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The *Australian Journal of Advanced Nursing* is the peer-reviewed scholarly journal of the Australian Nursing and Midwifery Federation (ANMF). The Mission of *AJAN* is to provide a forum to showcase and promote a wide variety of original research and scholarly work to inform and empower nurses, midwives, and other healthcare professionals to improve the health and wellbeing of all communities and to be prepared for the future.

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EDITORIAL

From margins to the centre: Positioning nurses and midwives to create climate-resilient health systems

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When floods displace families and heatwaves fill emergency rooms, nurses and midwives are always there. But when policies are drafted and funding decisions made, they remain conspicuously underrepresented. While much attention, rightly, is given to climate mitigation through emissions reduction, climate change adaptation remains equally critical. As the frequency and intensity of extreme weather events increase, the consequences are increasingly borne by communities on the ground. Despite their unique position within health systems and communities, nurses and midwives are among those routinely overlooked in policy negotiations. Addressing this gap is not only a matter of equity but also essential for shaping effective system-wide climate resilience.

A growing body of frameworks, resources, and evidence have been developed to shape adaptation and resilience-building efforts across the health sector. The World Health Organization (WHO) has developed the Health Adaptation and Resilience framework which details ten key components for building resilient health systems necessary for effective action, including governance, integrated risk assessments, and workforce capacity building.[1] This framework defines *adaptation* as "process of adjustment to actual or expected climate and its effects", while *resilience* describes the capacity of health systems and communities to absorb, respond to, and recover from climate-related shocks.[1]

In Australia, the WHO Resilience Framework is reflected throughout National policy and planning. For example, the National Health and Climate Strategy [2] provides Australia's foundational climate and health policy response and has led to initiatives such as the National Climate Risk Assessment (first pass assessment report),[2,3] with the second report due for release later this year. Australia's national emergency management response, led by the National Emergency Management Agency (NEMA),[4] provides coordination frameworks and resources to support preparedness, response, and recovery.[5] Tools such as the Australian Climate Adaptation Database offer additional examples of localised adaptation.[6] However, neither platform clearly identifies and defines the roles of nurses and midwives, or the projects they are a part of, making it difficult to identify where nurses and midwives meaningfully contribute within Australia's climate resilience agenda.

Nurses and midwives continue to be marginalised in the development of disaster frameworks. This exclusion may stem, in part, from nurses and midwives being overlooked in dominant professional and societal understandings of what constitutes as "emergency disaster response" work.[4,7] For example, government documents and media narratives frequently centre police, firefighters, and paramedics in discussions of natural disaster response, while the critical roles of nurses and midwives are largely overlooked.[8] Further, the division of responsibilities between state and federal health systems, coupled with fragmented ministerial portfolios, creates significant ambiguity around where authority for health resilience and climate change adaptation resides. As a result, nurses and midwives are frequently rendered invisible in emergency planning frameworks, despite their vital, community-embedded roles during disasters.[9]

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This marginalisation is further perpetuated by the unrealised potential of the National Health and Climate Strategy. Within the strategy, targets and timelines, robust accountability mechanisms and opportunities for cross-jurisdictional collaboration are presently unclear. Most importantly, the National Health and Climate Strategy lacks dedicated funding.[10] This structural constraint limits meaningful and proportionate representation of health care workers (HCW), including nurses and midwives, in climate and health planning across state and federal jurisdictions. Taken together, these factors contribute to the enduring omission of nurses and midwives from national climate adaptation and resilience planning.

The absence of nurses and midwives from climate adaptation planning is shaped not only by the above factors, but also by a professional identity that has not always positioned itself within the climate change adaptation discourse.[11] Although nursing and midwifery scholarship is increasingly contributing to environmental academic literature,[12] climate change is still too often framed as a "future" challenge, rather than a present reality marked by increasing frequency and severity. Subsequently, student and early-career nurses and midwives continue to be educated in systems ill-suited for a climate-altered future.[13,14] Additionally, the devaluation of feminised labour,[15] often mediated by structural gender bias,[16] is not only externally imposed but also, at times, internalised within nursing and midwifery due to longstanding systemic inequities.[15] Subsequently, meaningful progress will depend on the willingness of nurses' and midwives to confront not only systemic barriers, but also the identity narratives that continue to limit their full engagement in climate action.

Despite the challenges, meaningful climate adaptation and resilience planning must include nurses and midwives as a matter of necessity, not discretion. Nurses and midwives already routinely serve on the "frontlines" during extreme weather events,[9] and have developed a nuanced understanding of the health needs of communities.[17] During weather events, nurses continue to deliver clinical care (often whilst navigating damaged infrastructure), manage scarce resources, and assume leadership roles to make critical decisions during events.[9] Such duties are consistently performed without sufficient training or support,[9,17] often when they are a victim of the event themselves.

Time and again, when major events unfold, policy decisions are made rapidly, often without consultation with impacted community stakeholders. The COVID-19 pandemic exposed systemic gaps in preparing and supporting the health workforce, with national survey data from the Australian Nursing and Midwifery Federation finding that nurses and midwives felt underprepared and unsupported throughout the response.[18] In the short term, this disempowerment may leave nurses and midwives feeling excluded and disillusioned. In the longer term, and in the context of broader systemic issues, it contributes to nursing and midwifery attrition from a sector that routinely denies them a voice. The COVID-19 example offers a stark warning: if lessons are not heeded, gaps in workforce preparation and health service delivery are likely to persist, presenting compounding effects amid the growing frequency and intensity of climate impacts.

Strengthening individual-level resilience among nurses and midwives is an essential component of broader health system preparedness for climate-related disasters.[1] A recent study on health care workers' disaster experiences proposed a 'Resilience Toolkit' with four institutional priorities: wellness, education, resources, and communication.[19] This includes fostering agency, autonomy, and empowerment amid escalating climate pressures. This begins with support for nurses and midwives to understand and engage with the climate science. Building on that foundation, sustained investment in wellbeing, professional development, and access to timely, context-specific resources and communication is essential to prepare the workforce for adaptation.[19]

Resilience is not just built at the individual level. It is reinforced, or undermined, by the systems that surround us. A truly resilient health system is characterised by its ability to retain skilled and committed nurses and midwives. Rather than relying on individual factors, goodwill or a sense of duty, systems are deliberately designed to support and sustain workers irrespective of the global challenges. A resilient system empowers nurses and midwives to engage meaningfully in their roles, free from the constraints of poorly informed structural decisions, and to experience the professional fulfilment that comes with delivering high-quality care to their communities.

Resilience also requires a system oriented toward health and wellness, not solely illness. At present, the dominant Australian biomedical model continues to marginalise nurses and midwives,[20] keeping them at the periphery of decision-making instead of placing them at the heart of community health responsiveness. If resilience is to be truly prioritised, political leaders will need to invest in nurses and midwives to practice in a way that fully leverages their expertise and scope. Optimising resilience in nursing and midwifery therefore requires a deliberate shift away from a purely biomedical model towards holistic models of care, emphasising systems-informed approaches that account for social, psychological, and environmental dimensions of practice.[20]

To enhance the capacity of nurses and midwives to respond to the health impacts of climate change, a series of targeted recommendations are proposed.

1. Nurses and midwives must not be confined to post-disaster response; they must be engaged in planning and preparedness as leaders and experts in health system adaptation and resilience.

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2. The National Health and Climate Strategy requires immediate and ongoing funding, including meaningful operational and representative roles for nurses and midwives across community, subnational and national forums.
3. Nationally coordinated but locally tailored guidelines for disaster planning in health services must be prioritised, ensuring they are informed by the expertise of nurses and midwives.
4. First Nations knowledge and leadership must be centred in all decision-making processes, recognising their enduring expertise in land, community, and health resilience.
5. Effective climate change planning must integrate both system-level and individual-level resilience. Strengthening the capacity of nurses and midwives to adapt, lead, and thrive under climate pressures is essential to this dual approach.

We don't lack answers to the climate crisis; we lack the full participation of those closest to its human consequences. Real, contextually relevant solutions emerge from those most affected. As the largest and most widely distributed health workforce, nurses and midwives must be positioned to respond to community needs before, during, and after climate-related disasters. It's time to move beyond symbolic recognition and invest in the leadership of nurses and midwives as catalysts for transformative climate resilience.

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Enhancing nursing team resilience to manage continuous change in practice: A qualitative descriptive study

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ABSTRACT

Aim: The study explored nurses' perceptions of team resilience in coping with continuous changes and in developing nursing practices. Additionally, it sought to identify what nurses need to strengthen their team's resilience in adapting to change and how clinical nurse specialists can support these efforts.

Background: Persistent changes in healthcare require nursing teams to continuously adapt and develop their practices. However, development and implementation processes are often challenging, stressful, or unsuccessful. This can lead to change fatigue and, when combined with daily workload pressures, high job turnover. Currently, individual resilience is regarded as a key factor in coping with workplace stressors and burdens. Yet, growing critical perspectives emphasise the importance of team resilience, which differs from individual resilience. Despite practice development being mainly a team effort, nursing team resilience remains underexplored in the literature.

Study design and methods: This qualitative descriptive study involved 29 registered nurses from two nursing teams at a Swiss paraplegic rehabilitation clinic. Data were collected through eight semi-structured group discussions, and the analysis was conducted using structured qualitative content analysis.

Results: The nurses identified four key areas as crucial factors for team resilience in managing change:

1. A lack of knowledge about team resilience and interest in integrating the concept as fundamental resource.
2. Psychological safety within the nurse team and the desire to enhance interprofessional psychological safety, recognised as key factor in team resilience.
3. Readiness to learn.
4. Anticipated burdens. Furthermore, they expressed a need for support from clinical nurse specialists to strengthen team resilience.

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Conclusion: Team resilience was identified as an unrecognised and neglected concept, yet it was acknowledged as being significant both intra- and interprofessionally for coping with challenges; weak team resilience was considered disadvantageous. Clinical nurse specialists should play a key role in supporting team resilience.

Recommendations for research and practice: Team resilience should be promoted among nurses across all education levels and fostered within nursing teams. Models for interprofessional collaboration and implementation could enhance team resilience factors that are essential for managing change. Additionally, the perspectives of other professionals on collaboration with nursing teams should be explored further.

What is already known?
- Nursing teams must continuously adapt their practices due to persistent changes in healthcare. This process is often challenging and stressful, increasing daily workloads and potentially leading to change fatigue and job turnover.
- The level of resilience in individuals, teams and organisations becomes evident when challenges and stresses arise. Currently, individual resilience is regarded as a key factor in coping with workplace challenges and burdens.
- Hospital nursing relies on a strong team-based approach, and nurses face numerous challenges, including those arising from ongoing change.

What this study contributes:
- This study highlights the importance of team resilience. A knowledge gap regarding this concept was identified and addressing it could enhance teams' ability to cope with change.
- Nurses recognised team resilience as an essential resource for managing persistent change and fostering future development. Consequently, they expressed a desire to gain knowledge about team resilience and to strengthen key factors such as psychological safety in interprofessional collaboration, readiness to learn, and the anticipation of burdens associated with change.
- Integrating and strengthening team resilience in change implementation may facilitate more successful and sustainable development.
- Clinical nurse specialists should play a key role in enhancing team resilience.

Keywords: Advanced practice nursing, change, clinical nurse specialist, practice development, psychological safety, team resilience.

INTRODUCTION

Healthcare organisations are in a constant state of transformation due to technological advances, demographic shifts, evolving disease patterns and new treatment options.[1] Increasing demands from society and the health care system require nurses to undergo continuous professional development and adaption to ensure patient-centred, safe and, effective care.[2–4] Frequent change and transformation have become an ongoing challenge, often triggering varied responses, including resistance and change fatigue driven by fear and uncertainty.[5,6] The well-documented effects of frequent change on staff health and well-being include reduced commitment, decreased productivity, work-related stress, emotional exhaustion, mental health issues, and absenteeism.[7–9] However, how nurses navigate this constant and inevitable change remains largely overlooked and insufficiently researched.[10]

In Switzerland, advanced practice nurses with clinical nurse specialist (CNS) profiles are increasingly leading practice development in hospitals by initiating innovations and change processes.[11–13] They support teams at intra- and interprofessional levels to evaluate and adapt care practices using team-building, training strategies and, leadership skills.[14] Leading change is a complex process, not yet fully understood, and remains one of the most challenging leadership tasks.[15,16] In nursing literature, the failure rate of change efforts is estimated at 40-80%.[16]

Resilience, originally a concept in physics, describes the ability of materials to withstand pressure, maintain function, and regain their original form. In psychology, the concept of resilience was first transferred and applied to humans in the 1970s and is now widely recognised for managing burdens, crises and change.[17] In its original technological domain, this concept evolved into an interdisciplinary field known as resilience engineering, which integrates multiple disciplines to enhance systems abilities to function, resist, adapt, and learn.[18] This is significant, as resilience and learning are closely linked.[19] In the workplace, resilience is regarded as both a key factor and a critical asset for maintaining performance and well-being, and for coping with – and ideally maturing through – changes and challenges.[20,21]

Resilience is crucial at both the individual and team levels.[22] Despite its relevance for organisations, team resilience (TR) is particularly in nursing less studied compared with individual resilience.[23–25] Research throughout various nursing settings

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has predominately focused on individual resilience.[26–31] However, there is growing criticism and concern about the focus on individual resilience, as this places the burden on individuals to cope with adversity rather than fostering collective responsibility to support and protect them.[32] TR emerges from interactions among team members and goes beyond the sum of individual resilience; achieving shared goals through teams' collective ability to manage challenges and burdens.[22,33]

Resilience cannot be measured directly; it is derived from the relationship between risk-taking and positive adaptation.[34] Numerous models outline key factors for enhancing resilience. In the context of TR, the primary factor is psychological safety (PS), followed by collective efficacy, optimism, learning readiness, solution and goal orientation, problem-solving ability, an open error culture, reflective practice, and burden anticipation.[21,35] At the organisation level, critical factors include value orientation, a shared vision, knowledge transparency, change anticipation, adaptability and leader encouragement.[17]

The literature underscores that resilience is fundamental to sustaining nurses' health, functioning, and professional development. Initially discussed in terms of individual resilience, the importance of TR is now increasingly recognised.

In paraplegic rehabilitation care, patients remain on the same ward from the acute phase until rehabilitation is complete, placing considerable physical and mental demands on nursing staff. Nurses support these patients through highly stressful periods, characterised by significant uncertainty and severe physical dependency. Moreover, medical advances, ageing, and multimorbidity necessitate continuous adaptation of care. Consequently, nurses are highly dependent on effective teamwork.

To date, no studies have explored TR in paraplegic rehabilitation nursing or its role in ongoing development within this setting. Therefore, this study aimed to understand how nurses perceive their TR, what they require to strengthen TR in managing continuous development and change, and how TR can be supported by CNSs.

The research questions were as follows:

1. How do nurses in a paraplegic rehabilitation setting describe TR in relation to change and practice development?
2. Which TR related factors do nurses wish to enhance to cope with change and development, and how can CNSs support them in increasing TR?

METHODS

A qualitative descriptive design was employed to address the research questions, guided by a content analysis approach.[36] According to Margrit Schreier (2014), content-structuring qualitative content analysis is a systematic method for analysing qualitative data, aiming to provide a structured and detailed description of content categories. This approach facilitates the organisation and interpretation of large volumes of qualitative material by dividing the process into clearly defined steps. It is particularly well suited for understanding and describing the perceptions, views, and needs of care team members.[36,37]

DATA COLLECTION

Between December 2021 and January 2022, eight semi-structured group discussions were conducted with nurses from two wards using an interview guide. The groups were specifically composed for each ward, allowing for the identification of shared dimensions of interaction, attitudes, behaviours, and action patterns within a their social group. The aim was to facilitate a dialogue among participants with minimal external influence, enabling them to select the topics within a predefined thematic framework. This approach was intended to help uncover implicit knowledge derived from their everyday interactions.[38–40]

Recruitment, inclusion criteria's, participants, and group composition:

For the study, 51 nurses from two teams at the paraplegic rehabilitation centre were contacted by email in November 2021 via an information flyer and invited to participate. A total of 29 nurses were recruited, all of whom met the following inclusion criteria: a) Holding a nursing degree for at least six months. b) Being employed in one of the two teams for a minimum of six months with a work schedule of no less than 40%.

Of the participants, 26 were female and 3 were male, reflecting the department`s gender ratio. The average age was 42.9 years (range: 21 to 61 years), with an average of was 17.6 years in the profession and 9.7 years of employment at the rehabilitation centre.

The groups were formed from randomly selected nurses who were either assigned to a shift that day or willing to come to the clinic for the discussion. From each ward, three groups of four nurses were formed, while one ward had an additional group of three nurses. Ward managers were interviewed separately in pairs to provide them with the opportunity to speak freely about the relationships between employees and management.

The discussions were conducted in a medium-sized hospital in German-speaking Switzerland, in a meeting room at the participants' workplace, free from patient calls, outside their working hours. The interviews lasted between 60 and 90 minutes and were digitally recorded using a free-standing microphone.

The interview guide was developed based on resilience models and their key components.[21,35] Items were selected in alignment with the research questions on TR, with a particular focus on teamwork and its relevance to learning processes and change management in practice development (Table 1).

TABLE 1. INTERVIEW GUIDE

Introductory phase: Introductory question & narrative stimulus
What do you know about TR?
To what extent is this term familiar or understood?
Consolidation phase
Attitude/resources for learning and change
How does the team manage the demands of learning?
What team resources are available to support change and development?
How do you perceive TR in relation to learning, change and development?
How do you perceive the key components of TR in relation to these aspects? • Psychological safety • Collective efficacy-beliefs • Learning readiness • Orientation towards the future • Reflectivity • Error culture in learning • Solution orientation & coping styles • Optimism • Creativity • Burden anticipation • Uncertainty tolerance • Perseverance
Solutions & wishes
What could enhance TR to manage change and practice development?
Which key concept(s) should be promoted?
How is the leadership style experienced in practice development?
How can CNSs support TR?
Exit phase: Closing question for open points

Each discussion started with introductory questions about TR knowledge, followed by general questions on learning and managing change. To minimise external influence, key components were gradually introduced throughout the discussion.

Each session concluded with questions about support, needs, unmet challenges and unresolved issues.

DATA ANALYSIS

The digital interview recordings were transcribed using MAXQDA analysis software (version 2022). Following the analysis of the group discussions for each ward, similarities were identified. The coding process was theory-driven, employing deductive coding for the main categories (based on the interview guide) and inductive coding for subcategories emerging from the data.

The subsumption strategy was applied, where subcategories were continuously developed based on newly mentioned relevant terms. This combined concept- and data-driven approach resulted in fewer additional main categories. To enhance clarity and consistency, all main and subcategories were clearly defined with content specifications. Text codes were continuously reviewed, eliminating the need for sample coding and subsequent revisions of the coding system.[36,37]

To ensure intracoder reliability, repeated analyses were conducted to verify the categorisation within the category system. All coded text passages were summarised and annotated. Approximately 1100 coded segments related to key components were grouped based on factors that either promoted or weakened resilience. A qualitative descriptive design was selected to address the research questions, employing a content analysis approach [37].

ETHICS

The Cantonal Ethics Committee of the Canton of Zurich confirmed its non-responsibility in accordance with the Swiss Human Research Act (BASEC no. Req-2021-00900).[41]

All participants received detailed study information and were given several days to make their final decision. They provided written consent, understanding that they could withdraw at any time without facing any disadvantages. Anonymity was ensured, and the results were securely stored. Quotations were assigned randomly generated numbers.

RESULTS

Four key TR areas and associated requirements for the CNS role were identified:

1. A lack of knowledge about TR
2. The need to enhance PS in interprofessional collaboration
3. Learning readiness.
4. Burden anticipation.

KNOWLEDGE ABOUT TEAM RESILIENCE

Almost all nurses were unfamiliar with TR. The topic had not been covered in their education; only individual resilience was occasionally discussed. However, during the interviews, they reported a wealth of implicit experiences with components of TR, distinguishing factors that strengthened or weakened their ability to cope with change. They likened

themselves to elements of a mobile sculpture, highlighting how they were interconnected, mutually dependent, and moved as one team.

> "I think it's much harder to build TR in a nursing profession, (…) you might only work with someone twice in two months, and then not meet them again." N_14

This quote illustrates the challenges of developing TR amid constantly changing team compositions, which are exacerbated by shift work, frequent reliance of temporary staff, and evolving requirements. The nurses expressed a strong desire for direct attention to TR and for acquiring relevant knowledge, and they recognised that CNSs play a key role in this process.

PSYCHOLOGICAL SAFETY

The teams described PS as essential for teamwork, enhancing the quality and effectiveness of collaboration in managing daily tasks and changes. Both teams reported differing experiences between intra- and interprofessional collaboration, highlighting a significant need to strengthen interprofessional PS. They recognised that CNSs play a key role in mediating between professions.

Intraprofessional psychological safety

The nurses felt psychologically safe within their teams; some had previously experienced a lack of safety, which made them value it more.

> "I think it's simply because we have a good team spirit. I don't feel stressed knowing my colleagues are there and I can reach them, and I feel much more relaxed working, even running all day (…). I`m feel like I'm in good hands." N_24

Feeling supported, trusting their colleagues and being able to ask for help enhances nurses' PS. In caring for the paraplegic population, nurses are highly dependent on one another; due to patients` often severe physical impairments and psychological burdens, nurses typically work together to provide care for a single patient. The nurses stated that without effective team performance it would be impossible to deliver care, facilitate professional development, and adapt to change.

> "We know each other and how to take care of us. We support one another super well; I think that's a great resource that we have there. (P11: I think so too). If that was not the case, we would have even more significant fluctuations." N_26

All groups affirmed the nursing team's crucial role as a cornerstone of their professional experience. Remaining in the workplace, which is highly valued in today's world, was strongly influenced by the team and also contributed to their professional development. However, this setting is also frequently challenged by staff turnover and shortages.

> "I noticed the team has moved extremely close together and the remarkable factor is the ability for teamwork, (…) social competencies are almost paramount in the team at the moment, (…) we can handle it together, no matter what happens". N_20

The intraprofessional PS of nurses has remained stable despite numerous intense and stressful periods. They take pride in their mutual appreciation, which fosters optimism and reinforces their sense of capability as a team. Some nurses emphasised the importance of strengthening collaboration with healthcare assistants to support future development.

Interprofessional psychological safety

The nurses aimed to enhance their PS through interprofessional team collaboration.

> "I think a lot of work has to be done regarding how we are perceived from others as a professional group." N_04

Despite significant advancements in nursing, it continues to be perceived as a service profession. This perception does not align with the contemporary therapeutic understanding of nursing as an equal discipline alongside other professions. It is the shared responsibility of nurses and other professionals to challenge and reshape this view.

> "Sometimes I truly have the feeling I am everyone's secretary. (…) It makes me very unhappy and eats up a lot of my energy and time, which I could invest much better." N_11

This issue was frequently described as a lack of respect for the nursing profession, exemplified by tasks being delegated without consultation, frequent work interruptions, and the requirement to adhere to timelines set by other professions. The nurses expressed a desire for greater recognition, as both they and their work were negatively impacted by these circumstances.

> "Often, we as nurses simply lack appreciation; I think that is the problem (N_02: Exactly, exactly). (…) the cooperation, the whole interdisciplinary thing, is difficult sometimes, isn't it! Because doctors are still so hierarchical; he decides, he says, partly you are not even asked, I think that is still a problem in rehabilitation." N_12

All groups expressed concerns regarding positioning and recognition of the nursing profession, which they viewed as inherently interdisciplinary, particularly through greater participation in decision-making. They noted that hierarchical structures continue to shape the healthcare system, especially in rehabilitation care.

> "However, what CNSs could maybe change, during rehabilitation meetings, so there is a bigger voice from nursing." N_08

The importance of being heard was explicitly emphasised. The participants stated that nurses` input should be recognised as an essential contribution. They also highlighted the potential for their voices to be strengthened interprofessionally through the role of CNSs.

> "In general, I would like to see more self-confidence in our profession, also in relation to other disciplines. I have a feeling that things are getting better, but there is still room for improvement." N_26

The nurses also reflected on their own roles, recognising the need for development. They discussed their responsibility for improving presentation skills, to represent nursing care more professionally, which was closely linked to strengthening their own PS. Most nurses saw the potential for future interprofessional synergies and believed that development could be encouraged and hierarchies flattened. However, a few showed resignation and expressed little or no confidence in this regard.

LEARNING READINESS

The nurses' readiness to learn was influenced by a constructive approach to mistake management culture, along with their capacity for reflection and mutual support. Sensemaking and practical applicability were also top priorities for nurses when learning and implementing changes.

> "It must truly make sense; it must save us time or *increase* quality *(*N_24*: Exactly)* and not just be a theoretical thing." N_01

The nurses reported being open to change, but they emphasised the importance of practical relevance. They also cited negative experiences with theory-driven changes that lacked clear practical benefits or disregarded their input.

> "I think there's something new every day. Therefore, that's what it feels like." N_21

Ongoing learning is the norm rather than the exception; it is integral to nursing care. The nurses noted that innovations and changes were continuous, requiring extensive learning and frequent information-seeking among colleagues.

> "Well, we are mostly determined, you know, almost in everything. We determine very little ourselves as a team." N_27

Under a top-down approach, nurses were generally only informed about changes and were rarely involved in decision-making.

> "I would say the reaction is usually resistance at first because it is an additional task that is added. Structures need to be rearranged for new things." N_18

The nurses reported that learning is influenced by how change is communicated; changes can significantly disrupt an individual's routine, pushing them beyond their comfort zone. This can lead to stress and potentially weaken both resilience and learning readiness.

> "That's why I think if you let people have a bit of a say (…), I think that's how you can increase resilience in a team extremely fast." N_01

Good guidance and support are crucial for innovation, including pilot phases and opportunities to discuss difficulties, progress, and outcomes; however, these processes were frequently lacking.

BURDEN ANTICIPATION

The nurses' daily routines had become significantly more burdensome and demanding over the past two to ten years.

> "The basic work, nursing itself, demands more from us every day; the healthcare system, demographic development, patient expectations, have changed in recent years, which means the basic workload is much more and that there is always more research work, more change, more new things coming our way". N_10

Constant change, increasing complexity and a shifting demographic in the patient population were the primary causes of heightened burden.

> "Officially, we still are a paraplegic rehabilitation centre, but there have been fewer classic rehabilitation patients in recent years; (…) only a few patients can be rehabilitated nicely, and most have additional complicating diagnoses." N_26.

The diverse needs of patients had a significant impact on nurses. Gerontological, oncological, palliative, and psychiatric care are becoming increasingly complex, often making traditional rehabilitation challenging or unfeasible.

> "We have old people with multimorbidity here. (…) You push them, but (…) what we achieve is so little. Hardly anything. And that's frustrating, of course, because you give everything and maybe the patient does too (…), but it doesn't work." N_27

This led to ethical dilemmas, placing increasing strain on nurses.

> "And if we mention it, (…) most of the time you don't get very clear ideas and goals, also from the doctor's side. (…) I think if it would be more clearly defined; (…) I could deal with it differently and then I would somehow have other instruments to work with and a different attitude." N_18

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There was a lack of concepts, knowledge, and skills among nurses to address specific patient needs. They expressed a desire for interprofessional agreement and collaborative development to meet the demands of this evolving patient population. The complexity of these challenges could only be effectively addressed by amplifying nurses' collective voices.

> "The implementation of new things, concepts, (…) in the team, sometimes proves to be very, very difficult (…) because the workload has increased very, very much. People are exhausted and there is always something new, (…) then it's uuuhhhh!!!! Not again! We have enough and where should we find time for this? (…) I also think, we have our job, and now we must do something new again and again!" N_17

A predicament is emerging due to the strain caused by both a lack of change and excessive change, compounded by the intensity of the daily workload. Changes must be context-appropriate and adapted to everyday practice; if they are unsuitable or occur too frequently, they can become overwhelming or unmanageable, leading to work overload and change fatigue.

DISCUSSION

The interview results revealed that TR was an unconsidered area, with a lack of knowledge and no practical application in managing change. All nurses agreed that acquiring knowledge is essential to understanding TR and developing the capability to enhance it for professional development.

According to literature from 2007/2009, personal resilience is considered a necessary quality for success in nursing. In the context of adverse conditions[42], resilience theory should be incorporated into nursing education to foster resilience through training, education, and modifications in workplace culture.[43] More recent literature (2018/2019) confirmed that education remained focused on individual resilience, as stated by younger interviewees.[44,45]

The nurses encountered the concept of TR for the first time in this study yet simultaneously recognised their implicit experiences with TR-related factors. They realised that TR is inherent and accessible construct within self-regulation.

TR has emerged as a crucial mechanism for nurses to cope with challenges and adapt to change, but guidance and support are essential, as highlighted by the following two citations. Nursing leaders play a vital role in ensuring excellent-quality care and supporting nurses in demanding situations,[46] while also bearing responsibility for fostering a culture of resilience.[47]

CNSs should integrate and cultivate TR to guide nurses through change, employing resilience models such as the TR Compass (adapted from Wellensiek, 2011). This model could provide theoretical knowledge about TR factors and serve as a practical assessment tool.[48,49]

Among the possible TR factors, the nurses identified PS as the most important. PS is widely recognised as a central resilience factor that emerges from strong cooperative relationships. It establishes the conditions necessary for experimentation, risk-taking, and learning from mistakes while fostering trust, courage to explore new ideas, and a sense of appreciation.[50,51]

Aligned with these qualities, the nurses in this study confirmed that they felt psychologically safe within their nursing teams. They also stated that intraprofessional PS played a crucial role in their decision to remain in their workplace.

In today's strained staffing environment, staff turnover demands substantial resources and leads to knowledge loss, which can, in turn, hinder effective teamwork.[52]

In contrast, the nurses perceived PS within their interprofessional team as quite low. They expressed a desire to strengthen PS, believing it would enhance the position of nursing by increasing in involvement and ensuring their voices were heard.

As confirmed by studies in healthcare, successful interprofessional teamwork is essential for effective and efficient treatment, high-quality care, and the safety and satisfaction of both patients and staff.[53,54]

Interprofessional teamwork was identified as a key factor influencing nurses' working environments and their decision to leave their organisation.[55] This underscores the significance of the interprofessional team, as described by the nurses.

Traditionally, medical doctors (MD) occupy a higher position then nurses and other health professionals within the medical hierarchy, making them the primary decision-makers in hospitals.[56] Such a hierarchical structure can discourage health professionals from voicing their opinions, potentially limiting valuable contributions to patient care.[57,58] The literature indicates that nurses report lower levels of satisfaction with teamwork climates compared to MD`s. It is more challenging for nurses to express their opinions, and they often feel that their contributions are not adequately recognised.[59]

These experiences were discussed in the groups, with existing hierarchies were identified as a significant obstacle. In the interviews, this issue was described as a systemic problem related to roles and professional groups. However, this culture is gradually evolving, with the role of nurses shifting towards greater autonomy.[60–62]

The finding of this study could support this transformation by fostering interprofessional discussion on TR and PS in rehabilitation nursing. CNSs, through their leadership skills and commitment to evidence-based nursing, can support nursing and interprofessional teams in interdisciplinary collaboration by assisting them in jointly reviewing and adapting their practice concepts.[14,63]

Notably, the nurses emphasised the importance of strong PS within both their nursing teams and at the interprofessional level.

To enhance interprofessional PS, it is essential to determine the extent to which interprofessional teams perceive themselves as cohesive units and their willingness to apply the concept of TR. This, in turn, could contribute to improved patient outcomes and greater staff satisfaction.

The Safe, Reliable and Effective Care Framework, developed by the American Institute for Healthcare Improvement, could serve as a model to support interprofessional teams. Within its two domains – team culture and learning system – it directly emphasises PS, alongside team collaboration, negotiation, and continuous shared learning. The overarching goals are to improve patient outcomes and staff satisfaction.[64]

Learning readiness and burden anticipation were identified as two central factors in practice change. The nurses reported that excessive changes or those introduced with poor timing or irrelevant content created additional burdens, reduced learning readiness, and, in the worst case, led to resistance or change fatigue.

To prevent this, changes in healthcare are more likely to succeed when health professionals can actively influence the process, feel adequately prepared, and recognise its value in terms of patients benefits.[1] Additionally, learning readiness can be fostered within teams through a learning zone, where performance is supported by strong PS. This approach enhances team learning and promotes a positive work climate, thereby improving effectiveness, efficiency, and overall team functioning.[65]

Furthermore, the nurses expressed a need for continuous learning and found a lack of change to be burdensome. The following statement highlights the importance of addressing such challenges through ongoing development; a workplace culture that fosters learning and professional growth among nurses can further enhance job satisfaction and nurse resilience.[66]

To summarise, change and development are essential, but their timing and scale must be carefully managed, taking the daily workload into account. Both too little and too much change can create challenges. Therefore, nursing teams seek leadership and support from CNSs. They can help teams anticipate pressure, establish priorities, and facilitate change, thereby enhancing learning readiness for successful and sustainable development.

According to the literature, leaders benefit from understanding how to enhance TR, as it can contribute to positive team outcomes.[24] The core objective of the CNSs – to achieve excellent care quality and promote continuous evidence-based nursing – would be strengthened by robust TR.

TR has a positive influence on employees' attitudes and behaviours towards change, increasing their willingness to support organisational transformation.[67] CNSs could directly support teams through a transformational leadership style, which is recognised for its role in fostering resilience.[48] As outlined in the introduction, change processes are challenging and frequently unsuccessful. To date, no studies have examined the link between increased TR and change implementation in nursing. To facilitate change, implementation science offers various implementation models for nursing. CNSs could, for instance, apply the revised Integrated-Promoting Action on Research Implementation in Health Services (i-PARIHS) framework. This model emphasises values, beliefs, team culture, motivation, networks, time resources, boundaries, evaluation, feedback processes, collaboration, the learning environment, and previous experiences with innovation and change.[68] The model incorporates the key factors identified in the introduction as essential for enhancing TR, managing stress effectively, and fostering the bottom-up management approach that nurses seek. Given that separate TR workshops and courses can be time-consuming, costly, and potentially unsustainable. Integrating both a collaborative framework and an implementation model into everyday practice could strengthen TR within the work process while also supporting change, ensuring continuous consideration of the current state of TR.

CONCLUSION

This study confirms existing literature indicating that TR in nursing is largely unconsidered. However, rich implicit knowledge was identified, which nurses could reflect upon and access. The nurses recognised the enhancement of TR as a crucial strategy for managing change and professional development.

CNSs play a key role in facilitating TR knowledge acquisition and linking it with nurses' implicit experiences. Intra- and interprofessional PS was identified as essential for professional growth.

The nurses emphasised that strengthening PS is critical for interprofessional collaboration and highlighted the need for a shared understanding of TR. CNSs are regarded as key supporting and mediating figures between professionals, with the ability to apply team collaboration models to strengthen TR. Addressing today's challenges requires interprofessional approaches based on mutual respect and joint learning.

As highlighted by the nurses, collaborative, adaptive patient care – tailored to the evolving needs of patient populations – could reduce burdens for both patients and nurses while enhancing TR. This may be essential in counteracting the negative spiral of strained nursing conditions.

Furthermore, learning readiness should be actively considered by anticipating workload burdens, thereby preventing change fatigue and Implementation failure.

CNSs could enhance understanding of change and support TR by applying insights from resilience engineering. Whereas resilience is understood as a complex interaction of various disciplines, this highlights the need for CNSs to integrate their understanding of implementation, collaboration, leadership, and resilience theories.

Teams with strong burden anticipation and high learning readiness could, in turn, contribute to improved quality of care, better patient outcomes, greater job satisfaction.

RECOMMENDATIONS FOR RESEARCH AND PRACTICE

TR knowledge should be incorporated into nursing education at all levels, particularly for APNs in context of leadership and change management. The promotion of TR should be firmly established in practice to support demanding teamwork and adaption to change.

In clinical practice, CNSs should recognise TR as a central factor in managing workplace challenges, burdens, and interprofessional collaboration. The collaboration and implementation models mentioned earlier, which incorporate key resilience factors, could be effectively applied.

A professional leadership approach should be oriented towards TR promotion and follow a bottom-up principle, aligning with contemporary concepts of collaborative practice with reduced hierarchy. Additionally, the healthcare sector could draw insights from resilience engineering, a well-established concept in technological fields, which has already demonstrated substantial systemic evidence.

Further research is required to explore the perspectives of different health professionals on TR and to determine which interventions effectively enhance TR in targeted and sustainable manner. Moreover, models that enhance TR in both collaboration and implementation should be tested and evaluated to facilitate and sustain change.

LIMITATIONS

The results are not generalisable due to the use of a qualitative methodology. Additionally, only nurses were interviewed. The first author held a dual role as both a CNS and researcher. She acknowledged and addressed this potential bias through transparency.[69] While no nurses perceived this as problematic, it may still have influenced their responses.

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RESEARCH ARTICLES

The level of nurses' knowledge about and attitude towards caring for dying patients and relationship with evidence-based practice among nurses of primary health care organisations in Kazakhstan: A cross-sectional study

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ABSTRACT

Background: To provide quality care at the end of life or for chronically sick patients, nurses must have good knowledge, attitude, and practice about palliative care. Lack of knowledge about palliative care, negative attitudes towards it, as well as gaps in evidence-based practice among nurses, are some of the most common obstacles to quality palliative care.

Methods: To collect data, a cross-sectional questionnaire was administered to 565 nurses working in primary health care organisations in Astana, Kazakhstan. Data collection was completed from January 2022 to March 2023. The questionnaire contained demographic and professional characteristic questions, the Palliative Care Quiz for Nurses (PCQN), the Frommelt Attitudes Towards Care of the Dying (FATCOD), and the Evidence-based Practice Questionnaire (EBPQ). Descriptive statistics, independent *t*-tests, and one-way ANOVAs were used for analysis.

Results: The sample size was 565 nurses. Nurses' palliative care knowledge level was low (mean score: 9.06 ± 2.93). The largest number of the correct answers on the PCQN questionnaire was received in the category "Management and control of pain and other symptoms" (49.95%). The majority of nurses (93%) have a neutral or negative attitude towards caring for dying patients (mean score: 94.50 ± 12.41). Only 6.7% of respondents had a positive attitude. The obtained score (4.39 ± 1.05) on the EBPQ scale indicates an average level of competence in evidence-based practice. Age, work experience, educational level, attendance at palliative care training, and good competencies in evidence-based practice are statistically significant factors that affect knowledge of palliative care. The aspect of knowledge/skills in EBP is the most significant ($\beta = 0.122$; $p = 0.005$).

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Conclusions: An insufficient level of nurses' knowledge about palliative care and a neutral or negative attitude towards caring for dying patients was revealed. Health care providers are encouraged to expand palliative care-related training programs, which together can improve the quality of palliative care nursing services for patients. The results also indicate that much attention, and resources should be directed to improving the level of knowledge of nurses in the field of evidence-based practice, because this aspect significantly affects the level of knowledge on palliative care.

Implications for research, policy, and practice: Further research is needed to identify the factors contributing to nurses' inadequate knowledge of palliative care, including gaps in training and cultural or systemic barriers. Policymakers should develop national frameworks for palliative care training and certification, while healthcare institutions should regularly assess and enhance nurses' knowledge through continuous professional development.

What is already known about the topic

- Most nurses do not receive training in palliative care.
- The benefits of using evidence-based medicine in palliative care are described.
- The most common barriers to providing quality palliative care have been described many times.

What this paper adds

- Primary care nurses have insufficient knowledge of palliative care.
- Primary care nurses have a negative or neutral attitude towards palliative care.
- The use of evidence-based medicine by nurses contributes to the formation of a high level of knowledge about palliative care and a positive attitude towards it.

Keywords: Attitude, education, evidence-based practice, knowledge, nursing, palliative care.

INTRODUCTION

Palliative care is an approach to improving the quality of life for patients and their families confronting life-threatening illness. The approach focuses on preventing and relieving suffering through early identification, careful assessment and treatment of pain and other physical symptoms This includes the provision of psychosocial and spiritual support.[1] According to the World Health Organization (WHO), palliative care (PC) improves the quality of life of patients and their families who face problems associated with a life-threatening disease, whether physical, psychological, social, or spiritual.[2] A patient with a serious illness should receive palliative care from the time of diagnosis until the end of their life.[3]

Adequate palliative care reduces the suffering and burden of seriously ill patients.[4] Nurses spend a significant amount of time with patients – more than any other health care professional and have numerous responsibilities that,[5] when performed effectively, help ensure patient safety. Palliative nursing is a holistic approach to managing the symptoms of incurable diseases while simultaneously eliminating pain and other symptoms, psychosocial problems, maintaining spirituality, and improving the quality of life of a seriously ill person.[4] Palliative care is successfully implemented due to the combined influence of good knowledge, attitudes, beliefs, and extensive experience of medical professionals. The negative attitude of nurses towards death and the care of dying people can significantly affect the quality of palliative care.[7]

Nurses working in palliative care are often required to independently master a variety of patient care skills and must learn and adapt to situations at the bedside.[8] It is proved that nurses who actively combined patient preferences with evidence-based practice were able to improve the quality of life of patients and improve individual care.[9] However, at the moment, there are no studies devoted to the study of the problem of the introduction of evidence-based medicine in nursing care at the PHC stage. The majority of scientific research on the introduction of evidence-based nursing was conducted in inpatient hospitals.[10]

Today, palliative care is undergoing many reforms in the world because very few initiatives aimed at implementing it exist, and available evidence is weak. To date, no large-scale clinical trials have been conducted in palliative care.[11] However, there are many studies that confirm the widespread lack of proper knowledge and skills of nursing specialists in palliative care. For example, a study in Iran showed that nurses are poorly familiar with palliative care and its components, they cannot correctly assess the level of pain of patients, and do not have a basic level of communication skills, which are significant obstacles in providing quality palliative care.[12] A Columbia study found that palliative care nurses lacked confidence in their formal knowledge gained through institutional training. Nurses expressed confidence only in the knowledge gained from their experiences. They believed that this was not enough to fully fulfil their role.[13] In Spain, nurses also demonstrate a low level of knowledge in the field of palliative care; however, the level of knowledge

was significantly higher among those who received special training (theoretical or practical) in palliative care.[14] This data is also confirmed by a Taiwanese study, where the professional experience of nurses in the field of palliative medicine positively correlated with their position, professional level (rank), and competence in this field.[15]

It is necessary to note the important role of nurses in ensuring universal access to palliative care, especially at the primary health care (PHC) stage. After all, the vast majority of terminally ill patients receiving palliative care prefer to die at home, so from a medical and ethical point of view, palliative care should be provided at home as part of primary care.[16,17]

The evidence-based approach (EBP) plays an important role in order to better navigate a variety of situations at the bedside of patients.[18] It is proved that nurses who actively combined patient preferences with evidence-based practice were able to improve the quality of life of patients and improve individual care.[19] However, at the moment, there are no studies devoted to the study of the problem of the introduction of evidence-based medicine in nursing care at the PHC stage. The majority of scientific research on the introduction of evidence-based nursing was conducted in inpatient hospitals.[20]

For health systems around the world, providing adequate palliative care is an important challenge. There is a serious gap in this area in many countries, including Kazakhstan.[21] The problem of training palliative care specialists should be recognised at the state level. It is necessary to improve a system for training nurses in palliative care.[22,23]

MATERIAL AND METHODS

STUDY DESIGN AND PARTICIPANTS

A descriptive, cross-sectional study was conducted between 2022 and 2023. The study utilised a convenience sampling method to select participants. Nurses working in PHC organisations in Astana who were involved in delivering palliative care to seriously ill patients at home were targeted for inclusion. Exclusion criteria included nurses working in hospitals or those who had not delivered home-based palliative care.

The study was conducted across 10 randomly selected PHC organisations in Astana. Considering that approximately 3,000 nurses are employed in the city's health organisations, the optimal sample size was calculated to be 341 nurses, based on a 95% confidence level and a 5% margin of error.

All nurses provided informed consent and were sent a link to a Google Form containing the study questionnaire.

DATA COLLECTION

Online questionnaires were used to collect research data as one of the key data collection strategies. Data were collected between January 2022 and March 2023. Online questionnaire included demographic and professional characteristics of participants and questions from two questionnaires (Palliative Care Quiz for Nurses (PCQN); Frommelt Attitudes Towards Care of the Dying (FATCOD) and the Evidence-based Practice Questionnaire (EBPQ)).

MEASUREMENTS

A translated version of the Palliative Care Quiz for Nursing (PCQN), the Frommelt Attitudes Towards Care of the Dying (FATCOD) and the Evidence-based Practice Questionnaire (EBPQ) were utilised to assess nurses' knowledge about palliative care and attitude towards end-of-life care, respectively. These are specialised questionnaires that are widely used by authors all over the world. A self-administered questionnaire used for data collection contained three different parts.

The first part was demographic and professional characteristics of nurses such as age, gender, work experience, level of education, attendance of training.

The second part of the study involved the use of the Palliative Care Quiz for Nurses (PCQN) questionnaire, which was developed by Ross et al. in 1996.[24] This instrument measures the basic palliative care knowledge of nurses. According to Ross et al., the scale indicated high content validity, and a reasonable reliability (test re test r = 0.56 and Kuder-Richardson 20 = 0.78). This questionnaire contains 20 questions, which are grouped on three subscales including:

1. philosophy and principles of palliative care (1, 9, 12, 17 items),
2. management and control of pain and other symptoms (2, 3, 4 , 6, 7, 8, 10, 13, 14, 15, 16, 18, 20 items),
3. psychosocial aspects of care (5,11,19 items).

These categories can be summarised to get a total knowledge score for each participant. Total scores range from 0 to 20, with higher scores indicating higher knowledge levels. The answers are formulated as: "true", "false" and "I do not know". The final answers are coded as follow: 1 = correct, 0 = incorrect and I do not know.

In the third part of the study, the Frommelt Attitudes Towards Care of the Dying (FATCOD) questionnaire was used to measure both the respondent's attitude towards a dying patient and toward a dying patient's family. This questionnaire consists of 30 items. Each individual item is rated on a 5-point Likert scale ranging from one "strongly disagree" to five "strongly agree". Namely: 1 = strongly disagree, 2 = disagree, 3 = not sure, 4 = agree and 5 = strongly agree. Each item provides a description of beliefs and feelings regarding end-of-life care, such as allowing patients to make their own decisions, the nurse being emotionally invested in the patient's

experience, caring for the patient's family, and managing pain. The scale contains an equal number of positively (1, 2, 4, 10, 12, 16, 18, 20, 21, 22, 23, 24, 25, 27, and 30) and negatively (3, 5, 6, 7, 8, 9, 11, 13, 14, 15, 17, 19, 26, 28, 29) formulated statements (15 each). For negative items, the scores are reversed (1 = strongly agree, 2 = agree, 3 = not sure, 4 = disagree and 5 = strongly disagree). Possible scores ranged from 30 to 150, with higher scores reflecting a more positive attitude, and a low score indicating a negative attitude of participants towards caring for dying patients. Twenty statements of the FATCOD scale reflect the attitude of nurses directly to the patient (a possible range of 20–100), the remaining ten statements indicate the attitude of nurses to the patient's family (a possible range of 10–50). An overall score transposed to a percentage scale of 0 to 100. Scores more than 65% of the total possible score (>108) were considered as positive attitudes; between 50% and 65% of the total score (91–108) as neutral; and less than 50% of the total score (<91) as negative attitude.

At the fourth stage of the study, an assessment of knowledge/skills, attitudes and practice of EBP was carried out using knowledge-related questions from the Evidence-based Practice Questionnaire (EBPQ), developed by Upton and Upton. EBPQ is a self-assessment by a medical professional of his own evidence-based practice, which describe nurses' day-to-day use of EBP. This questionnaire contains 3 subscales that represent knowledge/skills (14 statements), attitudes (4 pair of statements) and practice of EBP (6 statements). These 24 items were rated on a Likert-type scale from 1 to 7. Possible total scores range from 24 to 168 points, with greater scores indicating higher levels of knowledge regarding EBP, more positive attitudes and more frequent use of EBP. Responses to each EBPQ items were considered negative if scores were between one and four. [25]

STATISTICAL ANALYSIS

Descriptive statistics were used to summarise participants' demographic and professional characteristics (frequencies, percentages, means, and standard deviations). Independent *t*-test was used to examine correlation between PCQN, FATCOD, EBPQ mean scores and some characteristics including: gender, attending training regarding palliative care. To check the association between PCQN, FATCOD, EBPQ mean scores and age, work experience, level of education, One-Way ANOVA was performed. The Scheffe test was used to make comparisons among group means in an analysis of variance (ANOVA). Correlation of PCQN, FATCOD mean scores and EBPQ scale mean score evaluated by use of Kendall tau rank correlation coefficient. The significance level considered at 0.05. SPSS version 24 was used to analyse the data.

ETHICAL CONSIDERATIONS

Ethical approval was obtained from the Local Bioethical Committee of the Astana Medical University (Protocol No. 15 of October 21, 2021). All procedures in the study were conducted in accordance with the 1964 Helsinki Declaration on Ethical Standards. All participants of the study were informed about the objectives of the study before conducting the survey and signed an informed consent to participate. The survey was anonymous. Before starting the survey, the study participants were warned that the results obtained during the survey will not entail negative consequences for them, the answers will be used in a generalised form and only in this study, confidentiality is guaranteed.

RESULTS

The questionnaire was distributed among 650 nurses, 23 participants did not meet the inclusion criteria, and 565 responded (response rate of 90.5%). The majority of participants were female (94.5%). The age of respondents ranges from 19 to 65 years, with a mean age of 36.90 ± 11.08. The average duration of clinical experience was 12.11 ± 9.83 years. More than half (52.4%) of the participants held a diploma of secondary vocational education in nursing, while the remaining respondents held higher academic degrees (22.7% held an applied bachelor's degree, 17.2% academic bachelor's degree, and 7.8% a master's degree) in nursing. Most of the nurses (60.2%) have been trained or advanced training in palliative nursing care at least once in their lives. Table 1 presents the respondents' demographic characteristics.

TABLE 1 CHARACTERISTICS OF RESPONDENTS.

Variables	*n* (%)
Age (years)	
Between 18–25 years	62 (10.97)
Between 26–35 years	249 (44.07)
Between 36–50 years	167 (29.56)
50 years old and over	87 (15.40)
Gender	
Women	534 (94.5)
Men	31 (5.5)
Work experience (years)	
Between 1–10 years	312 (55.22)
Between 11–20 years	153 (27.08)
Between 21–30 years	63 (11.15)
31 years and over	37 (6.55)
Level of education	
Secondary education	296 (52.4)
Applied bachelor's degree	128 (22.7)
Academic bachelor's degree	97 (17.2)
Master's degree	44 (7.8)
Attending training regarding palliative care	
Yes	340 (60.2)
No	225 (39.8)

NURSES' LEVEL OF KNOWLEDGE IN PALLIATIVE CARE

The total average score of the nurses' level of knowledge in palliative care at home was 45.3% (9.06/20, SD: 2.93). The minimum and maximum scores were 0% (0/20) and 95% (19/20), respectively. None of the participants scored the highest possible score. The investigation results indicated that almost two thirds of respondents (63%) scored between 30–50%, which can be interpreted as their limited knowledge. Furthermore, only 9 nurses (1.59%) showed a high level of knowledge, scoring above 15, representing adequate knowledge about palliative care (Figure 1).

The largest number of the correct answers on the PCQN questionnaire was received in the category "Management and control of pain and other symptoms" (49.95%). The smallest number of correct answers belonged to the category of "Philosophy and principles of palliative care" (35.18%) (Table 2).

Table 3 shows nurses' level of knowledge in palliative care as well as the number of correct and incorrect answers for each item. The percentage of correct answers for each item

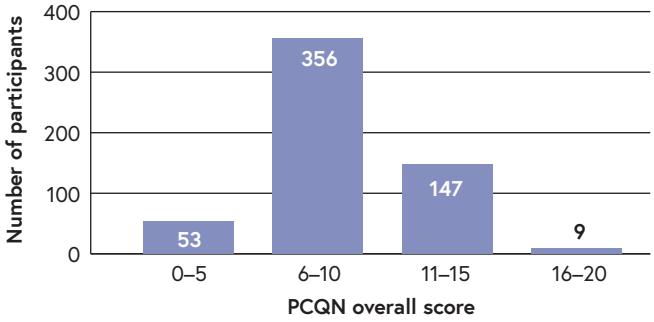

FIGURE 1. NUMBER OF PARTICIPANTS BY RANGE OF POINTS

TABLE 2. CORRECT AND INCORRECT ANSWERS ON THREE SUBSCALES OF THE PCQN QUESTIONNAIRE

Subscales	Correct answers (%)	Incorrect answers (%)
Philosophy and principles of palliative care	35.18	64.82
Psychosocial aspects of care	38.58	61.42
Management and control of pain and other symptoms	49.95	50.05
Total	**45.29**	**54.71**

TABLE 3. CORRECT AND INCORRECT ANSWERS TO EACH QUESTION ON THE PCQN QUESTIONNAIRE

Subscales	Item no.	Questions	Correct answers		Incorrect answers	
			n	%	*n*	%
Philosophy and principles of palliative care	1	Palliative care is appropriate only in situations where there is evidence of a downhill trajectory or deterioration (F)	153	27.08	412	72.92
	9	The provision of palliative care requires emotional detachment (F)	208	36.81	357	63.19
	12	The philosophy of palliative care is compatible with that of aggressive treatment (T)	308	54.51	257	45.49
	17	The accumulation of losses renders burnout inevitable for those who seek work in palliative care (F)	126	22.30	439	77.70
Psychosocial aspects of care	5	It is crucial for family members to remain at the bedside until death occurs (T)	198	35.04	367	64.96
	11	Men generally reconcile their grief more quickly than women (F)	330	58.41	235	41.59
	19	The loss of a distant or contentious relationship is easier to resolve than the loss of one who is close or intimate (F)	126	22.30	439	77.70
Management and control of pain and other symptoms	2	Morphine is the standard used to compare the analgesic effect of other opioids (T)	398	70.44	167	29.56
	3	The extent of the disease determines the method of pain treatment (F)	193	34.16	372	65.84
	4	Adjuvant therapies are important in managing pain (T)	289	51.15	276	48.85
	6	During the last days of life, the drowsiness associated with electrolyte imbalance may decrease the need for sedation (T)	304	53.81	261	46.19
	7	Drug addiction is a major problem when morphine is used on a long-term basis for the management of pain (F)	90	15.91	475	84.09
	8	Individuals who are taking opioids should also follow a bowel regimen (T)	329	58.23	236	41.77
	10	During the terminal stages of an illness, drugs that can cause respiratory depression are appropriate for the treatment of severe dyspnoea (T)	240	42.48	325	57.52
	13	The use of placebos is appropriate in the treatment of some types of pain (F)	145	25.66	420	74.34
	14	In high doses, codeine causes more nausea and vomiting than morphine (T)	343	60.71	222	39.29
	15	Suffering and physical pain are synonymous (F)	325	57.52	240	42.48
	16	Demerol is not an effective analgesic in the control of chronic pain (T)	298	52.74	267	47.26
	18	Manifestations of chronic pain are different from those of acute pain (T)	444	78.58	121	21.42
	20	The pain threshold is lowered by anxiety or fatigue (T)	271	47.96	294	52.04

T – True; F – False

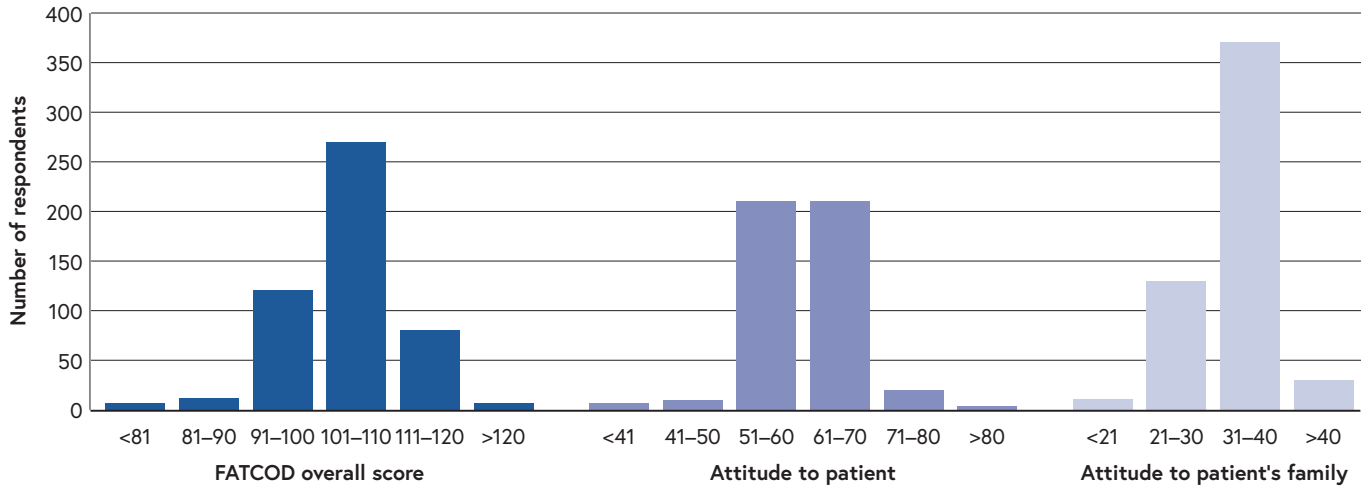

FIGURE 2. NURSES' SCORES ON FATCOD SCALE

ranged from 78.58% to 15.91%. Thus, item 18, which stated that the manifestations of chronic pain are different from the manifestations of acute pain, had the highest number of correct answers (78.58%). However, almost all participants (84.09%) answered incorrectly to item 7, which stated that drug addiction is a serious problem with long-term use of morphine for pain treatment.

NURSES' ATTITUDE TOWARDS CARING FOR DYING PATIENTS

The mean score for all respondents on FATCOD was 94.50 (SD = 12.41) (approximately two third of possible score), with a range from 38 to 142. One third of nurses (34%) had a negative attitude to palliative care, and only 6.7% of respondents had a positive attitude. The majority of nurses (59.3%) had a neutral attitude towards caring for dying patients (Table 4).

TABLE 4. ASSESSMENT OF THE NURSES' ATTITUDE OF PALLIATIVE CARE

Attitude level	Frequency (n)	Percent (%)
Negative attitude	192	34
Neutral attitude	335	59.3
Positive attitude	38	6.7
Total	**565**	**100**

As the analysis of the attitude towards care of the dying showed, almost all respondents' (90%) scored in the range of 81-110 (possible score 30-150), indicating that nurses possess neutral or negative attitudes towards caring for dying patients. The mean score for attitudes towards the patients was 60.37 (SD = 8.59), with scores ranging from 23-88 and most nurses (85%) scored ranging from 51–70 (expected range of scores 20–100). The average score on the subscale about attitude to patient's family was 32.92 (SD = 5.48), varying from 12 to 49 (possible score 10-50), where 68% of nurses scored 31-40 (Figure 2).

Table 5 shows that the average overall score ranged from 2.34/5 (SD: 1.15) "When a patient asks, "Am I dying?" I think it is best to change the subject to something cheerful" to 3.77/5 (SD: 1.05) "Families should be concerned about helping their dying member make the best of his or her remaining life" with a mean of 3.15 (SD: 0.41). Nurses expressed negative attitudes on several items. Thus, the lowest scores were determined for the following statements: "I would be uncomfortable talking about impending death with the dying person", "I would be upset when the dying person I was caring for gave up hope of getting better", "It is possible for nurses to help patients prepare for death " and "When a patient asks, "Am I dying?" I think it is best to change the subject to something cheerful", 2.62/5 (SD: 1.17), 2.57/5 (SD: 1.16), 2,58/5 (SD: 1.18) and 2.34/5 (SD: 1.15), respectively. These statements refer to the subscale "Attitude to patient".

Furthermore, more than 70% of nurses agree that families should maintain as normal conditions as possible for their dying family member (n = 398); families should help the dying family member to make the best use of the rest of his life (n = 426); families need emotional support to accept changes in the behaviour of a dying person (n = 408); the family should be involved in the physical care of a dying person (n = 409).

EVIDENCE-BASED PRACTICE, KNOWLEDGE AND ATTITUDES TO

The mean total score was 109.7 ± 25.4 points out of 168 (4.39 out of 7 points (95% CI, 4.31-4.48). The Attitude subscale obtained the highest mean score (4.55 ± 1.41) followed by knowledge/skills (4.45 ± 1.28) and practice (3.90 ± 1.31) subscales (Table 6). Responses were considered negative if scores were between one and four. So, 32.6% of nurses scored below 4 points, which indicates a low level of professional competence in the field of evidence-based practice. Only 1 respondent scored the highest possible score.

TABLE 5. MEAN SCORES FOR INDIVIDUAL ITEMS OF FATCOD SCALE

FATCOD items	Mean ± SD	Strongly disagree *n* (%)	Disagree *n* (%)	Unsure *n* (%)	Agree *n* (%)	Strongly agree *n* (%)
Attitude to patient						
30. It is possible for nurses to help patients prepare for death.	2,58 ± 1,18	114 (20.2)	183 (32.4)	130 (23.0)	101 (17.9)	37 (6.5)
27. Dying persons should be given honest answers about their condition.	2,95 ± 1,26	88 (15.6)	142 (25.1)	106 (18.8)	171 (30.3)	58 (10.3)
3. I would be uncomfortable if I entered the room of a terminally ill person and found him/her crying.	2,74 ± 1,29	77 (13.6)	95 (16.8)	82 (14.5)	225 (39.8)	86 (15.2)
25. Addiction to pain relieving medication should not be a concern when dealing with a dying person.	3,00 ± 1,29	89 (15.8)	136 (24.1)	93 (16.5)	180 (31.9)	67 (11.9)
23. Nurses should permit dying persons to have flexible visiting schedules.	3,12 ± 1,25	69 (12.2)	130 (23.0)	100 (17.7)	195 (34.5)	71 (12.6)
21. It is beneficial for the dying person to verbalise his or her feelings.	3,65 ± 1,10	42 (7.4)	50 (8.8)	69 (12.2)	306 (54.2)	98 (17.3)
19. The dying person should not be allowed to make decisions about his or her physical care.	3,07 ± 1,12	57 (10.1)	161 (28.5)	149 (26.4)	159 (28.1)	39 (6.9)
17. As a patient nears death, the nurse should withdraw from his or her involvement with the patient.	3,62 ± 1,08	106 (18.8)	272 (48.1)	83 (14.7)	77 (13.6)	27 (4.8)
15. I would feel like running away when the person actually died.	3,60 ± 1,06	94 (16.6)	276 (48.8)	97 (17.2)	69 (12.2)	29 (5.1)
14. I am afraid to become friends with a dying person.	3,55 ± 1,10	95 (16.8)	260 (46.0)	102 (18.1)	75 (13.3)	33 (5.8)
13. I would hope the person I'm caring for dies when I am not present.	3,52 ± 1,10	108 (19.1)	212 (37.5)	141 (25.0)	75 (13.3)	29 (5.1)
11. When a patient asks, "Am I dying?" I think it is best to change the subject to something cheerful.	2,34 ± 1,15	49 (8.7)	44 (7.8)	76 (13.5)	278 (49.2)	118 (20.9)
10. There are times when death is welcomed by the dying person.	3,10 ± 1,14	67 (11.9)	109 (19.3)	123 (21.8)	233 (41.2)	33 (5.8)
8. I would be upset when the dying person I was caring for gave up hope of getting better.	2,57 ± 1,16	52 (9.2)	79 (14.0)	87 (15.4)	269 (47.6)	78 (13.8)
7. The length of time required to give care to a dying person would frustrate me.	3,23 ± 1,13	64 (11.3)	208 (36.8)	126 (22.3)	128 (22.7)	39 (6.9)
6. The nurse should not be the one to talk about death with the dying person.	2,66 ± 1,21	53 (9.4)	103 (18.2)	95 (16.8)	228 (40.4)	86 (15.2)
5. I would not want to care for a dying person.	3,17 ± 1,17	75 (13.3)	171 (30.3)	143 (25.3)	128 (22.7)	48 (8.5)
3. I would be uncomfortable talking about impending death with the dying person.	2,62 ± 1,17	54 (9.6)	82 (14.5)	100 (17.7)	254 (45.0)	75 (13.3)
2. Death is not the worst thing that can happen to a person.	3,03 ± 1,25	77 (13.6)	137 (24.4)	106 (18.8)	181 (32.0)	64 (11.3)
1. Giving care to the dying person is a worthwhile experience	3,45 ± 1,15	53 (9.4)	62 (11.0)	107 (18.9)	264 (46.7)	79 (14.0)
Attitude to patient's family						
30. Family members who stay close to a dying person often interfere with the professional's job with the patient.	2,91 ± 1,11	49 (8.7)	135 (23.9)	137 (24.2)	204 (36.1)	40 (7.1)
28. Educating families about death and dying is not a nursing responsibility	2,74 ± 1,17	52 (9.2)	103 (18.2)	130 (23.0)	206 (36.5)	74 (13.1)
24. The dying person and his or her family should be the in charge decision makers.	3,61 ± 1,07	45 (8.0)	37 (6.5)	97 (17.2)	301 (53.3)	85 (15.0)
22. Nursing care should extend to the family of the dying person.	2,93 ± 1,16	62 (11.0)	177 (31.3)	102 (18.1)	188 (33.3)	36 (6.4)
20. Families should maintain as normal an environment as possible for their dying member.	3,68 ± 1,03	37 (6.5)	38 (6.7)	92 (16.3)	306 (54.2)	92 (16.3)
18. Families should be concerned about helping their dying member make the best of his or her remaining life.	3,77 ± 1,05	35 (6.2)	38 (6.7)	66 (11.7)	307 (54.3)	119 (21.1)
16. Families need emotional support to accept the behaviour changes of the dying person.	3,71 ± 1,02	35 (6.2)	34 (6.0)	88 (15.6)	312 (55.2)	96 (17.0)
12. The family should be involved in the physical care (feeding, personal hygiene) of the dying person.	3,69 ± 1,04	38 (6.7)	38 (6.7)	80 (14.2)	316 (55.9)	93 (16.5)
9. It is difficult to form a close relationship with the dying person.	2,92 ± 1,07	41 (7.6)	136 (24.1)	169 (29.9)	177 (31.1)	42 (7.4)
4. Nursing care for the patient's family should continue throughout the period of grief and bereavement.	2,98 ± 1,18	67 (11.9)	149 (26.4)	124 (21.9)	179 (31.7)	46 (8.1)

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TABLE 6. MEAN SCORES AND STANDARD DEVIATIONS OF EBPQ SUBSCALES

Subscales	Possible range	Score (mean ± SD)
Knowledge/skills associated with evidence-based practice	14–98	69 (4.45 ± 1.28)
Practice of evidence-based practice	6–42	23 (3.90 ± 1.31)
Attitude towards evidence-based practice	4–28	18 (4.55 ± 1.41)
Total	**24–168**	**110 (4.57 ± 1.05)**

As the analysis demonstrates, the level of knowledge/skills in the field of EBP was 69.07 ± 17.5 points out of 98. The participants highly evaluated their knowledge and skills in the reviewing their own practice (5.17 ± 1.5) and sharing of ideas and information with colleagues (5.15 ± 1.6). The level of attitude to EBP was 17.8 ± 5.6 points out of 28. Nurses had the most positive attitude to the fact that EBP is fundamental to professional practice (4.63 ± 1.8) and their practice has changed because of evidence they have found (4.59 ± 1.7). "Practice" subscale showed the lowest mean score among three subscales with a total score of 22.9 ± 7.7 points out of 42. The participants demonstrated high scores in such aspects as: "Share information with colleagues" (4.53 ± 1.9) and "Formulation of clearly answerable question as the beginning of the process towards filling this gap" (3.93 ± 1.8).

ASSOCIATIONS BETWEEN DEMOGRAPHIC/PROFESSIONAL CHARACTERISTICS AND RESEARCH RELATED VARIABLES

Analysis of variance was used to check the relationship in mean scores depending on various characteristics of the respondents. Thus, the findings showed that only nurses who are older ($F = 129.957$; $p = 0.000$) and have more work experience ($F = 90.27$; $p = 0.000$) had a significant difference in their mean total score on the PCQN scale. Factors such as level of education and attending training regarding palliative care positively affected on total score ($F = 4.111$ ($p = 0.000$); $t = 4.353$ ($p = 0.000$) respectively). Only gender did not show a significant difference.

The analysis demonstrated the statistical significance between the overall score on the FATCOD scale and almost all characteristics, with the exception of gender. Thus, no significant differences were detected between gender and attitude.

Nurses with a higher level of education obtained significantly higher total score on the EBPQ scale ($F = 86.213$; $p = 0.000$). Significant differences were also found depending on age ($F = 3,519$; $p = 0.015$). However, no statistically significant differences were identified according to gender and work experience (Table 7).

THE RELATIONSHIP BETWEEN THE LEVEL OF PREPAREDNESS OF NURSES TO PROVIDE PALLIATIVE CARE TO PATIENTS AND EVIDENCE-BASED PRACTICE

Total score of EBPQ scale was significantly correlated with total score of PCQN scale ($t = 0.073$, $p = 0.013$), with his subscale "Management and control of pain and symptoms" ($t = 0.064$, $p = 0.032$), as well as to the total score of FATCOD scale ($t = 0.227$, $p = 0.000$) and its subscales: Attitude to patient ($t = 0.160$, $p = 0.000$), Attitude to family ($t = 0.236$, $p = 0.000$). "Practice" scale of the EBPQ questionnaire was significantly correlated only with total FATCOD scale ($t = 0.204$, $p = 0.000$) and subscale "Attitude to patient" ($t = 0.086$, $p = 0.003$). "Knowledge/skills" scale of the EBPQ questionnaire showed a significant correlation with all variables, specifically with the PCQN scale ($t = 0.100$, $p = 0.001$), its subscales (Philosophy and principles ($t = 0.113$, $p = 0.000$), Psychosocial aspects ($t = 0.064$, $p = 0.036$), Management and control of pain and symptoms ($t = 0.085$, $p = 0.005$)), and FATCOD scale ($t = 0.190$, $p = 0.000$) and subscales (Attitude to patient ($t = 0.161$, $p = 0.000$), Attitude to family ($t = 0.177$, $p = 0.000$)). However, there is no correlation between "Attitude" subscale and all the variables presented (Table 8).

DISCUSSION

Our study assessed the level of nurses' knowledge about palliative care and attitude towards caring for dying patients and relationship with EBP among nurses of PHC organisations.

TABLE 7. ASSOCIATIONS BETWEEN DEMOGRAPHIC/PROFESSIONAL CHARACTERISTICS AND RESEARCH RELATED VARIABLES (ONE-WAY ANOVA)

Variables	The overall score on the PCQN scale		The overall score on the FATCOD scale		The overall score on the EBPQ scale	
	t / F	*p*-value	*t* / F	*p*-value	*t* / F	*p*-value
Gender	*t* = -0.618	0.537	*t* = 1.395	0.164	*t* = 0.516	0.606
Age (years)	F = 129.957	0.000	F = 9.659	0.000	F = 3.519	0.015
Work experience (years)	F = 90.27	0.000	F = 5.079	0.002	F = 0.224	0.879
Level of education	F = 4.111	0.007	F = 15.107	0.000	F = 86.213	0.000
Attending training regarding palliative care	*t* = 4.353	0.000	*t* = 10.279	0.000	–	–

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TABLE 8. CORRELATION OF SCORES ON THE EBPQ QUESTIONNAIRE WITH PCQN AND FATCOD

		Palliative care knowledge (PCQN)				Attitude towards caring for dying patients (FATCOD)		
		Total	Philosophy and principles	Psychosocial aspects	Management and control of pain and symptoms	Total	Attitude to patient	Attitude to family
Knowledge/skills, attitudes and practice of EBP (EBPQ)	Total	t = 0.073* (p = 0.013)	t = 0.034 (p = 0.2702)	t = 0.031 (p = 0.308)	t = 0.064* (p = 0.032)	t = 0.227** (p = 0.000)	t = 0.160** (p = 0.000)	t = 0.236** (p = 0.000)
	Practice	t = 0.039 (p = 0.215)	t = 0.008 (p = 651	t = 0.015 (p = 0.643)	t = 0.027 (p = 0.403)	t = 0.204** (p = 0.000)	t = 0.086** (p = 0.003)	t = 0.025 (p = 0.448)
	Attitude	t = 0.009 (p = 0.791)	t = 0.032 (p = 0.331)	t = –0.048 (p = 0.149)	t = 0.015 (p = 0.645)	t = 0.057 (p = 0.052)	t = 0.010 (p = 0.691)	t = 0.037 (p = 0.241)
	Knowledge/skills	t = 0.100** (p = 0.001)	t = 0.113** (p = 0.000)	t = 0.064* (p = 0.036)	t = 0.085** (p = 0.005)	t = 0.190** (p = 0.000)	t = 0.161** (p = 0.000)	t = 0.177** (p = 0.000)

Notes:
t – Kendall tau rank correlation coefficient
** Correlation is significant at the 0.01 level
* Correlation is significant at the 0.05 level

Findings indicated that the nurses' knowledge about palliative care among nurses were low/inadequate (total means core 9.06 out of 20). Similar findings reported by previous studies conducted in Ethiopia,[26] Iran,[27] India.[28] In Australia, nursing assistants within a palliative approach in residential aged care facilities (RACFs) had an overall mean score on the PCQN questionnaire of 13.72.[29] However, when compared to other published literature, the total PCQN score in our study was higher than Southeast Iranian,[30] Indonesian,[31] Palestinian,[32] Mongolian[33] nurses, where the mean scores were 7.59 ± 2.28, 7.78 ± 3.56, 7.75 ± 2.96, 7.15 ± 2.31, respectively. However, studies conducted in countries where palliative care is well developed have shown better results than in our study. In Northern Irish the mean score was 12.89 ± 3.03,[34] and in USA the mean score of nurses was 12.3 ± 2.70 out of 20 possible.[35]

In many studies conducted earlier, the items with the highest number of correct answers related to pain and symptom management scale, as in our study.[36,37] Comprehensive care of physical symptoms including pain is a principle of palliative care.[38] Nurses are essential for palliative care because pain and symptom management are important fundamentals in nursing.[39] The reason for the higher level of knowledge about pain management and other symptoms may be due to the fact that nurse practitioners, and especially those who work in PHC organisations, most often take care of patients with chronic diseases who require daily pain killers and symptom control.[40]

Palliative care is increasingly seen as an essential component of comprehensive care across the lifespan and as a fundamental human right. Despite the existing differences in approaches in different countries, the general philosophy, values and principles of palliative care stand out.[43] However, according to the results of our study, the smallest number of correct answers was in the category "Philosophy and principles of palliative care" (35.18%).

Disciplines on palliative care have recently been introduced in Kazakhstan medical universities and colleges, advanced training courses have been created. Despite this, our study showed that 40% of nurses currently have never been trained in palliative care. This result is consistent with previous studies conducted in Palestine,[42] Jordan[36] and Egypt.[43]

The mean score of the FATCOD scale was 94.50, the majority of nurses (59.3%) had a neutral attitude towards caring for dying patients. It is higher than the results found among nurses in Ethiopian public hospitals,[26] Nigerian teaching hospital,[44] but lower than that of nurses in Australia,[45] Vietnam,[46] Japan,[47] USA.[48] Differences in the attitude of nurses may indicate differences in beliefs and cultural characteristics of the above regions that need to be investigated. Across Asian countries, nurses' attitudes toward death may also be influenced by social, cultural, and organisational differences in practice.[49]

The family plays an important role in the daily life of a terminally ill patient.[50] Most of the nurses surveyed agreed that the family should be as involved as possible in meeting the physical, psychological and other needs of the patient. This may be due to the fact that in some countries, including Kazakhstan, caring for terminally ill patients is considered the responsibility of the family. For example, in Indonesia, due to certain cultural beliefs, almost all hospitals allow family to be with patients 24 hours a day.[51]

Fristedt S. and co-authors conducted a study in Sweden among registered nurses and undergraduate nursing students', which revealed statistically significant differences between the overall score in accordance with work experience and attendance at the Palliative Care program.[52] In our study, similar results were obtained, according to which, work experience and attendance at palliative care training

statistically significantly influenced the nurses' attitude towards caring for dying patients. Furthermore, our study established that nurses' age and level of education influenced their attitudes towards caring for dying patients. Thus, older nurses and those with a higher level of education showed a more positive attitude. These factors are strongly supported by more recent similar studies undertaken in Jordan and Iran.[53,54,55] An interactive review of 26 studies (published between 2000 and 2017) examining nurses' knowledge and attitudes towards palliative care found a positive effect of educational level and years of experience.[56]

The identified correlation between nurses' knowledge of palliative care as a function of attendance at palliative care training and level of education shows the need for adequate training and the involvement of institutions responsible for providing this training.[57,58] The inclusion of palliative care education in the educational programs of universities and nursing schools will improve the education of nurses and improve their attitudes towards end-of-life care. In addition, there is a need to introduce and improve postgraduate and continuing education with a variety of training hours and content depending on the level of education of palliative care nurses.

However, in order to identify the real educational needs of nurses, a thorough assessment of knowledge in the field of palliative care among medical workers is necessary, not only in primary care and not only in Astana but throughout the country. There is currently a lack of instruments that are designed to test nurses' knowledge of palliative care separately according to the level of palliative care provision. This could be a further direction for research.

The mean EBPQ score in the present study was 4.39 out of 7 points. This score is slightly higher than the result obtained from registered nurses in traditional Chinese medicine hospitals,[55] but higher than surveys conducted in Spain and Latin America, Oman, Egypt and Jordan, where mean scores ranged between 4.96 and 5.5.[25,59,60]

In our study, as in most other similar studies, EBPQ subscale scores were highest for "attitude" followed by "knowledge/skills" and "practice".[25,59,61] According to the results of a study that we conducted, most nurses scored low points on the "practice scale". This finding is consistent with the results of another study, a study conducted among nurses in Nepal, where Karki S. and co-authors described the greatest barriers, such as lack of time and resources, difficulty understanding research articles and translating the findings to practice, and limited autonomy to change practice based on evidence.[62]

A survey of regional Australian nurses and midwives showed that the level of possession of evidence-based practice remains low. Education level and job satisfaction are key correlators of evidence-based practice potential in this regional Australian sample.[63] Australian researchers have proven that a higher level of education, less emotional exhaustion and higher job satisfaction, full-time work are the best predictors of the level of EBP skills.[64]

To the best of our knowledge, this is the first study that examines the level of nurses' knowledge about and attitude towards caring for dying patients, evidence-based practice among nurses of PHC organisations in Kazakhstan.

LIMITATIONS

This study has some important limitations. The FATCOD scale used in our study is self-report questionnaire, which can lead to potential bias and overestimation of some results. The study involved 565 nurses working in PHC organisations. For a more detailed analysis, it may be necessary to include more respondents. The cross-sectional design of the study does not allow us to draw an unambiguous conclusion about the cause-and-effect relationship between phenomena but only describes them.

IMPLICATIONS FOR RESEARCH, POLICY, AND PRACTICE

Further investigation is needed to explore the factors influencing the inadequate knowledge of nurses in palliative care. This could involve identifying gaps in training programs, examining the cultural or systemic barriers to knowledge dissemination, and investigating how these knowledge deficits affect patient outcomes. Additionally, comparative studies across countries with well-established palliative care systems could provide valuable insights into the effectiveness of various educational strategies and interventions. In Kazakhstan, the issue of adequate nursing care in palliative care requires further study.

Policymakers should prioritise the development of national frameworks for palliative care training and certification for nurses. In countries where palliative care is underdeveloped, initiatives could include the establishment of specialised training centres and collaboration with international organisations to elevate the overall quality of care.

Healthcare institutions should regularly assess the palliative care knowledge of their nursing staff and provide continuous professional development opportunities to address knowledge gaps. Emphasising the core values and principles of palliative care in everyday clinical practice can improve care delivery and ensure that all patients, regardless of their age or stage of illness, receive the compassionate and comprehensive care they deserve.

CONCLUSION

In the course of the study, data were obtained indicating insufficient knowledge about palliative care and a neutral or negative attitude towards caring for dying patients among nurses working in PHC organisations in Astana.

Demographic and professional factors such as age, work experience, level of education, attending training regarding palliative care may affect the level of nurses' knowledge about palliative care and attitude towards caring for dying patients.

The lack of knowledge and skills of nurses in the field of evidence-based practice may contribute to insufficient knowledge about palliative care, possibly due to the lack of knowledge necessary to formulate a clinical question, search and selection of scientific publications. It may be necessary to strengthen the theoretical part of the curriculum of the discipline "Evidence-based practice", and a continuing palliative care education may need to be added to the nursing curriculum in order to improve the quality of end-of-life care.

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A mixed methods study exploring delays amongst patients ready to be discharged home in an acute surgical unit in New Zealand

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ABSTRACT

Objective: This study aims to explore the reasons for hospital discharge-delay in an acute surgical unit (ASU) and the ways in which discharge-delays can be minimised.

Background: Discharge-delay, the period of continued hospital stay after a patient is deemed medically fit to leave hospital, is one of the most significant barriers to optimal patient flow within the hospital system. Discharge-delay retains non-acute patients in the acute environment unnecessarily, while preventing acutely presenting patients from accessing services in a timely manner. It results in overcrowded emergency departments (ED) with delayed admissions, slowed theatre schedules, and bed blocking in critical care, as well as negatively impacting patient experience.

Methods: A two phased, mixed methods design was employed in this research. Phase one obtained qualitative data through semi-structured interviews with nine staff members occupying different roles within the health care team. Themes derived from phase one informed the development of an audit and survey form utilised in phase two, which involved collecting quantitative data through its completion by registered nurses working in the ASU during the study period. This audit recorded the time a patient was cleared for discharge, and the time they left the ward, from which the amount of discharge-delay could be calculated. The survey recorded delaying factors that occurred for each patient discharged from the ward during the audit period.

Results: Thematic analysis of the interview transcriptions revealed three core themes:
(i) It takes a village to discharge a patient;
(ii) Preparation, clearance, home; and
(iii) Challenges and solutions to discharge-delay.

The survey was completed by Registered Nurses regarding 40 discharging patients who they provided care for. Analysis revealed a mean patient discharge-delay of 225 minutes across the 40 patients. The most frequently recorded delay factors were 'waiting for paperwork' (55%) and 'waiting for transport' (40%).

Conclusions: This study found that to reduce discharge-delay system-wide optimisation across the entire patient journey, with particular focus on reducing paperwork related delay, is required. Introducing a 'discharge-focused clinician' and improving the utilisation of transit lounge will especially help to reduce discharge-delay.

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What is already known about the topic?
- Unnecessarily long hospital admissions negatively impact patient experience and outcomes.
- Slow acute discharges effects patient flow organisation wide, including EDs, critical care, and theatre.

What this paper adds?
- This paper focuses on the time between a patient being medically cleared and physically leaving the acute ward environment, allowing the specific period of discharge-delay to be quantified, understood and addressed.
- It clearly identifies specific discharge-delay causing factors in the context of an ASU and proposes solutions to optimise the discharge process.

Keywords: Access-block, acute-surgical-unit, delay, discharge, length-of-stay, optimisation, patient-flow

INTRODUCTION

Ensuring that patients have access to services in a timely manner is fundamental to providing quality care, therefore, moving patients along their in-patient journey from admission to discharge efficiently is essential. The most frequently cited cause of patient flow issues relates to discharge-delay.[1,2] In the context of a hospital, discharge refers to the completion of inpatient hospital care, with the patient either returning home with no further care required, or with care continuing in some capacity but within a non-hospital environment.[3] The discharge process involves the health care team determining whether the patient is ready to leave the hospital environment, and formally discharging the patient from their care.[4] Patient education, follow up care planning, and the delivery of a prescription and discharge summary may all be included in this process.[5]

Discharge-delay occurs when patients remain in the acute care setting beyond the time in which they are medically fit to leave this environment.[6] This phenomenon retains patients in hospital unnecessarily, while preventing other patients from accessing acute services – a process known as access block. Previous literature has identified inadequate health team resourcing and lack of collaboration,[2] rehabilitation and nursing home bed shortages,[7] and poor discharge planning as causes of discharge delay.[8] Minimising discharge-delay is key to improving patient flow and service access. This research aims to identify the causes of discharge-delay in a large New Zealand tertiary hospital, explore the impact of discharge-delay, and discuss the ways in which discharge-delay can be reduced.

Hospitals are complex organisations with many services and processes that must integrate together cohesively to ensure patients receive timely and appropriate care. To achieve this, supply and demand for services must remain in equilibrium. The balance of supply and demand is essentially an issue of bed space availability; for every patient presenting to hospital, either acutely or electively, there must be a patient leaving. Therefore, focusing on this 'leaving' portion of the patient journey is fundamental to improving patient flow and overall hospital function. The effects of discharge-delay are far reaching. When bed spaces in wards cannot be made available, patients who present to the hospital acutely via the emergency department (ED) cannot be admitted and instead must remain in the ED. This results in overcrowding, stretched resources, and increased wait times within the department.[9] Elective treatment is also impacted, as it cannot take place without a bed to admit a patient to post-operatively.[10,11] Thus, discharge-delay increases the hospital above ideal operational capacity resulting in stretched resources, long wait times, and care rationing.[10,11]

Patients who experience discharge-delay may experience its negative effect directly through increased exposure to potential hospital acquired complications,[12] increased risk of deconditioning,[13] and decreased wellbeing due to feelings of isolation, anxiety and disempowerment.[6,14]

Other patients receiving care in a system with prevalent discharge-delay are affected indirectly. Overcrowding, care rationing, and delays in access to care such as medical imaging and surgery are all increased in a system where discharge-delay occurs and are linked to negative patient outcomes.[9–11]

Furthermore, delayed discharges have been associated with higher hospital costs due to increased length of stay, delayed transfers between departments, and the cancellation of elective surgery.[10,11,15–17] Reduction of surgical throughput, because of elective surgery cancellation due to unavailability of beds, may result in reduction of revenue in health systems where revenue is associated with surgical volume.[18–20]

Previous research has focused on factors that increase patients' overall length of stay such as delays to medical imaging or surgery, or on intrinsic patient factors such as older age and co-morbidity. Although this literature highlights important features of discharge-delay and proposes some solutions,[21–25] an evident research gap remains. Health workers anecdotally report that most patients remain in the acute environment for several hours after they are deemed dischargeable and are no longer requiring acute care. However, little research has focused on the time between when a patient is medically cleared for discharge and the time that they leave the acute environment. To address this research gap, this study defined

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discharge-delay as the amount of time between when the patient is medically cleared for discharge and when they leave the acute ward environment and sought to explore this phenomenon and its cause.

METHODS

STUDY DESIGN

This research was carried out as a two-phase mixed-methods study. A dialectical mixed-methods methodological approach was employed allowing for quantitative trends to be identified while exploring the multifaceted and interconnected qualitative concepts influencing these trends. Mixed methods research aims to demonstrate that a relationship or phenomena exists, and why and how it exists within its context. It draws strengths from both qualitative and quantitative research paradigms and is therefore an appropriate choice for health care research such as this where many interwoven concepts underpin an observable phenomena or trend.[26,27]

The first phase involved interviews with a range of staff, exploring the discharge process, perceived causes of discharge-delay, and the way in which different roles engage with patient discharge. The qualitative data from phase one informed the development of the second phase, which utilised a survey and time audit to quantify the cause and extent of discharge delay on the studied ward (Figure 1). The study was undertaken in 2022 and received ethics clearance in 2021 (Approval number: Ref: 2021#31).

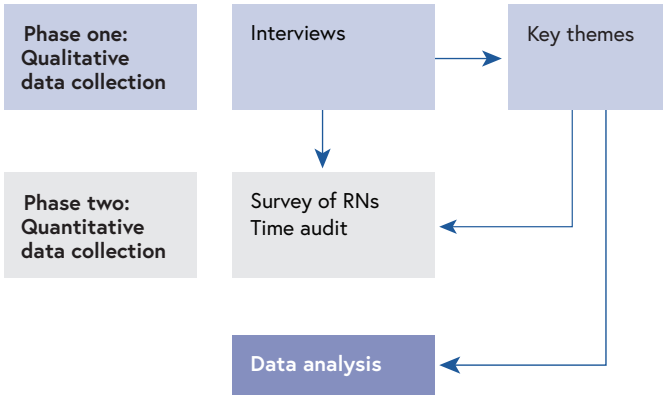

FIGURE 1. STUDY DESIGN

STUDY SETTING AND RECRUITMENT

The research was undertaken in one acute surgical unit in a large 600+ bedded tertiary hospital in the central health region in the North Island with a population of over 420,000 people.

DATA COLLECTION AND ANALYSIS

Phase one involved gathering qualitative data through a series of semi-structured interviews with relevant staff involved in the discharge process. The purpose of the interviews was to ascertain the opinions of staff on the discharge process, causes of discharge-delay, and on what they believe could be improved on, as well as garnering understanding of the discharge process broadly and the way different professional roles engage with patient discharge. These data were then analysed systematically using general inductive inquiry. After the interviews were transcribed, they were read thoroughly, with a code attributed to each idea or concept articulated by the participants. Once a series of codes was established across the interview's transcriptions, these codes were condensed into categories, which were in turn grouped into themes. This process allowed for the many different ideas that emerged from the interviews to be translated into broader themes to answer the research questions from a qualitative lens, as well as providing the context for the development of the survey form used in phase two.

Phase two involved an audit and survey, completed for all patients discharged from the Acute Surgical Unit over a 14-day period. When a patient was declared 'ready for discharge' or for 'discharge planning' by the medical team, the time of the decision was recorded on the time audit form by the patients RN, signifying the time at which the patient was medically cleared for discharge. Once the patient left the care of the ward, this time was also recorded, signifying the time they stopped receiving acute care. The length of time between these two events was recorded as discharge-delay. These two moments were chosen because they best captured the phenomenon being studied and aligned with the study's stated definition of discharge-delay. The total and mean amount of discharge-delay observed during the study period could then be calculated.

After the patient left the ward, the registered nurse responsible for the patient completed the survey by recording the events that had taken place in the time between the patient being medically cleared for discharge and physically leaving the ward. This survey was a tick box form that contained 21 potential causes of delay, where any number of events could be selected that the RN believed had delayed their patient's discharge. These cause options were developed from the causes of delay identified in the qualitative interviews in phase one. The selected causes of discharge-delay were totalled and recorded in a frequency table. Percentages of their frequency of occurrence were also calculated so that the discharge delaying factors that occurred most frequently could be more fully understood.

RESULTS

QUALITATIVE FINDINGS

A total of nine interviews with members of the health care team were conducted. The sample selected included participants with a broad range of involvement in health care and in the discharge process. Their roles and relevant experience are outlined in Table 1.

TABLE 1. PHASE ONE SAMPLE

Participant	Role description
Charge nurse manager	Charge nurse of the sampled ward
Senior operational manager	Nurse manager for surgery in charge of 11 surgical wards, prehospital preparedness unit and the nurse specialists for surgery. Project managed the development of the sampled ward
Executive nursing manager	Senior manager whose portfolio covers professional development, education and training and workforce. Background as duty manager.
Associate charge nurse manager	ACNM in role for one year with extensive experience in surgical nursing
Senior registered nurse	Senior floor RN with extensive experience in the general surgical specialty
House officer	Second year house officer completing a rotation in the general surgical speciality. Previous experience working in other hospitals.
Junior registrar	Junior general surgical registrar
Surgical fellow	General surgical training fellow
Physiotherapist	Rotational physiotherapist working in general surgery at time of interview

The interviews were all semi-structured in nature, allowing a wide range of topics relevant to discharge-delay to be explored. The interviews were transcribed verbatim and analysed using a general inductive method of enquiry. A total of 961 codes were generated, which were collated into seven categories and then three themes as illustrated in Figure 2.

Theme 1: It takes a village to discharge a patient

Overall, participants agreed that senior medical officers (SMO) have overall responsibility for discharge decisions, registrars often make those decisions on behalf of the consultants or in collaboration with them, and house officers (junior doctors who have not begun speciality training) complete the tasks required to discharge the patient. Underlying this, nursing staff proactively progress discharge, and multidisciplinary team members (MDT) provide clearance on specific requirements such as mobility, or diet.

> "The house surgeons are really good. They don't have as much say I don't think, but they provide information that aids me to make that (discharge) decision. For the nursing staff (their input is) really important because they know a lot more about what's going on with the patient. Are they cleared from a MDT perspective? Because it's not just us that always make the decisions, it's a whole bunch of people from different areas as well." Junior Registrar

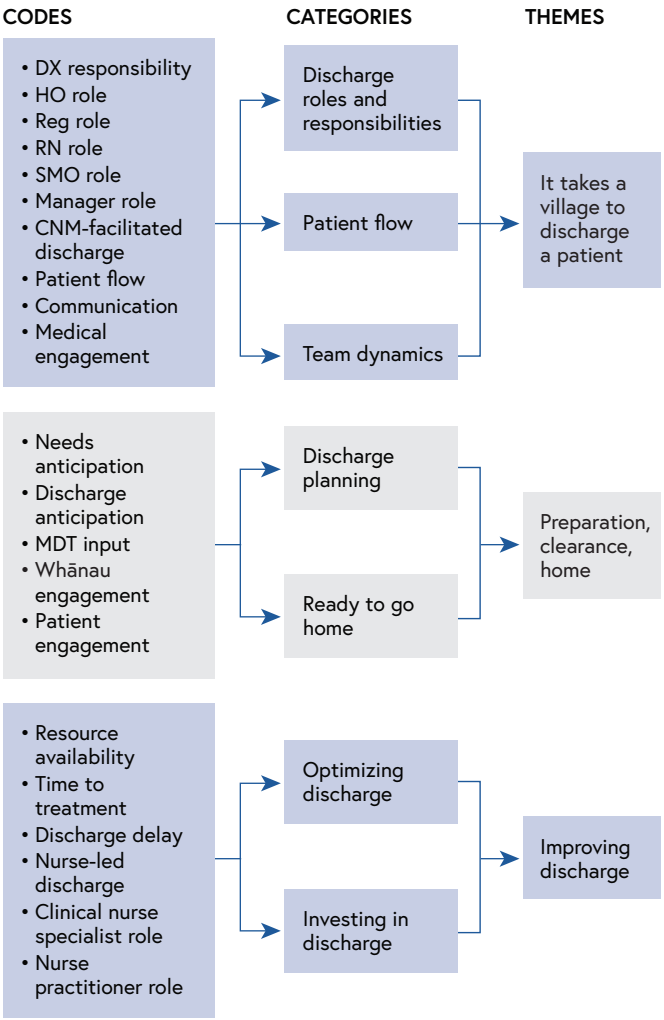

FIGURE 2. THEMATIC ANALYSIS

Inability to prioritise discharge was also discussed, with all participants agreeing that house officers are unable to prioritise and complete discharges due to their high workload.

> "Often, we need to get our CT scan requests, our cardiology consults or extra stuff done before lunchtime, or even before 1400 so that we actually get a plan before 1600 and so our discharges are our lowest priority…they are done after 1500… So because they are low priority, that's where the bottleneck lies. We can't do it the other way around. We can't discharge people early in the morning and then request our CT at 1500 because (the scan) won't be done (that day)." Surgical house officer

Communication was also discussed as it relates to efficient discharge. Participants cited faulty communication tools, and the inability to contact staff members quickly as barriers to efficient discharge.

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> "Often the registrars will just make the call on the ward round, but often, we've had a change or some blood results have come back, then we text or put it up on a group chat that "so and so is kind of ready for discharge. Are you guys happy?" and often the registrars are scrubbed into theatre so we don't get a reply until 15:30 or 1600, which means that the patients are kind of waiting around just to be discharged and even though the house officer is happy with the patient going home, ultimately, we usually can't make that decision until a registrar or consultant has signed them off." House officer

Theme 2: Preparation, clearance, home

The importance of commencing holistic discharge planning from admission, and revisiting discharge progression every day was emphasised by all participants. Participants also reflected that discharge planning needs to involve the patient and their family or support system to ensure that the patient feels well prepared, and that all their holistic discharge needs are understood by the health care team.

> "Our communication with them, allowing the families to prepare. I think we do that really poorly, we don't engage them in the conversation. What is this going to look like for the family? How are they going to support this person? Are they living in a multi-storey apartment? Have they got a mode of transport? How are they going to cope? So it's about us understanding what it is for the patient and their family when we are discharging them." Senior operational management

The process of a patient being cleared for discharge was also discussed. A patient is cleared for discharge when the treating team believes the presenting complaint has been addressed, or treatment goal has been met, and that the patient is safe to go home as they do not require hospital level care for their recovery.

> "I consider it when they don't have any active medical problems. When they can eat and drink, when they can mobilize, do toileting, whether that means maybe looking after a new stoma or whatever. And they're off anything IV, any sort of infusion. Basically, if they're able to manage at home by themselves, or they've got someone at home who can help them manage and function well. Then I would consider them ready for discharge." Surgical fellow

Participants also agreed that discharge readiness extends beyond clinical parameters to include the patient's wholistic needs.

> "They might be clinically ready for discharge, but they've got other factors, social issues or whatever, they're not ready for discharge…we need to discharge people safely and I would never want to discharge somebody back to a situation that they're not going to be safe. So it's making sure that they've got all the bases covered; their spiritual stuff, the social stuff, their clinical-physical things." Charge nurse manager

If a patient is ready to leave acute care, but is not yet ready to return home, there are several different types of discharge options that can be put in place, as described in this quote.

> "If it's something where they just maybe need a little bit more time. You can look at something like rest and recuperation services, if you think they need more time… looking at convalescent care…or rehab. So, we've got quite a few discharge options." Physiotherapist

Finally, transport following discharge was discussed as a cause of discharge-delay. The hospital this study took place in is a large tertiary centre which services a large geographical area, adding unique challenges to the transport part of the patient journey.

> "Transport is a big issue. Whether that be an ambulance, car, helicopter or plane, we use all of those on a daily basis, and it's an expensive resource and it's a finite resource as well. So, we may have six patients to go back to Taranaki. But we can't get six patients back because they don't have the resource, they don't have enough flights for the day or whatever it might be. So that's a bit of an issue." Executive nursing management

Theme 3: Improving discharge

Communication between the medical team in the form of ward round notes was frequently implicated as a cause of delay, as afterhours house officers may not be able to understand and carry out the documented plan due to illegibility or vagueness, or they may not feel confident to discharge the patient due to lack of experience. Participants felt that this could be improved through clear documentation.

> "I think if you're if you're leaving clear plans for that person, then that shouldn't be an issue…The evening house officer just has no idea of the patient, and they're busy and they're being called to lots of other places, they don't have time to sit down actually and work it out… and so often the safer thing is to say 'she's staying'." Surgical fellow

Participants also highlighted the timing of surgical diagnostics and treatments as an area that could be optimised. In an optimal system, the treating team has all the all the diagnostic data available at the time of the ward round in the morning and can make a discharge decision based on this. In some cases where diagnostic imaging and blood test results are not available at the time of the ward round, discharge is delayed.

> "I think the bloods in this hospital take way too long, and I've worked at four other hospitals. So the bloods don't get done till like 1100, 1200, and sometimes never come back till 1400. And not necessarily everyone needs bloods early in the morning, but I think, especially our surgical patients, that the bloods determine the plan for that day." House officer

Participants suggested that the discharge process could be easily improved by routinely taking bloods at 0600 for patients who are likely to be discharged, so that the results are available on the morning ward round. The way in which discharge paperwork is completed was also consistently criticised as unnecessarily time consuming, as explained in this quote comparing a computer based system to the discharge system utilised in the hospital studied. Utilising a different computer programme may reduce discharge-delay.

> 'We just literally copy the admission or the presentation, paste it into our discharge summary, write the progress and plan, and then we hit print, and it's all done. And so that's much quicker than for us to actually type out the entire admission note that the registrar has done and then the progress and plan. I don't see why we can't implement admission notes that are typed on the computer, that will make it a lot quicker for the discharge summaries." House officer

Alternatives to house officers completing discharge, such as nurse led discharge (NLD) and criteria-based discharge (CBD) were discussed as appropriate for some patient cohorts. However, participants citied instances where these systems had been trialled unsuccessfully because although NLD and CBD sped up the process of clearing the patient for discharge, discharge continued to be delayed due to delays in the completion of discharge paperwork by the medical team.

> "We did work on nurses facilitated discharge, like criteria-based discharge. If the patient's "this, this, this, and this, they can go home," but you still had to wait for the doctor to do the prescription and the discharge letter. So it didn't really speed up discharge." Senior operational manager

Participants attributed a great degree of discharge-delay to medical staff not having time to complete the tasks required for a patient to be discharged, specifically the paperwork, and suggested that introducing staff resource specifically dedicated to discharge would improve this. One participant believed a Nurse Practitioner would be most suitable in this role.

> "I'd like to implement a nurse practitioner for general surgery, who (independently) admits and discharges and does discharge paperwork and doesn't operate, and that could facilitate all the discharges in a timely manner. I think that would make a big difference because they wouldn't be pulled in all those different directions. They would have a focus on discharging patients home, making sure that they're safe, that they're ready to go home, and that it's all done." Senior Operational Manager

Alternatives such as a discharge coordinator or allocated house officer were also discussed. However, neither of these were thought to be viable options as a discharge coordinator would not be able to independently complete discharge paperwork, and a house officer would likely be rerouted to other urgent tasks.

Finally, the usage of the studied hospitals 'Transit Lounge' was discussed as a way to reduce discharge-delay. Participants agreed that all patients who are suitable to wait in transit lounge should be transferred there as soon as they have received their discharge paperwork. Some participants felt that patients should wait in transit lounge for their paperwork, however the doctors interviewed stated that this was too difficult logistically.

> "It's really underused. I mean, they've got significant capacity there that they could be, you know, taking a lot more patients. It's just a really underutilized area. If you look at the hospital only about 10% of our discharge patients go through transit lounge. . .40 – 50 % (is the goal)" Executive nursing director

QUANTITATIVE FINDINGS

A total of 40 patients were audited during the two-week period, with an overview of their demographic data presented in Table 2.

TABLE 2: PHASE TWO SAMPLE DEMOGRAPHIC DATA

Variable	Results (%)
Respondents	40
Gender count	
Female	32 (80)
Male	8 (20)
Gender diverse	0
Ethnicity count	
Māori	9 (22.5)
NZ European	26 (65)
Other	5 (12.5)
Shift discharge count	
AM	25 (62.5)
PM	15 (37.5)
Night	0

From the interviews a total of 21 factors were identified as potential causes of discharge-delay and these were added to the survey. These factors were supported by the reviewed existing literature the ensure the survey was comprehensive. Through the survey process, the occurrence frequency of these factors was recorded. Of these factors, the one that occurred most frequently was 'waiting for paperwork' followed by 'waiting for transport'. The remaining 19 factors were recorded between one and four times. Several factors were included in the survey form as potential causes of delay but were never attributed as causing delay. The potential delay causing factors and their occurrence rates are outlined in Table 3.

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TABLE 3: DISCHARGE DELAY FACTOR FREQUENCY

Discharge delay factors	Count (%)
Waiting for paperwork	22 (55)
Transit lounge	4 (10)
Transport	17 (40)
House officer availability	3 (7.5)
Waiting for transfer acceptance	1 (2.5)
Medical review	3 (7.5)
Registered nurse review	3 (7.5)
Patient concerned	1 (2.5)
Whānau concerned	1 (2.5)
Pt deteriorated	1 (2.5)
Discharge if no change	1 (2.5)
Discharge pending bloods	1 (2.5)
Wound/dressing	1 (2.5)
Waiting for post-acute bed	0 (0)
Communication issues	0 (0)
Waiting for OPAL/DSL	0 (0)
Registered nurse concern about discharge	0 (0)
Waiting for Physiotherapy clearance	0 (0)
Waiting for Occupational therapy clearance	0 (0)
Waiting for Social work clearance	0 (0)
Waiting for Dietician clearance	0 (0)

Non-productive time

The quantitative data highlights the significant amount of non-productive admission time occurring on the sampled ward. Across the 40 patients sampled there was a total of 10,185 minutes of discharge-delay recorded, with a mean delay per patient of 255 minutes (4.25 hours). Each of the 17 surgical beds on the ward has the maximum potential of 8,760 hours per year. The 17 beds (calculated at 85% capacity) can accommodate a total of 2,637 patients using a mean length of stay of two days. If each patient has a mean 4.25 hours of discharge-delay as seen in the audit, removing this delay would generate 11,207 hours (467 days) in total over the year, potentially allowing for a further 233 patients to be admitted to the ward over the year.

DISCUSSION

The study results revealed that the most significant cause of discharge-delay is delay in the completion of discharge paperwork (55% occurrence), followed by transport related delays (40% occurrence). Other factors implicated in the study as causes for delay included team dynamics, communication, discharge planning, and multi-disciplinary team input, however these were not shown to be as prevalent as paperwork delays and transport delays. Underpinning all the factors identified in this study as causes of discharge-delay were the themes of staffing and workload. While the listed factors consistently cause discharge-delay, their effect is catalysed in systems where workload is high and/or staffing is in deficit.

This study demonstrated that discharge-delay within the ASU is extensive, with a total of 10,185 minutes of discharge-delay recorded over the two-week audit period equating to a mean delay of 255 minutes. Literature supports the argument that discharge-delay such as this impacts the patient directly and indirectly, as well as the hospital organisation through poor patient flow and loss of potential bed days.[9–14,28]

Two previously published studies had a similar research purpose to this study and focused on measuring the amount of discharge-delay that occurred after a patient had been declared medically dischargeable. Of these two studies Cai et al recorded a mean delay of 1.5 days,[29] while Roberts et al recorded a mean delay of 4.8 days.[25] These results demonstrate a markedly longer mean delay time compared to the 4.25 hours seen within this study. These differences may relate to differences in patient cohorts across the studies. This study's cohort was mainly medium acuity general surgical patients, who typically do not have complex discharge planning needs compared to other medical specialties such as the Trauma and Neurology patients studied by Cai and Roberts respectively.[25,29] Furthermore, these two studies focused on unnecessary bed days spent on the ward, recording 15 percent and 39 percent of patients as experiencing delay, while this study recorded delay in hours, and included any amount of time remaining on the ward past the point of medical clearance as discharge-delay, resulting in 100 percent of the population being recorded as experiencing some degree of delay, despite some patients recorded as experiencing as little as five minutes of delay.[25,29] When only 'significant delay' is considered, a delay of greater than 12 hours, this study's results are more comparable with previous work, with only 7.5 percent of patients experiencing significant discharge-delay and a mean delay of 18.2 hours within this subgroup.

Within the qualitative data, participants suggested a range of ideas to reduce discharge-delay, which largely aligned with previous research into discharge delay.[5,8,30] Interventions related to discharge anticipation included appropriate transfers to the hospital, discharge planning, patient and family/support people engagement, and the optimisation of the timing of diagnostic tests. Interventions related to medical clearance and the discharge process itself included improving communication and the need to improve discharge paperwork. A range of improvements were suggested, including not writing discharge summaries for all patients, improving the software and process of writing discharge paperwork, and the introduction of a 'discharge focused clinician'. The participant suggestions related to

discharge paperwork and a 'discharge focused clinician' were novel, and had not been identified in previous literature at the time of the study. Interventions post medical clearance were also suggested such as streamlining transport resources, and optimising transit lounge. These results suggests that a cohesive, system wide approach to minimising discharge-delay is required, with specific emphasis on discharge paperwork and the effective utilisation of a transit lounge.

THE PATIENT JOURNEY OPTIMISED FOR DELAY REDUCTION

Taking the data into account, a patient journey optimised for discharge was developed and is outlined in Figure 3. The area circled in blue demonstrates the time period from medical clearance to discharge, and the elements of discharge that must happen concurrently, or as close together as possible in order to avoid discharge-delay. The brackets indicate the concepts of communication and appropriate resourcing that must underpin the system in order for it to function.

THE DISCHARGE PAPERWORK BOTTLENECK

Discharge paperwork has been identified in this study as the most frequently occurring contributor to discharge-delay, with 55 percent of patients experiencing discharge-delay related to waiting for discharge paperwork. However, its impact is greater than its occurrence rate because of its effect on the overall discharge journey. Within the discharge process at the studied hospital, discharge paperwork is the final requirement for a patient to leave the acute environment, only followed by the patient being transported home. Because of its position within the discharge process, discharge paperwork acts as a bottleneck; a patient may experience an otherwise perfectly optimised discharge journey and yet experience several hours of delay attributable solely to paperwork delays. This bottle neck must be addressed as part of a system wide approach to minimising discharge delay. If other improvements are made without addressing discharge paperwork, any gains made by these interventions will be annulled by the ongoing inefficiency of the paperwork process.

Introducing a 'discharge focused clinician', who can independently complete simple discharges after the primary team has declared the patient to be medically dischargeable may open the bottleneck. One interview participant suggested that this role would be best filled by a Nurse Practitioner. However, it is possible that other staff members, such as a Clinical Nurse Specialist, could also effectively fill the role if they were able to independently complete the entire discharge, including prescription, without requiring additional sign off from a doctor. Although the role could also be filled by a dedicated Junior Doctor participants expressed concern that this would not solve the issue, because they may be reallocated to other important medical tasks. Instead, introducing a 'discharge focused clinician' whose primary job is to discharge would allow for the protected prioritisation of discharge. It can be argued that for the right population, such as certain simple general surgical patients, discharge could be safely completed autonomously by an appropriately trained nurse. CBD works along similar conceptual lines and has been demonstrated to be effective when applied to the right population and carried out by appropriately trained staff.[23,31] While CBD usually involves a patient being assessed

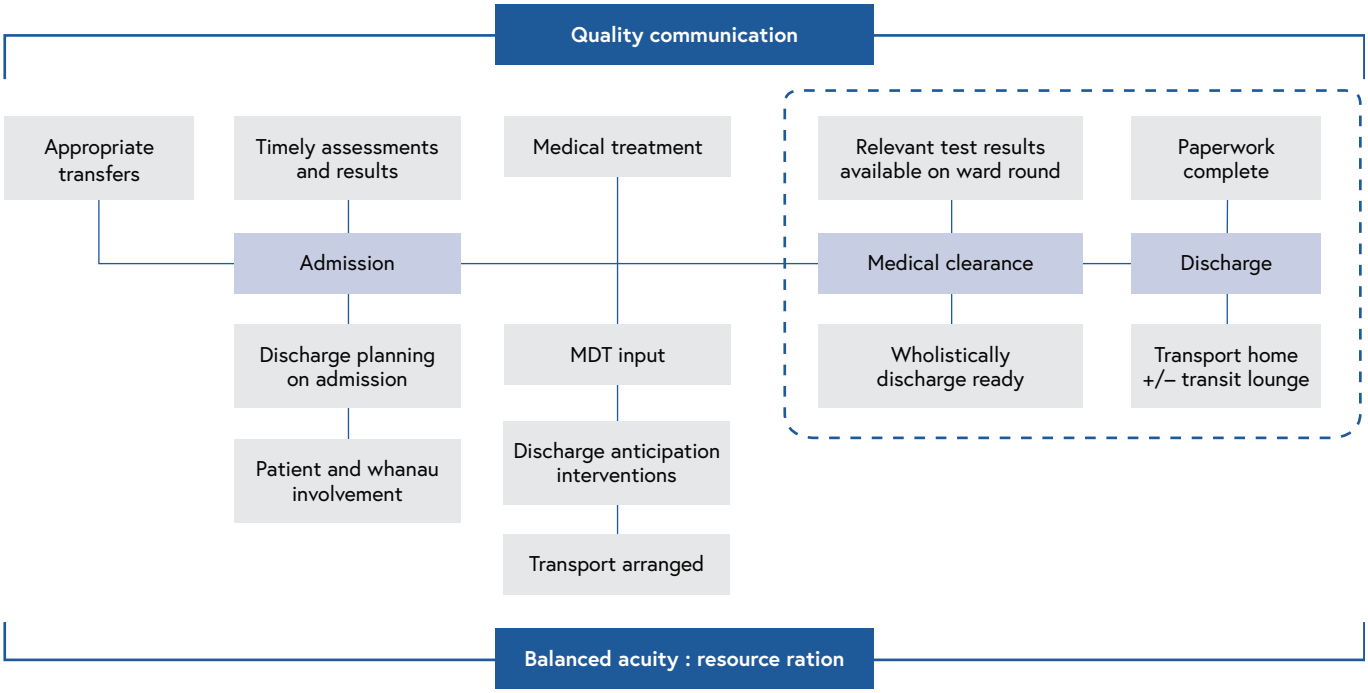

FIGURE 3. OPTIMAL PATIENT JOURNEY

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against a predetermined set of criteria by their primary nurse,[32] the system suggested by participants in this study would involve the primary medical team declaring the patient for discharge, and if they were an appropriate candidate for the discharge focused clinician, the associated paperwork and other discharge activities would then be completed by this staff member. Participants did not favour CBD as a solution to the discharge-delay bottle neck, because within the studied hospital, it had been trialled unsuccessfully because the discharge paperwork still required completion by a doctor. The advantage of a discharge focused clinician would be their ability to autonomously complete the relevant paperwork including the discharge letter and prescription. Nurse prescribing is increasing, with research supporting positive impacts on patients and organisations,[33] therefore nurse prescribing within a discharged focus clinician role may be appropriate and effective. This appears to be a novel concept and no literature on the topic was able to be identified. Further research into the feasibility of a discharge focused clinician, or similar concept is required to test whether this would be an effective solution to removing the discharge-delay bottleneck. Any intervention aimed at reducing discharge-delay due to paperwork delays needs to enable discharge paperwork to be rapidly completed following medical clearance. Further research into interventions that would support this goal may generate other novel ideas.

Although discharge paperwork was identified as a clear bottleneck within this population and hospital system, the same issue may not be present in other patient populations or health systems. This research highlights the importance of identifying the most prevalent cause of discharge-delay in a health system prior to initiating a reduction intervention. This concept is echoed throughout the literature where discharge-delay reducing interventions are not always proved effective.[34] An intervention that is successful in one system may not succeed in another if it is targeting the wrong cause of delay.[35] Instead, developing proposed solutions after the local systems causes of discharge-delay have been identified, such as was achieved in this study, may produce more successful interventions.

CONCLUSION

Optimisation of patient discharge is essential as it impacts both the patient and the entire health system. Patients should be discharged as close as possible to the time they are declared medically stable and safe to leave the inpatient environment. This study sought to fill a research gap through a mixed-methods study design, combining both qualitative and quantitative methodologies. The study design involved two phases, the first explored the research questions through interviews, while the second phase measuring the extent of discharge-delay and the causes of it. At the completion of phase one, through the process of thematic analysis, the data was condensed into three core themes:

(i) It takes a village to discharge a patient;

(ii) Preparation, clearance, home; and

(iii) Challenges and solutions to discharge delay.

The concepts that emerged within these themes informed the development of the audit and survey, which over a two-week period, recorded a mean delay of 255 minutes, or 4.25 hours, per patient. Within the study population, the most frequently occurring factor was 'waiting for paperwork' (55%) followed by 'waiting for transport' (40%). Triangulating the qualitative and quantitative data resulted in an understanding of how best to reduce discharge-delay in the studied hospital: a system wide focus on discharge across the entire patient journey with particular focus on the bottleneck of discharge paperwork, potentially through the introduction of a discharge focused clinician who can autonomously discharge patients following medical clearance. This research highlights the importance of identifying the most prevalent cause of discharge-delay in a health system prior to initiating a reduction intervention.

LIMITATIONS

The study design resulted in limitations in the precision of the quantitative data, as method of time recording potentially limited the consistency of time recordings. The method used in this study worked effectively for patients who were cleared for discharge on the morning ward round as the nurse would either have been on the round or could refer to the notes to see the time medical clearance was documented. However, for patients who were cleared for discharge later in the day, for example, postoperatively, or after diagnostic tests, the time of medical clearance was more difficult to pinpoint, as medical clearance may not be immediately communicated to the nurse. If resources allowed, the researcher being always present on the ward during the audit period to track the discharging patients may have allowed for more consistency across the time recordings. The study timeframe also limited the way factors were attributed to delay. The study method effectively captured the occurrence rate of many potential causes of discharge delay; however, eight factors were included in the audit based on the themes derived from the qualitative data but were never recorded during the audit. This is not to say that these features do not ever delay discharge, however they were not captured within the two-week audit period, implying that these factors may not occur frequently. A longer audit period may better reveal their occurrence frequency.

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REVIEW AND DISCUSSION PAPERS

A desk audit of perimenopause and menopause resources on ACCHO websites for Indigenous women

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ABSTRACT

Objective: This study examines whether Indigenous women can access information about perimenopause and menopause through the Aboriginal Community Controlled Health Organisation (ACCHO) sector.

Background: Indigenous women in Australia often face significant health inequities, including limited access to healthcare resources tailored to their specific cultural needs. While Aboriginal Community Controlled Health Organisations (ACCHOs) offer specific information about Indigenous health, it is not clear whether they are fully tailored to all stages of the life course for women.

Study design and methods: This study is a desk audit of resources available from ACCHO websites for Indigenous women as they transition through perimenopause and menopause.

Results: The audit identified 114 ACCHO websites. Of these, only 2 provided information or resources about perimenopause or menopause. In comparison, 81 websites provided resources for mums and bubs, and 43 websites provided resources for Elders.

Conclusion: This desk audit highlights a critical gap in healthcare resources for Indigenous women transitioning through perimenopause and menopause. Addressing this gap is essential for promoting health equity and improving health outcomes. There is a pressing need for comprehensive, culturally safe resources to support Indigenous women during this life stage.

Implications for research, policy, and practice: This desk audit highlights the urgent need for Indigenous-led research to address the specific perimenopause and menopause needs of Indigenous women. It calls for the development of culturally safe resources within ACCHOs to fill this critical gap. Healthcare providers must integrate these resources into practice to enhance health equity and outcomes for Indigenous women.

What is already known about the topic?

- Indigenous women in Australia face significant health inequities, including limited access to healthcare resources tailored to their life course needs.
- Indigenous women's experiences of perimenopause and menopause are not well understood or known.
- To date, no research in Australia about perimenopause and menopause has been led by Indigenous researchers.

What this paper adds

- This paper identifies a critical gap in the availability of perimenopause and menopause resources for Indigenous women within the ACCHO sector.
- It underscores the necessity for culturally safe, comprehensive resources to support Indigenous women during these life stages.
- The paper advocates for prioritising the development and integration of these resources into ACCHO services to enhance health equity and outcomes for Indigenous women across the lifespan.

Keywords: ACCHO; case study; desk audit; Indigenous women; menopause; perimenopause.

INTRODUCTION

The first Aboriginal Community Controlled Health Organisation (ACCHO) was established in 1971 in Redfern, Sydney, and emerged from decades of activism. Following the 1967 Referendum, Aboriginal communities in Sydney, Melbourne, and Brisbane advocated for safe healthcare services, addressing racism and exclusion in mainstream healthcare practices.[1] By 1973, Aboriginal and Islander Health Services in Brisbane and Melbourne had expanded their offerings beyond basic medical services. The ACCHO sector maintained its community-controlled structure through elected boards comprising of local Aboriginal and Torres Strait Islander members.[1] Initially staffed by volunteers, the sector eventually secured federal government funding and now, some 50 years since commencing through a self-determined process, have grown to deliver diverse primary health care services across 144 ACCHOs nationwide.

Funding for ACCHOs has changed in recent years, with a shift in focus of some services and programs, culminating in changes such as four-year rolling funding agreements being introduced and the transfer of contract agreements being commissioned through the National Aboriginal Community Controlled Health Organisation (NACCHO).[2] Since the 2008 Council of Australian Government's commitment to Closing the Gap (CtG) in Indigenous outcomes, including health, the focus has primarily been on CtG priorities.[3] Whilst necessary, the CtG targets and measures continue to expose systemic inequities in areas such as health, education, and housing, raising concerns that this focus may have overlooked other critical health aspects.

While the ACCHO sector continues to meet important health needs for Indigenous peoples, we are concerned that one key service area is missing: little support is available for Indigenous women who are navigating "the change" – that is, perimenopause and menopause. We are concerned about the paucity of resources for Indigenous women about this normal, yet significant, life transition.

Indigenous women face unique challenges during perimenopause and menopause that differ from those experienced by non-Indigenous women. These include higher rates of chronic diseases such as diabetes and cardiovascular disease, which can complicate menopausal symptoms and management.[4] Moreover, during the Senate Inquiry into Issues related to menopause and perimenopause, Indigenous women articulated there is a lack of culturally safe research in First Nations menopause perceptions' and understanding of menopause amongst healthcare workers.[5] Additionally, culture, beliefs and practices may influence how Indigenous women perceive and manage menopausal changes.[6] The intersection of cultural, geography, socioeconomic, and health factors necessitates tailored information and resources that address not only the biological aspects of menopause but also its cultural and social dimensions. For instance, traditional healing practices and community support systems may play a crucial role in managing menopausal symptoms for some Indigenous women.[6] However, the extent to which these needs are being met within the current healthcare framework remains largely unexplored. Further, there is no research on Indigenous gender-diverse people, non-binary or trans men. To investigate this, we surveyed perimenopause and menopause resources offered by ACCHOs across Australia.

OBJECTIVE

This study involved a desk audit of the ACCHO sector to identify resources for Indigenous women about perimenopause and menopause. This study is intended to be descriptive and involved a search of ACCHO websites.

METHODS

STUDY DESIGN & DATA COLLECTION

A desk audit was conducted over a one-month period between May and June 2024. We identified and comprehensively searched ACCHO websites identified via the National Aboriginal Community Controlled Health Organisation (NACCHO) website and conducted comprehensive searches across each site,[8] focusing on health services, programs, resources, and news. For comparison we also audited resources available for mums and bubs, and for women Elders.

We developed our search terms based on a review of the perimenopause and menopause literature and consultation with health practitioners. Our search included menopause-related terms ("menopause" or "perimenopause" or "the change" or "women's health" or "midlife women's health"), mums and bubs-related terms ("mums and bubs" or "women and children" or "maternal health" or "infant health" or "parenting support"), and Elder-related terms ("elders" or "senior health" or "aged care" or "elder support").

We recorded our findings in a structured template and documented details such as ACCHO name, location, URL, resource category (menopause/perimenopause, mums and bubs, Elders), type of resource (brochure, online article, service provision, support service), description of resource, and direct link to the resource. We also recorded our analysis and observations of the resources we identified, and any comments about ease of access (such as paywalls or restricted content).

DATA ANALYSIS

We evaluated resources for relevance to Indigenous women who are seeking information about perimenopause or menopause. This included assessing for quality, comprehensiveness, cultural safety, and credibility, and considering whether the resources were specifically tailored to Indigenous women's health needs. These factors were analysed through the reviewer's expertise.

Our data analysis included descriptive quantitative analysis (e.g., number of resources found), comparative analysis (e.g., comparison of menopause-related resources with those for mums and bubs and Elders) and qualitative observations (e.g., cultural safety).

ETHICAL APPROVAL

Ethics approval was not required for this audit.

RESULTS

We audited 144 ACCHOs across Australia. Of these, 30 (20.8%) did not have a functioning website, meaning that some of the ACCHOs did not have websites, or links within the website did not function. In total 114 (79.2%) had websites suitable for analysis.

Of the 114 ACCHOs with websites, only 2 (1.8%) included resources specifically related to perimenopause or menopause.

The two ACCHOs offering perimenopause or menopause resources were from New South Wales and South Australia:

1. One service mentioned providing assistance with "hormone problems, menopausal problems" as part of general medical consultations, but provided no further specific information.
2. One service offered a "Well Women's Clinic", with information about breast self-examination, cervical screening, and "addressing any other concerns a woman may have i.e. menopause, contraception".

We found no ACCHO website offering dedicated resources or comprehensive information specifically about perimenopause or menopause.

In comparison, we identified 81 (71.1%) ACCHO websites with specific resources for mums and bubs and 43 (37.7%) websites with specific resources for Elders.

The 81 websites with mums and bubs information offered 134 different resources, including 67 about clinics or clinical services, 32 about support or yarning groups, 36 about tailored programs, 15 online brochures, and 4 miscellaneous other resources (including health week information and podcasts).

The 43 websites with Elders information offered 57 different resources, including 11 clinics or clinical services, 9 support or yarning groups, 26 tailored programs or packages, 8 online brochures, 5 transport services, and 7 other resources (such as portrait exhibitions, Elders Day events and news articles).

DISCUSSION

This desk audit reveals a significant gap in perimenopause and menopause resources available from ACCHO services for Indigenous women. Many women face these hormonal changes alone, due to a lack of openness, education, and resources available within the ACCHO sector. It has been identified internationally that Indigenous women face greater barriers to accessing culturally safe care, report more severe symptoms, and experience menopause at a younger age, all of which are compounded by the lasting effects of colonisation and the erosion of traditional knowledge systems.[7,8,9] A focus towards understanding the lack of service provision within the ACCHO sector is therefore

warranted to understand why there is a lack of services and resources around this normal life transition for women. The ACCHOs focus on other health issues, such as curtailing communicable diseases, reducing the rates of alcohol and other drug dependence, and optimising child, youth, and maternal health. ACCHOs also focus on identified health disparities.[9] ACCHO services are in-line with national public health recommendations and CtG initiatives, which is important for attracting funding and conducting research.

The Well Women's Clinics described on one ACCHO website may help to meet the broad needs of women's health and wellbeing. While these clinics are likely to extend across the full life course, their focus is on facilitating much-needed services such as breast and cervical screenings. Even within the information provided about Well Women's Clinics, there is a glaring gap in resources focused on perimenopausal and menopausal health. This complex stage involves physiological and anatomical changes impacting a woman's home, work, relationships, and self-identity. Women need information to navigate this stage of life in a way that is holistic and culturally safe.

Evidence suggests that perimenopause and menopause are broadly undertreated in Australia, often because general practitioners lack confidence in prescribing hormone replacement therapy (HRT), lack the time needed to fully investigate women's symptoms, and often lack knowledge about this stage of women's lives.[10] It is not surprising that this underappreciation of perimenopause and menopause extends to the services offered by ACCHOs. However, we argue that insufficient attention to the nuances of perimenopause and menopause-related care means that women experience a major service gap. Physical and mental health needs are being overlooked during a critical time, with possible long-term impacts on rates of osteoporosis and cardiovascular disease.[11]

Little is known about the experiences of Indigenous Australian women during perimenopause and menopause. Giving a voice to this under-represented cohort of women is vital to develop supportive healthcare services and empowering Indigenous women to negotiate this time. Indigenous-led research is needed to examine this often taboo and neglected subject, to enhance Indigenous-focussed healthcare services and direct future research. We need to know more about the cultural influences of perimenopause and menopause.

LIMITATIONS

This audit was limited to publicly accessible ACCHO websites, potentially overlooking offline or unpublished resources. This study did not differentiate between resources for male and female Elders as they were unable to be stratified, which may influence the comparison with perimenopause and menopause resources.

CONCLUSION

This desk audit of information about perimenopause and menopause available on ACCHO websites across Australia found a critical lack of information about this phase of women's lives. While information is available addressing other life phases such as mums and bubs and Elders care, there is a clear gap in the available information about perimenopause and menopause which sits between these two life phases. ACCHOs, a key service provider of healthcare for Australian Indigenous women, have a responsibility to provide healthcare across the full life course, including perimenopause and menopause. The current lack of information identifies a critical need for further and deeper research about what types of resources are needed.

Implications for research, policy, and practice

This study highlights the need for Indigenous-led research to address the unique needs of Indigenous women during perimenopause and menopause. It also emphasises the importance of developing culturally safe resources within ACCHOs and equipping healthcare providers with the tools to support women during this critical life stage, ensuring health equity and improved outcomes.

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REVIEW AND DISCUSSION PAPERS

Determining clinically significant patient change with effect sizes: considerations for clinicians and researchers

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ABSTRACT

Objective: To aid nurses' understanding of effect size utilisation in clinical and research contexts.

Design and data sources: Methodological discussion paper that is based on the author's experiences as a clinician and researcher and is supported by literature.

Primary arguments: Patient change is a key consideration for clinical nurses and nurse researchers. Nurses routinely use measurement instruments to identify and quantify such change informing intervention outcomes, clinical decision-making, and health research conclusions. Whether improvement or deterioration, patient change should be operationalised through the magnitude of change (i.e., effect size). Effect sizes relative to the context of change (clinical vs empirical) and the reliability of the instruments used are important considerations here. However, despite discourse on the utilisation of effect sizes in health, aspects of effect sizes can be poorly understood, misapplied or overlooked. Furthermore, nurse researchers may default to Cohen's *d* for use in power analysis and results reporting where they should be considering an effect size derived from other methods in the first instance. In part, this is due to the literature surrounding aspects of effect size being inherently complex, impacting on nurse and nurse researchers' capacity to acquire a thorough understanding of the topic.

Conclusions: Effect size in health can be particularly complex. Nevertheless, nurses and nurse researchers should have some understanding about effect sizes and their role in measuring patient change in clinical and empirical contexts. They need to be aware of how measurement instruments detect, track and quantify patient change and the resultant magnitude of effect relative to the clinical significance of the change for the patient. This paper aids nurses to effect robust change based on informed decision making thus strengthening their evidence-based practice.

What is already known about the topic?

- Patient change informs nurses clinical decision-making strategies; however, nurses may not consider the magnitude of change relative to the context of change and the reliability of the instruments used to identify and quantify the change
- Effect size is one of the four criteria needed for power analysis and is perhaps the most difficult to identify
- Underpowered studies result in imprecise estimation of the true effect, which could be an over- or an under-estimation

What this paper adds:

- This paper dispenses with the inherently complicated and technical terminology on effect size often found in the literature that can impact understanding. Consequently, this paper equips nurses to critique research literature and apply this knowledge to their clinical practice
- Provides other methods for identifying a suitable effect size for use in power analysis and results reporting as opposed to defaulting to Cohen's *d*
- Draws attention to the importance of reporting effect size and associated confidence interval with research results data

Keywords: Effect size, measurement, instrument, clinically significant

INTRODUCTION

The measurement of patient change is important for clinical nurses and nurse researchers to understand. Patient change is characterised as a deviation from a patient's baseline in medical, physical, behavioural, cognitive, functional, capacity and/or mental health domains. A change in a patient's condition is complex as it could be benign or clinically important, subtle or overt, sudden or gradual and positive or negative in nature. Regardless of the nature, however, nurses consider patient change with each encounter to inform clinical decision making. Indeed, a key goal for clinicians is to identify, treat, and modify care interventions based on patient change. Clinical researchers may use patient change, such as comparing two antihypertensives in a randomised controlled trial (RCT), as evidence regarding the efficacy of an intervention. Identifying reliable measurement instruments to predict, identify, and quantify patient change is important for both clinicians and researchers. Effect and effect size (ES) have a central role in these considerations.

In health patient change is often described as an effect. An effect in this context relates to patient change due to an action, intervention, or other cause. Nurses generally observe effects from two perspectives: functional (e.g., changes to capacity, mobility, or continence) and medical (e.g., changes to temperature or blood pressure) contexts. Clinical researchers use statistics to identify an effect when comparing outcomes in two populations (e.g., between two treatments in an RCT), treatment effects within the same group, or between low and high-risk groups. This information is dichotomous in nature informing whether an effect exists or not. On the other hand, ESs provides information about the magnitude, direction, and strength of an effect in relation to results as they occur and as such, are termed magnitude of effect.[1–3] For this reason, effect and ES are important concepts for nurses and nurse researchers to understand. The purpose of this paper is to aid the understanding of ES utilisation in determining clinically significant patient change by nurses and beginner nurse researchers whose knowledge on these concepts may be limited.

BACKGROUND

This paper is part of a series of articles about methodological aspects of health research. The overarching aim of this series is to assist nurses and beginning nurse researchers to critique research literature and conduct research that informs evidence-based practice. In this paper aspects of ES in measuring patient change are discussed. There are numerous methodological papers on ES, so from this perspective this paper is not new. What is new, however, is the aim to do without the inherently complicated, dense, and technical discourse that is often found in the literature regarding the subject that can impact the ability of beginning researchers and nurses to understand and apply the information. This paper provides a straightforward perspective on some long-standing ES concepts.

Effect sizes have a role in many aspects of clinical health and research. Quantifying patient change, power analysis, establishing the responsiveness and minimal detectable change (MDC) of health-related measurement instruments and minimal clinically important difference (MCID) are all relevant here. Researchers need to translate their results to some quantifiable meaning, such as an ES, and then provide a qualitative explanation of the effect regarding clinical significance from which clinicians can then apply to their practice. These aspects of ES have important implications for researchers, patients, and nurses. This paper begins by providing some background context to these concepts in relation to ES.

THE IMPORTANCE OF ES IN POWER ANALYSIS

A study's power (aka statistical power) is the probability of detecting a true effect when it exists. Establishing a study's power often involves a priori (before the study) power analysis. This type of power analysis is a process for determining sample size or number of observations needed to avoid a Type II error (false-negative), given a desired significance level, statistical power and population ES.[4,5] Historically a notable proportion of published research has been underpowered.[6–8] This is a concern as statistically significant results in underpowered studies can reflect an

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imprecise estimate of the true effect of an intervention as 'underpowered studies have to detect much larger effects to achieve statistical significance.'[9,1(p.125)] Overall, in underpowered studies true and smaller effects can be missed, there is an increased risk of false positive statistically significant results and ESs of statistically significant results can be exaggerated to appear larger than they actually are resulting in little useful information about the effect size.[6,8,10] This is why identifying a suitable population ES for inclusion in power analysis is a primary consideration.

STATISTICAL SIGNIFICANCE VS CLINICAL SIGNIFICANCE

Statistical significance and clinical significance are not the same thing, and the relationship between them is inherently complex. The former should be thought of as a necessary condition but not sufficient for judging a treatment to be effective.[11] However, a pervasive myth in clinical research is that the smaller the *p*-value (i.e., statistical significance) the stronger the hypothesis that an effect, relationship or association exists.[12] This is due to the *p*-value only informing the likelihood of the results occurring by random chance and consequently, it doesn't tell you if the null hypothesis is true or false. Another consideration here is that 'a sufficiently powerful test will almost always generate a statistically significant result irrespective of the effect size'.[1(p.16)] That is, with large samples extremely small effects can result in statistically significant results even when there is little to no clinical significance.[13]

Statistically significant results in health research are commonly interpreted as important and meaningful patient change. This is not entirely accurate. When researchers and clinicians consider a statistically significant result from a statistical test, the utility of the effect in terms of clinical significance is perhaps more important to consider. This is because a statistically significant result only informs whether an effect exists which may not be synonymous with any clinical or practical significance for the patient as it does not convey the magnitude of the effect. Consequently, the reliance on '*p*-values as a basis for evidence-based clinical decision-making is a major source of error' and should not be used as the sole inference for clinical significance.[14,12(p.302)]

Clinical significance goes beyond statistical significance as it identifies whether the statistically significant difference, or score on a measurement instrument, is large enough to have clinical implications for the patient.[15,16] This is where the utility of a statistically significant finding in terms of the associated ES and confidence interval (CI) needs to be considered. However, this is not so straightforward as some 'commonly used effect sizes are limited in conveying clinical significance' as they have limited interpretability as an ES misleading clinical decision-making, for example, odds ratio.[12,14(p.990),17] It is recommended that ESs number needed to treat (NNT), success rate difference (SRD) and if relevant area under the receiver operating characteristic curve (ROC) be reported to convey clinical significance when comparing two populations.[12,14] Reporting such ES with their CIs allows consumers of research to better judge the clinical significance of research results as they apply to their own contexts and standards.

While ESs are used to report research results when sampling a population of patients, a more relevant issue for clinical nurses is how to measure, quantify, and track individual patient change. Further, even if a statistically significant result is clinically significant and can be generalised to the population of interest, it may have little importance to an individual patient. There are simply too many research confounders, individual patient factors, and contextual factors to account for. This is where the use of measurement instruments and identifying MCID to quantity patient change is beneficial.[15,18]

MCID AND MDC

Minimal clinically important difference (MCID) and minimal detectable change (MDC) have a role in determining whether patient change is clinically significant. MCID (aka minimally important difference) is fundamentally an outcome ES derived from health-related measurement instruments. MCID can be used as a reference point for identifying the magnitude of treatment effects based on patient change.[19] Jaeschke et al provides a self-explanatory definition of MCID as being 'the smallest difference in score in the domain of interest [e.g., outcome measure or scale] which patients perceive as beneficial which would mandate, in the absence of troublesome side-effects and excessive cost, a change in the patient's management.'[20(p.408)] Guyatt et al recommended adding 'or harmful' to the definition to address patient deterioration.[21]

Several factors make the concept of MCID useful in health. First, MCID can be used 'for judging the magnitude of treatment effects [i.e., clinical significance] not only in routine clinical practice but also in clinical trials and systematic reviews, facilitating the establishment of treatment recommendations for patients.'[22(p.2)] Second, MCID is an ES that can be used for sample size estimates regarding the desired MCIDs one wishes to detect. Third, MCID 'emphasizes the primacy of the patient's perspective and implicitly links that perspective to that of the physician.'[21(p.377)] Finally, the MCID construct is easily understood by clinicians as they routinely use the instruments used to determine MCIDs (e.g., Visual Analog Scale and Functional Independence Measure) and are knowledgeable of the patients' presenting condition and associated deviation from baseline.

The MDC criterion is tied to clinical significance and MCID. This is mainly due to the difficulty in operationalising MCID without a minimum reference point which MDC provides.

MDC reflects a threshold for minimum point change of an outcome measurement instrument or scale; this relates to its ability to detect actual patient change beyond measurement error within a defined level of statistical confidence (e.g., 95% CI).[15,23] Consequently, an instrument's standard error of measurement (SEM) needs to be determined to identify MDC. There is a relationship between SEM, MDC, ES and MCID characterised by: (i) the higher the instrument's reliability the lower the ES needed to achieve an MCID;[15] and (ii) MDC needs to be smaller than an MCID to ensure that the change score is beyond measurement error (i.e., SEM).[23]

RESPONSIVENESS OF HEALTH-RELATED MEASUREMENT INSTRUMENTS

A fundamental role of health-related measurement instruments is to identify patient change, whether improvement or deterioration. Responsiveness of instruments is one of their psychometric properties warranting consideration here. The responsiveness of a measurement instrument relates to its ability to accurately *detect* and *track* clinically meaningful patient change. This primarily relates to an instrument's change score which is obtained by the arithmetic differences between serially gathered data, such as before and after treatment or comparing a control group and an intervention group.[24] Responsiveness can be further divided into internal and external responsiveness. The former relates to an instrument's precision in tracking patient change over time or change before and after an intervention which can be defined as MDC. With external responsiveness, a reference instrument is compared to an external criterion, index, or measure from which MCID can be determined.[16,25,26]

AIM

To aid nurses' understanding of effect size utilisation in clinical and research contexts.

DESIGN AND DATA SOURCES

A methodological discussion paper that is based on the author's experiences as a clinician and researcher and is supported by literature.

DISCUSSION

ES TYPES AND CATEGORIES

There are many different types of ES that are generally based on how they are derived and from which data source. For instance, researchers may need to identify a *population* ES for priori power analysis while research results may be used to compute a *sample* ES. ES can further be divided into *absolute* (raw), such as the difference between cohort means, and *relative* (standardised) ESs. Any indices (e.g., squared correlations and kappa) that convey the magnitude of change are considered a relative ES.[27]

Relative ES can be categorised as the difference between groups or measures of association known as the *d* and *r* family, respectively.[1,28] In the *d* family ES includes comparisons between binary variables (e.g., yes/no data) that can be expressed as relative risk or SRD. These indices represent the difference between two proportions classified as the probability of being in one of the two categories, such as in the Chi-square test.[3] In this family, comparisons between a continuous variable (e.g., height and weight) means and their associated standard deviations (SDs) are used to calculate standardised differences expressing ES in SD units.[29] Cohen's *d* is an example here. SDs on their own can also be considered as a discrete ES statistic as they represent the variation of each group around the mean.[1,30]

The *r* family of ES covers the direction and strength of a relationship between two or more binary or continuous variables.[1] Some examples include ANOVA (*f*), Pearson product moment correlation coefficient (*r*) and Spearman's rank correlation coefficient (p or r_s). Proportion of variance indexes are also part of this family including coefficient of determination (r^2) and multiple regression (R^2).

In addition to statistical test and variable type impacting on which ES should be considered, some ES are only valid when statistical assumptions are met.[31] For instance, in comparing two treatments or interventions in an RCT the ES may be expressed as a hazard ratio (HR), which is only valid if two survival curves are being compared that satisfy the proportional hazards assumption in that population.[12,32] The validity of Cohen's *d*, Hedges' *g* or Glass's delta, depend on the outcome measures in the two populations having a normal distribution with equal variances.[12,31,33] Another consideration if assumptions are met, is that some ES can be converted to others. For example, conversions between Cohen's *d*, HR, NNT and SRD are possible and assist with clinical interpretability and determining the clinical significance of results.[12]

DETERMINING ES

There are many types of ES and methods for determining an ES. Based on their context of use, ESs are generally derived from two methods: distribution-based and anchor-based.

Distribution-based approaches for determining ES

The distribution-based method for determining relative ES involves the underlying distribution and magnitude of change measured in SD units around the mean.[22] ES can be expressed in three ways using this method:

(i) between-person SD units (person 1 mean minus person 2 mean);

(ii) within-person SD units (post-test mean minus pre-test mean); and

(iii) the standard error of measurement (SEM).[21]

There are numerous methods for calculating relative ES within the distribution-based category. Perhaps the most widely used and reported method involves comparing the means of continuous variables (see Table 1). While there are online calculators for determining some of the ESs in Table 1, the formulas are provided as clinicians generally only need means, SDs and cohort numbers to calculate their own ES if not reported aiding the interpretation of results. It is important to note that when using SDs as an ES and for research in general, the population SD and sample SD are calculated differently and are represented by different indices (= population SD, s = sample SD). There are also two different mean indices (= population mean, = sample mean).

Population ES is one of the four criteria needed for power analysis in quantitative studies and is perhaps the most difficult to identify. Being derived from distribution-based methods, an ES is required for all types of power analysis except sensitivity power analysis where the goal is to identify an ES based on a known sample size. Regarding the former types of power analysis, researchers in the first instances should always attempt to identify a population ES worth investigating as they would be applied to the relative clinical or empirical context.[10] This could be based on previous similar studies, a systematic review, expert clinical judgment or informed clinical opinion. Study design and methods and types of variables, statistical tests and measurement instruments used are also considerations here.[4]

TABLE 1: FORMULAS FOR DETERMINING DISTRIBUTION-BASED ES

Relative effect size	Characteristics	Formula	Considerations
Cohen's *d*[34]	Either group SD if they are homogeneous	$d = \frac{m_1 - m_2}{s}$	
Cohen's *d*[34]	Pooled SD_{pooled} if SDs are about the same	$d = \frac{m_1 - m_2}{\sqrt{\left[\frac{(s_1{}^2 + s_2{}^2)}{2}\right]}}$	Can overestimate the true population ES
Glass's delta (Δ)[35]	Control group SD if the SD of each group are sufficiently different	$\Delta = \frac{m_1 - m_2}{s_{control}}$	Also referred to as relative change[16]
Hedge's *g*[35]	Weighted & pooled SD if group sizes are different	$g = \frac{m_1 - m_2}{\sqrt{\frac{[(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2]}{(n_1 + n_2 - 2)}}}$	Suitable for sample sizes <20 & unbiased estimates of the population ES opposed to Cohen's *d*
Kazis formula[11]	Pre-intervention SD used as a proxy for control group SD	$ES = \frac{m_1 - m_2}{s_{preintervention\ group}}$	Can be used for within-person and between-person. Same as Glass's Δ when the assumed control group is the pre-intervention group.
SRM[25,36]	Mainly used to determine internal responsiveness	$SRM = \frac{m_1 - m_2}{s_{change\ score}}$	Also termed responsiveness to treatment coefficient or efficiency index
SEM	For calculating MDC	$SEM = SD \times \sqrt{1 - r}$	SD = from total sample at baseline[23] or pooled initial and re-test SDs. r = reliability coefficient of the reference tool being test-retest[22] including ICC[23] or internal consistency (Cronbach's α)[15,36]
MDC[37]	Identifying MDC of a measure	$MDC_{CI} = SEM \times z \times \sqrt{2}$	z-values depend on the desired CI. E.g., 1.64 for 90% CI and 1.96 for 95% CI.
GRI[26]	Mainly used to determine MDC and internal responsiveness	$GRI = \frac{\Delta}{\sqrt{2 \times MSE}}$	Δ = mean change of treatment group.[23] MSE = ANOVA for multiple baseline measures prior to intervention or SD of reference group for two observations (before and after intervention)[25]
Responsiveness statistic[26]	Mainly used to establish responsiveness	$ES = \frac{m_1 - m_2}{s_{stable\ group}}$	
Relative change[11]	Quantitative descriptor of patient change[16]	$RC = \frac{m_1 - m_2}{m_1}$	
Norman index[18]	Mainly serves as a starting baseline for estimating MCID	$ES = 0.5 \times S_{\text{preintervention}}$	Control group SD can be used. Manly used for patient-reported outcome measures.
RCI[38]	Mainly used with MCID estimates to ascertain if the score change (e.g. before and after an intervention) is statistically significant[39]	$RCI_{CI} = \frac{m_2 - m_1}{\sqrt{2 \times (s_1\sqrt{1 - r})^2}} \times z$	Formula in brackets is SEM using SD of pre-intervention group. E.g., if z = 1.96 and RCI >1.96 then there is a statistically significant change based on 95% CI.

Abbreviations: *m*, mean; *s*, standard deviation; *n*, number in group; MDC, minimal detectable change; MCID, minimal clinically important difference; SEM, standard error of measurement; ICC, interclass correlation coefficients; SD, standard deviation; CI, confidence interval; SRM, standardised response mean; GRI, Guyatt Responsiveness Index; RCI, Reliable Change Index

TABLE 2: PROPOSED ES THRESHOLDS FOR COMMON STATISTICAL TESTS

Description	Example of statistical test	Indices	Proposed effect sizes		
			Small	Medium	Large
***d* ES family for mean differences**					
Independent means of continuous variables	Student's *t* test	*d*, Δ, *g*	.20	.50	.80
***r* ES family for correlation indexes**					
Binary variables	Chi-square test	ω, φ, *V*, *C*	.10	.30	.50
Two interval or ratio scale variables	Pearson coefficient	*r*			
Comparison of two correlations	Fisher's *r* to *z*	*q*			
Average Spearman Rho	Friedman test	*p* (r_s)			
***r* ES family for proportion of variance indexes**					
Difference between proportions	Sign Test	Cohen's *g*	.05	.15	.25
For independent proportions	*z*-test	*h*	.20	.50	.80
Mean dispersion in multiple groups	ANOVA	*f*	.10	.25	.40
	Eta/Omega[2]	η^2, Ω^2	.01	.06	.14
Multiple regression • Multiple & hierarchical regression • Bivariate regression		R^2 f^2 r^2	.02 .02 .01	.13 .15 .09	.26 .35 .25
Other					
Group mean differences	Student's *t*-test	*d*, Δ, *g*	.41	1.15	2.70
Relative risk (risk ratio)	Chi-square test	*RR*	2	3	4
Correlation indexes (range –1 to 1)	Pearson and Spearman's coefficient	*r*, *R*, ρ, β, *tau*, φ	± .2	± .5	± .8
Proportion of variance indexes (range 0 to 1)	Regression modelling	r^2, R^2, η^2, ε^2, ω^2	.04	.25	.64

Note: Adapted from Cohen[34], Ferguson[40], Ellse[1]

Motivated by the prevalence of underpowered studies,[15] Cohen developed three operational definitions to describe distribution-based ES that could be used when no better basis for identifying an ES is available.[34] These include:

1. *small* ES being noticeably smaller than medium but not so small that it is trivial, however, cannot be detected by the naked eye but detected by a statistical test;[2]
2. *medium* ES being an effect *likely* to be detectable by a careful or trained observer; and
3. *large* ES being an effect detectable by an untrained observer[2] represented by an effect that is as far above a medium effect as small is below it.[34]

Cohen further identified ES thresholds for several statistical tests based on these three definitions (see Table 2) which assists in operationalising desired (i.e., sample size estimates for power analysis) and clinically significant effects (i.e., interpreting results).[34] It is important to note that Cohen describes his definitions as arbitrary conventions and the associated ES thresholds as subjective judgements.[34] Consequently, they should serve as a guide only and not detract researchers from identifying relevant context-specific ES from the research literature based on empirical data and reasoned arguments.[28] Cohen's *d* can also be converted to other ESs (see Table 3). Formulas for these conversions are readily available in the literature.[3,34]

TABLE 3: CONVERSIONS BETWEEN COHEN'S *d* AND OTHER EFFECT SIZES

d effect size descriptors	*d*	*r*	r^2	SRD	NNT	HR[a]	HR[a]
	0	.000	.000	.00	∞	1.00	1.00
	.1	.050	.003	.06	17.7	.89	1.12
Small	.2	.100	.010	.11	8.9	.80	1.25
	.3	.148	.022	.17	6.0	.71	1.40
	.4	.196	.038	.22	4.5	.64	1.57
Medium	.5	.243	.059	.28	3.6	.57	1.76
	.6	.287	.082	.33	3.0	.51	1.98
	.7	.330	.109	.38	2.6	.45	2.22
Large	.8	.371	.138	.43	2.3	.40	2.50
	.9	.410	.168	.48	2.1	.36	2.81
	1.0	.447	.200	.52	1.9	.32	3.17
	2.0	.707	.500	.84	1.2	.09	11.71

Abbreviations: *d*, Cohens *d*; *r*, Pearson correlation coefficient; r^2, coefficient of determination based on Pearson correlation; SRD, success rate difference; NNT, number needed to treat; HR, hazed ratio.

a – which HR used depends on whether the event is undesirable (HR <1 if population 1 is better than population 2) or desirable (HR >1).

Note: Adapted from Cohen[34] and Kraemer et al[12(p.303)]

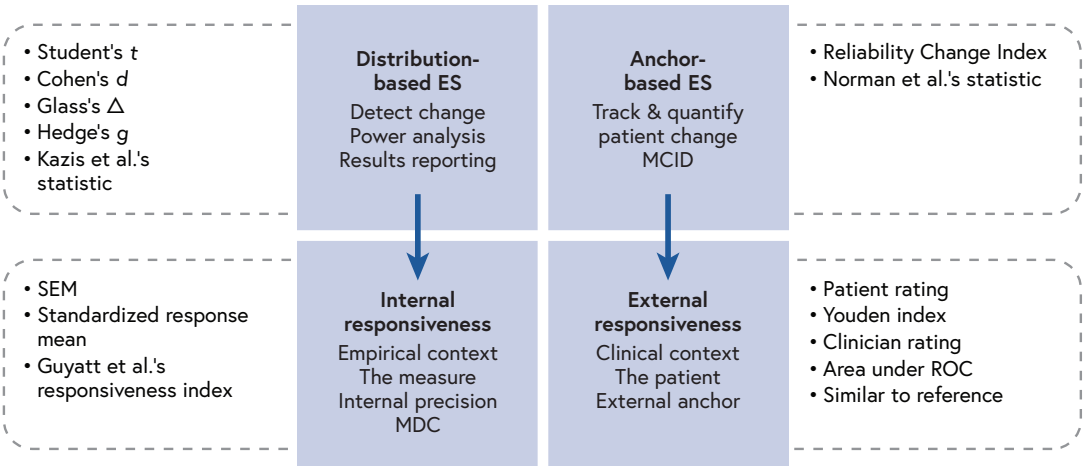

FIGURE 1: ES APPLICATION AND APPROACHES FOR DETERMINING ES AND RESPONSIVENESS OF A MEASURE

Distribution-based methods are also used to determine the internal responsiveness (aka internally referenced or precision) and MDC of measurement instruments. Standard error of measurement (SEM) of an instrument in identifying its MDC is an important aspect here. This is because MDC serves as an anchor of sorts. That is, only when an individual's change score exceeds the SEM can clinicians be confident that it is an actual change rather than a product of instrument measurement error.[24] While many of the distribution-based approaches for determining ES in Table 1 could be used to examine the precision of a measure,[24] the standardised response mean (SRM) and Guyatt et al., responsiveness index (GRI) are mainly used. Proposed ES benchmarks for SRM and GRI include 0.20-<0.50, 0.50-0.80, and >0.80 representing small, moderate and large responsiveness, respectively.[25,26,41] A summary of distribution-based approaches for determining ESs and the internal responsiveness of a measure are illustrated in Figure 1.

Anchor-based approaches for determining ES

While ESs derived from distribution-based methods have a key role in identifying population effects from an intervention in research and MDC, they have limited operational utility in guiding clinical decision-making based on individual patient change.[15] This is where MCID is important to consider. MCID represents a small ES as it is the minimum point gain on a measurement instrument indicating clinical improvement.[42] Anchor-based (aka externally referenced) methods are used to identify MCID. Anchor-based methods primarily involve using an independent and external instrument or criterion (i.e., anchor) that measures change in the patient's condition, function, or activity to examine the MCID of the reference instrument. The advantage of this method is that a robust clinically important difference (RCID) can be established as one or more independent measures can be compared to a single reference instrument.[39]

Identifying MCID associated with this method is a complex process involving multiple steps and statistical methods. This process largely depends on the anchors selected and a statistical platform will be needed for analysis. For instance, clinicians and researchers should be familiar with all the measures used, a patient-reported outcome measure should be the primary anchor (e.g., Global Impression of Change Scale) and empirical correlation (usually Spearman's correlations coefficient) of at least 0.5 (>0.7 is preferable) between the anchor/s and the reference measure is needed.[39] Several different types of anchors can be used, some of which are considered ESs (see Figure 1). If more than one anchor is used triangulation of the resultant MCID values will be needed. Complicating matters, patient-reported outcome measures as a primary anchor may not be possible in some patient cohorts due to cognitive capacity. In this instance, similar measures to the reference measure, a checklist using the clinician's perspective regarding discrete patient change (e.g., independence in transfers) and/or a functional outcome measurement instrument (e.g., the Functional Ambulation Categories) can be used.[22]

Anchor-based methods should be the primary method used for estimating MCID over distribution-based methods This is because this method quantifies patient change relative to a measurement instrument.[15] However, distribution-based methods do also have a role. For instance, the Norman et al., formula (see Table 1) can be used to reveal small but important patient change from an intervention as indicated on the reference instrument and the Reliable Change Index statistic can show whether a score change is statistically significant.[18,22] Due to the complex nature of incorporating both methods in determining MCID a full breakdown is out of the scope of this paper. Of the many methodological papers in the literature that can assist here, the paper by Malec and Ketchum is a standout as it provides step-by-step instructions.[39]

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REPORTING ES

It is essential that results of clinical research be conveyed to consumers in ways that accurately informs clinical significance and ultimately decision-making; '*p*-values do not serve that function. Nor do statistics like Odds Ratio'.[12(p.307)] Furthermore, researchers should not treat *p*-values as a surrogate for ESs as they are not synonymous with clinical significance. This is due to a *p*-value primarily reflecting the quality of research design decisions including statistical tests, analytical procedures and reliability of measures used and above all, sample size.[12] Consequently, in addition to the *p*-value researchers should report both absolute and relative ES along with SDs and CIs with all general results. This, however, is not common practice. Consumers of research need ESs as they show the size of the substantive significance (magnitude) of an effect which aids in determining the clinical significance of research results. Reporting more than one ES is a consideration here. For example, Kraemer et al., recommends reporting SRD, NNT and ROC curves for studies that compare two samples, such as in RCTs.[12]

Solely reporting an ES by itself is meaningless for a consumer as it can mean almost anything. A small ES can have clinical significance in one context but not another, whereas a large ES might have relatively less importance or persuasive. Consequently, reported a ES needs some narrative contextualising it against some frame of reference, such as a well-known scale, outcome, patient experience, previous study, or functional based change.[1] Narrative around the index (e.g., Cohen's *d*) used for obtaining the ES, quantifying the magnitude of the effect and a qualitative explanation of the effect regarding everyday practice is also needed to fully appreciate the clinical significance and utility of the effect. Finally, reporting ES as part of general results can aid future research as they can be used for priori power analysis.

The above recommendations are not new. In 1999 The Task Force on Statistical Inference of the American Psychological Association (APA) outlined similar expectations of researchers as part of their common reporting standards across research designs.[43] These recommendations continue today in the current APA Manual (v7) that notes the importance of reporting ES so the consumer can fully understand the importance of a study's results. Even before these APA recommendations, Kazis et al., advocated for 'the use of effect sizes as a method for estimating and communicating the extent of health status change that occurs in a group.'[11(p.188)] They further go on to advise that ES should supplement statistical significance testing in interpreting results and when reported, assist in comparing results across studies.[11]

Reporting CIs around ES should be considered but are not commonly reported.[9,29] This is because the connection between an ES and statistical significance (i.e., *p*-value) is via CI width. CIs provide a range of internal result estimates being a measure of imprecision or uncertainty of the true effect. That is, 'a confidence interval can also be defined as a point estimate of a parameter (or an effect size) plus or minus a margin of error.'[1(p.17)] The wider the CI the less certain or precise the true effect is and if the CI crosses zero, a result is not statistically significant. A CI of 95% means the true effect lies within the lower and upper CI limits 95% of the time. It is important to consider that a CI width is inversely proportional to sample size so the larger the sample size the narrower the probability and more precise the effect distribution (i.e., CI) is likely to be. The relationship between these aspects is illustrated in Figure 2 through four hypothetical scenarios.

This figure illustrates that while a study's results may be statistically significant, they may not be clinically significant due to the desired ES (> 0.8) being based on a therapeutic decision limit (4% drop in blood pressure). It also illustrates how CI width is inversely proportional to sample size (scenario 4).

INTERPRETING ES

Interpreting the clinical significance of an ES as it relates to results and the clinical context can be difficult. This is mainly due to the numerous factors needing consideration. Some include the type of ES reported, how the ES was derived, what the ES is to be used for, the context (empirical vs clinical), the relevant diagnosis related group (DRG), and how the ES was identified (i.e., using an outcome measure or statistical test). Findings from four inpatient rehabilitation studies are used to illustrate how ESs can be interpreted (see Table 4).

Drop in BP (%)	0 1 2 3 4 5 6 7 8	Significance
Scenario 1 2 mg Perindopril		Not statistically significant & no clinical significance. ES < 0.2, *N* = 50
Scenario 2 4 mg Perindopril		Statistically significant but no clinical significance. ES < 0.2, *N* = 50
Scenario 3 8 mg Perindopril		Statistically significant & clinical significance. ES > 0.8, *N* = 50
Scenario 4 8 mg Perindopril		Not statistically significant with possibly clinical significance. ES > 0.8, *N* = 10

4% drop in BP = Clinical significance decision limit

FIGURE 2. RELATIONSHIP BETWEEN STATISTICAL AND CLINICAL SIGNIFICANCE, SAMPLE SIZE (N) AND EFFECT SIZE (ES)

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TABLE 4: EXEMPLAR OF STUDIES ILLUSTRATING THE DIFFERENCE BETWEEN ES AND DRGS IN INPATIENT REHABILITATION

Studies	DRG	Measures	AFG (SD)	*d*	Δ	Cohen's U_3 index	MDC_{95}
Van der Putten et al[30]	MS	FIM total BI (0-20)	6.9 (8.3) 2.1 (2.4)		0.30 0.37	61.8% 64.4%	
	Stroke	FIM total BI (0-20)	21.9 (19.0) 5.2 (4.4)		0.82 0.95	79.4% 82.9%	
Houlden et al[45]	BI vascular TBI	FIM total	17.3 (15.1) 17.4 (15)		0.59 0.52	72.2% 69.8%	
	BI vascular TBI	BI (0-20)	3.9 (3.4) 3.95 (3.4)		0.65 0.55	74.2% 70.9%	
McKechnie et al[44]	TBI without RTAC TBI with RTAC	FIM total FIM total	28.2 (25.8) 33.3 (32.3)		0.85 1.21	80.2% 88.7%	11.9
Arcolin et al[22]	Hip fracture	FIM total BI (0-100)	24.4 (11.8) 23.4 (15.1)	1.39 1.35		91.8% 91.1%	10.3

Abbreviations: DRG, diagnosis related group; AFG, absolute functional grain (discharge mean – admission mean); SD, standard deviation; *d*, Cohen's SD_{pooled}; Δ, Glass's delta; MS, Multiple Sclerosis; BI, brain injury; TBI, traumatic brain injury; RTAC, readmission to acute care; FIM, Functional Independence Measure (18-126 score range); BI, Barthel Index

Note: Cohen's U_3 index[34] based on Cohen's SD_{pooled} or Glass's delta and used for comparison between pre vs post treatment and not between two independent groups

The Functional Independence Measure (FIM) and/or Barthel Index (BI) were used in the four exemplar studies to examine the effectiveness of inpatient rehabilitation for five DRGs. As per the results in Table 4, hip fracture,[22] brain injury,[44] and stroke patients,[30] appeared to have a moderate to large benefit from inpatient rehabilitation as they all had ESs above 0.5. The FIM and BI derived ESs for the multiple sclerosis (MS) cohort equated to small effects being 0.30 and 0.37, respectively. This is an important finding as it shows that the effectiveness of inpatient rehabilitation differs between DRGs, with MS patients possibly only obtaining modest benefits from this intervention compared to other DRGs. This is further evidenced by the MS cohort having low absolute function gain scores. MS is a degenerative condition that possibly mitigates some capacity for MS patients to improve from rehabilitation compared to other DRGs with newly acquired conditions who are likely to have more capacity to improve.

Several other inferences can be drawn from the ES results data in Table 4. First, rehabilitation had a large effect on traumatic brain injury (TBI) patients irrespective of their rehabilitation program being interrupted resulting from readmission to acute care (ES = 1.21).[44] Second, TBI patients in a specialist TBI inpatient rehabilitation unit had larger functional gains (ES = 0.84 and 1.21) compared to those admitted to a general neurological rehabilitation unit (ES = 0.52 and 0.55).[44,45] Third, the FIM and BI had similar responsiveness for these DRGs as their ESs were comparable. Finally, the FIM's MDC is approximately 11 points of total FIM score which stands to reason as FIM is an 18-item ordinal scale with item scores ranging from 1 for completely dependent to 7 for independent.

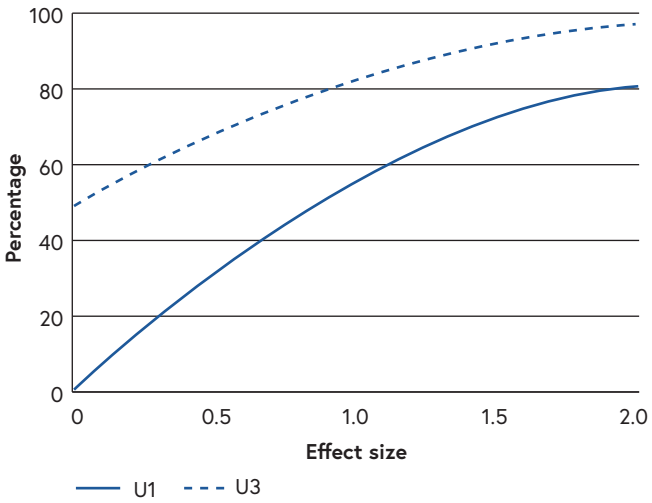

FIGURE 3: EQUIVALENTS OF COHEN'S *d* REPRESENTED AS U INDICES

Another relatively unfamiliar way to interpret the clinical significance of ES is by using an improvement index to convert the ES value into percentile gain manifested by the target group.[3] Being derived from equivalents of Cohen's *d*, the U indexes can be used here (see Table 4 and Figure 3).[34(pp.21–22)] For example, an ES of *d* = .30 indicates that 61.8% of the treatment group will be above the mean of the control group (Cohen's U_3) representing a 62% improvement in the treatment group. Cohen's U indexes can also be interpreted in terms of percentage of non-overlap (U_1) between treatment group and untreated group scores on a bell curve. In this instance, an ES of .30 indicates that 21% of the two groups' scores will not overlap (79% overlap).

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An automated online tool for these calculations that also provides an interpretation of the results is available at https://rpsychologist.com/cohend/. The website's author notes differences in their results compared to Cohen's regarding the percentage of non-overlap (Cohen's U_1) and provides a detailed rationale for the inconsistencies stating that his calculations are more robust.[46] Using the above example, $d = .30$ equates to 12% non-overlap based on his calculations. The improvement per cent index (Cohen's U_3) remains the same.

IMPLICATIONS FOR RESEARCH, POLICY AND PRACTICE

Clinical nurses use patient change and measurement instruments to rationalise clinical significance and their resultant interventions. They should also consider the magnitude of effect and the responsiveness of instruments they use for more robust evidenced-based clinical decision making. Nurse researchers in the first instances should always attempt to identify population ESs worth investigating as they would be applied to their context. Both clinical nurses and nurse researchers need to understand aspects of ES to realise these goals. Considerations for measuring and quantifying patient change with ESs has been discussed. In doing so, this paper aids clinical nurses and nurse researchers in using ES to inform clinical decision making and report clinically meaningful research results.

CONCLUSION

This paper provides clinical nurses and nurse researchers with a broad overview on determining clinically significant patient change using ESs. In doing so, it provides guidance on how to critique research literature and apply ES in clinical and research contexts. This paper aids nurses to effect change based on informed decision making thus strengthening their evidence-based practice.

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