

EXPLORATION OF EFFECTIVE NURSING SHIFT HANDOVER IN THE INTENSIVE
CARE UNITS IN SAUDI ARABIA: ADAPTATION AND VALIDATION OF THE
HANDOVER EVALUATION SCALE

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ABSTRACT

Background: Effective nursing shift handover in intensive care units (ICUs) is crucial for maintaining care quality and patient safety and reducing the risk of adverse events. In multicultural ICUs in Saudi Arabia, where nurses have diverse linguistic and cultural backgrounds, handover communication can be challenging. Although several handover evaluation tools exist, few reflect the unique demands of ICU practice or the multicultural dynamics that influence communication among nurses.

Purpose: This dissertation aims to adapt the Handover Evaluation Scale (HES) and to assess its content validity, reliability, and dimensional structure for evaluating handover practices and factors influencing handover quality in Saudi Arabian ICUs.

Method: An exploratory mixed-methods design was used. In the qualitative phase, semi-structured interviews were conducted with 24 ICU nurses recruited through purposive sampling. Data were analyzed using interpretive description to identify themes and items relevant to modifying the existing HES. Findings informed revisions to the instrument, which six expert ICU nurses with a master's or doctoral degree in nursing evaluated for content validity. In the quantitative phase, 443 ICU nurses completed the modified HES in a cross-sectional study assessing its reliability and factor structure. Statistical analyses were performed using SPSS.

Results: ICU nurses described handover as an integrated process involving informational and interactional components shaped by contextual factors such as, interpersonal, organizational, and environmental factors. These insights informed modification of the HES, including removal of irrelevant items and addition of a contextual factors section. Content validation showed strong

expert agreement. Exploratory factor analysis supported a two-factor structure for the HES, comprising (a) information quality and engagement and (b) disruptive communication. It also supported a three-factor structure for the contextual factors scale, representing interpersonal and cognitive factors, organizational support, and operational interruptions. Reliability testing indicated acceptable internal consistency, although lower alpha values for subscales indicate the need for refinement.

Conclusion: The modified HES represents an appropriate and reliable tool for assessing ICU nurses' perceptions of handover within multicultural settings in Saudi Arabia. Refinement and psychometric testing are required to establish construct validity and enhance the tool's applicability.

Keywords: Shift handover, intensive care unit, Handover Evaluation Scale, exploratory factor analysis, reliability, multicultural

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LIST OF ABBREVIATIONS

HES	Handover Evaluation Scale
ICU	Intensive Care Unit
WHO	World Health Organisation
ACSQHC	Australian Commission for Safety and Quality in Health Care
JCI	Joint Commission International
AHRQ	Agency for Healthcare Research and Quality
CEX	Clinical Evaluation Exercise
CVI	Content Validity Index
I-CVI	Item Content Validity Index
S-CVI	Scale Content Validity Index
MOH	Ministry of Health
SCFHS	Saudi Commission for Health Specialties

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1 CHAPTER ONE: INTRODUCTION

1.1 Organisation of the Dissertation

This dissertation is written in a manuscript-style format and consists of four manuscripts presented in a specific sequence. Chapter 1 provides an introduction to the dissertation. Chapter 2 presents a literature review that synthesizes evidence across five domains that frame the study: (1) communication in multicultural nursing teams, (2) effective shift handover in the ICU, (3) factors influencing ICU shift handover, (4) current literature on Saudi Arabian nursing handover, and (5) existing handover evaluation tools. Chapter 3 includes the first published manuscript, *A protocol for validation of the Handover Evaluation Scale in multicultural ICUs*, published in *Nursing in Critical Care*. This manuscript reports on the research design and methods. Chapter 4 reports the results of the exploratory phase of the study and presents nurses' experience with effective handover in Saudi Arabia's multicultural ICUs. This manuscript, titled *Nurses' experiences of effective handover practice in multicultural ICUs: An interpretive descriptive study*, has been submitted to the *Nursing Open*. Chapter 5 addresses the tool modification and content validation processes and findings. This chapter includes the third manuscript, *Modification and Content Validation of the Handover Evaluation Scale in the Intensive Care Unit*, which has been prepared for submission to *Nursing in Critical Care*. Chapter 6 presents the fourth manuscript, *Validating the Modified Handover Evaluation Scale: Factor Analysis and Reliability Testing in Saudi ICUs*, which describes the last phase of the study. Chapter 6 has been prepared for submission to *Western Journal of Nursing Research*. Finally, Chapter 7 provides an overall discussion of the findings, conclusions, and recommendations. The appendices include supporting materials such as ethical approval, the interview guide, permission from Dr. O'Connell to modify and use the tool, and the modified HES.

1.2 Introduction to the Problem

Nursing shift handover is an important communication process that occurs throughout a patient's hospital stay. Its purpose is to maintain continuity of care by transferring responsibility, accountability, and patient information from one staff member to another (Kim & Seomun, 2020). Handover has been the focus of international research and clinical improvement initiatives for many years, as the accuracy and completeness of information exchanged can directly impact patient safety (Hada & Coyer, 2020). Many organizations, including the World Health Organization (WHO) (2007), the Australian Commission for Safety and Quality in Health Care (ACSQHC) (2010), and the Joint Commission International in the United States (JCI) (2017), have identified handover as a priority in patient-safety initiatives.

Ineffective handover practices have been associated with adverse patient outcomes, such as delays in diagnosis and procedures, inaccurate clinical assessment and diagnosis, medication errors, and duplication of tests. These, in turn, contribute to longer hospital stays, higher costs, and lower staff and patient satisfaction (Hada & Coyer, 2020). According to the JCI (2017), ineffective handover is one of the root causes of more than 60% of adverse patient events. It is; therefore, imperative to implement effective handover practices to ensure complete and accurate exchange of patient information.

Shift handover in the intensive care unit (ICU) is a key aspect of caring for critically ill patients. The acuity and complexity of ICU cases, as well as the higher staff-to-patient ratio typically one nurse per one or two patients compared to four or more patients in general wards, ICU handovers are more complex and detailed than in other clinical settings (Ahn et al., 2020). Critically ill patients are usually managed by a multidisciplinary team and using medical devices, such as chest tubes, ventilators, dialysis machines, and continuous vital sign monitors. As a

result, ICU handovers are expected to be comprehensive and to include specific, and critical information. The dynamic and unstable nature of ICU patients also means they are at risk of sudden deterioration, which makes timely and accurate information exchange critical to ensure appropriate management (Ahn et al., 2021). Accuracy and completeness of handover information are therefore crucial to patient safety in this setting.

Given these factors, the ICU environment is unique and adds an additional layer of complexity to nursing handover. It is also a high-intensity setting characterized by continuous stimuli such as frequent alarms from monitors, infusion pumps, and ventilators, which can interrupt the process (Spooner et al., 2015). The unit is often busy with multiple health care providers, such as nurses, physicians, respiratory therapists, and other allied health professionals. The ICU is event-driven, and patient care practices are often dictated by sudden clinical changes, urgent procedures, or emergent interventions. Such events require immediate attention and frequent updates to patient information. As this environment is highly demanding, it creates challenges for effective handover and increases the risk of omitted information or miscommunication.

Considering the increasing health care demands and the shortage of nurses worldwide, many nurses tend to move internationally in search of better working conditions, quality of life, and opportunities for professional development (Viken et al., 2018). As a result, health care systems around the world are becoming increasingly multicultural, which introduces cultural complexities that influence communication and in turn, handovers. Halverson and Tirmizi (2008) define multicultural teams as collections of individuals from different cultural backgrounds who are interdependent in their tasks, share responsibility for outcomes, and manage their relationships across organizational boundaries as cohesive social entities. In this study, the term

multicultural refers to groups of ICU nurses from diverse cultural and linguistic backgrounds who work together within the same scope of practice and share responsibility for providing safe care within the ICU.

The nursing workforce in Saudi Arabia is considered multicultural because of the chronic shortage of Saudi nurses. This shortage has been attributed to several social, cultural, and organizational factors that make the nursing profession less desirable to Saudis (Elmorshedy et al., 2020). The country is therefore heavily reliant on expatriate workers to meet the demand for health care. More than 68% of the nursing workforce in Saudi Arabia consists of expatriate workers from approximately 40 countries (Al-Dossary, 2018; Falatah et al., 2022). Saudi health care facilities have adopted English as the formal language of communication, despite Arabic being the official language of the country. The majority of registered nurses (both Saudi and non-Saudi) speak English as a second language (Alyamany, 2013). As a result, the country's nursing workforce possesses a range of cultural, language, educational, and experiential backgrounds, which have implications for effective handover. The Saudi Patient Safety Centre (2022) published a national report on patient safety culture using data from 366 hospitals, which reported that approximately 50% of nurses perceived handover as "problematic" and in need of improvement in their hospitals. Given the role of intercultural communication and the limited research on handover in the Saudi health care environment, there is an urgent need to identify the challenges and opportunities for improving handover practices.

Monitoring the quality of nursing shift handover in multicultural ICUs is a crucial step in identifying current challenges and informing the design of appropriate interventions to improve handover. Importantly, evaluating handover through the perceptions of ICU nurses can provide unique insight into the realities of communication, as these nurses directly experience the

pressures of caring for critically ill patients within multicultural teams. Despite a growing body of literature on nursing handover, most studies have focused on inpatient wards, and few have examined ICU handovers from the perspective of observers assessing handover practices. To identify challenges and opportunities for development, it is necessary to develop a tool to explore nurses' perceptions of the quality of current handover practices and the factors contributing to effective handover.

The Handover Evaluation Scale (HES) was developed by O'Connell et al. (2014) to explore nurses' perceptions of the quality of handover in acute care settings. This tool has been validated and translated across various clinical contexts and countries; however, its use in ICU settings has been limited. The HES can provide valuable insight into nurses' perceptions of their current handover practices in terms of the quality of information and interactions, as well as the efficiency of the handover process. Considering the significant differences between nursing shift handover in ICUs and in inpatient wards, it is important to ensure that the HES can capture the complexity of ICU handover. The nursing workforce in Saudi Arabia is unique in its reliance on a multicultural, expatriate-dominated staff, this creates distinct challenges for applying tools such as the HES without modification, to ensure its appropriateness for use in multicultural ICU settings.

To explore the perceptions of ICU nurses working in Saudi Arabia and to identify an appropriate, reliable tool to be used for monitoring the quality of handover, an exploratory sequential mixed-methods design was employed. This study aimed to (1) explore and gain an understanding of ICU nurses' perceptions of handover quality and the factors associated with effective handover, (2) apply the findings from the exploration phase to modify the HES, (3) determine the content validity of the HES in the Saudi Arabian ICU context, and (4) assess the

reliability of the HES and extract factors relevant to Saudi Arabian ICUs and to determine its internal dimensional structure using exploratory factor analysis.

1.3 Significance of Study

This study is highly relevant given that safe and effective handover is critical to patient outcomes in ICU settings, particularly within Saudi Arabia's multicultural nursing workforce. As the country continues to expand its health care services and relies on nurses from diverse cultural and linguistic backgrounds, understanding how nurses perceive handover quality is essential. The insights gleaned will help health care leaders, educators, and policymakers design effective strategies and interventions that can strengthen handover practice and improve communication across teams.

The findings of this study will also address a gap in the literature by providing evidence on ICU nursing handover in Saudi Arabia, where cultural and linguistic diversity creates unique challenges. By modifying and validating the HES for this setting, the study provides a reliable and contextually appropriate instrument for assessing handover quality and identifying areas for improvement. Accordingly, this tool may be applied not only in Saudi Arabia but also in other multicultural health care environments facing comparable challenges.

2 CHAPTER TWO: LITERATURE REVIEW

2.1 Communication in Multicultural Nursing Team

The increased global mobility of healthcare professionals has led to nursing teams in many healthcare systems becoming increasingly multicultural, so enriching clinical practice through the integration of a broad range of work experiences, skills, and knowledge (Theron et al., 2025). This can also result in communication complexities capable of challenging interpersonal dynamics and effective collaboration. Thus, misunderstandings may arise in response to differences in direct versus indirect communication styles, along with culturally influenced attitudes toward hierarchy and authority, and conflicting approaches to collaboration (Almutairi et al., 2017; Brett et al., 2020). Effective communication is crucial within a multicultural nursing team, as cultural and linguistic differences can influence how information is interpreted, concerns are expressed, and team members interact during handovers.

To better understand these dynamics, the following sections explore the key dimensions influencing communication within multicultural nursing teams, including firstly, the meaning of culture; secondly, the role of language; thirdly, collaboration across cultures; and finally, the impact of hierarchy and power distance.

2.1.1 *Understanding Culture*

The concept of culture is complex, dynamic and evolving, raising issues when it comes to capturing its full range in a single definition. The current study adopted the definition developed by Halverson and Tirmizi (2008), in order to understand culture within the context of multicultural teams. The definition acknowledges the layered, diverse, and shifting nature of culture, making it relevant for examining communication and interaction within multicultural nursing teams. Halverson and Tirmizi (2008) defined culture as:

“Shared ways of thinking, feeling, and behaving rooted in deep-level values and symbols

associated with societal effectiveness, and attributable to an identifiable group of people. Culture may manifest at different levels including national and organizational, may take several forms, and may evolve over time. (Halverson and Tirmizi, 2008, p. 23).”

In healthcare settings, a multicultural team includes members from diverse nationalities and ethnicities, with each contributing values and patterns and styles of communication (Fearon, 2003; Ancarani et al., 2016). These cultural dimensions shape cognition, emotion, and behavior, all of which can impact interaction and communication within the team (Ely & Thomas, 2001). A growing body of research has described multicultural healthcare teams by means of various dimensions, including: (1) nationality or country of origin (Almutairi et al., 2015; Alturki, 2018; Theron et al., 2025); (2) language (Ahmed et al., 2025); and (3) ethnicity (Ahmed et al., 2025; Beher, 2009; Fowler, 2018). Among these, language diversity is the most frequently explored, in conjunction with the question of an individual’s national or ethnic background (Schmidt et al., 2023).

These findings suggest that language and national origin are closely tied to the cultural identity of healthcare team members. This view was supported by an integrative review of forty-three studies undertaken by Schmidt et al. (2023), which confirmed that culture in healthcare teams tends to be multidimensional and can be discussed in terms of a variety of facets (i.e., racial, linguistic, ethnic and national) both separately and in combination. This current study considers differences in country of origin and language to describe multicultural teams, consistent with previous studies conducted in Saudi Arabian context (Almutairi et al., 2015; Alosaimi & Ahmad, 2016; Alturki, 2018; Theron et al., 2025)

2.1.2 Language and Communication Style

Language and culture are interconnected, shaping how individuals communicate,

interpret meaning, and engage in professional interactions. As noted by Guessabi (2013, p.233), “language is a culture, and a culture is a language,” so highlighting that language serves as a reflection of the speaker’s cultural values, social norms, and communication expectations. This relationship becomes particularly vital in multicultural healthcare teams, where differences in both verbal and non-verbal communication styles can impact on the exchange of information during handovers. Zanjani et al. (2018) emphasized that, in order to ensure mutual understanding, nurses need to be able to understand culture-specific expressions, both verbal and non-verbal.

The use of direct and indirect communication styles is a common area of cultural variation. For instance, Grossman and Taylor (1995) observed that in many Western contexts (i.e., among American nurses) directness is valued and associated with clarity, assertiveness, and efficiency. By contrast, nurses from collectivist cultures (i.e., Thai, Filipino, and Caribbean backgrounds) may adopt more indirect communication styles, emphasizing deference, relational harmony, and the avoidance of confrontation.

These differences in communication styles can influence how information is conveyed during the handover, as well as how it is interpreted by the receiving nurse. For example, while direct eye contact is considered a sign of honesty and confidence in some cultures, it may be perceived as disrespectful or confrontational in others, potentially resulting in a less engaging conversation between the nurses during a handover. Similarly, certain body language, or gestures, that are culturally acceptable in one context may be seen as inappropriate or offensive in another (Xiao et al., 2013). Such differences in non-verbal communication can create unconscious power differentials that would affect how nurses interact and communicate. These mismatches in communication norms can cause interpersonal tension, impact on team cohesion,

and hinder effective communication (Hilel et al., 2023). As these cultural preferences can influence how information is conveyed and received during handovers, they have the potential to impact the clarity and completeness of the transferred information.

In addition to cultural differences in communication style, nurses working in multicultural teams often face more technical linguistic barriers when it comes to verbal communication. These include factors potentially hindering understanding during a handover related to: (1) regional dialects; (2) idiomatic expressions; (3) conversational speed; (4) medical abbreviations; and (5) unfamiliar accents or slang (Theron et al., 2025; Pressley et al., 2022). Balante et al. (2021) found that internationally educated nurses frequently reported difficulties in understanding their colleagues and patients, even when they were fluent in the language. These studies suggest that formal language proficiency is not a sufficient measure of a nurse's ability to engage effectively in a handover. Viken et al. (2018) further supported this observation in their systematic review of 17 qualitative studies, which concluded that fulfilling language requirements does not guarantee effective communication within multicultural healthcare settings. This indicates that an effective handover in such environments not only depends on language skills, but also on non-technical competencies, including: (1) asking for clarification; (2) interpreting implicit cues; and (3) adapting to culturally influenced communication norms.

2.1.3 Collaboration Across Cultures

In addition, cultural and linguistic diversity also play a critical role in shaping broader team dynamics, particularly in relation to nurse-to-nurse collaboration, fundamental to a safe and effective handover. As noted by Alamrani (2022), collaboration enhances the quality of a handover by fostering trust, enabling open communication, and promoting shared understanding among team members. These relational dynamics improve the accuracy and completeness of

such an exchange of information. Several empirical studies have examined how the multicultural nature of a team influences collaborative practice. In the nursing literature, collaboration refers to a process where nurses collaborate as a team to address patient needs through sharing knowledge (Emich, 2018).

A recent cross-sectional study conducted in the United Arab Emirates investigated collaboration and job performance in multicultural ICUs, confirming a significant difference in the dynamic of collaboration among nurses from different ethnic backgrounds. Ahmed et al. (2025) indicated that a higher collaboration score is associated with improved job performance, i.e., coordination, interpersonal relationships and communication; however, they only grouped their participants into two broad categories (i.e., Arab and Overseas) without specifying their ethnic or cultural backgrounds. This limited their ability to determine whether the differences in collaboration were due to cultural differences or language barriers, or both.

Building on these findings, Alturki (2018) interviewed 18 nurses from 12 different countries working in Saudi Arabia, in order to explore their experience of collaboration in a multicultural hospital. The study found that many nurses lacked the cultural competence necessary for collaboration and struggled to communicate effectively with colleagues from differing backgrounds. Similar experiences were reported by Theron et al. (2025) who interviewed 17 nurses from four countries working in Saudi Arabia. They revealed that a lack of collaboration between nurses from different cultural backgrounds can hinder teamwork, as well as create communication barriers, and negatively impact the quality of patient care. Misunderstandings, particularly those related to interpreting behavior and expectations, were common and often led to a breakdown in teamwork (Theron et al., 2025).

These findings collectively highlight that, in multicultural teams, collaboration is

interconnected with communication and shaped by cultural values, interactional styles, and perceptions of hierarchy and respect. As such, ineffective collaboration that is rooted in cultural or linguistic misunderstandings has the potential to compromise the quality of nursing handovers when it is vital to establish mutual understanding and a clear negotiation of the various roles. Despite these challenges, multicultural teams can enrich nursing practice by contributing various professional and educational experiences, perspectives and skills that enhance adaptability, creativity and collaborative problem-solving (Theron et al., 2025).

2.1.4 Hierarchy and Power Distance

It is essential to understand how hierarchy operates within multicultural nursing teams, due to its potential to directly influence communication behaviours during a handover. This includes hierarchical expectations shaped by cultural norms, which can influence the interaction of nurses. One central concept in this context is power distance, which refers to the extent to which individuals accept and expect unequal distributions of power within organizations (Hofstede, 2011). Thus, in high power-distance cultures, individuals are typically socialized to defer to authority and refrain from questioning superiors, even when clarity is at risk (Hofstede, 2011). In contrast, low power-distance cultures promote more equal relationships and encourage open dialogue across hierarchies, where questioning and assertive communication are viewed as essential for ensuring safe and effective care.

This dynamic was illustrated in a study by Choi, Cook, and Brunton (2019), who explored the experiences of eight migrant nurses transitioning into the New Zealand health system. The study found that nurses from high power-distance cultures (e.g., the Philippines and India) often hesitated to question or speak up, because they were taught to defer to authority and avoid challenging more senior staff, including charge nurses and managers. This demonstrates

how an individual's culture frames understanding and beliefs which in turn drives values and behaviours.

Similar findings were reported by Omura et al. (2018), who investigated the experience of 23 nurses in Japan. Their study revealed that Japanese cultural norms discouraged the nurses from speaking up, even when patient safety was at risk. The participants described feeling that questioning or asserting themselves was inappropriate and could disrupt team cohesion.

These internalized beliefs concerning power and hierarchy created communication silences that delayed clarification and limited the exchange of essential information during clinical discussions (Kynärsalmi et al., 2025). These experiences, however, were related to daily conversations between the team and not specifically to the handover, where the nurses are expected to ensure a comprehensive understanding of a patient's condition.

Despite growing recognition of the impact of culture, language, collaboration, and hierarchy on communication within multicultural nursing teams, there remains a critical gap when it comes to specifically understanding how these dynamics influence the handover process. While the literature has broadly explored these themes in relation to team functioning and patient care, few studies have focused on the nuanced ways in which cultural and linguistic diversity shape the structure, content, and the quality of nurse-to-nurse handover. This gap is particularly significant in ICUs, where an effective handover is essential for maintaining patient safety. The complexity of these interactions is further intensified in multicultural ICUs, such as those in Saudi Arabia, in which a majority of the nursing workforce is internationally trained. Given the complexity of the ICU unit, it is essential to establish an understanding of effective handover and the factors leading to ensuring an effective handover.

The following section examines the practice of nursing handover within the ICU context,

outlining its essential components and challenges.

2.2 Effective Shift Handovers

The literature fails to offer a consistent definition of what constitutes an effective handover. A number of scholars have defined the effectiveness of a handover based on the procedure's function. For example, some authors have defined a smooth handover based on the completeness of the information transmitted (i.e., the handover functions as an information transfer method) (Foster-Hunt et al., 2015; Milesky et al., 2017). Others have defined it based on the quality of the interaction and the provision of communication (i.e., the handover functions as a communication method) (Jukkala et al., 2012; Wanigasinghe et al., 2016). A number of academics have indicated that an effective handover is based on the outcomes for both the patients and nurses involved (i.e., the function of the handover is to inform action) (Hada & Coyer, 2021; Wang et al., 2022). Each of these definitions has limited the functionality of an effective handover to either a transfer of information or the interaction/communication of action.

Patterson and Wears (2010) addressed this issue by proposing a broader framework comprised of three indicators for an effective handover, including content, process and outcomes. Firstly, the content indicator assesses the quality of the handover by identifying whether it used standard tools or protocols, or contained patient-specific information, i.e., medical history; treatment; resuscitation statuses; assessment; laboratory and imaging results; and pending tests or procedures (Braaf et al., 2015; Spooner et al., 2013; Siriwardena et al., 2017). Secondly, the process indicator measures the quality of the handover by examining its process, including the quality of the communication and interaction, along with how and where the handover was conducted (Ganz et al., 2015; Spooner et al., 2013). Finally, the handover outcomes indicator refers to the outcomes associated with an effective handover, including patient outcomes (e.g.,

falls, pressure injuries and medication errors) (Alharbi et al., 2019; Hada & Coyer, 2021) and nurse outcomes (e.g., job satisfaction, recall, understanding the information, teamwork, and group cohesion) (Wang et al., 2022).

This broader perspective aligns with the definition suggested by Alamarani (2022, p.3), who described an effective nursing shift handover as “an interactive process and face-to-face communication (verbal and written) between two nurses, resulting in the direct transfer of adequate, patient-specific, recent information in a manner that creates a shared understanding to facilitate nursing care after the handover.” This definition offers a more comprehensive lens for understanding and evaluating an effective handover in complex settings such as ICUs.

The following sections discuss the available literature focusing on handover content and process.

2.2.1 Handover Content

Effective handover content concerns the informational components, characterised by accuracy, completeness, timeliness, and the relevance of the given information (Alamrani, 2022). Until recently, there has been no consistent agreement on the specific content or format of information that should be exchanged during a handover (Starmer, et al., 2017). Many observational studies have reported commonalities in ICU handover content, including: (1) medical history and diagnosis; (2) physical examinations; (3) recent clinical events; (4) treatment and diagnostic plans; (4) nursing care plan and current medications; and (5) social and family needs (Malekzadeh et al., 2013; Spooner et al., 2015; Foster-Hunt et al., 2015; Siriwardena & Mudalige, 2017). These details are essential for gaining a complete understanding of a patient’s current condition, and any future treatment plans.

On the other hand, insights from recent qualitative studies have revealed a complex

reality when it comes to handover content. A qualitative meta-synthesis review of 10 studies carried out by Ahn et al. (2021) revealed that, despite the presence of this common content, ICU nurses frequently perceived handovers as incomplete, containing irrelevant details while omitting essential patient information. This variation in observed content and nurses lived experience highlights the persistent gap between the presence of handover information and its perceived adequacy, relevance, and clinical utility in supporting decision-making in ICUs.

In the absence of a structured tool, the information shared tends to vary considerably, often being compiled from diverse sources such as progress notes, care plans, and observation or flow sheets (Abraham et al., 2016). This lack of standardization can result in duplication, inclusion of irrelevant details, omission of essential patient-specific information, and inconsistencies between nurses (Wibrandt & Lippert, 2020). In addition, such variability in handover content increases the risk of information loss, which can compromise patient safety and contribute to adverse events (Hada & Coyer, 2021).

To address these communication inconsistencies, the Joint Commission, World Health Organization (WHO), and the Agency for Healthcare Research and Quality (AHRQ) have formally recommended the adoption of structured formats to guide and standardized handover content. Tools such as SBAR (Situation, Background, Assessment, Recommendation) have been recommended as part of broader patient safety strategies (WHO, 2007; AHRQ, 2019). While SBAR has been recognized for improving communication, Starmer et al. (2017) criticized it for being limited in its application to complex patients, particularly as it failed to facilitate the communication of detailed information, including during ICU handovers. For example, reliance on SBAR may fail to provide sufficient detail regarding fluctuations in vital signs, frequent changes in ventilator settings, medication adjustment and other dynamic aspects of patient status

that are critical for continuity of care in the ICU.

This observation is consistent with a recent scoping review by Azmi et al. (2025), who found the implementation of SBAR within critical care units and emergency departments as demonstrating substantial challenges, in particular due to patients' acuity, combined with staff training and experience, and environmental and organizational factors. These findings highlight the need to consider both the informational elements of the handover and the manner and context of its communication (i.e., interactional elements). The latter are examined in the following section concerning the handover process.

2.2.2 *Handover Process*

An effective handover process focuses on the interactional components facilitating the accurate and complete transfer of clinical information between outgoing and incoming nurses, so fostering a shared understanding and continuity of care (Alamrani, 2022). According to the JCI, the handover practice should incorporate a number of core interactional components, i.e., being face-to-face at the bedside; integrating verbal and written communication; including interactive communication; and ensuring the avoidance of interruptions and distractions (JCI, 2017). It is vital to understand how these elements contribute to effective handover in the ICU.

A nursing shift handover is generally carried out verbally and face-to-face in various locations. It can take place in the nursing station, at the bedside, or in a meeting room (Bakon et al., 2017). Over the previous decade, a growing body of literature has recommended a bedside handover, i.e., nurses stand at the patient's bedside to conduct the handover (Clari et al., 2021). The challenge with undertaking an ICU handover away from the patient (e.g., in the nursing station or a meeting room) was found to allow the nurses to engage in the process with fewer interruptions and distractions. These handovers commonly took place in patient wards, but were

criticized for being inconsistent, lengthy, inadequate, and associated with a patient's fall during the handover period (Galatzan & Carrington, 2021; Mardis et al., 2017). Furthermore, it prevented the incoming nurse to observe the patient and validate the information at the bedside (Clari et al., 2021). As a result, there has been a shift towards verbal face-to-face handover at the patient's bedside. This approach allows nurses to immediately address the patient's needs, as well as involve them when possible, and validate the information received (Clari et al., 2021).

The integration of both verbal and written communication has been found to further strengthen the handover process. In practice, verbal information often dominates the handover, as it conveys a large amount of patient information in a timely manner (Reisenberg et al., 2010; Abraham et al., 2016; Milesky et al., 2017). A verbal handover allows the outgoing nurses to emphasize critical information, as well as express any urgency and provide a contextual explanation of the written information (Galatzan & Carrington, 2021). It also enables the incoming nurse to immediately clarify and resolve ambiguities to establish a shared understanding (Alamrani, 2018).

Reliance on a verbal handover has been shown to increase the risk of loss of information, alongside potential misinterpretation, and misunderstandings (Abraham et al., 2016; Milesky et al., 2017). This has resulted in the recommendation of a written handover (i.e., paper and electronic communication) to support the verbal handover (JCI, 2017). The process involves using pre-prepared standardized forms containing patient information manually entered by the outgoing nurse (Spooner, 2018). A written handover plays a role in enhancing information retention, as well as ensuring standardization, verification, and accountability (Spooner, 2018). This suggests that the integration of both forms of communication is necessary to enhance the completeness and accuracy of information.

The interaction between nurses during the verbal handover is critical for ensuring an accurate transfer, accompanied by a shared understanding of the information involved (AlAmrani, 2022). Interactive communication refers to a two-way communication, where incoming and the outgoing nurses engage meaningfully and participate actively in the handover (Kim & Seomun, 2020). This approach allows the incoming nurse to ask questions, ensure clarity and validate the information available, while also providing opportunities for the nurses to critique actions, and detect and correct any errors (Alamrani, 2018; Kim & Seomun, 2020). On the other hand, the outgoing nurse plays a role in the interactive communication by accepting and encouraging questions to clarify ambiguity.

The effectiveness of the interaction depends on the quality of communication (Bergs et al., 2018) being supported by respectful and clear language, openness and a willingness to clarify uncertainties, so strengthening collaboration and accountability. Ineffective interaction is reflected in the use of language that is ambiguous, accompanied by a resistance to questioning and passive responses (Xiang-Jun & Yin-Ping, 2016). JCI has emphasized that the handover process must facilitate ongoing communication and feedback loops between healthcare providers (JCI, 2017). Several studies have suggested that an interactive handover tends to reduce misunderstanding, while promoting shared responsibility and accountability, thus strengthening the continuity of care (Bukoh & Siah, 2020; Ahn et al., 2021; Galatzan & Carrington, 2021). This indicates that such interaction contributes to an effective handover by transforming the exchange of information into a process of mutual verification and shared understanding, accountability and responsibility.

A further dimension of the process of an effective handover consists of the extent to which it is conducted without interruption or distractions. An uninterrupted handover allows

nurses to sustain their attention and maintain the flow of information, essential for ensuring it is communicated accurately and understood consistently (Spooner et al., 2015; Spooner et al., 2019). In such conditions, incoming and outgoing nurses can engage in interactive communication, so creating a space for clarification, verification and feedback. The absence of distraction supports a cognitive ability to focus, therefore enabling nurses to maintain the flow of information and retain critical details (Thomson et al., 2018). JCI recognizes this by emphasizing that a safe handover needs to be conducted in a place free from non-emergency interruption and distractions (JCI, 2017). Thus, the creation of a protected time and environment allows the handover process to become focused and reliable, enabling the nurses to concentrate on delivering critical information and strengthening their interactions.

While these elements outline the characteristics of an effective handover, their consistent application in practice is often challenged by environmental, interpersonal, and organizational factors capable of facilitating or hindering the exchange of accurate information. Thus, it is essential to establish these factors in order to understand how an effective handover can be achieved in practice.

2.3 Factors Affecting ICU Handover

Despite clarity concerning the factors enhancing handover practices, evidence shows that these are frequently undermined in ICUs by interruptions, a lack of structure, and interpersonal dynamics (Ahn et al., 2021; JCI, 2017). The review of the literature established multiple factors impacting on effective ICU handover practices. In a project aiming to improve handover communication in ten hospitals, the JCI (2017) reviewed the factors impacting the effectiveness of a handover. These included communication behaviours, a lack of structured and standardized protocols and clinician experiences and education (JCI, 2017). These bear similarities to those

reported by Alamrani's (2018) systematic review of twelve observational studies conducted in ICUs.

Furthermore, Ahn et al.'s (2021) recent systematic review and meta-synthesis of 10 qualitative studies exploring the challenges facing nurses during handover in the ICU, confirmed a lack of structured tools, as well as interruptions and distractions, as barriers to an effective handover practice. Ahn et al. (2021) also reported various challenges related to the communication skills and interpersonal relationships of incoming and outgoing nurses, i.e., a fear of criticism; not knowing or being wrong; the lack of a cooperative relationship; and a lack of opportunities to verify information. Literature has identified factors such as interruptions and distractions, the lack of structured tools, communication skills, and interpersonal relationships, which will be discussed in the following sections.

2.3.1 Interruption and Distractions

Literature consistently identifies interruptions and distractions as hindering an effective handover. Despite strong recommendations to minimize interruptions during the process (JCI, 2017), it remains highly challenging to achieve this in practice. Interruptions and distractions were often reported to occur in healthcare settings as a result of conversations with patient and family members, as well as other health professionals, alongside the sounds of alarms, call bells, and telephones (Spooner, 2018). The ICU environment remains prone to interruptions and distractions due to patient acuity, the nurse-to-patient ratio, and the frequency of patient treatments and procedures (Spooner et al., 2019).

The majority of studies have focused on the impact of interruptions on workflow (Weigl et al., 2011), cognition and task completion (Rivera-Rodriguez & Karsh, 2010), and the administration of medication (Thomas et al., 2017). A limited number have; however, investigated the impact of interruption during an ICU handover. In an observational study,

Spooner et al. (2015) recorded twenty ICU shift handovers, reporting that each was interrupted at least twice, equating to approximately one interruption every ten minutes. The majority were attributable to nurses and medical staff, alongside the alarms of medical devices, although the study did not report on the specific reasons. Extending this work, Spooner et al. (2019) found that team leader handovers in ICU were interrupted on average once every fourteen minutes. It is significant that the majority of these interruptions were unrelated to patient-specific needs, instead reflecting personal or work-related issues. There remains only a limited understating of the impact of interruptions on ICU nursing shift handovers.

2.3.2 *Lack of Structured Tool*

The lack of any structured handover tool has been identified as a major contributing factor to ineffective ICU handovers (Wibrandt & Lippert, 2020). Unstructured handovers can result in inconsistent, irrelevant information, along with omissions, and also a prolonged handover (Abraham et al., 2016; Powell et al., 2020; Rhudy, 2019). The absence of an agreed format leads to variations in content according to individual priorities, resulting in disorganization and gaps in communication. This can influence the cognitive ability to recall information, follow the flow of discussion, and engage meaningfully in the conversation (Galatzan & Carrington, 2021). In this context, unstructured handovers can be seen as disrupting handover flow and impacting a nurse's ability to obtain a shared understanding of a patient's condition.

Despite the organized policy of a structured handover, many studies have reported that nurses fail to adhere to structured tools (Riesenberg et al., 2010), so reflecting the gap between a standardized framework and the dynamic realities of ICUs. This led Alamrani (2018) to argue that a structured tool should be flexible and based on the needs of the unit. Observational studies in ICUs have demonstrated that individual skills in presenting the structured handover varied in

accordance with an individual's experience and training (Foster-Hunt et al., 2015). This suggests that where staff have different experiences, training, and communication styles, the use of a structured tool is essential for evaluating handover practices in ICUs.

2.3.3 Communication Skills and Interpersonal Relationships

Communication skills and interpersonal relationships are interconnected and considered key factors of an effective handover, with the communication influenced by two main aspects: (1) language (i.e., the technical aspect) and (2) behaviour and attitude, i.e. as the relational context in which interaction occurs. Within this process, the outgoing nurse is responsible for verbally presenting the information clearly, as well as through non-verbal cues, while the incoming nurse plays an equally important role in interpreting and clarifying that information (Kim & Seomun, 2020). Language is the essential component for communication as a medium of interaction, shaping both the clarity and accuracy of the information. As previously discussed, the understating and interpretation of this information is reliant on the level of proficiency in the spoken language, along with accents, the use of informal language, slang and jargon.

There are only a small number of studies that have examined language used during the handover process. For instance, Galatzan and Carrington (2021) conducted a qualitative study examining the language used in ten handovers related to patients in medical words, identifying the language used to be generally informal and including jargon and slang. Mantley (2021) reported the impact of using such language in a phenomenological study of operating room handovers among expatriate healthcare workers in the United Arab Emirates. The nurses reported the challenges of understanding informal language during the handover, frequently resulting in misunderstanding, and misinterpretation. In addition, Mantley (2021) found that nurses having English as a second language may be reluctant to ask questions for clarification and may not

admit to any failure to understand information. This indicates that the use of jargon-free language during a handover can increase the cognitive capacity to process incoming information, and decrease cognitive load (Sweller et al., 2019). This factor; however, has not been previously considered when evaluating the quality of handovers.

A key step in clarifying the issue of misunderstanding concerns the asking of questions. The quality of interpersonal relationships during handovers is reflected in the attitudes and behaviors of both incoming and outgoing nurses. Studies have shown that, while an interactive handover can reduce misunderstanding and strengthen shared responsibility, nurses frequently report barriers arising due to interpersonal relationships between members of staff that tend to suppress questioning and the seeking of clarification, i.e. fear of criticism, lack of trust, and hierarchical pressures (Ahn et al., 2021; Kowitlawakul et al., 2015; Mantley, 2018). For outgoing nurses, openness can be hindered by dismissive attitudes, lack of respect and cooperation, or feeling belittled when questioned (James et al., 2013; Kowitlawakul et al., 2015; Manias & Street, 2000; Vretare & Anderzen-Carlessen, 2020). These relational barriers can transform the handover from a collaborative process of two-way communication to a one-way transfer of information.

Many of these factors have been explored by means of qualitative or observational studies and have not been tested quantitatively to establish a statistical relationship between these factors and quality of handovers. Ahn et al. (2021) suggested that future studies should explore factors associated with the quality of a handover from the perceptions of nurses. This is particularly vital, as the identification and explanation of factors associated with the quality of handover allows them to be improved (Forde et al., 2018; Kim et al., 2021).

The following section examines the evidence relevant to the Saudi Arabian context.

2.4 Handover in Multicultural ICU Settings: The Case of Saudi Arabia

Saudi Arabia represents a unique case for examining ICU handovers, due to its highly multicultural nursing workforce. The majority of nurses working in Saudi Arabia are expatriate nurses, who come to work temporary before moving to other countries (Theron et al., 2025). These nurses bring with them different cultural values, behaviors, attitudes, communication styles, language, knowledge and experience that can differ significantly from their patients, colleagues, and Saudi Arabian employers.

As English is the standard medium of communication within the healthcare system, many Saudi and non-Saudi nurses speak English as a second or third language. This creates complex communicative settings in which the handover requires an accurate transfer of clinical information, as well as the need to understand linguistic variation, and the issues of cultural expectations and interpersonal dynamics. The evidence presented above demonstrates that the accuracy and completeness of a handover is determined by its structural elements, as well as culture, language, collaboration and factors relating to hierarchy. Collectively, this body of evidence shows that an effective handover is shaped by its content and process, while being influenced by the intersection of cultural, linguistic, relational, environmental and organizational factors. The international literature has examined many of these factors but has rarely explored the issue of language and culture within the handover context.

Saudi Arabian literature has considered the multicultural nursing team as an aspect of discussions concerning: (1) patient safety culture (Algahtani, 2015; Binkheder et al., 2023); (2) nurse-to-nurse collaboration (Alturki, 2018); (3) nurse-to-patient communication; and (4) cultural competence (Almurari et al., 2015; Alosaimi, & Ahmad, 2016; Falatah et al., 2022).

Particularly relevant are the findings from patient safety culture assessments, as these

include communication factors. Many of the quantitative studies assessing the perception of patient safety culture within Saudi Arabian hospitals have reported a negative perception when it comes to communication (Alrasheedday et al., 2024; Binkheder et al., 2023). An exploratory mixed-methods study carried out by Algahtani (2015) examined patient safety culture in multicultural operating rooms in six hospitals in Saudi Arabia. Algahtani (2015) interviewed twenty nurses, from four different cultural backgrounds, working within a multicultural workplace. The qualitative findings confirmed the multicultural workplace was a crucial factor influencing safety culture, along with the quality of communication, in particular due to difficulties in understanding different accents.

This finding was supported by a recent systematic review of fourteen papers exploring factors contributing to patient safety culture in Saudi Arabia by Albalawi et al. (2020), who found that cultural and linguistic diversity impacted staff members' ability to discuss patient safety concerns. These studies describe noteworthy communication challenges within multicultural Saudi Arabian hospitals and their potential impact on the quality of nursing handovers between shifts.

A recent study conducted by Theron et al. (2025) explored nurses' perception of communication issues in Saudi Arabia by interviewing seventeen nurses from Filipino, Indian, Malaysian, Saudi, and South African backgrounds. The participants expressed their concerns in relation to communication, as it exerted an adverse impact on both patient care and teamwork. Theron et al. (2025) found that nurses viewed communication as a two-way process, essential for daily nursing activities and patient safety. They reported a number of barriers due to language proficiency and cultural differences. Despite English being the standard language employed in the hospital, the participants noted a variability in fluency across expatriate nurses, leading to

misinterpretation of clinical information, incomplete documentation, and delays in patient care. Non-verbal communication (i.e., tone of voice, gestures, and body language) were reported as sources of misunderstanding and conflict, with behaviours perceived as normal in one culture being open to different interpretation in another. These findings suggest that linguistic and cultural diversity within a team can increase the complexity of interpersonal interactions, as well as having implications for clarity of information, all of which are crucial for an effective handover.

Despite this, there is only limited research directly examining handover practices in Saudi Arabia. Existing research has primarily focused on patient involvement in handover and nurse–patient communication (Alshammari et al., 2019), with particular emphasis on the challenges expatriate nurses face when communicating with Arabic-speaking patients. While handovers are typically conducted in English, this practice restricts meaningful patient participation due to language barriers. To date, very few studies have specifically investigated handover within Saudi ICUs.

To the best of the current researcher’s knowledge, only a single recent study by Abou Hashish et al. (2023) has explored handover practices in Saudi Arabian critical care settings, marking an important step for the growing recognition of the vital role played by handover quality in patient safety. Abou Hashish et al. (2023) conducted a descriptive correlational study in one hospital, collecting data from 201 nurses, using a tool that initially designed and validated in an emergency department in a Canadian hospital (Thomson et al., 2018). The tool was designed to explore the factors impacting on the handover, i.e., staffing; distractions; cognitive capacity; anxiety, acute fatigue; chronic fatigue; technology; face-to-face communication; and handover tools (Thomson et al., 2018). Abou Hashish et al. (2023) added two open-ended

questions concerning the facilitators and barriers to nurses' handover. The content validity was assessed by five experts; however, there was a failure to report their area of expertise, so limiting an ability to determine whether they possessed sufficient critical care experience relevant to handovers in ICUs. The content validity index was 0.87, and the reliability tested using Cronbach's alpha had a value of 0.871. The tool is therefore considered reliable. However, the constructed validity was not tested, which raises concerns about the appropriateness of the tool for exploring factors influencing the quality of handovers in a Saudi ICU context, particularly as it was originally developed for a Canadian emergency setting.

Despite these limitations, the study produced a number of valuable insights. The regression analysis identified significant positive predictors of handover quality relating to staffing; attention; cognitive capacity; interpersonal relationships; safety climate; and technology. On the other hand, fatigue, anxiety, time pressure, and distractions were negatively associated with handover outcomes (Abou Hashish et al., 2023). It is significant that the qualitative responses highlighted the critical issues raised by language barriers and interpersonal communication challenges, with nearly two-thirds of respondents citing linguistic difficulties and interpersonal relationships as compromising handover quality (Abou Hashish et al., 2023). This highlights the issue of critical barriers to the quality of handovers as consisting of persistent communication and language barriers, suggesting that existing instruments may fail to capture the lived realities of nurses in multicultural ICUs. To date, there remains no validated tool in Saudi Arabia to assess effective handover practices, or the contributory factors.

The next section examines the tools used to evaluate handover practices.

2.5 Existing Handover Evaluation Tool

Traditional evaluation has focused on either the content or process of the handover (Forde

et al., 2018). The evidence presented in this review reveals that a comprehensive understanding of such handovers requires an examination of the content, process and the contributory factors. The majority of previous studies have been based on an observational design, which involved observing handovers, rather than involving nurses in evaluating their own practice (Spoone et al., 2015; Foster-Hunt et al., 2015). There have been several criticisms of tools designed to observe a behaviour or practice, due to these being subjective and reliant on the observer's interpretation of events (Anderson et al., 2015). Manser and Foster (2011) suggested that subjectivity tends to be limited when performance or practice is evaluated by either self-assessment or peer assessment.

A recent study of sixteen systematic reviews confirmed the critical contribution of nurses in identifying communication challenges and opportunities for improvement by measuring their perceptions of their practice (Bressan et al., 2020). This indicates the importance of involving nurses in developing a tool to measure the quality of handovers, in order to ensure its consistency with the daily activities involved in their shifts (James et al., 2013). There are only a limited number of existing tools for evaluating the quality of nursing shift handover practices (Forde et al., 2018), i.e., the hand-off CEX (Horwitz et al., 2013), the handover performance tool (Pezzolessi et al., 2013), and the Handover Evaluation Scale (HES) (O'Connell et al., 2014). These are discussed in detail below.

2.5.1 The Handover Clinical Evaluation Exercise (CEX) Tool

The Clinical Evaluation Exercise (CEX) (Horwitz et al., 2013) tool was originally developed in the United States to enable medical faculties to observe and assess medical residents during an oral examination to evaluate their ability to obtain a complete patient history and physical examination (Norcini et al., 2003). The tool was later modified to become the Handoff CEX, which evaluates the handover skills of medical residents, based on the following:

(1) organization; (2) communication skills; (3) content; (4) clinical judgment; (5) humanistic qualities; and (6) overall handover competence (Farnan et al., 2009).

In order to address the lack of a tool to assess nursing handovers, Horwitz et al. (2013), modified the original handoff CEX tool, in accordance with a literature review and expert opinion. The tool was modified to allow the nurse educator (or observer) to assess both the incoming and the outgoing nurses based on six domains: (1) setting; (2) organization; (3) communication; (4) content; (5) judgment; and (6) professionalism. The Handoff CEX has subsequently been utilized within nursing education to evaluate patient handover training programs for nursing students (Akcoban et al., 2024; Avallone, & Weideman, 2015; El-Guindy et al., 2022). This suggests that the tool has a value as a teaching and an assessment aid in structured learning environments, in which handovers can be directly observed, and feedback can be provided systematically; however, its use in clinical practice remains limited.

While the Handoff CEX represents an important step in framing the handover as a measurable clinical competency, several limitations continue to constrain its applicability when it comes to nursing practice. Firstly, the tool was primarily designed within the medical education field, with its focus oriented toward individual performance, rather than capturing the complex dynamics of nursing handovers. Secondly, it relies on direct observation, including the authors recommending multiple observations of the same staff member. This raises concerns about its feasibility in busy ICU environments, where time and resources are limited. Thirdly, while it contains various valuable domains (i.e., organization, content, professionalism), the tool does not reflect the interactional components emphasized in the current handover research. It is not designed to capture contextual factors capable of impacting a handover. These limitations suggest that, although the Handoff CEX has reframed handover as a measurable skill, it remains

an approach that is relatively narrow, supervisor-driven and therefore may be incapable of adequately capturing the lived experience of ICU nurses.

2.5.2 *The Handover Performance Tool (Pezzolesi et al., 2013)*

The handover performance tool was developed by Pezzolesi et al. (2013) to evaluate medical shift handovers in the United Kingdom through the lens of aspect of the human factor. It was developed based on a literature review and a panel of experts, the majority of whom were medical doctors, and resulted in five domains: (1) communication; (2) teamwork; (3) leadership; (4) situation awareness; and (5) task management.

A key strength of the tool lies in its focus on the human factor, which aligns with wider patient safety initiatives that emphasize the role of teamwork and situational awareness in preventing errors (Sheehan et al., 2022). In a similar manner to handoff CEX, its reliance on external observation raises a number of concerns regarding subjectivity, resource demands, and feasibility in ICUs. As it has been developed within medical contexts, the handover performance tool may not fully capture the nurse-specific and interactional aspects of a handover, including the contextual challenges.

2.5.3 *Handover Evaluation Scale (HES) (O’Connell et al., 2014)*

HES was developed by O’Connell and Penney (2001), by means of a literature review combined with the opinions of experts. The original items of the scale were created based on the data obtained from semi-structured interviews with twenty-seven nurses in conjunction with field observations. The psychometric test of the HES was later tested by O’Connell et al. (2014), who conducted a secondary analysis of data obtained from nurses working in acute care settings in Australia between 2006 and 2008. The items were reviewed and revised by five experts, and a pilot application was reviewed by ten nurses (O’Connell et al., 2014). The HES examined nurses’

perceptions of the quality of information and interactions, alongside the efficiency of a handover.

The robustness and cross-cultural adaptability of this tool have been validated in various settings and countries, including Belgium (Losfeld et al., 2021), China (Wang et al., 2022) and Korea (Kim et al., 2021). When it comes to research, the tool has been widely used to evaluate nursing shift handovers by exploring nurses' perceptions of their handover practice in different clinical settings, including: firstly, the emergency department (Gungor et al., 2022); secondly, between departments (Bergs et al., 2018); thirdly, internal medicine and surgery (Kim et al., 2021); and finally, psychiatric nursing (Wang et al., 2022). It has also been employed in a pre- and post-quality improvement project (Ghonem et al., 2023). This suggests the applicability and visibility of the tool to be used across clinical settings.

HES provides valuable insights into the quality of information exchange, interactional process, and the efficiency of the handover; however, it lacks specific content-related items, as well as contextual factors. This indicates that including items relating to content can provide a more comprehensive understanding of the complexities capable of enhancing the real-world quality of handovers, particularly in multicultural ICU settings. While HES offers a robust foundation for the evaluation handover quality, it requires further modification and validation to ensure its relevance and accuracy when used in the Saudi Arabian ICU context.

In summary, existing handover evaluation tools, including the Handoff CEX, the Handover Performance Tool, and the Handover Evaluation scale, have contributed to advancing the evaluation of handover quality. They have also demonstrated a number of limitations. The Handoff CEX and the Handover Performance Tool were primarily developed for use within medical education and physician-oriented contexts, relying on external observation and focusing on individual performance. In contrast, HES has been developed for nursing handovers and has a

widespread application across various clinical settings, so offering valuable insights into the handover process from the nurses' perceptions of their own practice. In addition, HES can be seen as more relevant to the nursing shift handover, as well as applicable in different settings, and requiring less time and fewer resources.

The following sections summarize the existing evidence gap.

2.6 Evidence Gaps

2.6.1 *Knowledge Gaps*

The literature focusing on nursing handovers has predominantly conceptualized its effectiveness in terms of either firstly, the content (i.e., the accuracy and completeness of information transmitted) or secondly, the process (i.e., the communication and interactional quality). While these perspectives are valuable, they fragment the multidimensional nature of an effective handover, often neglecting to consider the broader integration of content, process, and outcomes. Although relational dynamics (i.e., collaboration, hierarchy, and interpersonal trust) are acknowledged as influencing communication, they are rarely incorporated into existing evaluation frameworks. A further gap lies in the limited exploration of the impact of cultural and linguistic diversity on nurse-to-nurse handovers. Existing studies have focused broadly on multicultural teamwork, or nurse–patient communication, but few have examined how the specific influence of these dynamics on the content, and interactional quality, of nursing handovers. This leaves an incomplete understanding of the complexities of relating to such handovers in multicultural ICU environments.

2.6.2 *Methodological Gaps*

The majority of existing handover evaluation tools are based on external observation and tend to be both resource intensive and subject to observer bias. Although HES provides a nurse

self-reporting measure, and has demonstrated robust psychometric properties across several countries, its scope remains limited. Specifically, it does not include items on: (1) contextual factors such as interruptions, workload, or environment; and (2) relational or cultural dimensions influencing communication. This restricts its ability to comprehensively capture the lived experiences of ICU nurses. Existing Saudi studies (e.g., Abou Hashish et al., 2023) have relied on tools originally developed for contexts that are non-ICU and non-Saudi (e.g., Canadian emergency settings). As a result, the methodological robustness and contextual appropriateness of the current instruments remain limited.

2.6.3 Context Gaps

The Saudi ICU context is unique, due to being heavily reliant on expatriate nurses working in multicultural settings, in which English is commonly used as a second or third language. This creates vulnerability when it comes to clarity, interpersonal interaction, interpretation and mutual understating, potentially with implications for patient safety. Saudi Arabian studies have been focused on communication challenges between nurse to patient and rarely addressed those between nurses. There are only limited studies concerning nursing shift handovers. Moreover, while local studies (e.g., Abou Hashish et al., 2023) have identified language and interpersonal communication as critical barriers, these insights have been captured only through open-ended survey questions, rather than using measurement that is structured and validated. This indicates a lack of tools that are context-specific to assess effective nursing shift handovers in Saudi ICUs. The main purpose of this study is to adapt and modify the HES to address the methodological gap and potentially fill the knowledge and context gaps.

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3 CHAPTER THREE: METHODOLOGY

3.1 Introduction

This chapter outlines the methods used in exploratory mixed-method research design undertaken to adapt the HES to fit the Saudi Arabian and critical care context. It provides an overview description of both the quantitative and qualitative phases, including the study design, sample, data collection, data analysis, rigour, and ethical considerations. A detailed description of the methods of each phase is provided in Chapter Four (qualitative phase), Chapter Five (modification and content validity), and Chapter Six (quantitative phase). This chapter has been published in *Nursing in Critical Care* (Alamrani et al., 2025). The study was approved by the Research Ethics Committees of York University under protocol number (STU 2023-068) and the ethics committees of the local hospitals in Riyadh, Saudi Arabia (H1RI-22-June23-01) (Appendices A and B, respectively). All supporting documentation for the study are included in appendices. Invitation email for the qualitative phase is provided in Appendix C, the interview consent form in Appendix D, the interview guide in Appendix E, the descriptive information form in Appendix F, the author's permission to use and modify the HES in Appendix G, the invitation email for the quantitative phase in Appendix H, and online survey consent form in Appendix I.

3.2 Purpose and Objectives

The purpose of this study was to adapt and assess the content validity and reliability of the HES for measuring effective handover and the factors that influence effective handover in Saudi Arabian critical care. The specific objectives were (a) to explore and gain an understanding of ICU nurses' perceptions of the quality of handover and the factors associated with effective handover, (b) to utilize the findings of the exploration phase to modify the HES, if necessary, (c)

to determine the content validity of the HES for the ICU and Saudi Arabian contexts, and (d) to assess the reliability of the modified HES to fit the ICU and Saudi Arabian contexts and to determine its internal dimensional structure using exploratory factor analysis.

3.3 Setting

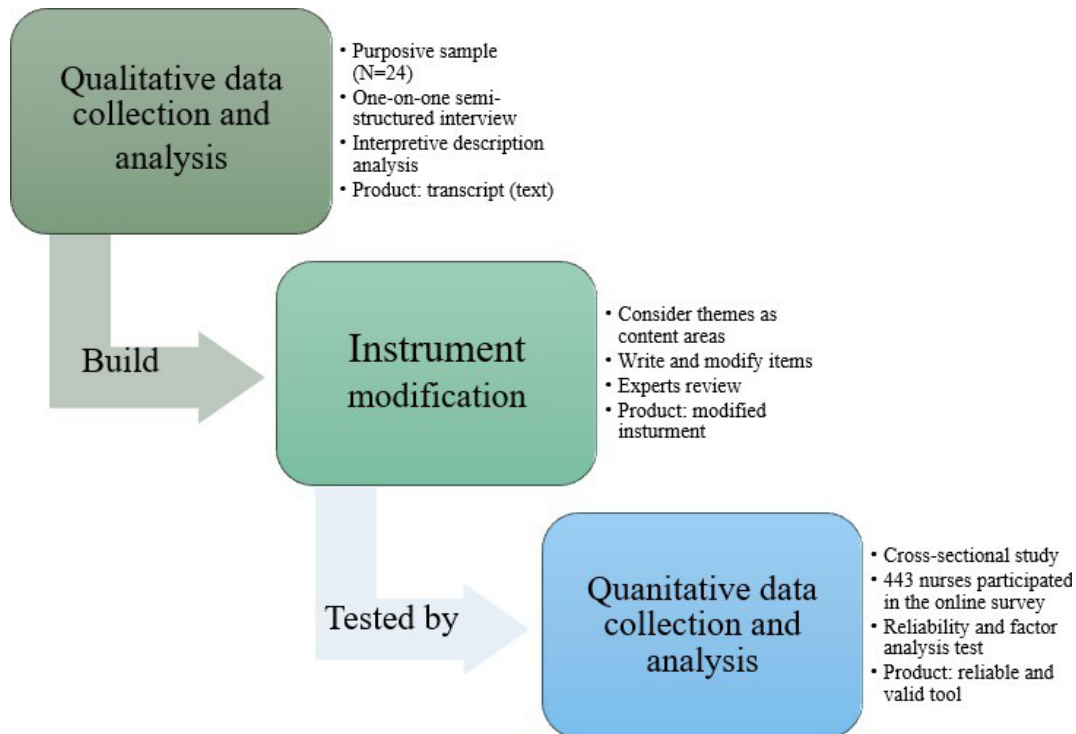
The study was conducted in ICUs in the four hospitals that comprise the First Health Cluster in Riyadh, Saudi Arabia (King Saud Medical City, King Salman Hospital, Allman General Hospital, and Imam Abdulrahman AlFaisal Hospital) and several primary healthcare centres. The ICUs in the First Health Cluster serve as the primary ICU facilities of the Ministry of Health. They have over 450 beds (Abdel-Qader, 2020) and include a trauma ICU, a maternity ICU, a burn ICU, and medical, surgical, and respiratory ICUs. The critical care nursing workforce comprises 2,145 registered nurses from different cultural backgrounds (H. Asseri, personal communication, April 24, 2022).

3.4 Design

This study used an exploratory sequential mixed-methods design to collect and analyse data from various sources using qualitative and quantitative methods (Creswell & Clark, 2018). This approach requires exploring the topic before choosing the variables to measure quantitatively, and it ensures that the quantitative measure is grounded in qualitative data (Creswell & Clark, 2018). This design was chosen to support the development of a context-specific instrument (Creswell & Clark, 2018) and to enable a comprehensive and context-specific understanding of effective nursing shift handover in Saudi Arabian ICUs. Data were integrated through a building approach, in which the qualitative findings informed the development of items for the revised HES and guided the subsequent quantitative phase. The study involved two phases: a qualitative (i.e., exploration) phase followed by a quantitative phase

(i.e., modification and validation). Figure 1 depicts the study's procedure model. The study was conducted from 2023 to 2025.

Figure 1 Model of the Study Procedure



3.4.1 Exploration Phase

The exploration phase focused on gaining an understanding of nurses' experiences of effective handover practices in multicultural ICUs in Saudi Arabia. This section describes the data collection process, analysis, and rigour of the first phase of the study.

3.4.1.1 Research Design. The exploration phase used an interpretive description approach to gather information on ICU nurses' perceptions of effective shift handover and its contributing factors. In this stage, the investigator develops a "complex, holistic picture, analyzes words, reports detailed views of informants, and conducts the study in a natural setting" (Creswell, 1999). Additionally, the researcher works within a

constructivist paradigm to create knowledge claims (Lincoln & Guba, 1985). This approach involves collecting and analysing data from individuals with experience in the study setting to understand the research problem through multiple contextual factors (Lincoln & Guba, 1985). Interpretive description was used to gain an understanding of ICU nurses' experiences of effective handover practices in a multicultural ICU setting. This method provides a foundation for identifying and organising patterns observed in the study (Thorne, 2016) and guides tool modification by incorporating the perceptions and experiences of the target population (Burdine et al., 2021). Thorne (2016) stated that interpretive description provides a clear interpretation of a phenomenon by identifying distinctive elements of common realities, analysing themes, and identifying variations between different experiences. The findings regarding the experience of ICU nurses in Saudi Arabia produced through this method facilitated tool modification.

3.4.1.2 Participants and Recruitment. Purposive sampling was used in the first phase to recruit ICU nurses working in Saudi Arabia (Creswell & Clark, 2018). This method involves intentionally selecting participants from relevant settings based on their expertise and experience with the phenomenon of interest (Thorne, 2016). In this study, nurses who had worked in the ICU for more than 4 years and had participated in a substantial number of handovers were recruited for interviews. Benner's (1984) novice-to-expert model states that an expert's knowledge allows them to understand complex issues confidently and intuitively. Therefore, the sample was selected to offer insights into handover practices and challenges in the ICU.

Most interpretive description studies use a small sample size, as data saturation is not a desirable outcome. Thorne (2016) stated that there is no ground rule for the number

of participants in this type of study. Because data are collected and analysed simultaneously, sample size is based on the comprehensiveness of the information obtained from participants, specifically whether it is sufficient to generate meaningful insights (Thorne, 2016). This is consistent with the concept of information power, which suggests that the adequacy of the sample is determined not only by numbers but also by the quality and relevance of the information gathered (Malterud et al., 2016). In this study, 24 nurses were interviewed.

To recruit participants, an invitation email (Appendix C) was sent to critical care directors, who were asked to forward it to all ICU nurses in their facility. The email included information on the study purpose, interview requests, and the researcher's contact details and invited nurses to contact the researcher to express their interest. Zoom meetings were scheduled with interested nurses at a convenient time. During the meeting, the researcher provided the participant with study-related information and asked them to review and sign a consent form (Appendix D).

3.4.1.3 Data Collection. Data were collected during semi-structured interviews conducted over Zoom. The interviews were conducted in English, audio-recorded, and transcribed verbatim. Each interview lasted between 20 and 40 minutes. The initial interview guide was developed by the researcher and subsequently reviewed by the supervisory committee members, who had extensive clinical and research expertise. The interview guide (Appendix E) was refined based on their feedback and recommendations. The interview questions were informed by the literature and designed as open-ended prompts. These served as guiding questions, which were supplemented by follow-up and probing questions based on participants' responses. The interviews gathered information on

current nursing handover practices, nurses' experiences with effective and ineffective handovers, and their perceptions of effective handover. Before the interviews, participants completed a descriptive information sheet (Appendix F) to gather demographic and professional information. Unique identifiers were assigned to each participant to maintain confidentiality. All audio recordings and descriptive information sheets were stored as password-protected files accessible only to the researcher and will be retained for five years before secure deletion.

3.4.1.4 Data were analyzed. Using interpretive description (Thorne, 2016), inductively derived themes, were used to adapt the tool for the Saudi Arabian context. The qualitative analysis followed the standard qualitative analysis steps described by Braun and Clarke (2021): becoming familiar with the data, generating initial codes, searching for themes, reviewing themes, defining and naming the themes, and describing the findings. The analysis involved an iterative process of reading and rereading the data and identifying connections and differences. The interpretative description technique influenced the analytic decisions (Thorne, 2016).

3.4.1.5 Rigour. The rigour of the qualitative phase was determined by considering the credibility, dependability, confirmability and transferability of the results. The credibility of the qualitative component was enhanced by “confirmation, clarification, and elaboration on the essential relationship . . . within overall data” (Thorne, 2008, p. 159). Participants were asked to clarify statements during the interview to ensure that their answers were understandable. Committee members also reviewed some data independently to confirm the themes that emerged. Credibility was also addressed by taking field notes on reflections and observations. To ensure dependability, the research supervisor or a

committee member checked, compared, and verified the coding categories.

Transferability was addressed by describing the context and population studied.

3.4.2 Modification and Validation Phase

In the second phase, the HES was modified using quantitative methods and then validated. This phase integrated data from the first phase to (a) refine the HES to measure the quality of nursing shift handovers and the factors influencing effective handover in Saudi Arabian ICUs and (b) assess the instrument's content validity and reliability and determine its internal dimensional structure.

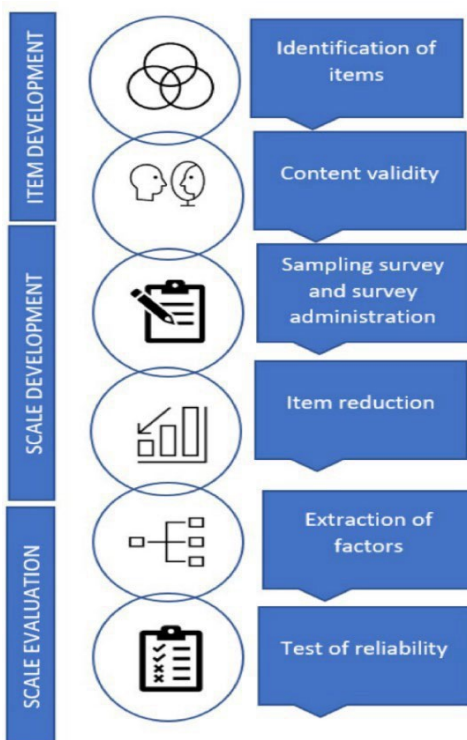
3.4.2.1 Instrument. The HES was used to measure nurses' perceptions of shift handover quality. The HES is a validated tool developed by O'Connell et al. (2014). It includes three scales: quality of information, interaction and support, and efficiency. Each scale is divided into subscales containing six, five, and three, respectively. Items are rated on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). A higher score indicates better handover quality. The reliability reported by Cronbach's alpha was 0.80 (O'Connell et al., 2014). The tool was used and modified with the permission of the original authors (O'Connell et al., 2014; see Appendix G).

3.4.2.2 Sampling and Recruitment. A convenience sample of ICU nurses was invited to participate to establish the instrument's psychometric properties. The sample size was calculated based on the number of items, with 10 participants required per item (Polit & Beck, 2020). A total of 443 ICU nurses participated in the survey. An official email sent to all ICU nurses included information about the study purpose and the survey link (see Appendix H).

3.4.2.3 Procedure. The procedure used to modify and validate the instrument was

influenced by Boateng et al.'s (2018) approach, which consisted of three main phases, as presented in Figure 2.

Figure 2 Overview of Tool Modification (Adapted from Boateng et al., 2018)



In the first phase, the themes that emerged from the qualitative phase were used as content areas to guide the modification of the HES. Following the modification, the readability and clarity of the modified HES were assessed. External experts in critical care nursing with a master's degree or PhD in nursing were recruited to assess the content validity in terms of relevance, representativeness, and technical quality. Polit and Beck (2020) stated that three to five content experts should be involved in this process. In this study, six experts were invited to assess content validity. The experts were sent a cover letter explaining the research aim and target population, instructions, and a content validity form. An explanation of the construct's conceptualisation and the relevance rating for each item was also included. The items were then accepted, rejected, or modified based on the experts' opinions.

In the second phase, the modified scale was uploaded using web-based software (Qualtrics, 2020), and the survey was administered to ICU nurses via an email containing the URL. The software facilitated data transfer to SPSS (Version 27, 2020) and reduced the time needed for data entry. When participants opened the link, they were redirected to a consent form (Appendix I) and asked whether they were interested in participating in the study. If they consented, they were directed to the survey questions.

Before validating the scale, item reduction and factor extraction were conducted using SPSS (Version 27, 2020), and inter-item correlation was computed. Exploratory factor analysis was used to determine the internal dimensional structure of the modified HES. Items with low correlation (below 0.30) (Boateng et al., 2018; Polit & Beck, 2020) and items with factor loading coefficients below 0.40 were considered for deletion (Boateng et al., 2018; Polit & Beck, 2020).

In the third phase, the reliability of the modified HES was assessed using Cronbach's alpha. An alpha coefficient of 0.70 or above was considered acceptable (Braun & Clarke, 2021; Polit & Beck, 2020).

3.4.2.4 Data Analysis. Phase 2 data were analysed using SPSS (Version 27, 2020) with descriptive and analytical indices, such as exploratory factor analysis, unweighted least squares extraction for factor extraction (Flora & Flake, 2017), and Cronbach's alpha.

3.4.2.5 Rigour. To address the reliability of the quantitative components, reliability analysis (Cronbach's alpha) was performed for the survey results. Content validity was achieved by examining the wording, structure, organisation, and statements of the tool to ensure that all variables and concepts were measured thoroughly and accurately (Polit & Beck, 2020). The survey content was reviewed by the researcher, supervisory committee members, and evaluated by six expert critical care nurses with master's or Ph.D. in

nursing.

3.4.2.6 Ethical Considerations. Ethics approval was obtained from the Research Ethics Committees of York University under the protocol number (STU 2023-068) and the local hospitals in Riyadh, Saudi Arabia (H1RI-22-June23-01) before the study. Informed consent was obtained from the participants, which provided sufficient information about the research project and contact information of the primary researcher. Participation was voluntary, and participants could withdraw at any time. Confidentiality and privacy were maintained throughout the research process through anonymisation and by securing data in encrypted storage devices.

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4 CHAPTER FOUR: NURSES' EXPERIENCES OF EFFECTIVE HANDOVER PRACTICE IN MULTICULTURAL ICUS: AN INTERPRETIVE DESCRIPTIVE STUDY

4.1 Abstract

Aim

To explore nurses' experiences with effective handover practices in a multicultural intensive care unit (ICU) setting.

Design

An interpretive description qualitative study.

Methods

Semi-structured interviews were conducted. The analysis was guided by the interpretive description approach.

Results

A total of 24 nurses representing five nationalities and four ethnic groups who were working in multicultural ICUs in four Saudi Arabian hospitals were interviewed. The findings suggest that handover in multicultural workplaces can precipitate challenges in communication; therefore, it is essential to consider the experience of nurses working in this environment. Four main themes emerged from the analysis: (1) the meaning of effective handover, which is influenced by the information and interaction components; (2) factors that influence effective handover, including psychological, organizational, communication, and interpersonal relationships, training and experience, and environmental and process-related factors; (3) the influence of ineffective handover on patient outcomes, such as medication errors, risk of infections, allergic reactions, prolonged ICU stay, and delayed investigations and diagnostic procedures, and (4) cultural and

language considerations that play a significant role in influencing effective collaboration and interaction, especially in effective handover practice.

Conclusion

The findings suggest that a multicultural ICU workplace presents significant challenges for effective handover practice. It is, therefore, crucial to recognize these challenges and design and implement strategies that promote culturally competent communication among nurses. Further empirical study is needed to examine the role of multicultural workplaces in communication, collaboration, team dynamics, and patient outcomes.

Reporting method

The results were reported in accordance with the Consolidated Criteria for Reporting Qualitative Research.

The study protocol was reviewed and approved by the Research Ethics Committees of York University and local hospitals boards of ethics. No patient or public contribution was required in this study.

4.2 Introduction

Communication is essential in day-to-day activities and even more so in a team providing safe patient care. Communication challenges in a critical environment such as the ICU may cause adverse events and unnecessary harm to patients (Hada & Coyer, 2021). Additionally, miscommunication may occur during handover if the nursing staff have diverse cultural backgrounds, training, education, language, and communication skills.

The increasing globalization of nursing and the international demand have increased the mobilization of nurses worldwide (Smith et al., 2022). When nurses from developing countries are dissatisfied with professional attributes such as salary, working conditions, and career development, they tend to move to other countries with better opportunities (Clayton et al., 2016). Many healthcare systems are multicultural, with nurses from diverse backgrounds (Smith et al., 2022). Saudi Arabia faces a chronic shortage of Saudi nurses due to social, cultural, and organizational factors (Alsadaan et al., 2021; Elmorshedy et al., 2020). It relies heavily on expatriate workers who come to work temporarily to meet its healthcare demands. More than 68% of the nursing workforce in Saudi Arabia is expatriate and non-Saudi from approximately 40 countries (Falatah et al., 2022). The increasing globalization of nursing and consequent multicultural workplaces in healthcare settings often create cultural complexities that affect communication (Cook & Brunton, 2018).

Nursing handover is the communication process that occurs when a nurse transfers information, responsibility, and accountability regarding a patient to their peer to ensure continuity of care. An effective nursing handover refers to “an interactive process between two

nurses that results in the direct transfer of adequate and recent patient-specific information in a manner that creates a shared understanding of information to facilitate nursing care provided after the handover” (AlAmrani, 2022). In contrast, an ineffective handover is one in which information is incomplete, inaccurate, delayed, or misinterpreted—leading to misunderstanding, care omissions, or potential harm to the patient (Hada & Coye, 2021). The importance of effective handovers is evident, with ineffective handovers linked to patient harm, and as a result have been identified as an international patient safety priority by the Joint Commission International (JCI, 2017). Few studies have explored the dynamics and challenges of nursing handovers within ICU settings, and to the best of our knowledge, none has specifically focused on handover practices in multicultural ICU environments. Identifying the current challenges and developing appropriate interventions are essential to improve quality and safety of patient care. To address this gap, this study explored ICU nurses’ experience of effective handover practices in a multicultural workplace in Saudi Arabia using an interpretive description approach.

4.3 Background

Handovers enable healthcare providers to describe or summarize patient information. The literature provides various suggestions regarding the content and procedures of effective handovers. For example, shift handover should be provided at the bedside rather than in an office or nursing station (Hada & Coyer, 2021) and within an appropriate timeframe depending on patient acuity, number of patients, and method of handover (Abou Hashish et al., 2023). The use of structured tools and standardized protocols such as situation, background, assessment and recommendation (SBAR) is essential for ensuring a comprehensive handover (Abdellatif et al., 2007). Despite an extensive body of research advocating best practices, challenges related to effective handovers remain.

Patients in the ICU are vulnerable and require complex care involving multiple disciplines, care activities, and sources of information. All these factors contribute to increasing the risk of adverse events and errors for patients in the ICU. Evidence suggests that ineffective ICU handover leads to negative consequences for patients, staff, and health organizations, contributing to approximately 10% of adverse events (Brown et al., 2018), such as delays in treatment (Lillibridge et al., 2017), repetitive diagnostic procedures, and preventable readmission (Hada & Coyer, 2021). These consequences not only harm patients, but also increase the length of hospitalization, cost of care, and risk of mortality (King et al., 2013).

Previous studies have found that communication failure in shift handovers is mainly related to communication issues among nursing staff, interruptions, and a lack of standardized practice (Ahn et al., 2020; Spooner et al., 2015). A systematic review of 10 qualitative studies exploring communication challenges faced by critical care nurses confirmed that communication issues and team dynamics hinder effective communication in ICUs (Ahn et al., 2020). These barriers include limited opportunities to ask questions, overwhelming feelings, fear, lack of mutual respect, and insufficient collaboration among nurses. It is important to note that all studies included in Ahn et al.'s (2020) review were conducted in Western and European countries, where the majority of nurses were locals or immigrants - individuals who relocate to a foreign country with the intention of permanent settlement and often eventual citizenship. There is a notable gap in the understanding of the experiences of nurses in Arab countries such as Saudi Arabia, where most nurses are expatriates from diverse countries and work temporarily before moving to other countries.

Communication challenges are further complicated by cultural and linguistic differences among nursing staff in multicultural workplaces such as Saudi Arabian hospitals (Abou Hashish

et al., 2023). In Saudi Arabia, Arabic is the native language, and the English is the official language in healthcare settings, while it serves as the second language for most healthcare providers. The diversity of backgrounds can create barriers to effective communication, particularly during handovers, as nurses may interpret information differently due to variations in cultural norms and language proficiency (Schmidt et al., 2023). Research has shown that communication styles, expectations, and hierarchies differ significantly across cultures, affecting how nurses collaborate and share critical patient information (Al Turki, 2018). For example, nurses from different cultural backgrounds may have diverse comfort levels when asking questions or expressing concerns, which can lead to misunderstanding. Miscommunication or incomplete information can arise when staff members are not fully proficient in the primary language in the workplace (Schmidt et al., 2023). The temporary nature of expatriate nursing in Saudi Arabia further increases these challenges as short-term staff may lack the opportunity to fully integrate into the team or adapt to local communication practices. Understanding the effective handover experiences of nurses in a multicultural team is crucial for improving patient safety and handover practices in multicultural ICU settings. This study explored nurses' experiences of effective handover practices in multicultural ICUs.

4.4 Methods

4.4.1 Design

The overarching project aimed to adapt and assess the content validity and reliability of an existing instrument for measuring effective handovers and the contributing factors to effective handovers in the Saudi Arabian critical care context. The results presented in this paper reports on the interpretive description qualitative approach which aims to gain a deeper understanding of

ICU nurses' experiences of effective handover practices in a multicultural ICU setting. An interpretive description design, as explained by Thorne (2016), helps interpret a phenomenon by identifying elements from common realities, analyzing themes, and uncovering variations in experiences. This methodology was chosen because it is best suited for gaining knowledge in collaboration with and for the benefit of clinical practice by exploring, describing, and understanding the experiences of ICU nurses with handover practices in a multicultural workplace. This study was reported in accordance with the Consolidated Criteria for Reporting Qualitative Research (COREQ) guidelines (Tong et al., 2007).

4.4.2 Data collection and procedure

Purposive sampling (Polit & Beck, 2020) was used to recruit 24 ICU nurses with more than four years of ICU experience from four different hospitals in Riyadh, Saudi Arabia. According to the novice-to-expert model described by Benner (1984), an expert has extensive knowledge of situations that allow for confidence and an intuitive grasp of complex issues. Thus, they can reasonably be expected to have experienced different handover practices and challenges in the ICU. Additionally, they have participated in a considerable number of handovers.

An invitation email (Appendix C) was sent to all ICU nurses working in the four hospitals. The email included information about the purpose of the study, interview request, and the researcher's contact details. Potential participants contacted the researcher to express their interest and interviews were arranged as per their convenience. All participants chose to be virtually interviewed at home in a private space.

Between August 2023 and January 2024, individual semi-structured interviews were conducted virtually by a female researcher with critical care nursing experience. The interviews lasted between 20 and 40 min. The initial version of the interview guide was developed by the researcher. It was discussed with the supervisory committee members with extensive research

and clinical experience and modified based on the constructive feedback and recommendations from the members. The interview questions were developed based on literature and were open-ended by design. They were guiding questions, supplemented by follow-up and probing questions depending on the participants' responses. The interview questions addressed the participants' perceptions of nursing team, current handover practices, experience of effective and ineffective handovers, and factors contributing to effective handovers (Appendix E).

With the participants' consent, the interviews were digitally recorded, pseudonymized, and transcribed verbatim. Each interview transcript was reviewed while listening to the recordings to ensure accuracy. In addition, before the interview, the participants provided their characteristics (age, sex, nationality, ethnic group, language spoken at home, place of work, level of education, years of experience in the current organization, and years of experience in nursing and ICU) in a descriptive information sheet (Appendix F). Field notes were taken after the interviews.

4.4.3 Data analysis

The analysis process followed the common steps used in qualitative data analysis, such as data organization, reduction, display, and conclusion establishment. The researcher followed the steps described by Braun and Clarke (2021)—familiarizing with the data, generating initial codes, searching for themes [concepts/categories], reviewing themes, defining and naming themes, and describing findings. The analysis involved an iterative cycle of reading and rereading data, identifying connections, and finding differences. The research questions guided the analysis. All interviews were transcribed into Microsoft Word documents to facilitate data organization. The researcher read the transcripts repeatedly to ensure familiarity with the data and generate the initial codes and themes. The initial coding was shared and discussed with the

supervisory committee members. As the analysis progressed, new codes were generated, some were modified, and the codes were examined to ensure that they fit into a theme. The final coding, including themes, subthemes, and illustrative quotes, was modified based on discussions between the researcher and the supervisory committee members.

4.4.4 Ethics

This study followed the standards of the ethical conduct of research on humans (Canadian Institutes of Health Research, 2018). The study protocol was reviewed and approved by the Research Ethics Committees of York University (Certificate No: STU2023-086) and local hospitals (Certificate No: H1RI-22-Jun23-01) (Appendices A & B). The participants were informed about the study and its aims and that the interview would be recorded and transcriptions would be analyzed. Participation was voluntary and participants had the right to withdraw from the study without any consequences. Confidentiality of the participants' personal information was ensured by identifying them with a unique identifier. Written informed consent was obtained from all participants before the interview (Appendix D).

4.5 Result

The study sample of 24 participants were completely female and represented five nationalities (Indian, Filipino, Saudi, Egyptian, and Sudanese) with Indian being the most prevalent. All participants had more than 4 years of experience in the ICU, and 54% (13) had more than 10 years of experience. Table 1 summarizes the nurses' descriptive data.

Table 1: Summary of descriptive data

		N	%
Age (years)	30 – 40	14	58
	41 – 50	10	42

Nationality	Indian	12	50
	Filipino	5	20
	Saudi	2	8
	Egyptian	3	12
	Sudanese	2	8
Ethnicity	Arab	5	21
	African	2	8
	South Asian	12	50
	Maguindanao	5	21
Education	Diploma	3	12
	BSN	20	83
	MSc.	1	4
Place of work	(A)	7	29
	(B)	4	16
	(C)	7	29
	(D)	6	25
ICU experience (years)	4-10	11	46
	11-15	3	12
	15-20	10	42

Four main themes emerged from the data analysis.

4.5.1 Theme 1: The meaning of an effective handover

The meaning of an effective handover is influenced by the information provided, interaction, and communication during the handover.

4.5.1.1 Subtheme 1: Information provided during the handover. The participants

described effective handovers based on the quantity and accuracy of information presented systematically. They mentioned that the quantity of information determined whether the handover was sufficiently effective for further care. This information, from the perspective of the receiver (incoming nurse), must include; but is not limited to, the patient's medical history, surgery and procedure history, allergies, code status, physical assessment, connected lines, tubes and devices, current medication, social and family needs, psychological status, infection precautions, existing and pending investigation (laboratory and imaging) results, and doctor orders and notes. The information provider (outgoing nurse) should be obligated to ensure the accuracy of the information, verify it during the handover by reviewing the patient files, and assess the patient with the incoming nurse. For example, RN 24 described an effective handover as follows:

“Effective handover... Both nurses should assess the patient from head to foot, ongoing medications, lines and tubes... Then they [outgoing nurse] have to describe all the patient details, previous medical history, what medications are ongoing now, any procedure is pending or any procedure to be done. Then lab reports also.”

RN 15 commented on the accuracy of information:

“Effective handover means we [incoming nurses] need to make sure what she [outgoing nurse] is telling is right or wrong, and we make sure the endorsement is properly given or not. We need to assess the patient and the file we need to check.”

4.5.1.2 Subtheme 2: Interaction and communication. The participants described that an effective handover is an interactive process in which incoming and outgoing nurses clearly understand each other. Interactive communication involved clarifying doubts,

asking questions and ensuring that the language used was clear and understandable for both nurses. For instance, RN 20 said:

“Effective handover, for me, [means that] the giver and the receiver should understand each other. I understand you, you understand me... the language should be very clear and understandable.”

The participants emphasized that the incoming nurse should be on time to allow for discussion time to both the nurses. Adequate time for a comprehensive discussion allows them to ask questions. For example, RN 24 stated:

“Effective handover: first thing, the staff should be on time... We can ask any doubt. For example, if we have any doubts about the medication calculation, we can ask anything”.

4.5.2 Theme 2: Factors influencing the quality of handover

From the participants’ perspectives, the quality of handovers was generally affected by psychological, organizational, communication and interpersonal relationship-related, and environmental and process-related factors, training, and experience.

4.5.2.1 Subtheme 1: Psychological factors. Psychological factors are emotional and mental factors that can affect how incoming and outgoing nurses communicate critical patient information during handovers. From ICU nurses’ perspective, stress, fatigue, and intimidation can hinder handovers. These factors could impede how incoming or outgoing nurses perceive and understand the situation because of their limited ability to provide, accept, and process information. Intimidation occurs when a nurse feels apprehensive about communicating openly with an incoming or outgoing nurse, who may be more experienced. This can lead to a reluctance to clarify doubts, potentially resulting in incomplete or inaccurate handovers. RN 11 mentioned:

“If you are senior [incoming or outgoing nurse], then I will be afraid to ask, or I cannot give all information. If you have the same experience as I do, I can ask and communicate without fear or stress.”

Stress and fatigue may affect the nurses’ cognitive functions, such as attention to detail and focus, which are essential for handover accuracy and completeness. The emotional states, such as feeling of rush or being overwhelmed, can negatively influence both nurses’ engagement in conversations. RN 24 described the mental and physical exhaustion after long ICU shifts, which can compromise the quality of handover: “I need to finish my work anyways, and I need to run away from the unit.” This can lead to rush communication in which critical information may be inadequately explained.

4.5.2.2 Subtheme 2: Organizational factors. The organizational factors affecting the handover quality are organizational culture, staff shortages, high turnover, nurse-to-patient ratios, and the technology used. Organizational cultures that accept incomplete handovers as a norm can *wahousho* the continuity and safety of patient care. It implies a reliance on afterwork call *2026-03-03 16:52:50* to complete or correct information, which can increase the delay in providing critical information. For instance, RN 15 mentioned that a common practice was to call an outgoing nurse if they forgot to provide some information during a handover:

“If I forget anything, maybe, during handover, I will call and I will tell her... sometimes they will forget something, then they will or I will call them.”

This subtheme also describes the challenges due to staff shortages, leading to decreased nurse-to-patient ratios, and their impact on the quality of handover and staff well-being. For

example, RN 24 stated:

“Sometimes, because of the shortage, we are getting two patients. Sometimes we are getting busy with that and we cannot give a good handover, or maybe we will forget something.”

4.5.2.3 Subtheme 3: Communication and interpersonal relationships factors.

This subtheme mentions factors such as language barriers, lack of interaction, interpersonal relationships, and tools used during handover which can affect the quality. An effective handover requires two-way communication, where both nurses speak in the same language and engage in the conversation by asking questions, accepting information, and answering. Language barriers and lack of interaction were commonly reported by the participants. Many ICU nurses noted that some staff members may withhold information because they lack English proficiency. This can lead to critical patient information being omitted or inaccurately conveyed, especially if they are reluctant to interact and clarify information. For instance, RN 10 said:

“They hide information because they can’t speak very well in English.”

Interpersonal relationships are key to handover quality. Positive relationships among nurses can foster open communication, making them more likely to share complete and accurate information, ask questions, and express concerns without fear of judgment; However, conflict and lack of respect can lead to incomplete information. One nurse shared an experience of disrespect that prevented detailed explanations or clarifications, which could have compromised the quality of handovers and care. RN 18 stated:

“If there is something happened between us and you didn’t have help me or you didn’t

respect me...I just read patient's data but not specific [information] or explanation."

The presentation and organization of information are important factors that can help nurses engage in conversations and understand information. Using a structured tool was essential to present patient data in a narrative style and to prioritize the information conveyed during the handover to enhance incoming nurses' engagement in the conversation. Although the SBAR tool is widely used, the ICU nurses mentioned that the flow sheet (a unit-based form containing patient-specific details) was more comprehensive and structured that helped provide a systematic and structured handover. Some participants said that although they completed the SBAR to comply with organizational protocols, it was inadequate in the ICU context and needed refinement. RN 16 said:

"We have to fill up this SBAR form, and it should be filled [in] every shift, but we are not following this form, honestly... the flow sheet is more detailed than the SBAR form."

4.5.2.4 Subtheme 4: Environmental and process-related factors. Environmental factors include those associated with the ICU environment, such as interruptions, unplanned procedures, and patient conditions. Some of these factors are unavoidable and cannot be controlled or minimized. The complexity of patient conditions, which may result in unplanned procedures at the end of the shift, can affect handover quality. However, some participants mentioned that certain procedures could be deferred until the handover is completed, necessitating other healthcare providers to determine the appropriate timing without compromising patient safety. This perspective was illustrated by the scenario shared by RN 1:

"[A] trauma patient is admitted, then, maybe, they [surgical team] will come [at]

6:45 for the dressing. It is inconvenient for the shift endorsement. So, the morning staff, she'll be attending the doctor, the night staff will be waiting for long time for the endorsement. Then they cannot do their work on time."

The participants also expressed that conversational interruption that usually occur when doctors interrupt a handover to ask non-urgent questions could lead to distractions. Nurses advocated the protection of handover time, emphasizing that it should be respected by other healthcare team members as a critical time for information exchange. RN 22 highlighted the frustrations experienced with such interruptions:

"It is very annoying when doctors interrupt the handover. You will tell them, 'This is my handover time'; you tell them many times, but they do not understand."

Process-related factors such as location, time, and information resources are associated with the handover process. Many participants shared that handovers must be conducted at the patient's bedside, allowing nurses to observe the environment, attached devices, and ongoing medications. This allows nurses to verify the received information in real time. Some nurses mentioned that a patient's surroundings indicated the quality of the handover. For instance, RN 15 considered a handover to be complete if the patient was cleaned and in a neat environment.

"I like to receive patients tidy and neatly. We are freshened up, so if surroundings are clean, we feel fresh, good to work. It should be a complete endorsement, so the patient should be neat and tidy."

Time was a factor that could reduce handover quality. Prolonged handovers may result in unnecessary information provision and distract incoming nurses. In contrast, limited time can compromise the amount of information provided. This could result in the omission of critical information because nurses may feel rushed or overwhelmed. For instance, RN 4 stated:

“I think time is the barrier. Because sometimes, the incoming staff is late, so we will also be in a hurry... hurry endorsement, sometimes we will miss some data.”

Nurses often rely on verbally communicated and patient assessment information as primary sources of data. Verbal handovers are the foundation for understanding the patient's condition; however, patient assessment by both incoming and outgoing nurses after a handover is considered a “safety check.” From the outgoing nurses’ perspective, this is a critical step in the handover to ensure patient safety, such as recalculating ongoing medication dosages. From the receiver’s perspective, it is essential to validate the accuracy of verbally conveyed information. Thus, both verbally communicated and physical check information should be integrated into the handover process to ensure accuracy and comprehensiveness.

“I should assess the patient during endorsement. Alternatively, we should check the patient’s surroundings, because whatever infusions and medicines are ongoing must be confirmed. Because maybe the staff are endorsing that this... for example, this medication is going this much microgram per minute, maybe in the syringe she adjusted to another dose. Therefore, we should assess the patient during endorsements.” (RN 24)

4.5.2.5 Subtheme 5: Training and experience. This subtheme represents the impact of nurses’ years of experience and training on the quality of the handover. Handovers are learning opportunities in which nurses can exchange knowledge and promote peer support. Many nurses expressed differences between senior and junior nurses regarding the quality of handovers, particularly in the presentation and completeness of information. RN 12 noted that when senior nurses conducted the handover, the information was organized, covering all necessary information:

“Especially when the seniors are giving handover to each other, [it is] very systematic. It doesn’t need to read letter by letter, word per word. You will hear that they are starting from head to toe, completely. They are not missing any information.”

Junior nurses were more reluctant to ask questions or present the necessary information, which could be attributed to their lack of experience or confidence, as described by RN 20:

“The new staff, they don’t know what to ask, because they are new and shy, they don’t know what to expect or what [they] need to know or ask.”

4.5.3 Theme 3: Influence of ineffective handover on patient safety

The participants shared their experiences of the adverse consequences of ineffective handover practices in patient care. Areas where ineffective handovers lead to compromised patient care and safety included medication errors, infection risks, allergic reactions, extended ICU stays, and delayed investigations. These incidents resulted from discrepancies, incomplete handovers, and misunderstandings. As mentioned by RN 22, tests could be delayed when the requested investigations are not effectively communicated during handover.

“I think two days ago, I have given handover that this test [is] supposed to be sent, but again it came back to me. Because they didn’t understand the full endorsement. So, again, that night shift I explained to her that this test is supposed to be sent during the night.”

The participants expressed concerns about the accuracy of the information conveyed during handovers. RN 16 stated that outgoing nurses may share inaccurate information that could affect patient safety.

“Some nurses may tell you they gave the medication to the patient, but when you go to the medication room, you find the same medication there, so how did she give the medication if the medication [is] still there?”

Such inconsistencies jeopardize patient safety and degrade trust among nursing teams in the unit. This was supported by RN 23”

“[For] some patients, I have to go inside and see everything because not all the nurse I take handover from can be trusted.”

4.5.4 Theme 4: Cultural and language considerations

The participants shared certain cultural traits observed during the handover. Understanding these cultural differences can help nurses engage effectively in handovers by adapting to their communication styles. The findings revealed that some nurses use nonverbal clues that carry different meanings across cultures and play a significant role in communication, such as nodding or shaking head. For instance, RN 23 commented:

“Some Jordanians, they will nod their heads, and you think they understand, but actually they don’t; they just want you to hurry and leave.”

This observation was supported by other participants, such as RN 8:

“Indian nurses shake their heads. I thought they were disagreeing with me, but later I learned that this means they were following you and understanding.”

Participants noted that cultural background could shed light on how the receiver perceives authority, time management, and work values. For instance, acceptance of handover information without clarification was a cultural trait observed particularly among Egyptian and Sudanese nurses. RN 12 commented:

“Egyptians and the Sudanese usually accept information without asking for clarification.”

The cultural values of professionalism and punctuality were particularly appreciated in

the interactions with Filipino nurses. RN 16 expressed a preference for receiving handovers from Filipino nurses because of their punctuality, organizational skills, and patient care:

“I like to receive [handover] from Filipino nurses because they are always on time and they will give you a clean patient. Their handovers are always organized.”

Use of a common language is important in multicultural settings. The study participants had English as their second language and preferred using their native languages to provide detailed handovers. Medical terminology is typically expressed in English. A Saudi participant (RN 23) shared her observation that non-Saudi nurses providing handovers in their native languages tended to complete handovers more efficiently, with no outstanding queries or ambiguities:

“They finish the endorsement very quickly with no pending or question marks.”

The participants outlined various linguistic challenges in the multicultural ICU, such as different accents, vocabulary, pronunciation, and overall English proficiency. These challenges sometimes lead to miscommunication, potentially delaying treatment or diagnostic procedures. RN 20 shared an incident highlighting the consequences of such misunderstanding:

“There is a test that needs to be done, and I said that ‘it’s still pending, you have to follow up and do the test.’ But at the end of her shift, unfortunately, I’m still the one who received [it] from her. So, I noticed that she did not do it because she misunderstood what I told her.”

Interactions among nurses from different cultural and linguistic backgrounds underscored language barriers. Indian and Filipino nurses faced difficulties in English communication of Egyptian and Sudanese nurses. For instance, RN 15 (an Indian) said:

“We can communicate easily with Filipinos and Saudis also, but it is difficult with

Sudanese and Egyptian.”

This challenge was acknowledged by an Egyptian nurse (RN 21), who attributed it to the educational and experiential background of Egypt, where nursing is taught in Arabic, with no English proficiency required for employment in Saudi Arabia:

“In Egypt, educational institutions teach nursing in Arabic, and in government hospitals, only Arabic... Before I came to Saudi Arabia, there was no English exam or anything. I just had a virtual interview.”

Despite being an Arab, Saudi nurse RN 23 commented that she preferred to speak in English during the handover even if the incoming nurse was also Arab. She mentioned that because nursing is taught in English in Saudi Arabia, Saudi nurses tend to speak English more often and comfortably than other Arab nurses.

“I feel more comfortable with English because I studied nursing in English, so it is easy to describe everything in English.”

This was supported by a Filipino nurse RN 6:

“I can understand Saudis, Indians, and other nationalities, but not Egyptians.”

To mitigate these language challenges in a multicultural workplace, some nurses use nonverbal communication or rely on others for interpretation. Consequently, handover takes longer than expected.

“Like, with Sudanese staff, I can’t understand their accents. So, sometimes I have to ask other staff members to interpret for me. Sometimes the handover takes a longer time due to different languages and nationalities.” (RN 13)

The ICU management recognizes the critical nature of effective communication, especially given the complex conditions of patients in ICUs. New nurses get time to improve

their language skills. Those who cannot improve are often reassigned to less critical units, as described by RN25:

“If others cannot pick up [the language], they are sending them to the ward.

Previously, we had two Egyptians, they could not understand anything. I think they do not know English. Therefore, they were sent to the ward.”

The participants acknowledged the importance of language in handovers for patient safety. They advocated the use of native languages whenever possible to minimize the risk of miscommunication. From their perspective, addressing language barriers is crucial before implementing any new tools or changes within the unit, as emphasized by RN 13:

“First, we should sort out the language barriers before implementing any new tools or forms because some newcomers are not familiar with English that much. Therefore, at least for patient safety, we must endorse this clearly using language. The main outcome, the person who is receiving, should understand clearly.”

4.6 Discussion

The nurses mentioned that effective shift handover is a complex process involving informational and interactional components influenced by various interrelated factors. The findings suggest that a significant barrier to effective ICU handovers is rooted in communication, interaction, and collaboration challenges, particularly among nurses from diverse linguistic and cultural backgrounds. These difficulties highlight the critical role of clear communication and cultural competence in ensuring an efficient and comprehensive handover process, ultimately affecting patient care outcomes in multicultural workplaces.

The findings revealed that ICU nurses' perceptions of an effective handover were characterized by content, process, and handover-related outcomes. The key factors of an

effective handover include shared understanding and provision of complete and accurate information for patient care. Ensuring comprehensive and accurate handovers is the shared responsibility of incoming and outgoing nurses. Notably, ICU nurses prefer comprehensive information encompassing the patient's medical history, current status, and future plans, whereas nurses in other inpatient wards prioritize receiving up-to-date information over detailed handovers (Haji Bakar et al., 2020). This can be explained by the nature of ICU shift handovers, which are typically detailed and lengthy, and reflect the multisystem complexities of patients and their nursing care needs. In contrast, in less critical inpatient wards, patients generally have less complex needs and multiple patients are often discussed during a single handover.

Interactions between nurses during handovers are as crucial as the amount of information exchanged. Nurses in this study emphasized that handovers are not merely about conveying information but also about engaging in meaningful conversations, sharing knowledge, and providing support. Effective interaction is characterized by active listening, clear communication, mutual respect, and opportunities to ask questions. Both nurses can fully engage in the handover process by asking questions, clarifying doubts, and ensuring that all critical information is understood. This finding is consistent with that of Kowitlawakul et al. (2015), who observed 50 pairs of nurses during handovers and confirmed that engagement and interaction fostered a collaborative environment in which nurses felt supported and confident in their understanding of patients' needs. Group cohesion can further promote effective interactions, whereby the team works collaboratively toward common goals. Relevant studies have shown that strong group cohesion positively influences nurses' clinical communication and professional knowledge, leading to improved handover quality (Spector & Pindek, 2016; Wang et al., 2022).

These findings underscore the importance of developing strategies to enhance group cohesion and dynamics and promote effective interactions during handovers.

The results of this study indicate that handover quality is influenced by a complex interplay of psychological and interpersonal relationships, as well as organizational, communication, educational, and environmental factors, some of which are unavoidable. For example, emergency procedures at the end of a shift may interrupt the handover process to prioritize patient safety. This finding is in line with nurses' experiences in the emergency department, where the handover quality is compromised due to unpreventable situations based on patient conditions (Tortosa-Alted et al., 2021). Regardless of the cause, such interruptions can result in the loss of critical patient information and disrupt nurses' continuity of thought during handovers (Spooner et al., 2015). It can potentially compromise the accuracy and completeness of the transferred information when it relates to non-emergency interruptions, such as irrelevant conversations.

The findings also highlight interpersonal relationships and psychological factors, such as stress, fatigue, and intimidation, as key elements that can disrupt handover effectiveness. Moreover, intimidation can create a barrier to open communication, particularly when less experienced nurses interact with senior colleagues. Fear of judgment may cause nurses to withhold questions or hesitate to seek clarification, leading to incomplete or inaccurate handovers. These factors impair the cognitive functions necessary for a thorough and accurate handover, such as attention to detail, focus, and ability to engage in conversations. This finding is consistent with that of a cross-sectional study conducted by Abou Hashish et al. (2023) involving ICU nurses in Saudi Arabia.

Many studies have shown that the tool used to deliver handover information is critical

concerning the completeness of the handover (Alizadeh-Risaniet al., 2024; Shahid & Thomas, 2018; Verholen et al., 2021). In this study, the ICU nurses perceived the SBAR tool to be inapplicable to ICU settings and requiring modifications. This finding contrasts with the widespread recommendations of the World Health Organization (WHO) and JCI to use SBAR as a structured handover tool (Abdellatif et al., 2007). The discrepancy between hospital policy and nurses' perceptions of the SBAR tool raises concerns about a potential knowledge-to-practice gap, in which standardized protocols do not reflect clinical practice needs. This highlights the need for further investigations into how handover tools can be adapted or redesigned to address the needs of critical care units. It also emphasizes the importance of involving bedside nurses in evaluating and adopting standardized tools to ensure their practice relevance.

The challenges perceived by nurses working in multicultural workplaces owing to language barriers and cultural differences are noteworthy. Language plays a pivotal role in handover, especially in this context, where English is the standard medium of professional communication, but a second language for all the participants. Miscommunication and misunderstanding owing to language barriers can adversely affect patient safety (Hull, 2016). Indeed, ICU nurses in this study expressed challenges in understanding their colleagues' spoken English, including their use of vocabulary and accents. These challenges are consistent with those reported by Mantley (2021) in a phenomenological study exploring handover communication among expatriate perioperative teams in the United Arab Emirates. Language challenges have also been reported by German nurses working with internationally qualified nurses, resulting in communication difficulties and a reluctance to ask questions, delaying patient care (Roth et al., 2023). Ensuring the language proficiency of nurses in a multilingual healthcare workforce is crucial for patient safety (Horváth & Molnár, 2022) in terms of mitigating the risk

of miscommunication due to language barriers.

The ICU nurses in this study mentioned that cultural differences among nursing teams impacted handover effectiveness. While some participants identified communication challenges with colleagues from specific cultural backgrounds, it is important to interpret such statements as reflections of individual perceptions rather than universal truths. These findings underscore the need for culturally sensitive communication training rather than reinforcing stereotypes. A lack of cultural humility can result in the misinterpretation of nonverbal communication, such as shaking head and nodding. The importance of understanding such nonverbal communication is supported by Al Turki (2018), who interviewed 18 nurses working in Saudi Arabia and found that limited knowledge of the other's cultural background impedes effective interaction and collaboration within nursing teams. Cultural background shapes nurses' behavior during handovers and influences aspects such as professionalism, punctuality, time management, perceived authority, and participation in discussions. The nursing culture in which the participants were trained may have shaped these behaviors. Brunton and Cook (2018) noted that, despite nurses from diverse cultural backgrounds sharing the common goal of providing the best care to patients, how they achieve this goal could significantly differ. Accordingly, cultural understanding and language proficiency may be relevant standards for nursing competence.

The factors identified by ICU nurses in this study reflected a human-factors approach, demonstrating their interaction in a socio-technical system. Human factors play a pivotal role in patient safety, namely how people interact with each other, their environment, and the systems in which they work, with the aim of improving performance and reducing errors (Manser, 2013). The general structure of the human-factors framework in healthcare is that a "sociotechnical work system produces work processes, which shape outcomes" (Holden et al., 2013). This

structure is similar to that of the healthcare quality model (structure-process-outcomes) (Donabedian, 1988), which is familiar to many healthcare providers. In this study, nurses performed handovers in an organization to achieve common goals (i.e., complete and accurate handovers and ensuring safe patient care). The sociotechnical work system in this study includes the characteristics of the nurse (such as education, years of experience, language, culture, and interpersonal relationships) who interacts with tools/technology (such as SBAR, ICU flow sheets, paper, or electronic medical files) to receive a handover in an internal environment (with interruptions, unplanned procedures, and specific unit culture) in an organization (with its specific organizational culture, nurse-to-patient ratio, policy, training, and turnover rate). The interactions among these components can produce work processes, resulting in cognitive, social, and behavioral interactions that can influence handover outcomes. Manser (2013) argued that the human-factors approach can provide a scientific foundation for effective interventions to improve handovers. Accordingly, future studies should consider this approach to understand and analyze the factors contributing to effective handover practices in ICU.

Patient safety concerns were frequently reported by ICU nurses in this study, which aligns with the WHO guidelines (Abdellatif et al., 2007) that effective handovers can reduce the risk of adverse events, thereby enhancing patient safety. Patient safety can be linked to either minimizing adverse events or understanding the factors that contribute to continuity and safe care (Hollnagel, Wears, & Braithwaite, 2015). No previous study has confirmed a direct causal relationship between handover quality and patient safety (Manser & Foster, 2011). If a handover is crucial for making informed decisions about ongoing care, the quality of care and patient safety should be enhanced when accurate information is provided. The participants in this study observed shift handover as an opportunity to ensure patient safety through the practice of a safety

check, in which both nurses assess the patient's overall condition and check factors such as medication dose, lines, tubes, alarms, and monitors. Although many qualitative studies have revealed that handover quality is linked to patient outcomes, there is a lack of quantitative evidence of this relationship (Loefgren Vretare & Anderzén-Carlsson, 2020), possibly because of a lack of measurable patient outcomes. Future studies should consider reporting patient outcomes that might reflect handover quality, such as medication errors; length of stay; delays in procedures, investigations, and treatment; response time to patient deterioration; incidents of missed care; and patient falls.

4.7 Strengths and limitations

The trustworthiness of this study was determined by considering the credibility, dependability, confirmability, and transferability of the findings (Polit & Beck, 2020). The interview guide was based on previous research, and the research committee, whose members are experts in research methodology and possess a broad range of clinical experience, both of which enhance credibility. Participants were asked for clarification during the interviews to ensure that their answers were understood. Committee members independently reviewed some of the data to confirm the researcher's findings on emerging themes. The researcher documented field notes after each interview to ensure confirmability. Transferability was strengthened by providing detailed demographic descriptions of the participants. To minimize reporting bias, the COREQ checklist was used to guide the reporting of the qualitative findings (Tong et al., 2007).

This study has several limitations, particularly with respect to the sample. The majority of the participants were experienced nurses, which may not fully represent the perspectives of junior or less experienced nurses. Although the participants were from various ethnic groups or

nationalities, their experiences may not reflect those of other nationalities currently working in Saudi Arabia. Furthermore, the interviews were conducted virtually at the participants' preferred times and locations, which may have facilitated open communication. However, this format may have limited the researchers' ability to observe subtle body language.

4.8 Conclusion

Working in a multicultural ICU can present significant challenges, particularly during handovers. It is essential to acknowledge the experiences of nurses working in such environments to ensure effective interaction and collaboration during handovers. This study highlights that language proficiency and cultural awareness are crucial factors that enable safe and effective handover practices. To promote this, establishing standardized language requirements and incorporating cultural competence criteria for nurses working in multicultural settings are recommended. This study revealed a gap between standardized protocols, such as the SBAR tool, and nurses' real-world experiences, raising concerns about the alignment between policy and practice. The results emphasize that ensuring an effective handover, and consequently, patient safety, is a shared responsibility that requires attention to human factors and complex interactions within the healthcare system. Overall, addressing these challenges requires a multifaceted approach, including ongoing education, organizational support, and a culture of open communication to enhance handover practices and improve patient safety in multicultural ICUs.

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5 CHAPTER FIVE: MODIFICATION AND CONTENT VALIDATION OF THE HANDOVER EVALUATION SCALE IN THE INTENSIVE CARE UNIT

5.1 Abstract

Background

Effective shift handovers are vital for patient safety in ICUs. However, existing tools lack adaptation to the ICU context and multicultural settings like Saudi Arabia. A contextually relevant tool is needed to assess nurses' perceptions of effective handover and support targeted quality improvement initiatives in critical care environments.

Aim

This study aimed to modify the original Handover Evaluation Scale (HES) to reflect the cultural, linguistic, and clinical realities of ICUs in Saudi Arabia and to assess the content validity of the revised tool.

Methods

Based on interviews with 24 ICU nurses, the HES was modified to focus on nurses' perceptions of effective shift handover in the ICU. Nursing experts participated in the content validation process, where they rated each item's relevance, and assess representativeness, clarity, and readability. An agreement level of 0.80 or higher was required for inclusion in the final tool. Six expert nurses with ICU experience and either a master's or doctoral degree in nursing provided content validation for the HES.

Results

Modifications included adding new items and revising or deleting existing ones to better reflect ICU-specific and multicultural context. A new section assessing contextual factors influencing handover quality was introduced, including items on language barriers, staffing shortages, and

communication dynamics. Content validity indices (I-CVI and S-CVI) ranged from 0.83 to 1.0, with an overall S-CVI of 0.94 for Section C and 0.99 for Section D, indicating excellent content validity. Experts also provided qualitative feedback that informed further refinement of the scale.

Conclusion

The modified HES is a contextually relevant tool with strong content validity for evaluating ICU handover practices in multicultural settings. Further testing is needed to establish its psychometric properties.

Relevance to practice:

This tool can support quality improvement initiatives by helping ICU teams assess current handover practices, identify challenges, and guide targeted interventions to enhance handover and patient safety.

Keywords:

handover evaluation scale, nursing handover, scale modification, content validation, intensive care unit.

5.2 Introduction

The importance of effective nursing handovers in ensuring patient safety and continuity of care has been well established (Bressan, Mio, & Palese, 2020). This importance is also widely recognized by international health authorities due to its impact on clinical outcomes (World Health Organization, 2015; The Joint Commission, 2017). Ineffective handovers are associated with delays in diagnosis and treatment, medication errors, and poor communication, which can compromise patient safety and the quality of care (Lillibridge et al., 2017; Hada et al., 2021). Consequently, numerous studies have highlighted the need to improve handover practices among nurses (King et al., 2013; Lillibridge et al., 2017; Hada et al., 2021). A critical first step is assessing existing handover practices to inform the development of targeted and evidence-based interventions (Bressan Mio, & Palese, 2020). A comprehensive and contextually appropriate evaluation tool that captures nurses' perceptions of effective handovers and factors influencing them is required to accurately identify areas for improvement.

The handover evaluation scale (HES) has been used in various contexts to explore nurses' perceptions of handover quality (O'Connell, Ockerby, & Hawkins, 2014). This tool was developed based by O'Connell and Penney (2001), through literature review, and expert opinions. The original scale items were created based on data obtained from semi-structured interviews with 27 nurses in conjunction with field observations. The psychometric properties of the HES were tested by O'Connell, et al., (2014), who conducted a secondary analysis of data obtained from nurses working in acute care settings in Australia between 2006 and 2008. The items were reviewed and revised by five experts, and a pilot application was reviewed by ten nurses (O'Connell et al., 2014). The HES comprises three sections: (a) demographics; (b) current handover structure; and (c) nurses' perceptions of current practices, consisting of the quality of

information (six items), interactions (five items), and handover efficiency (three items).

The HES has been translated, adapted, and validated for various contexts. The HES has been translated into Turkish and used to explore nurses' perceptions of handovers in general inpatient units in public (Tuna et al., 2018) and university hospitals (Demiray et al., 2018). A study in Belgium translated the HES into French and use it to evaluate nurses' perception of handover quality before and after quality improvement projects in rehabilitation, geriatric, and maternal wards (Losfeld et al., 2021). The HES has been translated into Chinese and used to investigate the relationship between handover quality, job satisfaction, and group cohesion among psychiatric nurses (Wang et al., 2022). Furthermore, Kim et al. (2021) translated the HES into Korean and used it to explore the current handover status and safety culture in small and medium-sized hospitals. In all previous studies, the HES has demonstrated good reliability and content validity.

5.3 Justification for the Study

Although the HES has been validated and used across various healthcare contexts, its application in intensive care units (ICUs) remains limited. ICUs represents a distinct clinical environment characterized by high patient acuity, continuous monitoring, complex interventions, and urgent decision-making (Spooner et al., 2015). These conditions require highly structured and accurate handover processes to avoid clinical errors and ensure the continuity of care. Unlike in general wards, ICU handovers often involve rapid information exchange, interprofessional collaboration, and the dynamic prioritization of patient needs (Brown et al., 2018). Consequently, constructs measured by the original HES may not fully capture the specific demands or communication challenges faced by ICU nurses (Alamrani et al., 2025). Therefore, adapting the HES to ICUs is essential to enhance its content validity and its relevance to ICU practice. By tailoring the

tool to reflect the nuances of ICU workflows and communication patterns, researchers and practitioners can accurately assess handover quality and identify targeted areas for improvement in critical care settings.

In addition to the clinical context, cultural and linguistic factors may play crucial roles in shaping handover practices, particularly in multicultural healthcare systems, such as those in Saudi Arabia (Alamrani et al., 2025). The nursing workforce in Saudi Arabian hospitals is predominantly composed of expatriate nurses from diverse cultural backgrounds, with English commonly used as the primary language of communication despite not being the first language of most nurses. Varying levels of language proficiency can affect the clarity, completeness, and confidence with which information is communicated during handovers (Almutairi et al., 2015; Alquwez et al., 2018). Moreover, cultural norms surrounding hierarchy, assertiveness, and interpersonal communication may influence how information is conveyed or received, potentially leading to misunderstandings or omissions (Okougha et al., 2010). Despite these complexities, existing tools, such as the HES, have not been sufficiently adapted to reflect the realities of multicultural work environments in Saudi Arabia.

5.4 Aim of the Study

This study adapted the HES to reflect the demands of ICUs and align with the linguistic realities and cultural context of nurses working in multicultural ICU environments in Saudi Arabia. Furthermore, this study assessed the content validity of the modified tool.

5.5 Methods

Tool modification and content validity procedures followed the approach described by Boateng et al. (2018). The conceptual foundation and design of this study adhered to the protocol presented by Alamrani et al. (2025).

5.5.1 Tool Modification

Item generation for the modified HES was directly informed by the qualitative study conducted by Alamrani, Jensen, and Dunwoody (2025), which explored ICU nurses' experiences with handover practices in multicultural settings. That study employed an interpretive description approach using in-depth semi-structured interviews with 24 ICU nurses who had more than four years of clinical experience. Participants were purposively selected from four hospitals in Riyadh, Saudi Arabia, to capture a diverse range of perspectives. The interview data revealed key themes, including the meaning of effective handovers, interactive communication between nurses, and contextual challenges, such as language barriers, fatigue, staff shortages, and environmental interruptions. The data were used to inform the development of new items and revision of existing items in the HES. Before assessing content validity, supervisory committee members reviewed the initial draft of the modified HES to evaluate the clarity, readability, and alignment of the items with the qualitative findings. Based on their feedback, item wording and structure were refined to ensure conceptual coherence.

5.5.2 Content Validity

Content validity was assessed following six structured steps adapted from Polit and Beck (2020): (1) preparation of the content validation form; (2) selection of expert reviewers; (3) distribution of the tool and evaluation form; (4) review of scale items; (5) rating of each item's relevance, representativeness, readability, and clarity to fit the target population; and (6) calculation of the content validity index (CVI).

Six expert nurses (three men and three women) with extensive clinical experience in ICUs in Saudi Arabia and diverse educational backgrounds, including master's and Ph.D. degrees in nursing, were invited to participate in the content validation. An email invitation that included a cover letter explaining the research aim, target population, a detailed explanation of

the tool, reviewer instructions, and content validation form was sent to all experts.

Content validity was assessed using a four-point Likert scale, where 1 indicated “not relevant”, 2 “somewhat relevant”, 3 “quite relevant” and 4 “highly relevant” to measure the relevance, representativeness, clarity, and readability of the items. In addition, the experts were encouraged to provide qualitative comments on each item. This form was used to ensure that the experts had a consistent understanding of their task and could systematically and meaningfully assess the items. The experts were provided two–four weeks to complete the validation process. A sample of the instructions and rating scale in the content validation form is presented in Figure 3.

Figure 3 A sample of instruction and rating scale in the content validation form for the HES

Content validity form

Dear expert,
Thank you for participating in the content validation of the Handover Evaluation Scale tool. This study aims to adapt and assess content validity and reliability of an existing instrument for measuring effective shift handover and the factors that contribute to effective shift handover in Saudi Arabian critical care context. The target population of this tool is ICU nurses working in Saudi Arabia. The tool comprises three main sections: current handover practice, perceptions of handover, and factors influence the quality of handover.

We seek your expert judgment on the degree of content relevance, representativeness, and technical quality for each item. Please use the comments column for any additional feedback. Please rate each item for its relevance, representativeness, clarity, and readability from 1 to 4 as described below:

Degree of relevance 1- The item is <u>not relevant</u> to the measured domain. 2- The item is <u>somewhat relevant</u> to the measure domain. 3- The item is <u>quite relevant</u> to the measured domain. 4- The item is <u>highly relevant</u> to the measure domain.	Degree of representativeness 1- The item is <u>not representative</u> of the measure domain. 2- The item is <u>somewhat representative</u> of the measure domain. 3- The item is <u>quite representative</u> of the measure domain. 4- The item is <u>highly representative</u> of the measure domain.
Clarity 1- The item is <u>unclear</u>. 2- The item is <u>somewhat unclear</u>. 3- The item is <u>mostly clear</u>. 4- The item is <u>very clear</u>	Readability 1- The item is <u>not appropriate</u> for target population's reading level. 2- The item is <u>somewhat appropriate</u> for target population's reading level. 3- The item is <u>mostly appropriate</u> for the target population's reading level. 4- The item is <u>highly appropriate</u> for the target population's reading level.

The content validity index used to assess the degree of content validity of an item, was

computed to quantitatively assess the scale's content validity. CVI is divided into item (I-CVI) and scale (S-CVI) categories (Polit & Beck, 2020). I-CVI was calculated by dividing the number of experts who rated the item's relevance as 3 or 4 by the total number of experts. S-CVI was the average of all I-CVI values based on the total number of items. I-CVI ratings of 0.80 and above were considered acceptable, and S-CVI ratings of 0.90 and higher indicated excellent content validity (Polit and Beck, 2020). The qualitative feedback provided by the experts was used to inform item modifications and to complement the CVI results by offering contextual insights into the relevance and clarity of each item.

5.6 Ethical considerations

This study has been reviewed and approved according to the Research Ethics Committee at York University (Certificate No.: STU2023-086) and the approval from the Research Ethics Committee at the local hospitals (Certificate No: H1RI-22-Jun23-01) (Appendices A & B). Author's permission (Appendix G) was obtained to use and modify the original HES (Appendix J)

5.7 Results

5.7.1 Tool Modification

The descriptive information and current shift handover practices in the HES were modified to appropriately address the Saudi Arabian context. Some items were deleted or modified, and new questions were added to fit the context. A question concerning the respondent's country of origin was added to provide cultural context. Conversely, the question regarding the ethnic background was not included due to the confusion it caused during the qualitative phase; specifically, participants tended to respond based on their nationality rather than ethnicity. In Section C, four items were deleted based on the qualitative findings. One item

related to patient involvement in handovers, included as an optional item in the original tool, was deleted. This decision was informed by two key factors identified based on the qualitative findings: (a) ICU patients are often unconscious and unable to participate in handovers; and (b) although handovers are typically conducted in English or other languages, most patients speak Arabic, limiting meaningful engagement. The other three items were omitted because they did not align with the nature of the ICU environment, where nurses are frequently busy and have limited time to discuss non-patient-related information such as debriefing, workload issues, or educational opportunities during handover. These deletions reflect the realities described by ICU nurses in this study. Table 2 summarizes the changes made to the HES.

Table 2 Summary of changes to the HES

Number of items modified	Number of new items	Number of deleted items
Section A: Demographic (descriptive) information		
4	3	1
Section B: Current shift handover practice		
3	5	4
Section C: Perception of shift handovers		
2	0	4
Section D: Factors influencing the quality of handovers		
0	16	0

Questions regarding the factors influencing shift handover quality were added based on the qualitative results. Consequently, a new section concerning factors influencing handover quality, comprising 16 items (e.g., language barriers, staff shortages, interruptions, interpersonal relationships, and level of experience), was added. Table 3 shows examples of how the qualitative findings were used to modify the HES.

Table 3 Examples of the qualitative data used to modify the HES

Quotes from expert comments	Corresponding survey item
“Sometimes, the mental status of the other staff affects the handover; the whole shift, they are tired... I need to finish my work, and I need to leave the unit.”	Feeling rushed or overwhelmed makes me less engaged in the handover.
“When a nurse takes care of two patients, she misses some points... For example, she may forget to report that she set the vancomycin level, or that one doctor came... during the consultation. So, it really affects the work”	If I have more than one patient, I often forget to include some information in the handover.
“Sometimes, because of the shortage, we get two patients. Sometimes, we may get busy with one, and we can’t give a good handover, or we may forget something.”	Shortage of staff affects handover quality.
“Some staff don’t speak English fluently. Sometimes, you’ll say something, you thought she understood, but no, she misunderstood.”	Language barrier sometimes cause misunderstanding during the handover.
“When two nurses speak the same language, they finish the handover very quickly with no pending or question marks.”	I prefer to speak my native language to provide a complete handover.

5.7.2 *Assessment of Content Validity*

The I-CVI of the modified tool ranged between 0.83 and 1, and the S-CVI was 0.94 as shown in Table 4. Therefore, the modified tool demonstrated excellent content validity; consequently, all items were retained.

Table 4 Content validation with six experts

Section C: Perceptions of handover practice
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	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	I-CVI
Item 1	4	4	4	4	4	4	1
Item 2	4	2	4	4	4	4	0.83
Item 3	4	3	4	4	4	4	1
Item 4	4	4	4	4	4	4	1
Item 5	4	4	4	4	4	4	1
Item 6	4	4	4	4	4	4	1
Item 7	4	3	4	4	4	4	1
Item 8	4	3	3	4	4	4	1
Item 9	4	4	4	4	4	4	1
Item 10	4	3	4	4	4	4	1
Item 11	4	4	1	4	4	4	0.83
Item 12	4	4	1	4	4	4	0.83
Item 13	4	4	1	4	4	4	0.83
S-CVI	0.95						
Section D: Factors influencing handover quality							
Item 1	4	4	3	4	4	4	1
Item 2	4	4	3	4	4	4	1
Item 3	4	4	3	4	4	4	1
Item 4	4	4	3	4	4	4	1
Item 5	4	4	2	4	4	4	0.83
Item 6	3	4	4	4	4	4	1
Item 7	3	4	4	4	4	4	1
Item 8	4	4	4	4	4	4	1
Item 9	4	4	4	4	4	4	1
Item 10	4	4	4	4	4	4	1
Item 11	4	4	4	4	4	4	1
Item 12	4	4	3	4	4	4	1
Item 13	4	4	3	4	4	4	1

Item 14	4	4	3	4	4	4	1
Item 15	4	4	4	4	4	4	1
Item 16	4	4	4	4	4	4	1
S-CVI	0.99						

While the majority of the items were deemed clear and appropriate, revisions were made to enhance clarity and ensure alignment with the intended target population. Table 5 outlines the modifications and their justifications.

Table 5 Changes made after the content validity assessment

Original item (before expert review)	Modified (after expert review)	Justification
10. What format of information is used during handovers?	10. What types of information sources are available in your hospital for accessing patient information during handovers?	This question aims to identify the resources available to nurses for accessing patient information. This modification was made to improve clarity and avoid ambiguity with Item 11.
14. Please indicate what other disciplines are usually present at handovers: ○ Medical team ○ Allied health ○ No other disciplines present ○ Other (specify)	14. Please indicate what other disciplines are usually present at handovers: ○ Doctors ○ Pharmacists ○ Respiratory therapists ○ No other disciplines present ○ Other (specify)	Experts pointed out that the term “allied health” is not commonly used and may lead to some confusion among the respondents. Therefore, the options were modified to fit the context.
15. Do you use any tool/form	15. Do you use any forms to	To improve clarity

to present handovers?	present shift handovers?	
20. I am provided with sufficient information about patients.	20. I receive sufficient patient information during shift handovers.	To improve clarity
21. I am often given information that is not relevant to patient care during handovers.	21. As a receiving nurse, I am often given information that is not relevant to patient care during handovers.	To improve clarity
22. The manner in which information is provided to me is easy to follow.	22. The manner in which information is provided to me during handovers is easy to follow.	To improve clarity
23. Patient information is provided in a timely fashion.	23. Patient information is provided during shift handovers in an appropriate timeframe.	To improve clarity

5.8 Discussion

This study modified the HES, used to assess handovers in acute care settings, to suit the multicultural ICU environment in Saudi Arabia and assessed its content validity. The results demonstrated the relevance and clarity of the modified tool. The patient involvement item was deleted because it did not fit the ICU context. This finding aligns with previous studies on ICUs that have reported limited patient involvement in bedside handovers due to the patients' critical conditions and levels of consciousness. For instance, Paredes-Garza et al. (2022) found that few ICU nurses perceived patient participation as relevant and identified it as a clarifying element in the handover process. Although patient involvement in handovers is recognized as a critical element of patient-centered care, it may not be feasible in most ICU cases due to patients being

sedated or unstable (Paredes-Garza et al., 2022). This may be particularly challenging in Saudi Arabia due to language barriers between nurses and patients, hindering meaningful involvement.

Furthermore, the results revealed that nurses' perceptions of effective handovers were not formed in isolation but were shaped by various contextual factors influencing handover quality. A section on these factors was added to the modified HES. The modified HES offers a comprehensive understanding of nurses' perceptions by situating them within the broader context of influencing factors, such as communication dynamics, cultural diversity, workload, and team relationships. The additional information enhances the interpretation of perception scores and provides a valuable framework for identifying specific areas that may require improvement. The result from the revised HES could aid the development of targeted evidence-based interventions aimed at enhancing the quality and consistency of handover practices in the ICU.

This perspective is supported by Ahn et al. (2020), who conducted a systematic review and qualitative meta-analysis of ICU handover studies and identified several recurring themes that hinder handover quality, such as unrealistic expectations, a lack of partnership, communication barriers, and frequent distractions. These issues reflect the contextual challenges addressed in the newly added section of the modified HES. This reinforces the importance of assessing handovers in a real-world context. Although previous studies have explored these factors qualitatively, this study built on this work by embedding them directly into the modified HES, thereby offering a structured and measurable approach for evaluating handover quality.

This study differs from previous international adaptations of the HES. In countries such as Turkey, Korea, China, and Belgium, the HES has been translated into the local language to suit a homogenous, native-speaking population (Tuna et al., 2018; Demiray et al., 2018; Losfeld et al., 2021; Kim et al., 2021; Wang et al., 2022). In contrast, the current study retained the

original English language, while adapting the content to fit the clinical and cultural realities of Saudi Arabia. Despite being a second language for most nurses, English serves as the main language of communication among the diverse nursing workforce in Saudi Arabian hospitals. Therefore, rather than translating the tool, this study focused on improving its clarity and contextual relevance within the existing language framework. For instance, terms such as “timely fashion” and “allied health” were revised to alternatives more familiar to the target population, such as “appropriate timeframe” and “pharmacists and respiratory therapists.”

This methodological decision is significant for two reasons. First, it acknowledges the reality of multicultural healthcare environments, in which English is often used as a shared second language by staff from diverse backgrounds. Second, the adapted HES may be applicable to other international contexts with similar linguistic dynamics, such as Canada, the United Kingdom, and the United States, where English is the second language for some nurses. However, further adaptation and testing in other settings would benefit from the input of linguistic experts to ensure that the language remains universally clear, accessible, and culturally appropriate across various English-speaking and multilingual healthcare environments. This aligns with the recommendations of Zhao et al. (2024), who emphasized the importance of linguistic reviews and the involvement of experts during adaptation and modification. Their framework highlights the importance of ensuring that tools are both semantically and culturally suitable for multilingual populations. Although linguistic experts were not involved in this study, their future inclusion would support the suitability of the HES for broader international use in diverse ICU settings.

High I-CVI and S-CVI scores reflected strong expert agreement on the relevance and appropriateness of the modified scale, suggesting its high content validity for use in diverse ICU

environments. Engaging experts in the content validation phase extended beyond numerical scoring. Allowing experts to provide qualitative feedback along with their ratings was instrumental in enhancing the clarity, readability, and contextual appropriateness of the items. Their insights led to meaningful refinements of the items' language, terminology, and phrasing, ensuring that the scale was conceptually sound and accessible to the target population. Although CVI offers a robust measure of face and content validity, it does not assess other essential psychometric properties, such as construct validity and internal consistency. These aspects should be examined in future phases of tool validation to ensure that the HES reliably and accurately evaluates handover quality across various ICU settings.

5.9 Strengths and limitations

The key strength of this study was its systematic and context-sensitive approach to tool modification and content validation. The use of qualitative data to inform item development ensured that the modified HES was based on the lived experiences of ICU nurses in multicultural settings. The engagement of experienced ICU nursing experts during the content validation process enriched the scale's relevance, readability, and applicability. The experts' feedback contributed to meaningful linguistic and contextual adjustments, which enhanced the clarity and usability of the scale in settings with English as the second language of most healthcare providers.

Nevertheless, this study had several limitations. First, content validation was based on input from a small group of experts. Although this was sufficient for CVI calculation, it may limit the generalizability of the findings. Second, as the scale was tailored to Saudi Arabian ICUs, its applicability to other multicultural or monolingual ICU settings remains unknown. Finally, the validation focused solely on content validity. Future studies are required to assess the

scale's construct validity, reliability, and applicability in clinical practice across diverse ICU contexts.

5.10 Implications for Practice

This study represents an initial step in the process of adapting and validating the HES for use in the ICU to align with a multicultural nursing workforce context. The content validation process ensured that the revised tool is conceptually sound and relevant to the clinical and cultural realities of ICU nurses in Saudi Arabia. As a next step, the tool should be tested on a larger, representative sample of ICU nurses to evaluate its psychometric properties. Specifically, exploratory and confirmatory factor analysis are recommended to assess the internal structure and construct validity of the scale. In addition, measures of internal consistency, such as Cronbach's alpha, should be used to establish the reliability of each scale and subscale. These steps are essential to confirm the tool's accuracy and consistency before it is widely adopted in clinical settings. Establishing the validity and reliability of the modified HES will support its use in routine quality improvement initiatives aimed at enhancing effective handover practices in diverse ICU environments.

5.11 Conclusion

A well-structured tool for assessing nurses' perceptions of effective handovers and the factors influencing handover quality in ICUs is required to design appropriate and targeted interventions and improve handover practices. This tool can potentially be used by ICU nurses, managers and educators of quality improvement initiatives to assess perceptions of effective handover before and after interventions. It may also serve as a baseline assessment to evaluate current handover practices and identify areas for improvement, as well as the contextual factors that shape how nurses perceive effective handover in multicultural critical care settings. While

the tool has demonstrated strong content validity, future research should focus on further testing its reliability and validity.

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6 CHAPTER SIX: VALIDATING THE MODIFIED HANDOVER EVALUATION SCALE: FACTOR ANALYSIS AND RELIABILITY TESTING IN SAUDI ICUS

6.1 Abstract

Background

Nursing handovers in intensive care units (ICUs) are high-risk communication events that demand clarity, structure, and clinical accuracy. In multicultural healthcare systems such as Saudi Arabia's, where diverse linguistic and cultural backgrounds are integrated, handover communication can be further complicated. Despite the availability of existing handover evaluation tools, few are tailored to reflect the realities of ICU settings or the multicultural dynamics that shape communication among nurses. This study addresses the need for a validated tool that captures both practice and context.

Aim

This study aimed to assess the reliability and determine internal dimensional structure of modified Handover Evaluation Scale (HES) to fit the Saudi Arabian ICU.

Methods

A cross-sectional study was conducted with a convenience sample of 443 ICU nurses across four hospitals in Riyadh, Saudi Arabia. The modified tool included four sections: demographics, current handover practices, a 13-item modified HES, and a 16-item contextual factors scale. Exploratory factor analysis (EFA) and Cronbach's alpha were used to assess internal consistency and determine the internal dimensional structure.

Results

EFA of the modified HES revealed a two-factor structure: (1) Information Quality and Engagement and (2) Disruptive Communication, with acceptable internal consistency for the

overall scale ($\alpha = .738$). The contextual factors scale revealed a three-factor structure: (1) Interpersonal and Cognitive Factors, (2) Organizational Support, and (3) Operational Interruptions, also showing acceptable reliability for the full scale ($\alpha = .782$).

Conclusion

The modified HES is a reliable tool to assess nurses' perceptions of effective handover and the factors contributing to the effective handover. It is useful tool to monitor and assess the current practice. This tool, however, needs further refinement and further psychometric testing to establish the construct validity.

Keywords

Shift handover, intensive care unit, exploratory factor analysis, reliability, handover evaluation scale

6.2 Introduction

Effective handover during shift change is widely acknowledged as an essential component of patient safety and continuity of care, especially in critical environments such as intensive care units (ICUs), where patient conditions are complex (Bressan et al., 2020; Ahn et al., 2021). It involves critical patient information that is needed to inform decision-making and action (Ahn et al., 2021; Alamrani, 2022). The process of transferring responsibility, accountability and information between incoming and outgoing nurses plays a crucial role in ensuring accurate care planning and preventing undesirable events (Tuna & Dalli, 2019). A recent annual report by the Joint Commission (2025) confirms that ineffective handover contributes to adverse events. Although the importance of effective handover is internationally recognized, ineffective handovers continue to occur and increase patient safety risks. In this context, assessment tools are needed that can help identify gaps in handover practices from the perspective of frontline nurses.

Shift handover in the ICU presents unique challenges that distinguish it from handovers in other general inpatient wards (Brown et al., 2018). ICU nurses communicate detailed, complex and frequently evolving clinical information, often in time-sensitive situations and in an environment prone to frequent interruptions and unexpected changes (Wibrandt & Lipper, 2020). The high acuity of patients, the use of advanced medical devices such as mechanical ventilators, dialysis machines and chest drains, as well as the involvement of a multidisciplinary care team, further increase the complexity of ICU shift handovers (Rodríguez et al., 2018). Ineffective handovers in such settings can have serious consequences, including delayed or inappropriate interventions, medication errors, care omissions and increased risk of patient harm (Lillibridge et al., 2017; Brown et al., 2018; Hada et al., 2021).

To evaluate and improve handover quality, researchers have identified three core domains underpinning effective communication during shift changes: (1) content, referring to the information exchanged; (2) process, which includes the steps taken to transfer responsibility and accountability; and (3) environment, encompassing the situational factors that influence the safety and quality of communication (Redley & Waugh, 2018; Alamrani, 2022). Numerous studies have considered these domains when evaluating handover quality by observing and evaluating nurses' practice (Spooner et al., 2015; Braaf et al., 2015; Reime et al., 2024; Cellura et al., 2025). These observational studies may provide a useful foundation, but they are prone to the Hawthorne effect, whereby staff may modify their practice when observed (Holden, 2001). Therefore, to develop a comprehensive view of the topic, it is important to explore how the nurses themselves perceive their practice.

Although various tools exist to assess handover practices, few are specifically designed to capture nurses' perceptions of effective handover (Forde et al., 2018). The handover evaluation scale (HES) has been used to evaluate the handover from nurses' perspectives (O'Connell et al., 2014). It focuses predominantly on the quality of information, namely, whether the information conveyed is sufficient, relevant, up-to-date and structured—valuable components in handover practice (O'Connell et al., 2014; Forde et al., 2018). The HES also contains items related to interaction and support between incoming and outgoing nurses. Research has shown that effective handover requires nurses to interact with each other to clarify information and engage meaningfully to enhance their understanding of patients' conditions (Alamrani, 2022). Although these items can provide insight into handover quality, the scale overlooks contextual influences (i.e., the environment) such as interruptions, staffing and organizational support. These factors can better illuminate the topic and provide a contextual framework for nurses' perceptions of

their practice.

The original HES items were derived from semi-structured interviews with 27 nurses working in an acute care setting in Australia, supplemented by field observations and validated through exploratory and confirmatory factor analysis (O'Connell et al., 2014). The HES consists of three main dimensions: quality of information (six items), interaction and support (five items) and efficiency (three items). All are measured on a seven-point Likert scale from 1 (strongly disagree) to 7 (strongly agree), with higher scores indicating better perceived handover quality. In the original study (O'Connell et al., 2014), the scale demonstrated strong internal consistency, with a Cronbach's alpha of 0.80 and was later tested and validated in diverse contexts, including China, Turkey, Korea and Belgium (Demiray et al., 2018; Kim et al., 2021; Losfeld et al., 2021; Wang et al., 2022). Although the HES has been proven to be reliable and valid in various settings, it has not been tested in Saudi Arabian ICUs.

The nursing workforce in Saudi Arabia is multicultural as a result of the country's strong reliance on expatriate nurses to meet its healthcare needs (Alsadaan et al., 2021). Non-Saudi nurses account for approximately 68% of the nursing workforce, and many are employed on short-term contracts before relocating to other countries (Al-Dossary, 2018; Falatah et al., 2022). English is the official language of communication in healthcare settings; however, it is a second language for most nurses, which may contribute to communication challenges. An interpretive description study by Alamrani, Jensen & Dunwoody (2025) based on interviews with 24 ICU nurses in Saudi Arabia revealed that language barriers, differing communication styles and cultural differences significantly impacted the effectiveness of handover. Similar challenges have been reported in other multicultural healthcare settings, for instance, in the United Arab Emirates (Mantley, 2021) and among internationally educated nurses in the United Kingdom (Okougha &

Tilki, 2010). As globalization continues to shape the nursing workforce worldwide, these challenges are expected to become increasingly prevalent, adding a layer of complexity to ICU handovers that warrants deeper investigation. This highlights the importance of using a valid and reliable tool that can account for the cultural and linguistic complexities influencing effective handover. To address this need, the HES was recently modified and content-validated for use in the Saudi ICU context (see Chapter 5).

The original HES was adopted and modified based on the qualitative findings of Alamrani, Jensen, and Dunwoody (2025) to fit Saudi Arabian ICUs. A panel of six ICU experts holding master's or doctoral degrees and working in Saudi Arabia were involved in assessing content validity. The modified HES includes a new section evaluating contextual factors (i.e., section D) that influence effective handover, including items on language barriers, staffing, organizational support and interpersonal factors, which were not addressed by the original tool. The modified HES showed excellent scale content validity indices (Section C S-CVI = 0.95, Section D S-CVI = 0.99). Building on prior work that involved the modification and content validation of the HES for use in Saudi Arabian ICUs, the present study aimed to examine the psychometric properties of the revised scale. Specifically, the objectives were to assess its internal consistency and explore its underlying factor structure through exploratory factor analysis (EFA). Establishing the reliability of the modified HES is essential for ensuring its suitability as a robust tool for evaluating handover quality in multicultural ICUs. The validated instrument is intended to support future research, inform clinical practice and guide targeted interventions to improve nursing handover in critical care settings.

6.3 Methods

6.3.1 Aim

The primary goal of the study was to adapt and validate an existing scale for measuring

effective handover practices and contributing factors in Saudi Arabian ICUs. Namely, it tested the reliability and determine internal dimensional structure of the modified HES, which was originally developed by O'Connell et al. (2014) and later modified and content validated in the previous chapter of this dissertation (Chapter 5) to evaluate nurses' perceptions of effective handover and factors influencing handover practice in the Saudi Arabian ICU context.

6.3.2 Study design

The study protocol and methodology were reported in detail in Alamrani, Jensen, Buick, & Dunwoody (2025). The present paper describes the final phase of the project, which employed a cross-sectional study design to test the scale's reliability and to determine the internal dimensional structure of the modified HES for use in Saudi Arabian ICUs (Polit & Beck, 2020).

6.3.3 Setting

The study was conducted at a health cluster in Riyadh, Saudi Arabia, comprising four hospitals and several primary healthcare centres. The ICUs in this health cluster are the main ICUs of the Ministry of Health, with a total of over 450 beds across trauma, maternity, neuro, cardiac, burn, and medical, surgical and respiratory ICUs.

6.3.4 Participants

The recommended sample size for validity and reliability studies lies between 5 and 10 participants per item (Boateng et al., 2018; Polit & Beck, 2020). In the present study, the researcher aimed to include 290 ICU nurses for the 29-item scale. Data were obtained from a convenience sample of 443 ICU nurses working in hospitals in Riyadh, Saudi Arabia.

6.3.5 Data collection

The data were collected via an online survey sent by email to all ICU nurses in the health cluster between October 2024 and January 2025 (Appendix H). The survey was uploaded using

web-based software (Qualtrics) and included an information page outlining the study's purpose, voluntary nature and confidentiality assurances. Informed consent was obtained electronically before survey access (Appendix I). The survey comprised four sections (Appendix K): (a) descriptive information, (b) current shift handover structure, (c) modified HES (i.e., perception of shift handover) and (d) factors influencing handover quality.

6.3.5.1 Descriptive information form (i.e., section A). The questionnaire included eight questions regarding nurses' gender, educational level in nursing, country of origin, position, clinical experience as a nurse and as an ICU nurse, employment status and place of work.

6.3.5.2 Current shift handover practice (i.e., section B). The next section contained nine questions about the handover structure, including handover length and location, source of information, language spoken during handover, language preference, form used during handover and other disciplines present during handover.

6.3.5.3 Modified Handover Evaluation Scale (i.e., section C). The modified HES was made up of 13 items exploring nurses' perceptions of handover practices. It featured items related to the quality of information, such as amount, structure, presentation, relevance and up-to-datedness of the information, interactions, patient assessment, handover duration and efficiency. The items were rated on a seven-point Likert scale as follows: 1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = neither disagree nor agree, 5 = slightly agree, 6 = agree and 7 = strongly agree.

6.3.5.4 Factors influencing handover quality (i.e., section D). This section involved 16 items investigating the factors affecting effective handover practice, such as organizational, environmental, communication, language and interpersonal relationships factors. Like the

modified HES, it employed a seven-point Likert scale.

6.3.6 Data analysis

The data were analyzed using IBM SPSS Statistics version 27 software (IBM Corp., 2020). The first two sections were presented and summarized using descriptive statistics (frequencies and percentages). Before conducting EFA for Sections C and D, inter-item correlations were examined using Pearson correlation coefficients to assess the strength and appropriateness of the relationships between the items. Items with weak correlations ($r < 0.30$) were reviewed for potential exclusion because they may not represent the underlying construct. Similarly, items with very high correlations ($r > 0.85$) were evaluated for redundancy (Polit & Beck, 2020). To assess the overall suitability of the data for factor analysis, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity were conducted. A KMO value of ≥ 0.50 and a statistically significant Bartlett's test ($p < 0.05$) were considered indicators that the data were appropriate for EFA (Watkins, 2018). To conduct the EFA, the unweighted least squares with direct oblimin method was employed to extract the factors and assess the structure. Items with factor loading coefficients below 0.40 were considered for deletion (Boateng et al., 2018). Internal consistency was assessed using Cronbach's alpha, with a value of 0.7 considered acceptable (Tavakol & Dennick, 2011).

6.3.7 Ethical considerations

Permission was obtained by email from Beverly O'Connell, who developed the HES (O'Connell et al., 2014), to adapt, modify and validate the scale to fit the Saudi Arabian ICU. Consequently, the study was reviewed and approved according to the Research Ethics Committee at York University (Certificate No. STU2023-086), and approval was received from the Research Ethics Committee at the local hospitals (Certificate No. H1RI-22-Jun23-01)

(Appendices A & B). The participants signed consent forms electronically before beginning the survey.

6.4 Results

6.4.1 *Demographic characteristics of the research participants*

Four hundred forty-three participants completed the HES online survey, and their demographic characteristics are summarized in Table 6. The participants were recruited from local hospitals in Riyadh, Saudi Arabia. Most of the participants who completed the survey were female nursing staff ($n = 394$, 88.9%), with male participants comprising 11.1% of the sample ($n = 49$). The most common education level in nursing was a bachelor's degree ($n = 389$, 87.8%), followed by a diploma ($n = 26$, 5.9%), master's degree ($n = 14$, 3.2%), graduate diploma ($n = 12$, 2.7%), and doctoral degree ($n = 2$, 0.5%). The participants represented diverse national backgrounds. Most were from India ($n = 269$, 60.9%), followed by the Philippines ($n = 72$, 16.3%) and Saudi Arabia ($n = 63$, 14.3%). Smaller numbers came from Egypt ($n = 9$, 2.0%), Pakistan ($n = 8$, 1.8%), Indonesia ($n = 6$, 1.4%), Jordan ($n = 5$, 1.1%), Malaysia ($n = 4$, 0.9%), Sudan ($n = 3$, 0.7%), South Africa ($n = 2$, 0.5%), and Somalia ($n = 1$, 0.2%) respectively. Regarding nursing experience, 33.9% had between 1 and 5 years of experience as registered nurses ($n = 150$), followed by 6 to 10 years ($n = 110$, 24.8%), 11 to 15 years ($n = 85$, 19.2%), and more than 15 years ($n = 81$, 18.3%). A small number reported less than 1 year of RN experience ($n = 17$, 3.8%). Similarly, participants' ICU-specific experience was most commonly 1 to 5 years ($n = 188$, 42.4%), followed by 6 to 10 years ($n = 118$, 26.6%), 11 to 15 years ($n = 58$, 13.1%), and more than 15 years ($n = 55$, 12.4%), with 5.4% having less than 1 year of ICU experience ($n = 24$). The majority of the participants were employed as staff nurses ($n = 365$, 82.4%), while 15.6% were charge nurses ($n = 69$) and 2.0% were unit managers ($n = 9$). Most participants

reported working full-time (n = 433, 97.7%), with a small number working part-time (n = 2, 0.5%) or as casual employees (n = 8, 1.8%). Regarding ICU work settings, the most common units were medical ICUs (n = 120, 27.1%) and cardiac ICUs (n = 118, 26.6%), followed by trauma ICUs (n = 72, 16.3%), neuro-ICUs (n = 65, 14.7%), and surgical ICUs (n = 21, 4.7%). Fewer participants worked in the neonatal ICU (NICU; n = 7, 1.6%) or pediatric ICU (PICU; n = 2, 0.5%).

Table 6 Demographic characteristics of the participants

	SAMPLE		POPULATION (MOH, 2023)	
	N	%	N	%
SEX				
Male	49	11.1%	51,259	24.1%
Female	394	88.9%	161,851	75.9%
EDUCATION				
Diploma	26	5.9%		
Bachelor's degree	389	87.8%	N/A	N/A
Graduate diploma	12	2.7%		
Master's degree	14	3.2%		
Doctoral degree	2	0.5%		
COUNTRY OF ORIGIN				
India	269	60.9%		
Philippines	72	16.3%		
Saudi	63	14.3%		
Sudan	3	0.7%	N/A	N/A
Egypt	9	2%		
Somal	1	0.2%		
Jordan	5	1.1%		
Malaysia	4	0.9%		
Indonesia	6	1.4%		
Pakistan	8	1.8%		
South Africa	2	0.5%		
YEARS OF EXPERIENCE IN NURSING				
Less than a year	17	3.8%		
1–5 years	150	33.9%	N/A	N/A
6–10 years	110	24.8%		

11–15 years	85	19.2%		
More than 15 years	81	18.3%		
YEARS OF EXPERIENCE AS CRITICAL CARE NURSE				
Less than a year	24	5.4%		
1–5 years	188	42.4%	N/A	N/A
6–10 years	118	26.6%		
11–15 years	58	13.1%		
More than 15 years	55	12.4%		
POSITION				
Staff nurse	365	82.4%		
Charge nurse	69	15.6%	N/A	N/A
Unit manager	9	2%		
EMPLOYMENT STATUS				
Full-time	433	97.7%		
Part-time	2	0.5%	N/A	N/A
Casual	8	2%		
WORKPLACE				
Medical ICU	120	27.1%		
Surgical ICU	21	4.7%		
Cardiac ICU	118	26.6%		
Trauma ICU	72	16.3%	N/A	N/A
Neuro ICU	65	14.7%		
PICU	2	0.5%		
NICU	7	1.6%		
Other	38	8.6%		

6.4.2 Descriptive results for current handover practices

The results of the second section (i.e., current handover practice) of the modified tool are depicted in Table 7. The participants reported a wide range in the duration of shift handovers. The average handover time was approximately 27 minutes ($M = 27.82$, $SD = 12.30$). Most of the participants conducted handover at the bedside (92.3%), followed by the nurses' station (5.4%). Similarly, when asked about their preferred location for handover, most preferred bedside handover (92.3%). Furthermore, most participants ($n = 277$, 62.5%) reported that no professionals from other disciplines were present during the handover process. Among those who

indicated the presence of other healthcare professionals, doctors were the most commonly reported ($n = 100$, 22.6%), followed by respiratory therapists ($n = 55$, 12.4%) and pharmacists ($n = 11$, 2.5%).

Regarding access to patient information, most participants ($n = 292$, 65%) reported the availability of electronic files during handover. Another 29.8% ($n = 132$) indicated that both electronic and paper files were available, while a small proportion had only paper files ($n = 14$, 3.2%). In terms of preference, most nurses preferred to use electronic files to access patient information ($n = 303$, 68.4%), followed by both paper and electronic files ($n = 114$, 25.7%). A minority preferred paper files ($n = 21$, 4.7%). When asked about the languages spoken during the handover, 81% of respondents reported using English, while others used English in combination with one or more additional languages. When asked about their language preference during handover if speaking the same language as the incoming/outgoing nurse, 73.6% ($n = 326$) still preferred English, whereas 23.9% ($n = 106$) preferred to use their shared native language.

Table 7 Characteristics of current handover practices

CHARACTERISTICS	CATEGORY	N	%
Source of information	Electronic file	292	65.9
	Paper file	14	3.2
	Both	132	29.8
	Other	5	1
Preferred source of information	Electronic file	303	68.4
	Paper file	21	4.7
	Both	114	25.7
	Other	5	1.1
Handover form	Yes	266	60
	No	177	40
Handover location	Handover room	3	.7
	Bedside	409	92.3
	Nurses' station	24	5.4
	Other	7	1.6
Preferred handover location	Handover room	8	1.8

	Bedside	409	92.3
	Nurses' station	17	3.8
	Other	9	2
Language spoken during the handover	English	359	81
	English & Arabic	31	7
	English & Urdu	16	3.6
	English & Malay	3	.7
	English & Hindi	14	3.2
	English & Tagalog	14	3.2
	English & Bahasa	2	.5
Language preference if the incoming or outgoing nurse speaks the same language	Same language	106	23.9
	English	326	73.6
	Other	11	2.5
Disciplines present at the handover	Doctors	100	22.6
	Pharmacists	11	2.5
	Respiratory therapists	55	12.4
	No other disciplines	277	62.5

6.4.3 *Factor analysis & Reliability Assessment*

Factor analysis was used to test the modified HES after combining the modified and additional items resulting from the qualitative findings (AlAmrani, Jensen & Dunwoody, 2025). The new version of the modified tool contains four sections: (a) descriptive information, (b) current shift handover practices, (c) perceptions of shift handover, and (d) factors influencing the quality of handover. The first two sections include multiple-choice and open-ended questions. The last two sections are 7-point scales; therefore, factor analysis was conducted for the last two sections to determine the internal dimension structure of the modified HES and the factors influencing the quality of the handover scale.

Cronbach's alpha coefficient was used to assess the internal consistency of the scale. An alpha value describes the extent to which all the items in a test measure the same concept with acceptable value ranged between 0.70 to 0.95 (Tavakol & Dennick, 2011) In this study, reliability analysis was conducted for each identified factor and for the full 13-item scale (section C) and

for the 16-item scale (section D).

6.4.3.1 Exploratory factor analysis for the modified HES. Initially, the factorability of the modified HES was examined. Several methods were used to assess the assumptions for factor analysis. First, all the items correlated at least .3 with at least one other item, suggesting reasonable factorability. Second, the Kaiser–Meyer–Olkin measure of sampling adequacy was 0.85, above the recommended value of 0.5, and Bartlett’s test of sphericity was significant ($p < 0.001$) (Watkins, 2018); therefore, factor analysis was appropriate. Unweighted least squares with direct oblimin rotation of all items of the modified HES was conducted on data gathered from 443 ICU nurses. The two-factor solution explained 39.5% of the variance. The results of a direct oblimin rotation of the solution are shown in Table 8. Nine items loaded onto factor 1, labelled “Information Quality and Engagement”, with factor loadings exceeding 0.4. This factor reflects the extent to which the nurse perceives the quality of information in terms of accuracy, amount, structure, presentation, and engagement. It captures critical elements such as the sufficiency and timeliness of patient information, ease of following the information presented, the opportunity to clarify and ask questions, and the ability to remain mentally focused during the handover. Four items loaded onto factor 2, labelled “disruptive communication” with factor loading above 0.4. This factor represents potential barriers that can compromise the quality of information, such as the presence of irrelevant information, interruption, and inefficiency.

Table 8 Factor loading based on unweighted least squares with direct oblimin rotation of 13 items of the modified HES

Items	Factor 1	Factor 2
18. I have the opportunity to discuss difficult clinical situations I have experienced	.542	
19. I am able to assess the patient and check the patient’s	.649	

surroundings during shift handover	
20. I received sufficient patient information during the shift handover	.643
22. The way in which information is provided to me during the handover is easy to follow.	.745
24. I am able to clarify information that has been provided to me.	.729
25. Patient information is provided during the shift handover in an appropriate timeframe	.652
26. I have the opportunity to ask questions about things I do not understand	.675
28. The patient information that I receive is up to date	.625
29. I am able to keep my mind focused on the information being given to me.	.667
21. As a receiving nurse, I am often given information during shift handover that is not relevant to patient care.	.485
23. I am often interrupted during the shift handover	.643
27. I find shift handover takes too much time.	.521
30. I feel that important information is not always given to me	.484

Three-factor extraction was pursued after the initial two-factor solution distinctly divided the items into two broad groups. While statistically adequate, the conceptual alignment of some items within factor 1 raised concerns. Specifically, items such as item 18 (“I have the opportunity to discuss difficult clinical situations I have experienced”) and item 26 (“I have the opportunity to ask questions about things I do not understand”) appear to reflect aspects of interpersonal interaction, peer support, and openness during handover. In contrast, items such as 20, 22, 24, and 28 are more closely aligned with the quality of information, with a focus on sufficiency, structure, clarity, and accuracy.

To explore whether a more conceptually coherent grouping could be achieved, a three-factor solution was extracted. This was conducted by forcing all the factors to load on three factors to align with the number of factors in the original tool. A three-factor solution was extracted on the basis of the scree plot and eigenvalues >1 , which explained a cumulative 43.7% of the total variance. Factors 1, 2, and 3 accounted for 30.8%, 9.2%, and 3.7% of the variance, respectively. Despite acceptable statistical loadings, some conceptual overlap and ambiguity remained between factors. (Table 9)

Table 9 Factor loading based on unweighted least squares with direct oblimin rotation of 13 Items of the modified HES (3 factors)

Items	Factor 1	Factor 2	Factor 3
18. I have the opportunity to discuss difficult clinical situations I have experienced	.641		
19. I am able to assess the patient and check the patient's surroundings during shift handover	.724		
20. I received sufficient patient information during the shift handover	.547		
22. The way in which information is provided to me during the handover is easy to follow.	.633		
24. I am able to clarify information that has been provided to me.	.700		
25. Patient information is provided during the shift handover in an appropriate timeframe	.571		
26. I have the opportunity to ask questions about things I do not understand	.666		
28. The patient information that I receive is up to date			.831
29. I am able to keep my mind focused on the information being given to me.			.438

21. As a receiving nurse, I am often given information during shift handover that is not relevant to patient care.	.502
23. I am often interrupted during the shift handover	.640
27. I find shift handover takes too much time.	.511
30. I feel that important information is not always given to me	.485

After reviewing both the two- and three-factor solutions, the two-factor model was selected as the most appropriate structure for this study. Although the three-factor model accounted for slightly more variance, the third factor demonstrated weak internal consistency (Cronbach's $\alpha = 0.611$) and included items that were conceptually inconsistent. For example, one item addressed the timeliness of information, whereas another focused on the nurse's ability to stay mentally focused—two concepts that do not clearly represent a unified construct. In contrast, the two-factor model provided a more coherent and interpretable structure. It showed strong internal consistency, particularly for factor 1 ($\alpha = 0.866$), and grouped items in a way that aligned well with the intended constructs. Additionally, the two-factor solution is more parsimonious, which is preferable when there is no substantial improvement in model fit or clarity with a more complex structure. Thus, the two-factor model was retained for further analysis, as it balances statistical adequacy, conceptual clarity, and practical interpretability. The selection of the two-factor model was independently reviewed and confirmed by two statisticians' experts in factor analysis, enhancing the rigor and credibility of the findings.

6.4.3.2 Reliability assessment for the modified HES. The overall 13-item scale demonstrated acceptable reliability, with a Cronbach's alpha of 0.738. Subscale-level

analysis revealed a high reliability coefficient for factor 1 (information quality and engagement; 9 items), with an alpha of 0.866, indicating excellent internal consistency. In contrast, factor 2 (disruptive communication; 4 reversed items) yielded a lower reliability coefficient of 0.611.

6.4.3.3 *Exploratory factor analysis of factors influencing the quality of the handover scale.*

Section D of the survey refers to the factors influencing handover quality, including 16 items. These items are new items and have not been tested before. Each item correlated at .30 or higher with at least one other item, supporting the suitability of the dataset for factor analysis. The Kaiser–Meyer–Olkin measure of sampling adequacy was .80, and Bartlett’s test of sphericity was significant ($p < 0.001$) (Watkins, 2018); therefore, this section is appropriate for factor analysis. Unweighted least squares with direct oblimin rotation of all the items in section D was conducted. The three-factor solution explained 35.5% of the variance. The results of a direct oblimin rotation of the solution are shown in Table 10. Eight items loaded onto factor 1 (interpersonal and cognitive factors), encompassing relational challenges (e.g., hierarchy, language barriers) and cognitive load (e.g., feeling rushed or overwhelmed) that hinder interaction in effective handover. Five items loaded onto factor 2 (organisational support), including items related to organisational infrastructure (e.g., electronic file systems or policies for structured tools) and unit culture, which shapes the practice of complete and accurate handover. Three items loaded onto factor 3 (operational interruptions), reflecting workflow-related disruptions that interfere with handover quality and continuity. This factor includes the impact of nursing staff shortages, interruptions by other healthcare team members, and unplanned procedures occurring at the end of shifts. All the items loaded ranged from 0.403 to 0.68,

as presented in Table 10.

Table 10 Factor loading based on unweighted least squares with direct oblimin rotation of 16 items of section D

Items	Factor 1	Factor 2	Factor 3
31. I feel hesitant to ask questions or share information if the other nurse is more senior.	.565		
32. Feeling rushed or overwhelmed makes me less engaged in the shift handover.	.517		
33. If I have more than one patient, I often forget to include some information in the shift handover	.476		
36. Language barrier sometimes cause misunderstanding during the shift handover.	.423		
37. I prefer to speak my native language to provide complete shift handover.	.546		
38. If there is a personal issue between me and another nurse, I tend to provide only standard patient data without explanation.	.660		
45. Junior nurses hesitate to ask questions	.626		
46. Junior nurses hesitate to present necessary information during the handover	.641		
34. The ICU environment makes it easy to call the previous nurse after work to complete the shift handover or ask questions about the patient		.425	
39. Using the electronic file helps me to provide the		.458	

most recent and complete information.	
40. I prefer using the ICU flow sheet over the sbar tool to present the patient information.	.446
41. It is essential to ask questions during the shift handover for clarification.	.645
44. Senior nurses provide systematic and complete handovers.	.494
35. Shortage of nursing staff impacts the quality of handovers.	.684
42. Shift handover is interrupted by other healthcare team members.	.403
43. Unplanned procedures at the end of the shift negatively affects the quality of handover	.553

6.4.3.4 Reliability assessment of factors influencing the handover quality scale. The overall 16-item scale demonstrated acceptable reliability, with a Cronbach's alpha of 0.782. Subscale-level analysis revealed a high reliability coefficient for factor 1 (interpersonal and cognitive factors; 8 items), with an alpha of 0.812, indicating excellent internal consistency. In contrast, factor 2 (organisational support; 5 items), yielded a lower reliability coefficient of 0.554, and factor 3 (operational interruptions; 3 items), had an alpha of 0.605.

6.5 Discussion

The purpose of this study was to assess the reliability and determine internal dimensional

structure of the modified HES, as well as the factors affecting the quality of the handover scale, to fit the multicultural ICUs in Saudi Arabia. Tool adaptation, modification and content validity were described in the previous chapter (Chapter 5), which demonstrates strong content validity. A total of 443 ICU nurses working in various hospitals in Riyadh participated in this study, representing a diverse workforce in terms of nationality, experience and educational background. Exploratory factor analysis of the modified HES revealed a two-factor structure: (1) Information Quality and Engagement and (2) Disruptive Communication with acceptable reliability for the entire 13-item scale ($\alpha = .738$). A separate factor analysis of the newly developed items assessing contextual influences on handover identified three factors: (1) Interpersonal and Cognitive Factors, (2) Organizational Support and (3) Operational Interruptions with acceptable reliability for the overall 16-item scale ($\alpha = .782$).

The participants' demographic data reflect the complex and multicultural nature of critical care units in Saudi Arabia. The sample predominantly comprised female nurses, which aligns with global nursing demographics (WHO, 2025). Notably, over ten nationalities were represented in the sample, which demonstrates the cultural and linguistic diversity within the ICU teams. The data also indicate a predominance of expatriate nurses, particularly from India and the Philippines, which is consistent with the staffing composition of many Saudi hospitals (Almansour et al., 2020; Alanazi & Yates, 2022; Alharbi, 2025). This multicultural representation reinforces the necessity of validating the HES within a diverse workforce, where communication styles and language proficiency may affect the quality and consistency of shift handovers.

Exploratory factor analysis was used to determine the internal dimensional structure of the modified HES. EFA was appropriate at this stage given the addition and modification of items to the original tool, which warranted the exploration of potential new or restructured

dimensions. In this study, a two-factor solution was found to be the most conceptually and statistically appropriate, reflecting the Information Quality and Engagement and Disruptive Communication constructs. This differs somewhat from findings in Turkish studies, where Demiray et al. (2018) reported a one-factor structure, while Tuna & Dalli (2019) identified two factors. It is important to note that both Turkish studies employed principal component analysis (PCA), rather than common factor analysis techniques, such as unweighted least squares with direct oblimin rotation, which were used in this study. While PCA can be useful for data reduction and may assist in determining the number of factors to retain, it does not distinguish between shared and unique variance and does not account for measurement error. In contrast, common factor analysis is generally recommended to uncover latent constructs that explain the relationships among observed variables (Flora & Flake, 2017; Watkins, 2018). Therefore, different methodological approaches may explain the variability in factor structures across studies.

This study highlighted that the best fit for the data was a two-factor solution, which is different to the original tool. When comparing the findings of this study with the original HES developed by O'Connell et al. (2014), there are some clear similarities and meaningful differences. Both studies highlight the central importance of information quality. Items such as the receipt of up-to-date, sufficient and clearly presented information loaded strongly in both versions of the tool, reinforcing the vital role of accurate communication during handovers. The original tool included a separate subscale for Interaction and Support, while in this study, those items were grouped together with information-related items under one factor—Information Quality and Engagement. This indicates that in multicultural ICU settings, nurses may view the opportunity to ask questions or discuss concerns as an essential part of obtaining clear

information as part of the information exchange process.

Another key difference relates to the Efficiency subscale. In the original study, efficiency emerged as a standalone factor, reflecting concerns about time use and redundancy in handover (O’Connell et al., 2014). In contrast, in this study, items related to time burden, interruptions and missing information were grouped into a broader factor labelled Disruptive Communication. This shift in structure suggests that, in high-intensity ICU environments, efficiency is not perceived in isolation – inefficiency is experienced as part of a broader breakdown in communication, often compounded by environmental and interpersonal disruptions. By collapsing into a single factor, these issues appear more interconnected and reflective of the practical barriers nurses face during handover. This highlights the need to address both the quality of the information exchange as well as the factors that improve the effectiveness of the handover in diverse ICU contexts.

Qualitative research informed the addition of the new scale designed to identify the factors influencing effective handover, as nurses frequently raised these variables when describing their perceptions and experiences of the handover process (AlAmrani, Jensen, & Dunwoody, 2025). This represents a meaningful expansion beyond the scope of the original HES, which primarily focused on evaluating nurses’ perceptions of handover practice itself. The newly developed items provide contextual insight into the underlying conditions that may affect HES scores, capturing aspects not previously addressed in the original tool. The factor analysis revealed a three-factor structure reflecting Interpersonal and Cognitive Challenges, Organizational Support and Operational Interruptions, highlighting the multi-level nature of the factors shaping handover practice in an ICU setting. Importantly, this scale creates a foundation for future research to explore how nurses’ perceptions – positive or negative – of handover may

be shaped by interpersonal, organizational or operational factors. These findings reinforce the notion that effective handover practice is not only determined by the content of communication but also by the person delivering the information, the environment in which it is shared and the systemic structures that support or hinder the process. All items included in this scale, however, were newly developed and had not been tested in prior studies, making this a significant step toward establishing a more comprehensive tool.

Assessing internal consistency is a crucial step in scale validation to determine whether the items within each subscale reliably measure the same underlying construct (Tavakol & Dennick, 2011). Cronbach's alpha is a widely accepted statistical coefficient for this purpose (Boateng et al. 2018; Polit & Beck, 2020). Reliability analysis was conducted in this study, for both the newly developed scale measuring factors influencing handover quality and the modified HES to evaluate their suitability for use in multicultural ICU settings. The 16-item factors affecting the handover quality scale demonstrated an overall acceptable Cronbach's alpha of .782, with excellent internal consistency observed in the interpersonal and cognitive factors subscale ($\alpha = .812$). However, the Organizational Support ($\alpha = .554$) and Operational Interruptions ($\alpha = .605$) subscales yielded lower alpha values, which may be explained by the fewer number of items and the broader conceptual nature of these constructs (Tavakol, & Dennick, 2011). This suggests that although these subscales capture important dimensions of the handover context, further refinement or expansion of these items may be required to improve their measurement precision and ensure more reliable assessment in future studies.

Similarly, the modified HES demonstrated acceptable overall reliability ($\alpha = .738$), with strong internal consistency for the Information Quality and Engagement subscale ($\alpha = .866$). In contrast, the Disruptive Communication subscale, which consisted of four negatively worded

items, yielded a lower reliability coefficient ($\alpha = .611$). This pattern mirrors the findings from the original HES, where the Efficiency subscale – also composed of negatively phrased items – produced a comparatively lower alpha ($\alpha = .67$) (O’Connell et al., 2013). This suggests that negatively worded items may inherently reduce internal consistency due to increased cognitive burden or misinterpretation, particularly in survey-based studies, as noted by Dodeen (2023).

Compared with previous studies that translated and adapted the HES in more linguistically homogeneous contexts, such as Turkey, Korea and China, the reliability coefficients in this study are lower. For example, Tuna & Dalli (2019) reported an overall alpha of 0.92 with subscale alphas between 0.82 and 0.91, while Kim et al. (2021) and Wang et al. (2022) reported exceptionally high alphas of 0.95 and 0.96, respectively. These discrepancies may be explained by contextual differences. In this study, the linguistic diversity within the Saudi Arabian ICUs may have influenced the consistency of how participants interpreted and responded to items, particularly those that were negatively worded or abstract in nature. While the overall reliability of the modified HES remains within acceptable thresholds, the results indicate the need to refine subscales with reversed items. Future revisions may benefit from rephrasing or balancing positive and negative item formats to reduce misinterpretation and enhance psychometric robustness.

6.6 Strengths & limitations

This study provides a robust psychometric evaluation of the modified HES and a newly developed scale through EFA and internal consistency testing. A key strength is the large, diverse sample size ($n = 443$), which strengthens the statistical power and relevance of the findings to Saudi ICU settings. Reliability analysis demonstrated acceptable overall internal consistency for both scales, with excellent reliability for key subscales. However, some subscales showed lower

alpha values, particularly those with fewer or negatively worded items, highlighting the need for refinement. Additionally, the study was limited to cross-sectional data, and construct validity was not assessed. Future research should further evaluate the stability and predictive validity of the identified factor structures in varied ICU environments.

6.7 Relevance for Nursing Practice

Effective shift handover plays a critical role in ensuring accurate, comprehensive, and shared understanding of patient information. Safe handover practices help minimize the risk of omissions, misunderstandings, and ambiguities, thereby enhancing patient safety and continuity of care. The modified HES offers a reliable tool for assessing effective handover by capturing nurses' perceptions while acknowledging the contextual factors that influence practice. This tool can assist nursing educators in identifying specific areas to address in training programs focused on communication and handover competencies. The newly developed section of the modified HES provides nursing leaders with valuable data that can inform policy development, guideline updates, and strategic initiatives aimed at improving handover quality.

6.8 Recommendations for Future Research

The findings of this study lay the foundation for future research aimed at further strengthening the psychometric properties of the modified HES. While the current study established the tool's reliability and explored its factor structure through exploratory factor analysis, future studies should conduct confirmatory factor analysis to validate the proposed structure and assess the construct validity of the scale. Further refinement and testing of individual items, particularly those with lower internal consistency, may improve the overall reliability and conceptual clarity of the tool. It would be valuable to validate the scale in other countries with similar multicultural context to see how well it applies to in different cultural and

clinical contexts. The insights gained from using this tool can help inform practical strategies to improve handover process. Future research could explore how these strategies affect patient outcomes. It will also be important to test the tool's usefulness in measuring change over time particularly before and after interventions to ensure it can support ongoing improvements in handover practice.

6.9 Conclusion

The modified HES and the factors influencing the effective handover scale is a reliable tool that can be used within the Saudi Arabian ICU context to assess the nurses' perceptions of current handover practice and factors influencing effective handover practice. This tool can be used to provide insights into areas for improvement in the current handover process and to design relevant interventions based on the identified needs. It can also be used as pre/post intervention evaluation. Future study should test the validity of this tool in similar contexts.

6.10 Reference

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7 CHAPTER SEVEN: OVERALL DISCUSSION, IMPLICATIONS, RECOMMENDATIONS, STRENGTHS, LIMITATIONS, AND CONCLUSIONS

7.1 Introduction

This exploratory sequential mixed-methods study was conducted in Riyadh, Saudi Arabia, to adapt, modify, and validate the handover evaluation scale for use in multicultural ICUs in Saudi Arabia. This study explores effective shift handover in the ICU and the factors contributing to the quality of handover with consideration for the multicultural nursing workforce. The literature review showed that limited data are available on effective handover in the ICU, particularly in multicultural workplaces and specifically in Saudi Arabia. Therefore, this study makes an important contribution to the shift handover literature. The findings of both phases of this study are presented in earlier chapters; the current chapter integrates these results, discusses their implications, and presents the strengths and limitations.

7.2 Nurses' experiences in Saudi Arabia

To modify the HES and ensure its appropriateness for the Saudi Arabian context, it was necessary to explore ICU nurses' experiences working in Saudi Arabia. The findings of the qualitative phase (i.e., interpretive description study) provided a deeper understanding of nurses' experiences with effective handover and contributing factors. A key finding was related to how ICU nurses defined and understood effective handover, which highlighted that effective handover requires a combination of information and interaction components. Understanding the meaning of effective handover from the nurses' perspective was essential in modifying the tool. Nurses evaluate handover based on the information provided and the interactional process through which handover is conveyed. Recognising and learning about these perspectives is

crucial because it ensures that the modified tool assesses handover quality and reflects the realities of practice for ICU nurses, thereby strengthening its relevance.

The findings of this study confirm and expand upon what has been documented in international and local research on the communication challenges of handover. Ahn et al. (2020) synthesised qualitative studies from Western countries and identified incomplete information, interruptions, and limited opportunities for dialogue as persistent barriers, concerns also raised by ICU nurses in Saudi Arabia in the present study. Similarly, Theron et al. (2025) demonstrated that while multicultural teams enrich nursing practice, they also create opportunities for misinterpretation and conflict. The present findings confirm previous reported findings by Ahn et al., (2020) and Theron et al., (2025) and advances them by demonstrating how communication challenges emerge during ICU handovers. Hierarchical dynamics, indirect communication, reliance on nonverbal cues, and inconsistent language proficiency were found to compromise the clarity and accuracy of information transfer. These parallels suggest that although the Saudi ICU setting is culturally and geographically distinct, many of the core challenges nurses experience during handover mirror those identified in Western health systems, supporting the argument that handover challenges are similar globally. This similarity also suggests that the modified tool, while tailored to Saudi ICUs, has potential applicability in international settings where similar barriers exist.

Handover quality cannot be assessed without considering the factors that may affect the perceptions of handover and provide a realistic understanding of handover practice. The qualitative insights from this study complement the quantitative findings of Abou Hashish et al. (2023), who reported that staffing, fatigue, stress, and environmental factors were significant predictors of handover quality, while supportive teamwork and structured protocols enhanced it.

These factors identified in previous quantitative research are consistent with the themes described by nurses in this study, strengthening the evidence that psychological, organisational, and environmental conditions are central to handover effectiveness. However, the present study adds depth by highlighting how these factors are lived in practice. Moreover, this study identified cultural and linguistic diversity as well as hierarchical constraints as additional influences on handover effectiveness. Therefore, this study adds context and insights into handover failures, reinforcing the need for assessment tools that reflect the nurses' lived realities.

An important insight from the interpretive description study is the role of language and culture in shaping nursing handover, a dimension that has been mostly overlooked in the literature. Four key themes emerged that highlight the unique contribution of this study: (1) the influence of culture on handover, (2) English proficiency requirements, (3) advocacy for native languages, and (4) language and clinical competence.

7.2.1 The influence of culture on handover

Participants in the qualitative study described experiences where hierarchy, communication style, and cultural differences influenced the accuracy and completeness of information exchanged during handover. For example, one nurse explained, "If you are a senior nurse, then I will be afraid to ask..." This reflects the influence of hierarchy and power distance, where deference to seniority creates hesitation to seek clarification, even when it may affect patient safety. Such dynamics are consistent with Hofstede's (2011) concept of power distance and with studies showing that nurses from high-power-distance cultures may avoid challenging more senior staff (Choi et al., 2019; Omura et al., 2018). These dynamics affect the completeness of handover, reduce shared understanding, and hinder open dialogue.

Nonverbal cues were frequently misinterpreted during handover. For instance, one

participant noted that Jordanian nurses often nod their heads to indicate that they want the handover to be brief; another reported that among Indian nurses, shaking the head indicates agreement. These examples illustrate how culturally specific gestures may be misinterpreted, leading to inaccurate assumptions. For instance, if a nurse assumes that a nonverbal cue indicates understanding when clarification is needed, essential details can be overlooked. This suggests a lack of cultural understanding, which can affect how nurses interact during handover and lead to incomplete information. This finding aligns with studies showing that differences in direct and indirect communication styles, as well as culturally influenced nonverbal cues, can negatively affect effective communication in multicultural teams (Xiao et al., 2013; Zanjani et al., 2018).

These results confirm previous findings that multicultural teams face unique communication challenges (Almutairi et al., 2015; Brett et al., 2020) and expand on them by demonstrating that these challenges are enacted in everyday handover practices in Saudi ICUs. The contribution of this study lies in presenting, through nurses' experiences, how hierarchy, nonverbal cues, and cultural differences are lived realities that shape effective handover practice. The findings highlight the importance of developing culturally competent communication strategies to help nurses interact with their colleagues.

7.2.2 English proficiency requirements

Participants highlighted inconsistencies in the requirement for proof of English proficiency during recruitment. For example, some Arab nurses were not required to provide English test results despite completing their nursing education in Arabic, while non-Arabic speaking nurses were required to present proof, even if their training was in English. In practice, however, the Saudi Commission for Health Specialties (SCFHS) does not mandate a Specific English test for licensure; instead, all nurses must pass the national licensing examination, which

is conducted in English (SCFHS, 2023). The variability described by participants therefore reflects differences in recruitment policies among hospitals and healthcare organizations, rather than national licensing standards. This inconsistency creates a workforce with varying levels of language competence, which has direct implications for handover quality and other daily communication activities. Variation in proficiency can lead to misinterpretation, misunderstanding, and incomplete handover, compromising patient safety. In this study, nurses reported that those with limited English proficiency often accepted information without clarification, and they withheld information due to language barriers. Similarly, Manely (2021) reported that nurses in the operating room were reluctant to ask questions due to language barriers. Similar studies in Saudi Arabia have shown that limited English proficiency contributes to safety risks (Algahtani, 2015). The present study demonstrates that these challenges are shaped by both individual proficiency and recruitment practices, which determine the communicative capacity of the workforce. By drawing attention to organisational processes, this finding reframes language competence as a personal skill as well as a structural responsibility, emphasising the need for consistent policies that align recruitment standards with the communication demands of ICU practice.

7.2.3 Advocacy for native language

Due to miscommunication arising from language barriers, participants advocated for the use of their native language during handover. Speaking in a familiar language was perceived as a way to enhance mutual understanding and facilitate more interactive exchanges among colleagues who shared the same linguistic background. However, in multicultural ICU units, this practice presents several challenges. It can limit other team members in detecting and correcting potential inaccuracies, increasing the risk of incomplete or incorrect information exchanges. It

can also exclude patients and families from meaningful engagement in the handover process. Furthermore, this practice restricts educational opportunities for interns and student nurses, who depend on handover interactions to develop their communication skills and enhance their understanding of patients' conditions. This highlights the interconnected and complex relationship between individual linguistic comfort and the collective need for accurate, inclusive, and safe communication during handover in multicultural ICUs.

7.2.4 *Language and clinical competence*

Effective communication is essential to safe practice, particularly during handover, where the accurate and timely exchange of information is crucial. In one case, a participant shared an experience about a clinically competent ICU nurse who was transferred to a less acute ward due to limited English proficiency. Despite the ongoing nursing shortage, this case illustrates how management conceptualises competence as multidimensional, with communication positioned alongside clinical and technical expertise as a prerequisite for safe practice. In this instance, language proficiency was treated as a technical requirement, integral to ensuring the reliability of information transfer and the continuity of care. This interpretation aligns with national nursing competency frameworks in Saudi Arabia, which identifies communication as a fundamental domain of professional nursing practice (SCFHS, 2023) as well as patient safety standards that emphasise communication failures as a leading cause of adverse events (JCI, 2017). However, this finding also raises questions about organisational roles in recruitment and workforce development, particularly regarding the extent to which language requirements are supported versus enforced. It emphasises the need for strategies that ensure patient safety while also providing structured support for nurses who speak English as a second language, ensuring that clinical expertise is valued without compromising the quality of handover practice.

7.2.5 *Summary of contributions from nurses' experiences*

The qualitative phase of this study makes three important contributions to the literature. First, it confirms that many of the challenges identified in Western healthcare systems, such as incomplete information, interpersonal communication challenges, and workplace interruptions (Ahn et al., 2020), are also present in Saudi ICUs, suggesting that core handover issues are global. Second, it shows how multicultural workforce dynamics, including language barriers, nonverbal misinterpretations, and power distance norms, shape handover interactions in ways not widely addressed in prior research. These insights highlight that handover is not only a technical exchange of information but also a socially and culturally mediated process. Third, this study shifts the focus from individual behaviours to organisational responsibility, demonstrating how recruitment policies, language requirements, and workforce management influence the communicative capacity of ICU teams. Together, these insights provide a strong rationale for adapting the HES to reflect multicultural practice, offering a tool that can measure and inform strategies to improve handover quality in Saudi Arabia and other multicultural healthcare settings.

7.3 *Modification of the HES*

A key phase of this study was the modification of the HES. The data integration in this phase relied on qualitative findings using interpretive description approach to build and modify the items for the quantitative phase. The initial modified version of the HES was derived from these qualitative findings. The Handover Evaluation Scale had not been used in Saudi Arabia before this study. Originally developed in Australia, the HES has been applied in Belgium, Korea, China, and Turkey. It was also translated into several languages, including French, Turkish, Chinese, and Korean. For this study, the original language of the tool was used, as the

nurses in this study spoke English as the standard language of communication within the hospital. Prior studies have largely focused on linguistic translation to suit a relatively homogenous population. However, this study advanced the tool conceptually by embedding the contextual insights derived from the lived experiences of ICU nurses in Saudi Arabia.

The qualitative findings provide an in-depth understanding of what makes handover effective for ICU nurses. Many items from the original tool were retained, suggesting that nurses' experiences in this study are similar to those of nurses globally. This reinforces the global relevance of the HES, supporting its validity as a measure of core handover practice. Four items were omitted from the modified HES because they did not reflect the nature of the ICU, where staff are often busy and have limited time to discuss non-patient information during handover. The omitted items were related to debriefing, workload discussions, and educational opportunities, reflecting the experiences of ICU nurses in this study. The decision to omit the patient involvement item also reflected the nature of ICU patients, who are often unable to meaningfully engage during handover due to their conditions. This further reflects the Saudi context, as the handover is often conducted in languages other than the patient's language (i.e., Arabic).

The qualitative findings also informed the development of a new section addressing factors influencing handover quality. Nurses in this study evaluated handover by its informational and interactional components and the conditions under which they occurred, including staffing shortages, frequent interruptions, language barriers, hierarchical dynamics, handover tool availability, and interpersonal relationships. By incorporating these dimensions, the modified HES advances earlier adaptations that treated handover as an isolated technical event. Instead, it conceptualises handover as an interaction embedded within complex

sociotechnical systems. This represents a significant contribution, as it enables the tool to capture both the quality of the handover exchange and the contextual factors that shape it. The modified HES developed in this study retains global comparability while offering a contextually grounded measure that reflects the realities of multicultural ICU practice in Saudi Arabia and potentially in other international settings with similar workforce dynamics.

7.4 Reliability and validation tests

7.4.1 *Content validation*

To ensure the content validity of the modified HES, six experts with ICU experience and a master's or doctoral degree in nursing performed content validation. The content validity index provides a systematic approach for evaluating item relevance, appropriateness, clarity, and readability, offering transparent criteria for deciding which items to retain, revise, or remove. In this study, the CVI for the items and scale was acceptable; therefore, all items were retained. To enhance content validity, the experts were encouraged to provide qualitative feedback for each item. This process provided valuable modifications that refined the language and ensured clarity and readability for the target population. Future adaptations of the HES would benefit from including linguistic experts alongside nursing experts, ensuring the use of clear, standardised, and understandable language and supporting precision and accessibility in multicultural ICU contexts.

7.4.2 *Factor extractions*

The exploratory factor analysis provided initial evidence of the construct validity of the modified HES. The results from the EFA for the perception of the shift handover scale (section C) revealed two meaningful subscales: (a) information quality and engagement and (b) disruptive communication, aligning with the qualitative findings. The modified section C differed from that

of the original HES, which included three subscales (quality of information, interaction and support, and efficiency). This supports the qualitative finding that nurses viewed effective handover as the integration of information and interaction rather than as separate dimensions. However, future confirmatory factor analysis is needed to test the stability of this two-factor structure and provide stronger evidence for its construct validity and applicability across diverse contexts.

For section D (factors influencing the quality of handover), which introduced 16 new items, the three-factor solution identified (a) interpersonal and cognitive factors, (b) organisational support, and (c) operational interruptions. These findings extend the tool beyond perceptions of handover to include systemic and contextual influences, capturing the broader organisational and workflow realities that shape handover quality in multicultural ICUs. All subscales in sections C and D included more than three items, and the item loadings were acceptable.

7.5 Reliability

Cronbach's alpha scores for the entire scale (sections C and D) were within the acceptable range, indicating that the items collectively measured coherent constructs. The modified HES (section C) produced an overall Cronbach's alpha of 0.73, and the values for the two subscales ranged from 0.61 to 0.86. The lowest alpha was for disruptive communication, which included only four items, some of which were negatively worded. This may explain the lower reliability, suggesting that future refinement is needed. Future studies should examine the impact of adding items on the reliability of this subscale.

The newly developed survey assessing factors affecting handover quality (section D) yielded an overall Cronbach's alpha of 0.78, and the values for the three subscales ranged from

0.55 to 0.81. The lowest alpha was for organisational support, followed by operational interruptions ($\alpha = 0.60$). This lower reliability may suggest the conceptual breadth of these constructs and the limited number of items on these subscales (five or fewer items). Future revisions should expand these subscales and refine wording to strengthen reliability. Overall, sections C and D show that the instrument demonstrates acceptable internal consistency for exploratory use and provides a basis for further refinement and confirmatory testing.

7.6 Implications and recommendations

The findings of this study reveal critical insights into the complexity of handover practice within multicultural ICU nursing teams. This section provides nursing staff, educators, leaders, stakeholders and managers with recommendations to improve handover practices within multicultural teams. This study will benefit ICU nurses, clinical educators, nursing managers, and decision makers by showing that handover is a complex, multifaceted process that integrates informational and interactional components influenced by contextual factors that need to be thoroughly explored before designing interventions or tools. This approach, ultimately, fosters a safe clinical environment for both healthcare providers and patients

Handover practices in multicultural ICUs must be strengthened to ensure patient safety and quality of care. Nursing students must be supported throughout their education to develop effective handover skills, and nursing staff should receive managerial support to create a safe environment for handover and continuous professional development. ICU nurses must possess strong communication skills and cultural competence to ensure clarity and collaboration during handover. Moreover, leaders and educators should regularly evaluate handover practices to identify and address barriers to improvement.

Handover is a core clinical competence that nursing students should develop during their

undergraduate education. It should be taught theoretically and practically to ensure that students understand its purpose, core information, structure, and application across different clinical settings. Nursing students should practice handover in simulation labs, similar to other nursing competencies, to ensure that they are well-prepared before clinical practice. The evaluation of student handover competence should focus on completeness, accuracy, and communication style. Clinically, nursing students should have opportunities during their clinical placement to observe and practice handover. Additionally, students should be educated about different communication styles, strategies to seek clarification, and methods for maintaining positive and respectful collaboration with colleagues. Early preparation builds students' confidence, professional language, and awareness of varied handover contexts.

Nursing managers and hospital administrators play a crucial role in ensuring and maintaining a safe environment for effective handover. Their responsibilities begin at recruitment and continue through staff orientation and ongoing practice. Recruitment policies should apply consistent and equitable English language proficiency standards across nationalities, aligned with the communicative demands of nursing practice. As nursing demand increases, additional recruitment criteria may be required alongside English proficiency. Hospitals should balance hiring needs with structural support, including language training, mentoring, and continuous evaluation.

Orientation programs are crucial for newly hired nursing staff, bridging the gap between academic preparation and independent clinical practice. They also serve as a transition from previous experience in other countries or hospitals. Handover training within orientation programs should be inclusive and integrate basic knowledge of handover within specific clinical and organisational contexts. New staff must learn how handover is conducted within their unit,

including the format, expectations, documentation systems, and interdisciplinary communication patterns. Importantly, cultural competence should be incorporated within the orientation program. Allowing new staff to recognise and respect diversity in behaviour and language use, interaction styles, and attitudes toward hierarchy, which directly influence how information is exchanged during handover. For instance, nurses should have the opportunity to present and discuss aspects of their cultural norms, values, and communication styles during orientation to promote a mutual understanding among the team. This creates opportunities to discuss what is considered respectful or appropriate across cultures. Training should encourage new staff to use clear and respectful language, seek clarification when needed, and engage in open dialogue despite hierarchical differences. Orientation programs provide an opportunity to standardise handover practice among nurses from diverse cultural and educational backgrounds, promoting shared understanding and establishing the foundations of a culturally competent work environment.

Nursing educators can contribute to sustaining and refining effective handover practice through continuous professional development that includes regular in-service education, reflective learning, and frequent feedback and evaluation. In-service sessions should include practical, case-based discussions, such as reviewing incidents resulting from ineffective handover. These sessions allow nurses to reflect on actual practice gaps and identify strategies to prevent recurrence. They also promote accountability and reinforce a culture of safety and openness by linking handover to patient outcomes. Nurse educators should provide continuous feedback and evaluation during handovers to maintain consistency across shifts and staff.

Nursing managers play a key role in promoting safe environments for effective handover by developing policies and procedures to address factors hindering the process. For instance,

they should establish policies to minimise interruptions by protecting the handover time and preventing non-urgent procedures at the end of shifts. In the ICU context, this can be achieved by encouraging healthcare providers to avoid interruption for irrelevant conversation. Non-urgent procedures such as dressing change, planned central line insertions, or the removal of drains and lines can be deferred after the handover time when clinically appropriate. Managers should also implement a structured handover tool to facilitate and standardise handover practice. The structured tool must be adaptable and flexible to fit the needs of different units. The design of an appropriate handover tool must be collaboratively designed with bedside nurses to ensure that it reflects the realities of clinical practice. Additionally, nursing managers play an essential role in promoting cultural competence within their teams by encouraging inclusivity, respect, and awareness of cultural differences in communication. Nursing managers should also foster a culture that empowers nurses to speak up, use clear and consistent language during the handovers. Promoting communication clarity and consistency helps reduce misinterpretation, misunderstanding and enhance information accuracy. Encouraging open communication and mutual respect allows nurses to clarify uncertainties, express patient concerns, and share critical information without hesitation. This empowerment is essential for patient safety and ensures that handover remains an interactive process.

The modified HES will be useful in exploring nurses' perceptions of handover practice and identifying factors that affect handover. The tool can be used to assess current handover practice, identify improvement needs, and evaluate the impact of training or interventions to improve handover as a pre- and post-evaluation tool. However, further studies are needed to enhance reliability and assess the construct validity of the tool. Based on current knowledge, future studies should revise or expand items within the subscales with lower reliability (i.e.,

disruptive communication in section C and organisational support and operational interruptions in section D). Moreover, the exploratory factor analysis provides a foundation for conducting confirmatory factor analysis to test the stability of the tool with a larger sample. Involving a linguistic expert to review item wording and clarity is essential to ensure that the tool uses standardised and culturally appropriate language for use in multicultural workplaces.

7.7 Study strengths and limitations

The strengths and limitations of each phase are presented in previous chapters. Chapter 4 details the limitations and strengths of the qualitative phase. Chapter 5 presents the limitations and strengths of the modification phase, and Chapter 6 presents the limitations and strengths of the quantitative phase. This section presents the overall limitations and strengths of using exploratory sequential mixed methods to adapt, modify, and validate the HES.

7.7.1 *Strengths*

This dissertation used an exploratory sequential mixed-method design, which is suitable for tool modification because it allows in-depth qualitative exploration to identify context-specific meanings and experiences. This informed the modification of the tool, followed by testing its reliability and validity in the quantitative phase. To enhance transferability, a detailed description of each step in all phases was provided. The qualitative phase offered a detailed description of ICU nurses' experiences with effective handover practices, generating data that directly informed tool modification. The sample size for the qualitative phase was adequate, and the sample included nurses from diverse backgrounds, enriching the data. The data were collected from nurses at four hospitals in Riyadh with over four years of ICU experience. This strengthened the study by providing diverse, practical insights, making the modified tool relevant to other ICU settings in Saudi Arabia and similar contexts internationally. The tool modification

was directly influenced by the themes and quotes that emerged from the qualitative phase, ensuring that the developed and modified items reflected nurses' experiences. Involving ICU experts in the content validity assessment was a major strength of this study. Specifically, the qualitative feedback from the ICU experts made important contributions to enhancing readability and the relevance of the items to the target population. Lastly, the quantitative phase followed a systematic approach to assess reliability and conduct an exploratory factor analysis using data from 443 participants. This enhanced the statistical power of the analysis, reinforcing the credibility and applicability of the integrated findings to Saudi settings. The integration between the qualitative and quantitative phases demonstrated strong methodological coherence, as qualitative insights guided tool modification and quantitative testing confirmed its reliability.

7.7.2 Limitations

The present study has several limitations. First, the qualitative phase relied on a purposive sample drawn from four hospitals in Riyadh, which may limit the transferability of findings to other healthcare settings. Similarly, the quantitative phase focused on ICU nurses within these hospitals, which may limit the generalisability of the tool to other nursing populations or clinical contexts. Finally, transforming qualitative themes into measurable items involved researcher interpretation, which may have introduced some bias in item wording or conceptual framing. However, the involvement of the supervisory committee in reviewing and confirming the qualitative findings that informed the quantitative tool helped mitigate this bias and strengthened the credibility of the integration process.

7.8 Conclusion

This study is among the few conducted in Saudi Arabia exploring effective handover practice. It was designed to adapt, modify, and validate the HES to the critical care and Saudi

Arabian context. The findings reveal that effective handover requires a comprehensive understanding of the content, process, and contextual factors that can influence effective handover. The quality of handover should not be measured exclusively by the quality of information; rather, it requires close attention to the interaction between nurses and the situations in which handover occurs. The factors that can influence handover are related to the organisation, environment, communication, and interpersonal relationships. Linguistic and cultural differences emerged as unique factors that shape handover quality, suggesting that further investigation is needed in multicultural healthcare systems. The modified HES developed in this study demonstrated acceptable reliability and a coherent factor structure, providing a practical and contextually relevant tool for assessing handover quality in Saudi ICUs. However, further refinement is needed to enhance the reliability of certain subscales and confirm the stability of the identified factor structures through confirmatory factor analysis with a larger and more diverse sample.

7.9 Reflection on the Ph.D. Journey

7.9.1 *Introduction*

Pursuing a Ph.D. has been an intensive, intellectual, and personal journey extending beyond the production of a dissertation. It has been a process of self-discovery and continuous learning that often involved moments of self-doubt. Through these experiences, I developed resilience and a strong sense of confidence in navigating uncertainty, both as a researcher and in my personal life. This section provides a reflective account of my doctoral journey, exploring how my motivations and lived experiences shaped the research process.

7.9.2 *Motivation to pursue a Ph.D.*

Before beginning my Ph.D., I was an ICU nurse in Saudi Arabia, working as part of a

multicultural team. The unit manager was Jordanian, and many of my colleagues were from the Philippines, India, Pakistan, Malaysia, and Jordan. Among 80 ICU nurses in my department, only three of us were Saudis. Throughout my clinical experience, I encountered nurses in frontline roles and as leaders and educators from other countries such as South Africa, China, Indonesia, the United Kingdom, and Canada. It was inspiring to learn from colleagues with a rich variety of skills and knowledge.

This diversity exposed me to the complexities of communication in a multicultural team. As an ICU nurse, I witnessed an incident that shaped my motivation to pursue doctoral studies. I was on a night shift when I received a handover for a patient with septic shock who had been newly admitted to the ICU from the emergency department only 30 minutes before the shift ended. The outgoing nurse presented the patient information by referring to an incomplete flow sheet, physicians' orders, and the medication chart. The nurse referred to the doctor's order stating that the patient should receive a stat dose of an antibiotic. I asked the nurse if she had given it, and she said she had. The outgoing nurse left the unit, and I took over the patient's care. Four hours later, I realized the patient had not received the stat dose of the antibiotic. The following day, the nurse came to the unit to take over care of the same patient, and I asked her again whether she had given the stat antibiotic. She replied that she had not and had only sent the doctor's order to the pharmacy to prepare the medication.

Although this delay in treatment did not affect the patient in this case, it deeply concerned me. This incident sparked my curiosity about handover in our unit. I became more observant of how handover was conducted, and I noticed significant variation in the style, structure, language, and expressions used to convey clinical details. These observations stayed with me, and my primary research interest became improving handover practice in multicultural settings.

7.9.3 *Evolving research questions*

As I transitioned from clinical practice to academia, my motivation to improve handover practice evolved into a structured research inquiry. After beginning the Ph.D. program, I conducted an extensive literature review and received advice from supervisory committee members, which guided my research process. This process involved an initial exploration of the issue, the identification of areas for improvement, and the design of an appropriate, targeted intervention. This led me to choose an exploratory sequential mixed-methods design aimed at understanding, modifying, and validating a tool suitable for use in Saudi Arabia's multicultural ICUs. What began as a personal concern about a single handover incident transformed into a scholarly pursuit to generate knowledge supporting safer and more effective handover among ICU nurses.

7.9.4 *Challenges and growth during the Ph.D.*

My Ph.D. journey was filled with milestones that shaped my academic identity and perspective on life. It involved more than simply earning a Ph.D., as I also built a diverse skill set through the challenges I encountered. Furthermore, it reinforced my lifelong learning mindset, reminding me that scholarly growth extends beyond the formal structure of the Ph.D. program.

I began the process by formulating the research questions, which required deep engagement with the literature and the identification of critical gaps. Subsequently, I selected a mixed-methods approach to answer these questions. This methodology was time- and resource-consuming yet rewarding, as it allowed me to advance my knowledge in quantitative and qualitative methods. I became competent in conducting interviews, engaging with participants, collecting quantitative data, and using analysis tools such as SPSS. To strengthen my methodological and analytical skills, I enrolled in supplementary courses on qualitative and

quantitative analysis. These courses enhanced my confidence in data interpretation and improved the methodological rigour of my study.

My doctoral studies also allowed me to contribute to the scholarly community. I presented some of my findings at conferences in Canada and internationally, strengthening my confidence in communication and academic dialogue. Moreover, publishing parts of my dissertation in peer-reviewed journals was a transformative experience. The process of preparing the manuscript, responding to reviewers' comments, and adhering to different journal guidelines enhanced my academic writing and critical thinking. These experiences expanded my understanding of knowledge translation and fostered my academic identity as an emerging researcher committed to contributing to evidence-based nursing.

7.9.5 Adapting to life and balancing roles

Although living in Canada was not my first experience abroad, as I had previously completed my master's degree in the United Kingdom, adapting to a new environment required emotional and cultural adjustment. Living away from family and familiar support systems led to feelings of isolation and homesickness, especially because I began the Ph.D. during the COVID pandemic. However, these experiences strengthened my independence and resilience. Over time, I learned to establish a balance between academic demands and personal well-being by building supportive relationships with peers and mentors.

Navigating life as a doctoral student, a wife, and a mother of two children who were born during the Ph.D. was challenging and transformative. Balancing the responsibilities of motherhood and academic work required perseverance, adaptability, and time management. This experience deepened my empathy, strengthened my organizational and prioritization skills, and reminded me of the importance of self-compassion and supportive networks.

7.9.6 *Reflexivity and positionality*

Reflexivity was crucial throughout my dissertation. My background as an ICU nurse in Saudi Arabia and my experience as part of multicultural teams informed the development of my research questions and interpretation of data. I was aware that my professional and cultural perspectives could influence how I engaged with participants and analyzed their narratives. To minimize bias, I maintained a reflexive journal throughout the research process, conducted regular peer debriefings, and used neutral probes during interviews to ensure balanced data collection, analysis, and interpretation. Continuous feedback from my supervisory committee and reflective dialogue with academic peers further strengthened my analytical rigour. These reflexive practices enhanced the transparency and trustworthiness of the study, ensuring that the findings represented nurses' experiences rather than my assumptions.

Engaging in reflexivity has transformed how I interpret my clinical experience. With the knowledge I have gained throughout the research process, my understanding of the incident that initially inspired this study has evolved. What once appeared to be a single miscommunication now represents a complex human interaction within a system and environment. I now see how this incident reflects the communication dynamics and contextual challenges identified in my study, in which linguistic ambiguity, workload pressure, lack of structured tools, and differing cultural expectations intersect to shape handover effectiveness.

7.9.7 *Future Directions*

This doctoral journey has equipped me with transferable skills I need to grow as an emerging leader and researcher. Moving forward, I aim to translate the outcomes of this study into actionable strategies and participate in designing and evaluating educational and policy interventions to improve handover practice. I intend to develop a research program focused on

improving handover practice and patient safety within ICUs locally and globally. Furthermore, this Ph.D. journey has inspired me to mentor and support future nurses and contribute to leadership initiatives that empower evidence-based decision-making in Saudi Arabia.

In summary, the Ph.D. journey transformed my perspective as a clinician and a scholar. It strengthened my resilience, critical thinking, and cultural awareness, enabling me to view each incident or challenge as an opportunity to grow and learn.

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Appendices

7.10.1 Appendix A: Ethics Approval (York University)



OFFICE OF
RESEARCH
ETHICS (ORE)
3rd Floor, Klineff
Tower
4700 Keele St.
Toronto ON
Canada M3J 1P3
Tel 416 736 5914
www-research.yorku.ca

Certificate#:	STU 2023-068
Approval Period:	06/01/23-06/01/24

ETHICS FULL APPROVAL

To: **Abrar AlAmrani**
Graduate Student of Nursing
nurse_Abrar@hotmail.com

From: Alison M. Collins-Mrakas, Director, Research Ethics
(on behalf of You-ta Chuang, Chair, Human Participants Review Committee)

Date: Friday, July 14, 2023

Title: **Exploration of Effective Nursing Shift Handover in the Intensive Care Units in Saudi Arabia: Adaptation and Validation of the Handover Evaluation Scale**

Risk Level: [SJ Minimal Risk D More than Minimal Risk]

Level of Review: [SJ Delegated Review D Full Committee Review]

I am writing to inform you that this research project, "Exploration of Effective Nursing Shift Handover in the Intensive Care Units in Saudi Arabia: Adaptation and Validation of the Handover Evaluation Scale" has received ethics review and approval by the Human Participants Review Sub-Committee, York University's Ethics Review Board and conforms to the standards of the Canadian Tri-Council Research Ethics guidelines.

Note that approval is granted for one year. Ongoing research - research that extends beyond one year - must be renewed prior to the expiry date.

Any changes to the approved protocol must be reviewed and approved through the amendment process by submission of an amendment application to the HPRC prior to its implementation.

Any adverse or unanticipated events in the research should be reported to the Office of Research ethics (ore@yorku.ca) as soon as possible.

For further information on researcher responsibilities as it pertains to this approved research ethics protocol, please refer to the attached document, "**RESEARCH ETHICS: PROCEDURES to ENSURE ONGOING COMPLIANCE**".

Should you have any questions, please feel free to contact me at acollins@yorku.ca.

Yours sincerely,

Alison M. Collins-Mrakas M.Sc., LLM
Director, Office of Research Ethics

7.10.2 Appendix B: Ethics Approval (Local hospital in Riyadh, Saudi Arabia)

Kingdom of Saudi Arabia
Ministry of Health
King Saud Medical City



المملكة العربية السعودية
وزارة الصحة
مدينة الملك سعود الطبية

IRB Registration Number with KACST, KSA: H-01-R-053
IRB Registration Number U.S. Department of HHS IORG #: IORG0010374

- Memorandum -

Date: July 05, 2023

Proposal Reference No.	: H1RI-22-Jun23-01
Proposal Title	: "Exploration of Effective Nursing Shift Handover in the Intensive Care Units in Saudi Arabia: Adaptation and Validation of the Handover Evaluation Scale"
PI	: Abrar Alamrani
Co-Investigators	: Amjad Ayed AlOtaibi
Type of Review	: Modification
Category of Approval	: Exempt
Date of IRB Approval-Expiration (Validity)	: 05/07/2023 04/07/2024 (12 months)

Dear Abrar Alamrani:

We are pleased to inform you that the above-referenced research proposal has been reviewed and was approved. The Institutional Review Board (IRB) committee found that the research met the applicability criteria and was eligible for exempt review. However, to commence the collection of data a permission letter must be issued from the Director of the Research Center first.

This approval is valid for 12 months from the date of IRB review when approval is granted. The approval will no longer be in effect on the date listed above as the IRB expiration date. Please note that you are obligated to submit the following to IRB committee:

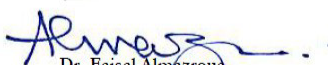
1. progress/final report on the 12 months (04-Jul-2024) (or earlier in the case the study has completed)
2. any manuscript resulting from this research for approval by IRB before submission to journals for publication.

The approval of the conduct of this proposal will be automatically suspended after 12 months, in the case the Progress Report (or Final Report, if relevant) is pending acceptance. You also need to notify the Research Centre as soon as possible in case of:

1. any amendments to the proposal;
2. termination of the study;
3. any serious or unexpected adverse events;
4. any event or new information that may affect the benefit/risk ratio of the proposal.

All records relating to the research including consent form must be retained and available for audit for at least 3 years after the research has ended.

We wish you every success in your research endeavors.


Dr. Faisal Almazrouz
Chairman, Institutional Review Board (IRB)
King Saud Medical City Riyadh, KSA



7.10.3 Appendix C: Invitation email for the interview

Dear Registered Nurse,

My name is Abrar AlAmrani, a graduate student from the school of Nursing at York University, Canada. My doctoral research is examining effective nursing shift handover practice in the intensive care units (ICU) in multicultural workplace at the first health cluster in Riyadh. If you have more than four years' of experience in the ICU, I would like to invite you to participate in the research. Your participation will involve in-depth interview, which will take 30 to 60 minutes and complete a descriptive information form. The interview will be conducted virtually via zoom at a time convenient for you. The interview will cover your knowledge and experience about effective shift handover practice in the ICU. The descriptive information form is about your gender, age, language spoken at home and years of experience.

Your participation in this project, is voluntary. If you do agree to participate you can withdraw from the project at any time without comments or penalty. Your decision to participate will in no way affect your current or future relationship with the first health cluster in Riyadh.

If you agree to participate, please contact the researcher

Abrar Omran AlAmrani
Saudi Arabia: +966XXXXXX
Canada: +1 XXXXXX
Abrar92@yorku.ca

Many thanks for your consideration of this request.

7.10.4 Appendix D: Interview consent form

Adapted Informed Consent Form from York University

Date:

Study Name: Exploration of Effective Nursing Shift Handover in the Intensive Care Units in Saudi Arabia: Adaptation and Validation of the Handover Evaluation Scale

Researcher name: Abrar AlAmrani a Ph.D. candidate at School of Nursing in York

University e-mail:

abrar92@yorku.ca , Dr. Elisabeth Jensen graduate supervisor email: ejensen@yorku.ca

Purpose of the Research:

The goal of this research is to adapt and validate the Handover Evaluation Scale to fit the critical care and Saudi Arabian context. The result of this research will be presented in academic articles, conference presentation, and dissertation.

What You Will Be Asked to Do in the Research:

You will be asked to review this informed consent form in its entirety and participate in a 30-to-60-minute interview and complete a descriptive information form.

Risks and Discomforts:

This research study will have minimal risks associated with involvement in an interview. The focus of this inquiry is the nurses' experience of handover. The interview can become difficult terrain. If so, the interview can be paused at any point. Your participation in this study may cause discomfort during individual interviews in terms of the commitment required in time. However, the interview will be scheduled at a convenient time that suits you. Discussing the handover experience may affect the sense of job security. The researcher will address the potential social risks, such as loss of privacy and confidentiality, by using pseudonyms and ensuring all interview data will be kept confidential. You will have the right to stop the interview at any time if you feel uncomfortable. You are free to reschedule or to drop out of the study.

Benefits of the Research and Benefits to You: While this research will have no direct benefits to you, it will provide valuable, in-depth knowledge regarding nurses' perceptions and experiences with handover and factors influence effective handover. Your participation can

inform directions for practice, policy, and education.

Voluntary Participation and Withdrawal: Your participation in the study is completely voluntary and you may choose to stop participating at any time. Your decision to stop participating, or to refuse to answer questions, will not affect your relationship with the researchers or study staff, or the nature of your relationship with York University either now, or in the future. In the event you withdraw from the study, all associated data collected will be immediately destroyed wherever possible. If the analysis has already been done on your anonymized transcripts or data, it will not be possible to withdraw those findings. However, no further analysis on your anonymized data will be done.

Confidentiality:

All information you supply during the research will be held in confidence and unless you specifically indicate your consent, your name will not appear in any report or publication of the research. This study will use the Zoom to collect data, which is an externally hosted cloud-based service. When information is transmitted over the internet privacy cannot be guaranteed. There is always a risk your responses may be intercepted by a third party (e.g., government agencies, hackers). Further, while York University researchers will not collect or use IP address or other information which could link your participant to your computer or electronic devices without informing you, there is a small risk with any platform such as this of data that is collected on external servers falling outside the control of the research team. If you are concerned about this, we would be happy to make alternative arrangements (where possible) for you to participate, perhaps via telephone. Data will be collected using field zoom recordings. Data will be collected virtually in an audio interview via zoom. Recordings (audio/video) will be saved in a password protected file to research team members' local computer, not the cloud-based service. Your data will be safely stored till May 2027 on a secured, password protected files and only the primary investigator (Abrar AlAmrani) will have access to this information. The principal investigator will keep a link that identifies you to your coded information, but this link will be kept secure and available only to the principal investigator and/or selected members of the research team. Any information that can identify you will remain confidential. Confidentiality will be provided to the fullest extent possible by law. Please note that it is the expectation that participants agree not to make any unauthorized recordings of the content of a meeting / data collection session.

Questions About the Research? If you have questions about the research in general or about your role in the study, please feel free to contact me at

Abrar AlAmrani

Ph.D. candidate at School of Nursing, York University

email: abrar92@yorku.ca

or the researcher supervisor Dr. Elisabeth Jensen

email: ejensen@yorku.ca

This research has received ethics review and approval by the Delegated Ethics Review Committee, which is delegated authority to review research ethics protocols by the Human Participants Review Sub- Committee, York University's Ethics Review Board, and conforms to the standards of the Canadian Tri- Council Research Ethics guidelines. If you have any questions about this process, or about your rights as a participant in the study, please contact the Director, Research Ethics in the Office of Research Ethics, 3rd Floor, Kaneff Tower, York University (e-mail ore@yorku.ca).

Legal Rights and Signatures:

I _____, consent to participate in Exploration of effective nursing shift handover in the intensive care units in Saudi Arabia: adaptation and validation of the handover evaluation scale conducted by Abrar AlAmrani I have understood the nature of this project and wish to participate. I am not waiving any of my legal rights by signing this form. My signature below indicates my consent.

Signature _____

Date _____

Participant

Signature _____

Date _____

Principal Investigator

1. Audio recording

“ I consent to the audio-recording of my interview(s).

2. Video recording

“ I consent to the video-recording of my interview for transcriptions purposes only.

Signature _____

Date _____

7.10.5 Appendix E: Interview guide

- Opening Question: Can you tell me a bit about yourself and how you came to work here at the organization?

- Can you describe nursing team in your unit?

- Can you describe the shift handover in your unit?

- What language or languages do you speak during the handover?

- What are your perceptions of the current shift handover practice in your ward?

- Can you tell me the last time you gave shift handover?

What are you doing well?

What could be improved?

- Can you tell me the last time you received shift handover?

What are you doing well?

What could be improved?

- Can you describe 'effective handover'?

- Could you give me an example of where handover has been good, and where it had broken down?

- What can make the handover effective?

- What are the factors that can negatively affect the quality of handover?

- Is there anything else you would like to share?

7.10.6 Appendix F: Descriptive information form

Age ()

Gender

Nationality

Ethnic group

Language spoken at home

Place of work

Years of experience as a nurse on the current organisation

Years of experience in Nursing

Years of experience in the ICU

Level of education

- ☐ Diploma degree
- ☐ Bachelor's degree
- ☐ Master's degree
- ☐ Ph.D.

7.10.7 Appendix G: Author's permission to use and modify the tool

CENTRE FOR QUALITY AND PATIENT SAFETY RESEARCH Monash Health Partnership



MonashHealth

Abrar AlAmrani,
Ph.D. nursing student
York University
4700 Keele St, Toronto, ON M3J 1P3, Canada

26" July 2021

Dear Abrar,

Thank you for your interest in our handover, research and, in particular, our staff survey.

We hereby provide you with permission to use our survey. You have permission to make adjustments to the survey, as necessary, to suit your local context and to reproduce your edited version of the survey.

Our original work using this survey was published in 2008 [O'Connell, B., Macdonald, K., & Kelly, C. (2008). Nursing handover: It's time for a change. *Contemporary Nursing*, 30(1), 2-11]. Since then we have conducted further analyses to establish the psychometric properties of the survey. A second paper was published in the Journal of Clinical Nursing and we suggest that you include this reference when acknowledging the source of the survey. We have not made any changes to the survey since this publication.

O'Connell, B., Ockerby, C., & Hawkins, M. (2014). Construct validity and reliability of the Handover Evaluation Scale. *Journal of Clinical Nursing*, 3(3-4), 560-570. doi: 10.1111/jocn.12189

Please find attached a PDF copy of the survey which is titled the Handover Evaluation Scale (HES). Our recent analysis has focused on Section C: Perceptions of Handover. As you will see, this section is part of a larger survey that contains other questions about the handover process, and the demographic characteristics of participants. You may like to include some, or all, of these questions in your survey.

The Instructions for completion are contained within the survey, **with** brief instructions provided at the start of each section. Items Section Care scored from 1 = Strongly Disagree to 7 = Strongly Agree, with the exception of four negatively worded items (2, 2, 24, 28, and 33) that are reverse scored.

We would be very interested to read about your findings once completed, so please do send us a link to your thesis and/or any publications that arise from your research.

Kind regards,

Prof Bev O'Connell

Dean, Faculty of Nursing, University of Manitoba, Winnipeg, Canada.
Honorary Professor, School of Nursing and Midwifery, Deakin University, Australia.

1 Block, Z46 Clayton Road, Clayton, Victoria 3168 Tel: 03 9594 4610 Fax: 03 9594 6094
Postal Address: Locked Bag 2:9, Clayton South, Victoria 3169, Australia

7.10.8 Appendix H: Invitation email for the survey

Title: Your Expertise Needed: Participate in a Quick Survey on Shift Handover Practices

Dear Registered Nurse,

You're invited to share your valuable experience with shift handover practice in your unit by completing an online survey. This survey should only take **10-15 minutes**.

Your participation in this survey is completely voluntary and all of your responses are anonymous. None of the responses will be connected to identifying information.

To participate, please click on the following link:

If you have any questions about the survey, or difficulty in accessing the site please contact

Abrar Omran AlAmrani
Saudi Arabia: +966 XXXXXX
Canada: +1 XXXXXX
Abrar92@yorku.ca

Many thanks for your consideration of this request.

7.10.9 Appendix I: Online survey consent form

Study Name: Exploration of Effective Nursing Shift Handover in the Intensive Care Units in Saudi Arabia: Adaptation and Validation of the Handover Evaluation Scale

Researcher name: Abrar AlAmrani a Ph.D. candidate at School of Nursing in York

University e-mail:

abrar92@yorku.ca

Researcher supervisor: Dr. Elisabeth Jensen e-mail: ejensen@yorku.ca

Purpose of the Research:

The goal of this research is to adapt and validate the Handover Evaluation Scale to fit the critical care and Saudi Arabian context. The result of this research will be presented in academic articles, conference presentation, and dissertation.

What You Will Be Asked to Do in the Research:

You will be asked to review this informed consent form it its entirety and response to this survey questions take 15-20 minutes, which consists of questions about the quality of nursing shift handover in the ICU and the factors contributing to the effective handover.

Risks and Discomforts:

This research study will have minimal risks associated with involvement in an interview. The focus of this inquiry is to develop a validated tool to measure the quality of nursing shift handover. We do not foresee any risks or discomfort from your participation in the research.

Benefits of the Research and Benefits to You: While this research will have no direct benefits to you, it will provide valuable, in-depth knowledge regarding nurses' perceptions and experiences with handover and factors influence effective handover. Your participation can inform directions for practice, policy, and education.

Voluntary Participation and Withdrawal: Your participation in the study is completely voluntary and you may choose to stop participating at any time. Your decision to stop participating, or to refuse to answer questions, will not affect your relationship with the researchers, or study staff, or the nature of your relationship with York University either now, or in the future.

Confidentiality:

All responses and information collected for this study will remain private and secure. Data will be protected, and no personal or identifiable information will be shared with a third party. All surveys' data will be stored on the Qualtrics server, which is an externally hosted cloud-based service. When information is transmitted over the internet privacy cannot be guaranteed. The researcher(s) acknowledge that the host of the online survey may automatically collect participant data without their knowledge (i.e., IP addresses.) Although this information may be provided or made accessible to the researchers, it will not be used or saved without participant's consent on the researchers system. Because this project employs e-based collection techniques, data may be subject to access by third parties as a result of various security legislation now in place in many countries and thus the confidentiality and privacy of data cannot be guaranteed during web-based transmission. Your data will be saved in a password protected file to research team members' local computer. Your data will be safely stored till May 2027 on a secured, password protected files and only the primary investigator (Abrar AlAmrani) will have access to this information. Confidentiality will be provided to the fullest extent possible by law.

Questions About the Research? If you have questions about the research in general or about your role in the study, please feel free to contact

Abrar AlAmrani, Ph.D. candidate at School of Nursing, York University

email: abrar92@yorku.ca

or the researcher supervisor Dr. Elisabeth Jensen

email: ejensen@yorku.ca

This research has received ethics review and approval by the Delegated Ethics Review Committee, which is delegated authority to review research ethics protocols by the Human Participants Review Sub- Committee, York University's Ethics Review Board, and conforms to the standards of the Canadian Tri- Council Research Ethics guidelines. If you have any questions about this process, or about your rights as a participant in the study, please contact the Director, Research Ethics in the Office of Research Ethics, 3rd Floor, Kaneff Tower, York University (e-mail ore@yorku.ca)

Please click the following indicating your choice to be in this study:

- Yes, I agree to participate in the study.
- No, I do not want to participate in the study

7.10.10 Appendix J: Original HES



DISSERTATION RESEARCH PROPOSAL

HANDOVER EVALUATION SCALE

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INSTRUCTIONS

Please shade one circle only to respond to the following items and write clearly in the boxes where required. If you shade the wrong circle, put a cross through it and shade the correct circle.

Shade Circle: Like This: 

Not Like This:  X

For optimum accuracy, please print carefully and avoid contact with the edge of the box

1 2 3 4 5 6 7 8 9 0

Section A: Demographics

1. What gender are you? ☐ Female ☐ Male

2. How long have you been a nurse? _____ year _____

3. How long have you been employed at Southern Health?  -  years

4. What is your position?

☐ Nurse Unit Manager
☐ Clinical Nurse Consultant
☐ Employed Nurse
☐ Other (specify below) _____

☐ Assoc Nurse Unit Manager
☐ Registered Nurse Graduate
☐ Nurse Educator

☐ Clinical Nurse Specialist
☐ Registered Nurse (Gr 2+)
☐ Midwife

5. What is your employment status?

☐ Full-time (permanent)
☐ Part-time (permanent)
☐ Bank
☐ Agency

☐ Other, please specify: _____

6. In which ward are you currently working? Intensive Care Unit : only : 1 : 11

On average, how much time do you spend per shift on general documentation (i.e., care plans, progress notes, etc.)?

 -  hours OR  -  -  mins

Section B: Current Afternoon Handover Structure

In this section, please answer questions with regard to AFTERNOON HANDOVER in your current ward.

8. On average, how much time in minutes do you spend on preparation for afternoon handover?

 -  hours OR _____ mins

Staff on some wards receive handover from two people (e.g., from the nurse in charge of the shift and from the nurse looking after the patient). If you only receive one handover, please leave the second column in the table below blank.

Question	Handover 1	Handover 2
9. On average, how long does afternoon handover usually take?	_____ mins 	_____ mins
10. How is afternoon handover usually conducted? (Shade all applicable options)	☐ Verbal ☐ Written ☐ Tape recorded ☐ Other (specify below)	☐ Verbal ☐ Written ☐ Tape recorded ☐ Other (specify below)

Please turn the page to continue →



Question	Handover 1	Handover 2
11. How would you prefer afternoon handover to be conducted? (Shade all applicable options) <i>Note: If you would prefer to have two handovers - even if you currently receive only one - complete both columns. If you would prefer only one handover, leave the second column blank.</i>	☐ Verbal ☐ Written ☐ Tape recorded ☐ Other (specify below) _____	☐ Verbal ☐ Written ☐ Tape recorded ☐ Other (specify below) _____
12. Who usually hands over information to you in the afternoon? (Please shade only ONE option)	☐ Nurse in charge of shift ☐ Nurse looking after patient ☐ Other (specify below) _____	☐ Nurse in charge of shift ☐ Nurse looking after patient ☐ Other (specify below) _____
13. Who would you prefer to hand over information to you in the afternoon? <i>Note: If you would prefer to have two handovers - even if you currently receive only one - complete both columns. If you would prefer only one handover, leave the second column blank.</i>	☐ Nurse in charge of shift ☐ Nurse looking after patient ☐ Other (specify below) _____	☐ Nurse in charge of shift ☐ Nurse looking after patient ☐ Other (specify below) _____
14. Where is afternoon handover usually conducted? (Please shade only ONE option)	☐ Handover room ☐ Bedside ☐ Nurses station ☐ Other (specify below) _____	☐ Handover room ☐ Bedside ☐ Nurses station ☐ Other (specify below) _____
15. Where would you prefer afternoon handover to be conducted? <i>Note: If you would prefer to have two handovers - even if you currently receive only one - complete both columns. If you would prefer only one handover, leave the second column blank.</i>	☐ Handover room ☐ Bedside ☐ Nurses station ☐ Other (specify below) _____	☐ Handover room ☐ Bedside ☐ Nurses station ☐ Other (specify below) _____
16. Please indicate which other disciplines are usually present at afternoon handover:	☐ Medical ☐ Allied Health ☐ No other disciplines present ☐ Other (specify below) _____	☐ Medical ☐ Allied Health ☐ No other disciplines present ☐ Other (specify below) _____

Please turn the page to continue →

Section C: Perceptions of Handover

Handover can have several purposes including the transfer of patient information, staff debriefing, support, and nurse education.

Please indicate the extent to which you disagree or agree with the following statements from the perspective of a nurse commencing a shift on your current ward.

	Strongly Disagree	Disagree	Slightly Disagree	Neither Disagree nor Agree	Slightly Agree	Agree	Strongly Agree
17. I have the opportunity to discuss difficult clinical situations I have experienced.	0	0	0	0	0	0	0
18. I am able to check the patient during handover. (optional item)	0	0	0	0	0	0	0
19. I am provided with sufficient information about patients.	0	0	0	0	0	0	0
20. I have the opportunity to debrief with other colleagues when I have had a difficult shift.	0	0	0	0	0	0	0
21. I have the opportunity to discuss workload issues.	0	0	0	0	0	0	0
22. I am often given information during handover that is not relevant to patient care.	0	0	0	0	0	0	0
23. The way in which information is provided to me is easy to follow.	0	0	0	0	0	0	0
24. I am often interrupted by patients and their significant others during handover. (optional item)	0	0	0	0	0	0	0
25. I am able to clarify information that has been provided to me.	0	0	0	0	0	0	0
26. Patient information is provided in a timely fashion.	0	0	0	0	0	0	0
27. I have the opportunity to ask questions about things I do not understand.	0	0	0	0	0	0	0
28. I find handover takes too much time.	0	0	0	0	0	0	0
29. The information that I receive is up to date.	0	0	0	0	0	0	0
30. Patients are involved in the handover process. (optional item)	0	0	0	0	0	0	0
31. I am able to keep my mind focused on the information being given to me.	0	0	0	0	0	0	0
32. I am educated about different aspects of nursing care.	0	0	0	0	0	0	0
33. I feel that important information is not always given to me.	0	0	0	0	0	0	0

Please turn the page to continue →



TATION RESEARCH PROPOSAL

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34. Is there variation between the morning, afternoon and night handover in the way handover is conducted on your current ward?

☐ No ☐ Yes

If yes, please describe the difference

35. In your opinion, which handover is the most effective on your current ward?

(Please select ONE option only)

☐ Morning ☐ Afternoon ☐ Night

36. What are the strengths of the afternoon handovers in your ward?

37. What are the limitations of the afternoon handovers in your current ward?

38. In what ways could the afternoon handover be improved in your current ward?

39. Are there any other issues with afternoon handover that have not been covered in this survey?

If yes, please describe?

**Thank you for your time in completing this questionnaire.
Please place your form in the designated box on your way once completed.**

7.10.11 Appendix K: Modified HES

Section A: Descriptive information

- 1. What sex are you?**
 - ☐ Female
 - ☐ Male
- 2. Education level in nursing**
 - ☐ Diploma
 - ☐ Bachelor
 - ☐ Graduate diploma
 - ☐ Master
 - ☐ Doctoral
- 3. Country of origin**
- 4. How long have you been a nurse?**
 - ☐ Less than a year
 - ☐ 1-5 years
 - ☐ 6-10 years
 - ☐ 11-15 years
 - ☐ More than 15 years
- 5. How long have you been as ICU nurse?**
 - ☐ Less than a year
 - ☐ 1-5 years
 - ☐ 6-10 years
 - ☐ 11-15 years
 - ☐ More than 15 years
- 6. What is your position?**
 - ☐ Staff nurse
 - ☐ Charge nurse
 - ☐ Unit manager
- 7. What is your employment status?**
 - ☐ Full-time
 - ☐ Part-time
 - ☐ Casual
- 8. In which ward do you currently work?**
 - ☐ Medical ICU
 - ☐ Surgical ICU
 - ☐ Cardiac ICU
 - ☐ Trauma ICU
 - ☐ Neuro ICU
 - ☐ PICU
 - ☐ NICU
 - ☐ Other (specify)

Section B: Current shift handover structure

Handover is the “endorsement” process where two nurses from the same unit exchange patient information at the end of the shift.

In this section, please answer the questions regarding current shift handover in your current unit.

9. **On average, how long does shift handover usually take?**
10. **What format of information source is available in your hospital for accessing patient information during shift handovers?**
 - ☐ Electronic file
 - ☐ Paper file
 - ☐ Both
 - ☐ Other (specify)
11. **What format of information source do you prefer to use during shift handover?**
 - ☐ Electronic file
 - ☐ Paper file
 - ☐ Both
 - ☐ Other (specify)....
12. **Where is shift handover usually conducted?**
 - ☐ Handover room
 - ☐ Bedside
 - ☐ Nurses station
 - ☐ Other (specify)....
13. **Where would you prefer shift handover to be conducted?**
 - ☐ Handover room
 - ☐ Bedside
 - ☐ Nurses station
 - ☐ Other (specify)
14. **Please indicate which other disciplines are usually present at shift handover:**
 - ☐ Doctors
 - ☐ Pharmacists
 - ☐ Respiratory therapists
 - ☐ No other disciplines present.
 - ☐ Other (specify)
15. **Do you use any form to present the shift handover?**
 - ☐ Yes (specify)
 - ☐ No
16. **What language do you speak during the shift handover?**
17. **If you speak the same language as the incoming or outgoing nurse, what Language do you speak during the shift handover?**
 - ☐ Same language as the nurse giving handover
 - ☐ English language
 - ☐ Other ... (specify)

Section C: Perceptions of shift Handover

Please indicate the extent to which you disagree or agree with the following statements from the perspective of a nurse commencing a shift on your current ward.

	Strongly disagree	Disagree	Slightly disagree	Nether disagree nor agree	Slightly agree	Agree	Strongly agree
18. I have the opportunity to discuss difficult clinical situations I have experienced							
19. I am able to assess the patient and check the patient's surroundings during shift handover							
20. I received sufficient patient information during the shift handover							
21. As a receiving nurse, I am often given information during shift handover that is not relevant to patient care.							
22. The way in which information is provided to me during the handover is easy to follow.							
23. I am often interrupted during the shift handover							
24. I am able to clarify information that has been provided to me.							
25. Patient information is provided during the shift handover in an appropriate timeframe							
26. I have the opportunity to ask questions about things I do not understand							
27. I find shift handover takes too much time.							
28. The patient information that I receive is up to date							
29. I am able to keep my mind focused on the information being given to me.							
30. I feel that important information is not always given to me							

Section D: Factors influence the quality of handover

Please indicate the extent to which you disagree or agree with the following statements from the perspective of a nursecommencing a shift on your current ward.

	Strongly disagree	Disagree	Slightly disagree	Nether disagree nor agree	Slightly agree	Agree	Strongly agree
31. I feel hesitant to ask questions or share information if the other nurse is more senior.							
32. Feeling rushed or overwhelmed makes me less engaged in the shift handover.							
33. If I have more than one patient, I often forget to include some information in the shift handover							
34. The ICU environment makes it easy to call the previous nurse after work to complete the shift handover or ask questions about the patient							
35. Shortage of nursing staff impacts the quality of handovers.							
36. Language barrier sometimes cause misunderstanding during the shift handover.							
37. I prefer to speak my native language to provide complete shift handover.							
38. If there is a personal issue between me and another nurse, I tend to provide only standard patient data without explanation.							
39. Using the electronic file helps me to provide the most recent and complete information.							
40. I prefer using the ICU flow sheet over the SBAR tool to present the patient information.							

41. It is essential to ask questions during the shift handover for clarification.							
42. Shift handover is interrupted by other healthcare team members.							
43. Unplanned procedures at the end of the shift negatively affects the quality of handover							
44. Senior nurses provide systematic and complete handovers.							
45. Junior nurses hesitate to ask questions							
46. Junior nurses hesitate to present necessary information during the handover							

47. What are the strengths of the shift handovers in your ward?

48. What are the limitations of the shift handovers in your current ward?

49. In what ways could the shift handover be improved in your current ward?

50. Are there any other issues with shift handover that have not been covered in this survey? If yes, please describe?

