Hospital in Saudi Arabia In addition to her research work, Selwan completed numerous professional training programs and certifications in biostatistics, research ethics, scholarly publishing in indexed journals, and scientific writing. She holds a postgraduate diploma in Training of Trainers (TOT) and has actively participated in multiple specialized and interdisciplinary workshops within and beyond the field of pediatric nursing. She is the inventor of the SH-BRAT tool and an advocate for biocompatibility-informed nursing practice. Her research reflects a strong commitment to elevating nursing science through innovation, education, and evidence-based practice Email: salwanhamza@gmail.com Phone number: 9665637146.