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Facilitators and barriers to nurses' adherence to traumatic brain injury management guidelines at the accident and emergency unit in a national referral hospital in Uganda: a qualitative study

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ABSTRACT

Objective This study explored the facilitators and barriers to adherence to traumatic brain injury management guidelines among nurses at the accident and emergency unit in a national referral hospital in Uganda.

Design An exploratory qualitative study was conducted among nurses. Data collection and analysis were guided by the Consolidated Framework for Implementation Research (CFIR).

Setting The study was conducted in the Accident and Emergency unit at the Mulago National Referral Hospital in Kampala, Uganda.

Participants The participants included nurses working at the Accident and Emergency unit of Mulago National Referral Hospital.

Results 15 nurses were enrolled in the study, but transcripts for 13 of them were analysed as two audio recordings were corrupted before transcription. The facilitators of TBI management guidelines included the perceived simplicity of stepwise assessment, nurses' motivation, experience and knowledge of TBI care, supportive peer relationships and nurses' ability to adapt during emergencies. Conversely, barriers to TBI management guidelines included inaccessible or outdated protocols, severe understaffing, inadequate in-service training, shortages of equipment, sundries and medicines, delays in imaging fee-waiver processes, limited dissemination of TBI guidelines, external pressure from political actors and family members, overcrowding, unpredictable patient surges and difficulty maintaining monitoring fidelity.

Conclusion Nurses' adherence to TBI management guidelines was shaped by the interaction between individual commitment, guideline accessibility and the wider emergency care environment.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ The study used the Consolidated Framework for Implementation Research, a validated tool.
⇒ The participants of the study were nurses with direct patient care experience.
⇒ A limitation of the study is that it was a single-site study, so results may not be generalisable.
⇒ Social desirability bias may have influenced participants' accounts, so it should be considered in the interpretation.

INTRODUCTION

Traumatic brain injury (TBI) represents a major public health problem and is the leading cause of disability and mortality across all age groups.[1] Globally, there were nearly 28 million new cases of TBI among 204 countries/territories, with Sub-Saharan Africa reporting 147 000 cases and the East African region reporting 9000 cases.[2] In Uganda, TBI represents a severe crisis, with admission reaching 89 cases per 100 000 among the general population and facility-specific mortality rates of between 45.3% and 75%, driven largely by road traffic accidents (89%), followed by falls (11%) among unintentional causes and assaults (97% among the intentional causes).[3] In a retrospective review of 843 files of trauma patients at the accident and emergency unit of the Mulago National Referral Hospital in Uganda, the most common indication for admission was TBI (84.5%), followed by haemodynamic instability (20.0%) and blunt chest injury (6.1%).[4]

In Uganda, evidence-based guidelines for the management of TBI were developed to improve performance.[5] However, they are not always applied correctly or as frequently as required.[6]

Clinical practice guidelines are evidence-based tools, and their use helps standardise

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care plans and allow evidence-based clinical decision-making, resulting in a decrease in the incidence of preventable harm and reduced mortality.[7] Notably, mortality after severe TBI has been found to improve with increasing adherence to evidence-based guidelines in both adults and children, and evidence further suggests that compliance with guideline recommendations improves functional outcomes and reduces the length of hospital stay.[8]

A systematic review that assessed barriers to evidence-based practice among nurses in low-income and middle-income countries (LMICs) found that the main barriers were scarce resources, limited access to information, inadequate staffing, lack of institutional support, poor communication between academic and clinical practice environments, inconsistencies between nursing education and clinical practice, limited teamwork, the public's negative perception of the nursing profession, perceived limitations in nurses' scope of practice, insufficient time and inadequate knowledge of evidence-based practice[9]

To improve guideline adherence in TBI management, general barriers as well as specific shortcomings in current TBI guidelines should be identified and addressed through evidence-based and context-tailored interventions.[10] Therefore, we need to understand the various factors that influence whether nurses follow or adhere to TBI management guidelines. While some studies have looked at barriers and facilitators to adherence to clinical practice guidelines,[7 11] there is a paucity of information in relation to TBI management guidelines among Ugandan nurses working in accident and emergency units. Therefore, this study explored the facilitators and barriers to adherence to TBI management guidelines among nurses at the Accident and Emergency Unit in the Mulago National Referral Hospital in Kampala, Uganda. Findings help inform interventions to improve quality of TBI care in the hospital and similar settings in sub-Saharan Africa.

METHODS

Study design and setting

We conducted an exploratory qualitative study. This design was appropriate because the study sought to understand the meanings, constraints and practical judgements that shape guideline use in a real-world emergency unit. The study was conducted in the Accident and Emergency Unit of Mulago National Referral Hospital, a 1500-bed specialty public hospital in Kampala, Uganda, which treats approximately 48 000 patients annually on average through its Accident and Emergency Unit.[12]

Research paradigm

This study is informed by a critical realist perspective.[13] Critical realism assumes that a reality exists independently of our observations while recognising that our knowledge of reality is partial and shaped by context, experience and interpretation. Accordingly, it directs attention not only to participants' accounts and observable events but also to the underlying structures and mechanisms that may help explain them. Consistent with this perspective, the study used an exploratory qualitative design guided by the Consolidated Framework for Implementation Research (CFIR) to explore the facilitators and barriers to adherence to traumatic brain injury management guidelines among nurses in the Accident and Emergency Unit. CFIR guided the interview topics and provided an initial coding structure. Beyond describing participants' accounts, the analysis considered contextual conditions and potential underlying mechanisms to interpret the findings. These explanations are treated as reasoned interpretations rather than direct observations of causal mechanisms.

Participant selection and recruitment

Nurses who had worked at the Accident and Emergency Unit of Mulago National Referral Hospital for at least 6 months and gave informed consent were selected. The threshold of 6 months was selected because the participants would have understood the unit's routines, workflows and documentation practices and would be more likely to have encountered patients with TBI and used the TBI guidelines. A homogeneous purposive sampling method was used to recruit participants.[14] Here, the researcher targeted only nurses working in the Accident and Emergency Unit. The availability and willingness to participate and the ability to communicate experiences and opinions in an articulate, expressive and reflective manner were important factors for the sampling.[15] We predetermined that 20 interviews would be needed to achieve thematic saturation and provide adequate representation of the population.[16] The interviews were conducted in tandem with participant recruitment until data saturation was reached, thus a point in time when the participants did not provide any new insights. Saturation was attained by the 14th interview, although we paused the interviews with the 15thth person.

Analytical framework

The CFIR was used to support the study from design to analysis. CFIR is a popular and highly useful framework for global implementation science practitioners, as it allows the identification of implementation facilitators and barriers across different settings. Constructs identified as more or less useful by authors often align with unique attributes of LMICs compared with high-income countries.[17] CFIR aims to predict or explain barriers and facilitators (determinants) to implementation effectiveness (the outcome) to guide the design and implementation of innovations such as interventions, programmes, policies and guidelines.[18] In this study, we used all five domains of CFIR to organise the participants' responses.

Data collection

A pre-test interview was conducted in the Accident and Emergency Unit of Naguru Hospital to refine the interview guide (interview guide attached as online supplemental

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material). Feedback obtained from the participants was used to rephrase and improve the clarity and flow of the interview guide while preserving the focus on the barriers and facilitators to TBI management guidelines among nurses. Data were collected through one-on-one in-depth interviews between 4 March 2026 and 22 April 2026. The interviews lasted between 60 and 80 min and were conducted in a quiet, private and convenient setting within the hospital. Interviews were digitally recorded, transcribed verbatim and de-identified immediately after transcription.

Data analysis

Data were analysed between 28 May 2026 and 2 July 2026 using ATLAS.ti. A total of 13 in-depth interview (IDI) transcripts were included in the analysis. Transcripts (008 and 009) were corrupted due to a recording equipment malfunction.

Since the analysis was based on verbatim transcripts, no transcript could be produced for these two interviews, and they were therefore excluded from the analysis. To strengthen the trustworthiness and reliability of the qualitative findings, all 13 transcripts were independently double-coded by two researchers with Master's degrees and experience in qualitative research studies. Each coder worked independently to minimise interpretive bias and ensure that emergent codes reflected participants' accounts rather than a single analyst's perspective.

A preliminary codebook was developed through a deductive approach, guided by CFIR. The deductive component drew a priori categories from key CFIR domains most relevant to guideline adherence: intervention characteristics, inner setting, outer setting, characteristics of individuals and implementation processes. The two coders each read a subset of the transcripts line by line, generated open codes and drafted operational definitions. These initial codes were then compared, merged and structured into a working codebook containing six analytic columns. The codes were organised in a structured framework, where each group code was defined and assigned to a category reflecting whether it acts as a facilitator or a barrier, and then the content was analysed to identify themes alongside the relevant CFIR constructs. This preliminary version was piloted on two transcripts and refined before being applied to the remaining transcripts. After independent coding, the two coders convened in structured consensus meetings to compare code applications transcript by transcript.

Discrepancies were classified into three types: differences in code labelling, differences in the boundaries or definitions of a code and differences in how an excerpt was categorised as facilitator versus barrier, or across CFIR constructs. Disagreements were resolved through discussion and consensus, with reference back to the original transcript to preserve participant meaning and to the CFIR construct definitions to preserve theoretical fidelity. Whenever the two coders disagreed, a third and more senior member of the research team was consulted as an arbitrator, and the final coding decision was reached by consensus and documented in an audit trail alongside its rationale. Definitions in the codebook were iteratively refined whenever a recurring disagreement pointed to ambiguity in the code definition itself. Once coding was complete and stable, codes were grouped into higher-order group codes and then classified as facilitators or barriers under their corresponding CFIR construct. Candidate themes were generated by clustering group codes that shared conceptual meaning across participants and mapping them onto CFIR domains. The final themes were agreed on through a team-based analytic meeting involving the two primary coders and the principal investigator. In this meeting, the team (i) reviewed each candidate theme against the supporting coded excerpts to confirm it was grounded in the data; (ii) checked each theme's coherence within the theme and distinctiveness from other themes; (iii) verified alignment with the relevant CFIR construct; and (iv) confirmed that each theme was represented across multiple transcripts, ensuring it reflected a shared rather than idiosyncratic experience. The themes were finalised only when full consensus was reached among the analytic team. The final codebook, including codes, definitions, illustrative excerpts and their mapping to CFIR constructs, served as the audit trail for this process and was presented as a companion document to the results.

Reflexivity and researcher perspective

Reflexivity is the researcher's deep introspection and reflection on how their biases and presence in the research situation may have affected how the data were collected, analysed and interpreted.[19] To mitigate these biases, the researcher engaged in peer debriefing before and after the data collection and used open-ended probing questions to ensure the findings reflect the experiences of nurses rather than preconceptions of the interviewer.

All IDIs were conducted by PN, a male Ugandan critical care nurse with clinical experience in an accident and emergency setting, and this provided consistency in the interviewing process. All the interviews were conducted in English because the participants could speak English fluently, and the interviewer made the questions simple for their understanding. However, the interviewer's sex, ethnic background, as well as his professional role, might have influenced the willingness of the participants to disclose all information during the interview. In addition, local politics may have influenced participants, especially while responding to sensitive questions. The extent to which these factors shaped the data cannot be independently established, and there is a need to consider them while interpreting the findings of the study. The research team involved in the data analysis comprised multidisciplinary experts from the fields of nursing (PN and PM), qualitative research methods (RA and JI) and bioethics (AGM). The research team possesses knowledge and experience in the field of qualitative methodology. To ensure that all topics are adequately supported by data

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with minimal scientific bias, all authors (PN, AGM, JI, RA, TDM and PM) reviewed the themes collaboratively. The team's clinical, content and methodological expertise enabled the identification of data-driven topics of barriers and facilitators to TBI management adherence.

Ethical considerations

The study received ethical approval from the Makerere University Research and Ethics Committee (reference number: Mak-SOMREC-2024-1021) and administrative clearance from Mulago National Referral Hospital (reference number: MHREC 2960). All participants provided written informed consent. To maintain confidentiality, all study data were de-identified by using unique codes, kept under lock and key, and accessible only to authorised study personnel. Privacy was maintained by holding the interviews in a quiet place that was convenient to the interviewer and participants.

Trustworthiness

Credibility was ensured by prolonged engagement with the participants and peer debriefing; dependability was ensured by maintaining an audit trail. Confirmability was maintained through independent coding, use of direct quotes and reflexive attention given to the lead researcher's clinical background in emergency and critical care nursing. Lastly, transferability was ensured by the use of homogeneous purposive sampling.

Reporting of findings

We followed the Consolidated Framework for Qualitative Research (COREQ) guidelines in reporting. The findings were presented using the CFIR domains. Within each domain, we first describe how participants experienced the determinant in everyday emergency practice and then provide illustrative quotations. This structure kept the analysis close to participants' accounts while showing how the determinants related to the implementation of

Table 1 Characteristics of the participants (n=15)

Particulars	Number
Qualification	
Diploma	2
Bachelor's degree	12
Master's degree	1
Years of experience as a nurse	
<10	5
≥10	10
Years of experience in emergency unit	
<5	11
≥5	4
Additional training in TBI	
No	6
Yes	9

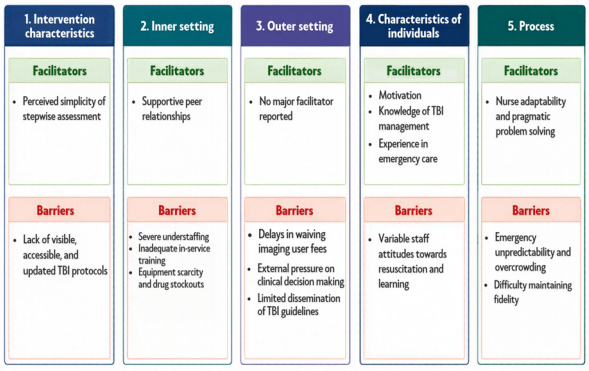


Figure 1 CFIR mapping of facilitators and barriers to nurses' adherence to TBI management guidelines. CFIR, Consolidated Framework for Implementation Research; TBI, traumatic brain injury.

TBI management guidelines. Table 1 shows a summary of the characteristics of 15 participants. Fifteen nurses participated in the interviews. Most held a bachelor's degree in nursing with >5 years of professional nursing experience. However, many had worked in the accident and emergency unit for <5 years, reflecting the rotation and deployment patterns described by participants. Nine participants reported additional training in TBI management. To protect confidentiality in this small single-unit sample, participant characteristics are summarised in aggregate rather than presented as individual profiles.

The findings below are supported by illustrative quotations from 13 participants, as two audio recordings were corrupted before transcription.

Facilitators and barriers to nurses' adherence to traumatic brain injury management guidelines

Figure 1 shows the mapping of facilitators and barriers to nurses' adherence to TBI management guidelines. Below, we describe each of the facilitators and barriers along with supporting quotes.

Consolidated framework for implementation research domain 1: intervention characteristics

This domain presents participants' perceptions of the characteristics of the TBI guidelines used in the management of patients with TBI. Participants identified several facilitators and barriers related to the intervention characteristics.

Facilitator: perceived simplicity of stepwise assessment

Staff described that Airway, Breathing, Circulation, Disability and Exposure (ABCDE) assessment of patients with TBI was easy to follow. They found it straightforward, typically because the sequence is drilled into them through training and can be executed at the bedside without consulting written protocols.

> I just find doing the ABCDE very simple because it helps you to go step by step, or not like, while

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prioritizing the patient and not like forgetting some of the things that you do. (002)

Some participants acknowledged that basic life support is specific and step-by-step and therefore not complex.

It's easier to follow the basic life support… Because you can do the neuro care bundle and if you have not done the basic life support. Trust me, the patient will be okay because you cannot elevate the head of the bed when you've not corrected the airway. (004)

Barrier: lack of visible, accessible and updated TBI protocols

Participants described the absence, invisibility or outdatedness of formal TBI protocols within the accident and emergency unit, which forces reliance on tacit knowledge, senior colleagues or clinical intuition rather than a shared, referenceable standard.

The guideline I think the guideline we are relying on is what the Ministry of Health has, but it's not displayed on the wall… so in that, which means the accessibility is still a challenge. (003)

Participants reported that guidelines exist but as unwritten institutional practice but not displayed on the walls. Thus, colleagues rely on memory but not hard copies.

We don't have a well-structured guideline. We base on, as I say, this one, then suddenly say okay, you do this. (012)

Consolidated framework for implementation research domain 2: inner setting

This domain describes the organisational context of the Mulago National Referral Hospital Accident and Emergency Unit, where patients with TBI are initially received, stabilised and subsequently referred to other hospital units for ongoing care. Participants identified the following facilitators and barriers within the inner setting that influenced implementation.

Facilitator: supportive peer relationships

The participants described that colleagues help maintain assessment sequence, share tasks, remind each other of steps and compensate for staffing gaps.

If you have a good team, you can follow those guidelines… At night, you're a nurse, you're a consultant, you're everything. It gets tricky at night. (004)

Barriers: understaffing, inadequate in-service training, equipment scarcity and drug stock-outs

Severe understaffing made guideline adherence difficult

Participants described severe understaffing that makes adherence to guideline-recommended nurse-to-patient ratios structurally impossible, forcing prioritisation and short-cutting of care. They reported that they find one nurse taking care of 20–30 patients in a zone in the Accident and Emergency Unit.

Staffing first—a shift in casualty is supposed to be covered by more nurses than we usually have. We often run with three to five nurses spread across five patient care points. One nurse cannot do two-hourly observations on thirty yellow-zone patients. (010).

Inadequate in-service training

Nurses describe irregular and non-standardised in-service training on TBI, with the accident and emergency unit often filled by staff transferred without preparatory training in emergency or neurocritical care. Some participants reported a knowledge deficit in drug dosages for paediatrics and in the interpretation of CT scans.

It was the first deployment when I came here on promotion. They assumed that because casualty is specialized, anyone they post here has been trained for it—which was not true. (015)

When asked if they had received additional training on TBI, some participants reported that nurses are brought from other units and deployed in the Accident and Emergency Unit, and it is treated as a 'dumping site' for nurses not needed elsewhere and allowed to start work without any structured training on TBI management.

I would say NO! Because when was I last trained I think six months ago.…casualty is actually a dumping place. For a nurse who is not wanted in another unit. (001)

Equipment scarcity and drug stock-outs

Interviewees described chronic, day-to-day gaps in the equipment and consumables required to deliver TBI care to the recommended standard—from ventilators and monitors to sundries such as gloves, giving sets and blood sugar strips. They reported that whereas they know what to do, they are limited by the absence of equipment and sundries required for use.

One monitor for forty patients. By the time you reach the last patient, the device is down. (013)

Some participants reported that blood sugar strips are unavailable, so blood sugars are not checked in 99% of patients with TBI.

The blood sugars, which is very important for these patients. Almost 99% of the patients with head injury, their sugars are not taken… it's just because of the strips. (003)

Staff described pharmacy stock-outs of first-line TBI medications and the practice of either sending relatives out to buy or substituting whatever drug is available, even when clinically inappropriate. This delays response time and affects patient outcomes.

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> Phenytoin was unavailable in our pharmacy, in theatre, in acute, and on the medical ward. I tried every avenue. The patient deteriorated and died. (014)

Consolidated framework for implementation research domain 3: outer setting

In this domain, we described the Ministry of Health and the community in which Mulago National Referral Hospital directly exists. Participants didn't report any facilitators but described the barriers as described below.

Barrier: delays in waiving imaging user fees

Some participants described national-level policies such as user fees for CT for patients who are unable to pay for the services. Fees on imaging are waived for patients who are unable to pay because they are brought either by police and don't have relatives or are too poor to afford the services. The process of waiving takes too long, which affects decision-making, thus affecting adherence.

> By the time the waiver form comes back to take the patient for CT scan, they have died. And it was too common that we complained and complained… (001)

> The hospital policy is: Any patient who has no caretaker… we do them a head-CT under the hospital waiver system. Actually, it takes like minimum 24 hours. And by the time the waiver is approved, the patient is already in the mortuary. (004)

Barrier: external pressure on clinical decision-making

Nurses described how political influence—either direct calls from officials or the visible status of specific patients—overrides clinical criteria and re-orders care within the unit. Some participants reported that protocol is not followed under phone pressure

> Political patients are the recurring category — MPs, RDCs, anyone with public profile. The whole hierarchy mobilises around such a patient, ahead of clinical criteria. The triage gets re-ordered to make the politically visible patient the first surgical case. (013)

Some participants reported that the whole administrative hierarchy mobilises for the families of 'very important persons' and somehow very sick patients are not attended to as a priority.

> Every family that arrives feels their patient is the urgent one. 'I am the son of so-and-so, mine first.' They make phone calls; they invoke authority. When the pressure escalates to administration, the order is sometimes to comply. The protocol bends. (011)

Barrier: limited dissemination of traumatic brain injury guidelines

Participants reported that Ministry of Health awareness is limited to epidemic communication. Local sensitisation via unit-level continous medical education sessions only, and ministerial visits are sporadic.

> I don't know how often ministries apply them… When ministries move around to cross-check, I don't know whether they pay attention to check whether the guidelines are displayed on the wall. (003)

> The Ministry communicates on epidemics—COVID and similar—not on head injury. (014)

Consolidated framework for implementation research domain 4: characteristics of individuals

This domain describes the personal traits, knowledge and mindset of the nurses involved in the treatment of patients with TBI. The participants described the following facilitators and barriers to adherence to TBI management guidelines in relation to this domain.

Facilitators: motivation, knowledge of traumatic brain injury management and experience in emergency care

Motivation

Some participants reported that they are self-driven, motivated and work with less supervision.

> Just assume that you just look at that person as either you or your brother or your father. How will you feel? That is what always drives me. (003)

Knowledge and experience

Participants identified personal attributes—education and empathy—that support their ability to apply TBI guidelines even in resource-poor conditions.

> Personal level of education because when I reached bachelor's level, I realized that my way of seeing a patient, how fast I can intervene… I got to understand better that the faster you do it, the faster you save the life. (001)

> Knowledge acts as a compass for me. I know that this is what I'm supposed to do. That is the direction I'm taking. (004)

Barrier: variable staff attitudes toward resuscitation and learning

Participants reported that some colleagues are reluctant and inactive and see resuscitation as 'someone else's job', and attitude toward learning varies. This may affect patient outcomes.

> There are some colleagues who assume resusc. is for [name]… which is very wrong. The idea why I was moved there is to try to share. And we bridge the gap. (003)

Consolidated framework for implementation research domain 5: process

This domain describes the activities and strategies used to support adherence to TBI guidelines. Participants described the following facilitators and barriers.

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Facilitators: nurse adaptability and pragmatic problem-solving

Nurses described informal adaptations they use to keep patients moving through the system despite structural gaps, including improvisation, resource-borrowing and personal triage rules.

> The beds are old and cannot elevate to thirty or forty degrees; we improvise with boxes and pillows. (013)

Some staff reported that they usually start and continue managing these patients with the available resources, while the waiver is still being processed for imaging. This saves lives!

> I cannot watch a patient deteriorate while we wait for the bureaucracy to catch up. (014)

Some participants reported that they usually adapt easily to new guidelines when properly briefed.

> I adapt to change easily. If a new guideline is introduced and properly briefed, I will read it, internalise it, and implement it. (011)

Barriers: emergency unpredictability, overcrowding and difficulty maintaining fidelity

Real-time disruption of stepwise care

Participants described how the immediate operational environment of the Accident and Emergency Unit, which includes patient surge, missing supplies and shifting priorities, repeatedly interrupts the intended step-by-step application of staff protocols.

> The difficulty is not the protocol; it is the resources. If I decide a patient needs an OPA and there is none on the trolley, I have to leave the bedside to find one, and by the time I am back I have lost my place in the sequence. (010)

Staff reported that the nurse leaves the bedside to hunt for supplies and loses the sequence, and there is compressed assessment when new patients arrive mid-work.

> Patients are arriving while I am still assessing the last one. You triage on the fly — which of the two is worse — and the more stable patient gets a compressed assessment. Things slip. (015)

Process fidelity problems

When participants were asked how often they carry observations on patients with TBI and whether they perform accordingly, nurses reported that there is a gap between the frequency of vital-signs and neurological monitoring recommended by TBI guidelines and that is actually not feasible under prevailing staffing and patient-volume conditions.

> Ideally, for patients who may have lost their consciousness, I would say it would be 15 to 30 minutes. But because of work overload, they are sometimes not done. You are one, and you have like three or four patients to monitor. (005)

Participants reported that they cannot achieve the 4-hourly monitoring of blood pressure with one nurse to 30 patients. This is not practical under the prevailing workload, which affects adherence.

> The four-hour thing on each patient is not possible… you'd be one person on 40 patients. (007)

DISCUSSION

This study used the CFIR to explore the facilitators and barriers to adherence to TBI management guidelines among nurses in an accident and emergency unit in a national referral hospital in Uganda. The findings show that adherence was not simply a matter of individual knowledge or willingness but was shaped by the interaction between guideline characteristics, the accident and emergency unit environment, external policy and social pressures, individual motivation and knowledge and the real-time processes of emergency care.

Across the CFIR domains, the most important facilitators were perceived simplicity of ABCDE-based assessment, motivation, clinical experience, peer support and practical adaptability. Moreover, the most prominent barriers were structural and operational. Nurses described inaccessible protocols, severe understaffing, inadequate training, equipment and medicine shortages, administrative delays for imaging, external pressure and overcrowding. These findings suggest that improving adherence will require system-level support that enables nurses to act on what they already know.

A step-by-step approach to TBI was identified by nurses as a key facilitator, which they described as less complex and easier to follow during time-critical emergency care.

A plausible explanation is that a structured, stepwise format may reduce cognitive load and help nurses avoid omission of essential components. This contrasts with another study reporting that perceived trustworthiness, clarity and complexity can act as barriers.[20] Despite the above facilitators, a lack of visible, accessible and updated TBI guidelines in the Accident and Emergency Unit was one of the barriers identified in the present study.

In practice, this means that nurses may not have immediate access to recommended steps during patient assessment and stabilisation, increasing the likelihood of reliance on memory or outdated approaches. Healthcare professionals' awareness of guidelines, familiarity with recommendations and guideline characteristics are associated with improved adherence.[20] Where protocols are not posted, nurses may rely on prior training that may no longer reflect current best practices.

The findings of this study underscore the critical role of supportive peer relationships among healthcare workers. Healthcare workers are more likely to follow guidelines when they observe their respected peers doing the

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same.[21] Social comparison and team-wide feedback are highly effective behavioural techniques that drive adherence. Colleagues can easily exchange useful information, reduce clinical uncertainty and work together to deal with difficult cases by promoting a psychologically healthy and safe environment.

Severe understaffing emerged as a major barrier. Staffing constraints are barriers to evidence-based practice among nurses in LMIC settings.[9] In an understaffed accident and emergency environment, patients may not receive the frequency of monitoring and repeated neurological assessments required by guideline-based TBI care. As a result, time-critical changes in consciousness or neurological status may be detected later than recommended. A patient with mild TBI may progress to a severe form unnoticed, leading to secondary injury such as hypoxia and shock due to delayed recognition.

We established irregular and non-standardised in-service training on TBI, with the accident and emergency unit often filled by staff transferred without preparatory training in emergency or neurocritical care. This agrees with previous study findings that only 9% of health facilities had e-learning modules or used training organised by an external organisation on TBI management.[22]

Hospitals that participated in The Adam Williams Initiative, a programme established to provide education and resources to encourage hospitals across the USA to incorporate the guidelines into practice, had good overall adherence to the recommendations detailed in the Brain Trauma Foundation guidelines.[23]

In this study, nurses identified critical resource constraints, especially equipment shortages and frequent drug stockouts, as major barriers to adherence to TBI management guidelines. This aligns with several studies where resource limitation was a major challenge faced by practitioners in adhering to specific components of the BTF guidelines.[20 24 25] Without essential equipment such as oxygen delivery systems, airway adjuncts, blood pressure monitoring tools or critical medications, guideline adherence is blocked. Stock-outs increase the likelihood of severe undertreatment because patients may lack money to buy all the drugs in their required doses.

Beyond guidelines, staffing and resources, this study also highlighted operational barriers that directly affect guideline adherence. Delays related to imaging user fees and administrative processes can postpone essential investigations, reducing the window for timely diagnosis and appropriate management. Patients may experience non-clinical delays before receiving prompt TBI evaluation and monitoring due to long working hours spent waiving user fees.

In reality, this diverts staff time from tasks guided by guidelines and raises the possibility that time-sensitive steps (rapid evaluation, start of neuromonitoring, documentation and escalation) are either neglected or carried out later than planned. Political and family interference in patient management was reported as an additional barrier. Such pressures can affect clinical decision-making, triage priorities and adherence to standardised protocols, thereby weakening the consistency and safety of TBI care. This aligns with results of a previous study reporting work pressure and lack of a motivational environment as barriers to full compliance with clinical practice guidelines.[7]

High knowledge and intrinsic motivation among some staff emerged as key facilitators to adherence to TBI management guidelines. This is consistent with existing literature, as autonomous motivation is associated with improved quality perceptions and work-related behaviours.[26] Further, evidence suggests that education and knowledge can reduce uncertainty and improve confidence to act promptly, supporting guideline-based decision-making.[27 28] Conversely, nurses in this study described a critical theme of poor attitudes toward resuscitation among some staff, characterised by reluctance, passivity and perception that resuscitation is 'someone else's job'. This perception points towards a lack of interprofessional role clarity. Participants further suggested that attitudes toward learning varied, implying uneven engagement with training and knowledge-sharing. Collectively, these perceptions may undermine coordinated team performance and contribute to delays or suboptimal initiation of resuscitation, potentially affecting patient outcomes. To bridge that gap between highly motivated staff and passive staff, targeted interventions such as crisis management training are needed to foster collective responsibility and clarify emergency roles.

Finally, nurse adaptability and pragmatic problem-solving to overcome structural limitations, such as improving head-of-bed elevation using available materials, are resilience strategies that facilitate guideline adherence. Although these workarounds may support immediate patient positioning, prior evidence cautions that extensive reliance on short-term adaptations may mask system deficiencies and hinder resilience unless structured issues are addressed.[29]

We found that due to prevailing conditions such as workload as a result of few nurses and many patients, the ideal steps of adherence to TBI management are often skipped. This agrees with a previous study reporting that workload negatively influenced guideline-based care of geriatric patients experiencing falls presenting to emergency departments in Ontario, Canada.[30] Even if the nurses knew the guidelines, fidelity drops because of complex processes such as bundles of actions for neuromonitoring and documentation. This study established that patient surge, missing supplies and shifting priorities disrupt the accident and emergency environment, leading to care fragmentation such as frequent handoffs and patient movement and reduced ability to maintain continuous monitoring and escalation. This aligns with evidence that overcrowding is associated with poor adherence to guidelines and that increasing emergency department crowding can negatively affect healthcare workers' compliance with protocols.[31] This leads to reduced

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adherence to guidelines, with delays and missed monitoring actions.

Implications for practice

The findings suggest that guideline implementation in the accident and emergency unit should be treated as a system issue rather than a training issue alone. Nurses' motivation and knowledge can support adherence to TBI management guidelines, but these strengths are undermined when protocols are not visible, supplies are unavailable, monitoring is not feasible and clinical priorities are disrupted by overcrowding or external pressure.

The findings therefore suggest that non-adherence to guidelines is not necessarily attributable to adequate training or motivation among nurses but to the substantial influence of workflow and environment on adherence.

Strengths and limitations of the study

A key strength of this study is its use of the CFIR to guide data collection and analysis, allowing facilitators and barriers to be interpreted across multiple implementation levels. The study also benefits from interviews with nurses who had direct experience of caring for patients with TBI in a high-volume emergency unit. The main limitation is that this was a single-site study in a tertiary hospital, so the findings may not fully represent other hospitals or lower-level facilities. The study also reflects nurses' perspectives only; views from physicians, hospital managers, patients and families may have added further insight. As with all interview-based studies, social desirability may have influenced participants' accounts. However, this was mitigated by regular debriefing with the research team and establishing rapport with the participants. Additionally, although we attained saturation with only 15 participants, interviewing more participants would have strengthened the current data on facilitators and barriers to nurses' adherence to TBI management guidelines.

Recommendations

Multi-level actions might be explored that go beyond individual knowledge and working conditions. Potential priorities for consideration may include displaying updated TBI protocols in the accident and emergency unit, offering regular TBI-focused in-service training and mentorship, exploring ways to improve staffing, reviewing imaging fee-waiver procedures and strengthening triage and escalation decisions when faced with external pressure. Where feasible and contextually appropriate, these actions could address clinical competence, the practice environment, governance and patient-centred care.

CONCLUSION

This study showed that nurses' adherence to TBI management guidelines is shaped by interacting determinants across all five CFIR domains. Facilitators of adherence included guideline simplicity, nurses' motivation, knowledge, experience and adaptability. Barriers to adherence included inaccessible or outdated protocols, understaffing, inadequate in-service training, scarcity of equipment and drug stockouts, administrative imaging delays, external pressure, overcrowding and difficulty maintaining monitoring fidelity.

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