

Factors impacting emergency department clinicians' peripheral intravenous catheter practice: A qualitative analysis

Author

Xu, Hui Grace, Ullman, Amanda J, Rickard, Claire M, Johnston, Amy

Published

2023

Journal Title

International Emergency Nursing

Version

Version of Record (VoR)

DOI

[10.1016/j.ienj.2023.101366](https://doi.org/10.1016/j.ienj.2023.101366)

Rights statement

© 2023 The Author(s). Published by Elsevier Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

Downloaded from

<http://hdl.handle.net/10072/426510>

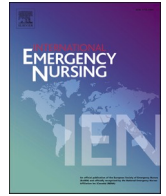
Griffith Research Online

<https://research-repository.griffith.edu.au>



Contents lists available at ScienceDirect

International Emergency Nursing

journal homepage: www.elsevier.com/locate/aaen

Factors impacting emergency department clinicians' peripheral intravenous catheter practice: A qualitative analysis

Hui Grace Xu^{a,b,c,d,e,*}, Amanda J. Ullman^{a,e,f,g}, Claire M. Rickard^{a,c,e,f,h}, Amy Johnston^{f,i}

^a NHMRC Centre of Research Excellence (CRE) in Wiser Wound Care, Menzies Health Institute, Queensland, Griffith University, Nathan, Brisbane, Queensland, Australia

^b School of Nursing and Midwifery, Queensland University of Technology, Kelvin Grove, Brisbane, Queensland, Australia

^c Centre of Clinical Nursing, Royal Brisbane and Women's Hospital, Herston, Brisbane, Queensland, Australia

^d Emergency Department, Queen Elizabeth II Jubilee Hospital, Brisbane, Queensland, Australia

^e Alliance for Vascular Access Teaching and Research, Schools of Nursing and Midwifery and Pharmacy and Medical Sciences, Griffith University, Brisbane, Australia

^f School of Nursing, Midwifery and Social Work, The University of Queensland, Brisbane, Queensland, Australia

^g Children's Health Queensland Hospital and Health Service, Brisbane, Queensland, Australia

^h Herston Infectious Diseases Institute, Metro North Health, Herston, Brisbane, Australia

ⁱ Emergency Department, Princess Alexandra Hospital, Woolloongabba, Brisbane, Queensland, Australia

ARTICLE INFO

Keywords:

Guideline adherence

Emergency department

Peripheral intravenous catheter

Vascular access

Survey

Qualitative analysis

ABSTRACT

Background: Peripheral intravenous catheters (PIVCs) are commonly used devices in emergency departments (EDs), and yet relatively little is known about factors influencing Australian clinicians' adherence to the national PIVC quality and safety Standard.

Aims: To explore attitudes and experiences of ED clinicians around PIVC insertion and care processes.

Methods: This study used an exploratory qualitative approach to analyse written responses to open-ended questions included in an online national (mixed data) survey. Snowballing methods were used to gather responses. Deductive analysis was used to analyse open-ended questions regarding practice and Standard adherence.

Results: There were 340 written responses, mainly from nurses in public EDs, who reported suboptimal practices regarding idle catheters, lack of patient participation in care, antecubital fossa insertion, multiple insertion attempts, inadequate site preparation, poor documentation and insufficient review of PIVC. The main factors inhibiting ED clinicians from adhering to the Standard includes inadequate knowledge, perceptions of infeasibility, disbelief in evidence, ambiguous responsibilities, habitual practice, insufficient training, lack of recognition of good practice and inadequate engagement.

Conclusion: The factors that impact ED clinicians' PIVC Standard adherence are complex and multifactorial. Strategies and interventions are needed to facilitate the implementation of the Standard into daily practice and achieve sustainable behaviour change.

1. Introduction

Emergency care often demands rapid access to the venous system to ensure delivery of timely and appropriate care [1]. Many peripheral intravenous catheters (PIVCs) are inserted in emergency departments (EDs) for lifesaving intravenous therapy or diagnostic tests [2]. PIVCs can be used for rapid blood sampling, delivery of essential fluids, blood products and medications. Indeed, PIVCs have become so typical that they are often reported as being inserted as a 'routine' part of patient

admission – the 'just in case' culture [1,2].

These apparently simple and commonly used devices are not without clinical challenges and patient concerns. Catheter insertion is typically a painful and stressful procedure [3]. Multiple insertion attempts are commonly observed in EDs; the first point of care for most hospitalised (admitted) patients [2]. Multiple insertion attempts can cause tissue damage including permanent damage to vein integrity and compromise subsequent clinical access to that vein. Poorly managed PIVCs can create portals for infection and a source of ongoing discomfort for patients,

* Corresponding author at: Centre of Clinical Nursing, Building 34, RBWH, Butterfield St, Herston, Queensland 4029, Australia.

E-mail address: g.xu@griffith.edu.au (H.G. Xu).

@GraceXu_NP (H.G. Xu)

<https://doi.org/10.1016/j.ienj.2023.101366>

Received 7 April 2023; Received in revised form 11 September 2023; Accepted 23 September 2023

Available online 16 October 2023

1755-599X/© 2023 The Author(s). Published by Elsevier Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

leading to complications and patient dissatisfaction as well as increases in staff workload and overall organisation costs [4].

In Australia, on arrival in an ED, PIVC insertion is a shared responsibility between ED nurses and doctors. Both doctors and nurses can assume responsibility for PIVC insertion, while ongoing care and removal is primarily undertaken by nurses [5]. ED doctors typically perform ultrasound guided PIVC insertions for difficult intravenous access, as ultrasound training is a usual part of medical training programs. While some EDs provide training for ultrasound insertion of PIVCs to nurses, it is not a routine practice [6], however education around ongoing care and removal of PIVCs is a usual part of nurse training [7].

Recognition of the issues around PIVC insertion, management, and removal, prompted the recent release of the very first national PIVC clinical care Standard in Australia, the *National Management of Peripheral Intravenous Catheters Clinical Care Standard* (abbreviated as the PIVC Standard) on May 2021, to guide PIVC use in Australian healthcare facilities [5]. The PIVC Standard was released by the Australian Commission on Quality and Safety. It was developed from research evidence and provides 10 quality indicators (QIs) to inform the best evidence-based clinical practice, guiding practice for doctors and nurses. However, decision support tools such as standards, guidelines and policies are not always well translated into practice, with an average rate of 34 % guideline adherence in general [8].

Thus far, knowledge of the factors that impact clinician's adherence to guideline-recommended PIVC insertion and maintenance practice is limited. Previous studies suggest that clinical and situational challenges in EDs might contribute to a large number of idle catheters [9], avoidable insertion into the antecubital fossa [10], multiple attempts by junior clinicians [11] and poor patient engagement. Understanding the emergency context for PIVC insertion and management is critical, particularly in light of the new Australian PIVC Standard [5]. Thus, the aim of this study was to use qualitative evidence to explore attitudes and experiences of ED clinicians around PIVC insertion and care processes.

2. Methods

This study used an exploratory qualitative approach to analyse written responses to open-ended questions included in a national (mixed data) survey [12]. The prompts included in the survey enabled an exploration of clinicians' knowledge, attitudes and adherence to the Australian PIVC Standard. The survey was conducted in Australia. All doctors and nurses working in Australian EDs were eligible to participate. Participants who had no prior ED experience or had not undertaken PIVC insertion were ineligible for the survey. The snowball sampling method was used after obtaining Griffith University ethical approval (2022/025). Numerous sources including access to professional networks, word of mouth and professionally linked social media were employed to promote a wide distribution of the link to the online survey in early 2022.

Open-ended survey questions (see Table 1) were developed based on the 10 key foci that align with the 10 QIs included in the Standard [5] (Supplementary Table 1). Questions based on previously established challenging aspects of providing excellent PIVC care [9,13,14] were designed by ED clinical experts and researchers to explore and capture clinicians' perspectives around common ED PIVC practice issues. Face validity for the survey questions was established by scrutiny by the diverse membership of the study team (ED and/or PIVC clinical and research experts) as well as by ten additional ED nurses and doctors [11]. Analytical rigour of qualitative data was maintained by following the Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist [15].

Anonymous data were collected via the online survey platform (LimeSurvey®), to encourage honest reporting by participants, and ensuring that the analysis team were unbiased by their potential knowledge of the individual participants and vice versa. This paper extends beyond the quantitative data [12] to report participants'

Table 1
Survey questions.

Practice-related questions:	Related standard
1. Do you routinely insert a PIVC if you believe that only blood tests are needed for the patient? Why or why not?	Standard 1 – Assess intravenous access needs
2. Do you routinely ask patients about previous PIVC insertion to identify any concerns when planning to insert a non-emergency PIVC? (e.g. difficulty with particular access sites, allergies to tapes or antiseptics, or certain sites where a PIVC should not be inserted) Why or why not?	Standard 2 – Inform and partner with patients
3. Do you routinely choose a 20 g pink PIVC as the first choice? Why or why not?	Standard 4 – Choose the right insertion site and PIVC
4. Do you routinely choose the cubital fossa as the first choice of PIVC insertion? Why or why not?	Standard 4 – Choose the right insertion site and PIVC
5. Do you routinely involve patients in decisions regarding PIVC site preferences if the patient can participate? Why or why not?	Standard 2 – Inform and partner with patients Standard 4 – Choose the right insertion site and PIVC
6. Do you attempt to insert PIVCs even when not confident about the likelihood of success? Why or why not?	Standard 5 – Maximise first insertion success
7. Do you routinely remove hair with a clipper if there is any hair at the PIVC insertion site? Why or why not?	Standard 6 – Insert and secure
8. How often do you document PIVC insertion and removal? Why or why not?	Standard 7 – Document decisions and care
9. Do you routinely wait for the alcohol to become completely air dry after decontaminating the PIVC connector before accessing it? Why or why not?	Standard 8 – Routine use: inspect, access and flush
10. Do you routinely review the ongoing need for PIVCs before patients are transferred to a ward or short stay unit? Why or why not?	Standard 9 – Review ongoing need Standard 10 – Remove safely and replace if needed
Barriers to adherence:	
11. What do you believe are the biggest barriers to adherence to best practices for PIVC insertion and use in the ED setting?	

responses to the open-ended questions in the survey.

2.1. Data analysis

Survey data were uploaded and analysed in NVivo (version 12). Deductive analysis was used to align the findings with the 10 QIs of the PIVC standard. Data analysis process, following the COREQ checklist [15], included coding identified key phrases, categorization and allocation to foci from each question [16]. Researchers read the free text answers to the open-ended questions multiple times to be familiar with the data. One researcher (HX) undertook coding of the complete dataset by systematically collating relevant components to each code/focus. Attitudinal and experiential comments were categorised by codes/foci and aligned with each 10 QIs included in the Standard [5]. Another researcher (AJ) completed 70 % coding and a consensus was achieved around key foci during subsequent discussion, congruent with deductive analysis.

3. Findings

There were 433 survey responses, of which 340 included responses to the open-ended questions. More than half of the respondents were nurses (n = 271, 63 %) and mainly from public EDs (n = 396, 91 %) in metropolitan hospitals (n = 263, 61 %), with a median of 10 years of PIVC insertion experience (Table 2). The key foci of respondent interests (and associated comments) included routine PIVC insertion, patient participation in care, catheter size and site choice, managing difficulty intravenous access, insertion site preparation, documentation, review of ongoing needs and barriers to adhering evidence-based practice (Fig. 1). Key participant quotations (Supplementary Table 2) are presented

Table 2
Demographics of participants.

Categories		N (%) (n = 363)
Median years of clinical experience (IQR)		12 (6–19)
Median years of ED experience (IQR)		8 (3–13)
Median years of PIVC insertion experience (IQR)		10 (5–16)
Hospitals	Public	219 (60.3)
	Private	114 (31.4)
Clinical role	Nurses	219 (60.3)
	Enrolled Nurse	21 (5.8)
	Registered Nurse	9 (2.5)
	Clinical Nurse / Clinical Nurse Facilitator	8 (2.2)
	Clinical Nurse Consultant/ Nurse Unit Manager/ Nurse Educator	172 (47.4)
	Nurse Practitioner	61 (16.8)
	Doctors	29 (8.0)
	Intern*	14 (3.9)
	Junior House Officer*	2 (0.6)
	Senior House Officer*	6 (1.7)
Registrar*	1 (0.2)	
Consultant*	19 (5.2)	
	51 (14.0)	

ED = emergency department, IQR = interquartile range, PIVC = peripheral intravenous catheter.

*Intern- medical student in the final year of their training; Junior House Officer- junior resident; Senior House Officer- senior resident; Registrar- medical officers who have enrolled in a specialty training program; Consultant- staff specialist who completed their specialty training.

illustrate each of these foci (findings).

3.1. Routine PIVC insertion

Many respondents (n = 109) mentioned that “routine” PIVC insertion was their “habit”. Others stated that insertion is generally performed when they assumed that PIVC is likely to be needed. Sometimes,

PIVCs were inserted “just in case”, as clinicians were concerned about patient safety and potential clinical deterioration – stating that “it is hard to predict” what might happen during the early stages of the patient ED journey. Many participants (n = 76) believed that routine insertions were justified for patient comfort (“avoid pain”), safety (“fast venous access if patient deteriorates”, “avoid delay medication administration”) or better experience (“avoid multiple insertions”), which are also likely to lead to a fast diagnosis, rapid patient progression through the ED (turn around) and so, improved patient transit through the ED (flow) to optimise bed blocking issues. Routine insertion is adopted to improve working efficiency, avoid future workload (“repeat venous puncture later”), and to show kindness and as a gesture of generosity to colleagues (reduce colleague’s workload, assist others who can’t cannulate). Participants also stated that they could be reported by ward nurses if patients arrive in the wards without a PIVC *in situ*.

A few nurses (n = 5) reported that idle catheter insertions were sometimes performed to meet the expectations of doctors and make life “easier”, to avoid the “same discussion”. One participant mentioned that they felt that nurses were powerless in facilitating changes to PIVC insertion despite the wide promotion avoidance of idle catheters.

“I do not insert the PIVC initially, however, many, many times the medical officer will request a PIVC ‘just in case’, despite there being no rationale to this. Despite attempting for many years to prevent this from happening, it becomes ‘easier’ to put in the PIVC.”

Potential patient harm was also a concern, especially surrounding perceived risks of managing rapid patient deterioration without vascular access. One participant captured such concerns in a strong statement challenging the promotion of idle catheter avoidance.

“This nonsense about 80 % (rule) is leading to direct patient harm on a regular basis and must stop. We are directly harming patients who deteriorate or require urgent imaging and the emergency department is critically understaffed for these ‘ivory tower’ idiots to come up with ways to

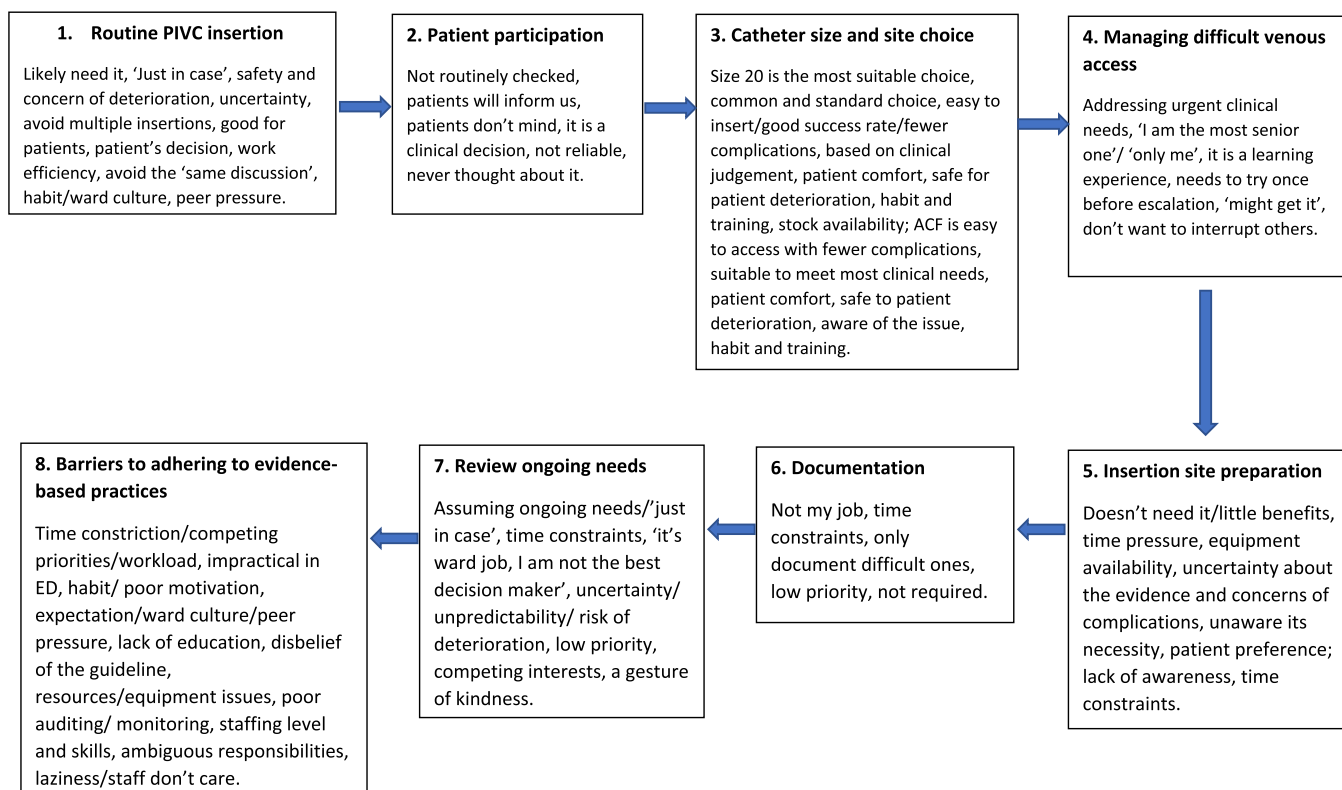


Fig. 1. Key foci.

make our job harder. We don't have time for your nonsense, we're too busy trying to save lives."

3.2. Patient participation

Many participants stated that they do not routinely ask patients about previous PIVC insertion history or site preference "unless [there are] suspected challenges with insertion". They stated that patients who have difficult intravenous access or special challenges (e.g. tape allergy) always "divulge" their personal risks, informing healthcare workers "without being asked". In general, these clinical participants felt that the information provided by patients is often not useful or reliable. Despite asking about patient history or opinion, it "usually doesn't make a difference" to what needs to be done as it is a clinical decision ("ideally should be the clinician guided based on clinical need and appropriate site"). Importantly, when patients were approached about PIVC insertion, they generally "don't really mind" or don't have the capacity to contribute to decisions ("too stressful") and so end up following the clinician's recommendation.

"Most of them don't have a particular choice and the decision ideally should be clinician guided based on clinical need and appropriate site."

3.3. Catheter size and site choice

Most participants stated that their catheter size selection was a clinical judgement based on several factors. Factors include patient acuity, presentation (e.g. trauma), risk of clinical deterioration (e.g. acutely bleeding patients), patient location (resus vs. triage), likely diagnosis (e.g. risk of acute crisis like a heart attack), predicted PIVC use (e.g. contrast for a CT scan, rapid fluid bolus) and the size and / or quality of patient's veins. In general, size 20G was standard and the most common "go to" or "routine" choice. Clinicians considered the "best suitable middle choice" that fits most adult veins and meets most clinical needs as ideal. In addition, participants believed that size 20G is "easier to insert" with a "higher success rate", "bleeding easily", less likely to develop complications and "less invasive" with less pain. It is the most "well-stocked" in many EDs compared with other sizes and became the most "familiar size" for most clinicians (routine – rather than clinical decision). In comparison, size 18 is generally chosen for trauma or unstable patients. Size 22 was deemed "too small". It was also thought to increase the chance of re-cannulation which would be time-consuming.

Antecubital fossa (ACF) was the most preferred site for PIVC insertion. ACF veins are large in diameter, easy to access ("visibility", "juicy" vein) and PIVCs in this site are faster to insert with a higher success rate, especially for "sick patients" who are "peripherally shut down". It is 'ideal' for learners, increasing success rates as well as fast and safe for resuscitation preparation and safe for administration of medications likely causing vein irritation (e.g. Amiodarone), contrast and to re-draw blood with a lower risk of haemolysis. ACF is also considered as a "least painful" insertion site. Many participants identified the ACF is not the "best" option for patients, especially for long-term treatments with potential complications (e.g. "limitation of movement", exhaust "best site" choice).

3.4. Managing difficult intravenous access (DIVA)

Insertion without confidence is commonly reported in managing patients with difficult intravenous access (DIVAs). Participants felt that they had "no choice" apart from "keep trying" if the patient needed a line for urgent treatment ("can't resuscitate a patient if you don't have access"). They reported not wanting to be seen as a "burden" on others or to "interrupt" other busy colleagues work. Sometimes, participants thought that they "might get it" although they did not feel confident. Often, as the "most senior" clinician or "only" clinician on-site in rural

and remote hospitals, participants had to "give it a go" rather than wait for a more experienced clinician. There seemed to be a general expectation to try "at least once" before escalation. At times, participants were afraid to be judged as "not dedicated enough to work" if they did not attempt and fail before seeking help. Although doctors typically perform ultrasound guided cannulation in Australia, interest from many nursing participants in learning ultrasound-guided PIVC insertions was observed together with the observation that there were often few opportunities for nurses to learn this skill.

3.5. Insertion site preparation

Removal of excessive hair on the PIVC insertion sites was not a commonly reported practice. Participants either "never had it (hairy arm) as a problem", or indicated that removing hair with clippers was "unnecessary" as dressings could "adhere appropriately without clipping". Some participants questioned the practice of clipping hair as instigating a risk of "increased infections", "cutting patients", causing "irritation" or "compromising skin integrity". Some participants were unaware of this practice as had not been introduced in their "training". Time and resources were the two main barriers cited; it was "time consuming" to locate clippers as it was often "too busy" and having "competing priorities". Clippers were either "not easily accessible", "not routinely available in cannulation trolley" or "always missing or broken".

Waiting for air-drying once the PIVC site was decontaminated using alcohol wipes was also not reported as being a common practice. Many participants were not aware that they "had to wait for it to dry", "didn't know that was a thing", never heard about it in training" or "never thought" about it. Participants often reported being unclear about the rationale for this practice or described not doing it due to time constraints.

3.6. Documentation

Time constraints were often reported as a barrier to time-consuming documentation of PIVCs. Clinicians prioritise "more important tasks" over documentation as PIVC insertion is "a minor routine procedure" and a so documentation of such was seen as a "low priority" task. They reported that there were always "too many things [about the PIVC] that need to be documented". Documentation of PIVC insertion and care was seen as the sole nursing task by medical participants. They felt it was "not" their job as "nurses often do it" unless the insertion is "difficult, critical, in children" or "ultrasound guided".

3.7. Review ongoing needs

Most participants claimed that they did not routinely review ongoing PIVC needs. PIVCs were often finally removed on discharge as PIVCs were "usually needed" or "may be needed" if being admitted or "just in case" for potential patient deterioration. A commonly expressed view was "why waste time reviewing" the ongoing needs for PIVCs? Sometimes, lack of a clear plan or likely changing plan ("doctors often change their minds") made it hard to predict if PIVCs would be needed. Many participants believed that clinicians who receive patients into the hospital spaces (e.g. inpatient team or ward nurses) should review the needs for PIVCs as they are in the best position to make the decision about ongoing efficacy. Many participants "never thought about [ongoing requirements for a PIVC] it" as they were "too busy". They also reported receiving little or no education about care, management or ongoing review of PIVC sites. Other participants reported intentionally keeping the PIVC *in situ* to avoid pain (reinsertion) or delayed care. Many doctors (n = 21) apparently believed that these are nursing tasks.

3.8. Barriers to adhering to evidence-based practices

Many participants cited the impracticality of the PIVC Standard as the main barrier to adherence in EDs. Working in an environment that is time constrained, with competing priorities to provide urgent care and managing a heavy workload, participants felt it remains impossible to adhere to some of the recommendations. More than half of the participants reported that they were not aware of the PIVC Standard and its QIs. Interestingly, the majority of the participants ($n = 248$) who suggested the PIVC Standard was impractical were the same group of the participants who reported that they were not aware of the Standard and its QIs.

Disbelief in research evidence was cited as another barrier. Participants commented, with some justifications, that “the evidence is usually not applicable to EDs and poor quality” or “the best available evidence is routinely questioned”. Therefore, they ignored the QI statements as “adherence to guidance is laborious and provides little benefit”.

Lack of staff education seemed to be another common issue for both doctors and nurses, especially junior doctors. Nursing participants commonly reported that there was “not enough emphasis on doctors’ basic skill training” and “there is hardly any education for IV cannulation for doctors”; significant issues needing urgent solutions.

“Their techniques are definitely not aseptic, poor sharps management and have very little knowledge and experience on how to position patient’s arm to cause less pain and a more accurate insertion”

Explanations for not adhering to the PIVC Standard also included poor motivation as “people don’t want to change their practice”. Poor auditing and “not enough compliance monitoring” added to the issue. Inadequate staff skills and ambiguous responsibilities in whose responsibility it was to insert or document PIVC care made patients suffer from poor practice. The staff attitude of “don’t care” may lead to poor practices exemplified by statements such as “clinicians are careless with their ANTT especially palpation after disinfection”, “ignorance of patient complications” or ‘under appreciation’ of PIVC as an invasive device.

4. Discussion

To promote and ensure guideline adherence, researchers and clinicians need to understand ED clinicians’ current attitudes and experiences around PIVC processes and the factors that they perceive impact their practice. This is the first study to use the relatively new PIVC Standard as a framework to explore aspects of the entire PIVC care journey of insertion, maintenance and removal. Most participants took the time to include rich qualitative data as part of their contributions to the survey, suggesting they were motivated to report and document views, barriers and current practices, even though adoption was still underway. They provided information about the widespread lack of knowledge about the new PIVC Standard; suggesting they experienced poor translation into practice. When questioned about adherence to the PIVC Standard, clinicians described a wide range of issues. Many of the issues have been individually reported in previous literature [1,2,9], but never as part of a comprehensive review of attitudes and experiences directing practices and beliefs about PIVCs in Australian EDs.

Participants contributed many responses to queries about barriers to PIVC Standard adoption. Some were common and reflect those reported by clinicians from other clinical areas, while some were clearly unique to the ED context. Many reported perceptions of a lack of feasibility of the Standard in an ED setting, disbelief in research evidence, as well as experiences of ambiguous responsibilities, inhibition by habitual practices, insufficient training, lack of recognition of good PIVC care and poor engagement. These were highlighted as the main factors that ED clinicians felt inhibited them and their colleagues from following the best recommended practices directed in the Standard.

Each of the factors cited that potentially inhibit adoption of the

Standard needs to be unpicked and addressed to ensure future implementation. Lack of knowledge and experience of the Standard is a key factor that impacts adherence, as highlighted in other studies [17]. Seventeen clinical care Standards (e.g. Sepsis) have been released by the Australian Quality and Safety Committee in the past seven years [5]. It is challenging for clinicians to keep a timely update with these new lengthy documents, especially ED clinicians who have a broad scope of practice.

Inadequate training, leading to lack of experience and thus, recognition, of good PIVC care can be challenging. Many hospitals have limited capacity to provide timely training, especially in the rural and remote settings, due to geographical distance, cost and backfilling issues [18]. Although education is usually provided, there are always competing interests in prioritising education topics based on organisational and departmental educational plans. Such prioritization may also subtly influence clinicians’ attitudes. It is also worth highlighting that, although participants reported that they have an inadequate understanding of the Standard, many QIs are not completely new (and are often already in place), as they are based on years of well-accepted evidence. Additionally, some initiatives have been introduced to target suboptimal (idle) catheter insertion practices in some Australian EDs in the past few years [19].

Another key factor impacting reported experiences of adherence is attitudinal; namely clinicians’ perceptions that the QIs in the Standard are neither feasible nor highly relevant in the ED environment. Although the Standard was built on the best research evidence, it is a generalised document covering all specialities, which may not be specifically relevant to specialty settings like EDs. Despite participants’ reports of awareness of what is considered the best practice, many of them also report deliberately choosing not to follow the QIs, citing various reasons. Clinicians working within the dynamic and demanding setting of ED reported lacking sufficient time, space and resources to fully comply with the Standard. Their perception generally was that the time constrained, high-pressure, and high-risk nature of the ED environment poses formidable challenges to adherence. Consequently, our data suggests clinicians resort to risk mitigation strategies, such as the insertion of idle catheters, driven primarily by perceptions of relative risk – particularly concerns about potential (perceived) risks around being unable to manage patient deterioration effectively without a reliable PIVC in place. Furthermore, reports of a recurring pattern of PIVC insertions into the antecubital fossa as apparently stems from the underlying assumption that patients may rapidly need fluid resuscitation and administration of highly concentrated drugs during clinical deterioration scenarios.

Maintaining efficiency is a high priority for ED clinicians. Completing a PIVC insertion promptly is seen as an essential task in speeding the patient care journey and so, maintaining departmental patient flow [20]. This imperative is also mirrored in perceptions of other areas of PIVC practice, including poor insertion site preparation, suboptimal documentation practices, inadequate attention to routine review of ongoing needs for PIVCs, and deferred catheter removal. Research shows that clinicians have a limited awareness of the potential PIVC-associated risk to patients [21]. Although some nurses were aware of the risks of the idle catheter, they sometimes ‘chose their battle’ during busy shifts and inserted idle PIVCs to just get the job done; expressing that it was a time saving instead of [trying to] ‘convincing’ the doctors. Similarly, ED clinicians’ expressed ‘low priority’ attitudes regarding the preparation of the insertion site, documentation, regular assessment of the needs of PIVC, and the timely removal of catheter commonly direct care processes. These tasks were perceived as being of relatively lesser significance, not vital, and often regarded as time consuming, leading to reduced work efficiency. Regrettably, the culture of convenience seems widely accepted as more important and feasible for clinicians than patient safety and cost to organisations [22]. It is important to acknowledge, however, that majority of ED presentations do not need time-critical interventions or urgent vascular access with

non-urgent presentations. Therefore, clinicians need to learn to adjust their practice to adhere to the best research evidence instead of routinely using time criticality as an excuse for non-adherence behaviour.

Disbelief in research evidence also has a negative impact on guideline adherence. Participants described adhering to guidelines as taking lots of effort, with limited benefits, based on poor quality of underpinning research. Thus, future development of clinical standards needs to consider and adopt new strategies to promote the engagement key partners as it will increase the likelihood to create evidence and recommendations that are more widely accepted by clinicians and leads to successful knowledge translation [23].

Many participants' practices were based on 'habit' or previous experience, which especially reflected in idle catheter insertion, catheter size and site choice, and multiple attempts without confidence. To be able to manage a heavy workload and competing interests, as well as to provide time-critical care, clinicians' preferences for easy, less time-consuming, automatic 'go to' practice and devices that meet almost all potential clinical needs will typically win over the best evidenced-based recommendations. Sometimes, these automatic actions involve minimal mental processing or decision-making, bypassing clinical assessment or judgement [20]. On other occasions, clinicians' assumptions of what needs to be done and associated risk assessment is based on their individual previous clinical experience. Disregarding how decisions were made, individual clinicians' preferences driven by habit commonly dominated their practice [17]. Undoubtedly, the application of critical thinking by clinicians during decision making pertaining to patient care, encompassing aspects such as determining patient needs, appropriate catheter size, optimal insertion site, and anticipated success rates, could enhance the overall quality of patient care. To ensure changes occur, interventions focused on addressing clinicians' readiness to change, promoting the recognition of the need to make changes and introducing intentional pause and rethink process [19] to assist the transition from the old practice to the new practice could become more widely adopted.

Underestimation of the value of patient participation and input is another important finding from the study. Clinicians commonly reported not actively involve patients in their own care or decision making. They cited lack of time, inconvenience and an assumption of ignorance of clinical value. These are all potentially incorrect and could reflect a general lack of expectation of consumer involvement in patient care.

4.1. Future research

Many ongoing clinical issues around ED clinicians' attitudes and experiences of PIVC practice have been reported and documented herein. These remain a concern and a potential threat to patient safety and quality of care. Future interventions and strategies are needed to explore rewarding good practice, providing focused training to ensure patient safety and ongoing adherence to the new national standard of care. Future studies using interviews could provide more in-depth understanding of barriers and enablers to guideline adherence supporting the development of specific interventions to amend existing attitudes and enhance current experiences. Researchers should understand what needs to change for the behaviour to change in the ED context and have completed a behavioural diagnosis prior to developing the change strategies and interventions. This could be completed using an implementation science framework.

4.2. Limitations of the study

Although the study had a large volume of responses representing a wide range of opinions which increases its transferability, open-ended questions embedded in a survey can cue response areas, risking biased foci. We did not capture participants' sex and/or gender, which may limit the generalisability of the findings. Surveys cannot provide the in-depth data available from interviews, and responses are driven by

motivations of participants and can reflect strong or unusual views. They do, however, enable many contributions to such research discussions.

5. Conclusion

The PIVC Clinical Care Standard should, like all the clinical standards, be universally acknowledged by Australian clinicians and should guide practice. The responses collected in this survey reflect that not only are clinicians' knowledge and attitudes barriers to implementation of the PIVC Standard, but the inability to adhere to guidelines in practice can be based on verifiable reasons such as challenging working environments. The PIVC Standard may be difficult to consistently apply or in the ED environment, but interventions to overcome this must be explored systematically. Moreover, some suboptimal practices, such as lack of patient participation in care, inadequate site preparation and insufficient review of PIVC, could be improved by fixing the root issues to adoption. Indeed, sustainable behaviour change demands not only awareness, time and acceptance from ED clinicians, but a sustainable plan to address individual issues in knowledge, attitude and practice. To achieve effective adoption and persistent adherence to PIVC guideline recommendations, individual-based implementation strategies may need to be developed and enacted by healthcare services to ensure the quality of PIVC care.

Ethics statement

The study has received ethical approval from the Griffith University Ethics Committee (2022/025).

Funding

The project was funded by Queensland Health Metro South Health Research Support Scheme (MSH RSS) Project Grant, Australia (RSS_2022_020).

CRediT authorship contribution statement

Hui Grace Xu: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Resources, Data curation, Writing – review & editing, Project administration, Funding acquisition. **Amanda J. Ullman:** Conceptualization, Methodology, Writing – review & editing, Supervision, Funding acquisition. **Claire M. Rickard:** Conceptualization, Methodology, Writing – review & editing, Supervision, Funding acquisition. **Amy Johnston:** Conceptualization, Methodology, Formal analysis, Writing – review & editing, Supervision.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

We acknowledge the assistance of the College of Emergency Nursing Australasia, Queensland Nurses and Midwives Union and Alliance for Vascular Access Teaching and Research in survey distribution.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ienj.2023.101366>.

References

- [1] Decker K, Ireland S, O'Sullivan L, Boucher S, Kite L, Rhodes D, et al. Peripheral intravenous catheter insertion in the Emergency Department. *Australas Emerg Nurs J* 2016;19(3):138–42. <https://doi.org/10.1016/j.aenj.2015.12.003>.
- [2] Thomas C, Cabilan CJ, Johnston ANB. Peripheral intravenous cannula insertion and use in a tertiary hospital emergency department: A cross-sectional study. *Australas Emerg Care* 2020;23(3):166–72. <https://doi.org/10.1016/j.auec.2020.02.001>.
- [3] Cooke M, Ullman AJ, Ray-Barruel G, Wallis M, Corley A, Rickard CM. Not “just” an intravenous line: Consumer perspectives on peripheral intravenous cannulation (PIVC). An international cross-sectional survey of 25 countries. *PLoS One*. 2018;13(2):e0193436. DOI: 10.1371/journal.pone.0193436.
- [4] Tuffaha HW, Rickard CM, Webster J, Marsh N, Gordon L, Wallis M, et al. Cost-effectiveness analysis of clinically indicated versus routine replacement of peripheral intravenous catheters. *Appl Health Econ Health Policy* 2014;12(1):51–8. <https://doi.org/10.1007/s40258-013-0077-2>.
- [5] Australian Commission on Safety and Quality in Health Care. Management of peripheral intravenous catheters clinical care standard. In: ACSQHC, editor. Sydney 2021.
- [6] Archer-Jones A, Sweeny A, Schults JA, Rickard CM, Johnson L, Gunter A, et al. Evaluating an ultrasound-guided peripheral intravenous cannulation training program for emergency clinicians: An Australian perspective. *Australas Emerg Care* 2020;23(3):151–6. <https://doi.org/10.1016/j.auec.2019.12.008>.
- [7] Stone R, Walker RM, Marsh N, Ullman AJ. Educational programs for implementing ultrasound guided peripheral intravenous catheter insertion in emergency departments: A systematic integrative literature review. *Australas Emerg Care* 2023. <https://doi.org/10.1016/j.auec.2023.06.001>.
- [8] Mickan S, Burls A, Glasziou P. Patterns of 'leakage' in the utilisation of clinical guidelines: a systematic review. *Postgrad Med J* 2011;87(1032):670–9. <https://doi.org/10.1136/pgmj.2010.116012>.
- [9] Limm EI, Fang X, Dendle C, Stuart RL, Egerton WD. Half of all peripheral intravenous lines in an Australian tertiary emergency department are unused: pain with no gain? *Ann Emerg Med* 2013;62(5):521–5. <https://doi.org/10.1016/j.annemergmed.2013.02.022>.
- [10] Carr PJ, Rippey JCR, Cooke ML, Higgins NS, Trevenen M, Foale A, et al. From insertion to removal: A multicenter survival analysis of an admitted cohort with peripheral intravenous catheters inserted in the emergency department. *Infect Control Hosp Epidemiol* 2018;39(10):1216–21. <https://doi.org/10.1017/ice.2018.190>.
- [11] Rippey JC, Carr PJ, Cooke M, Higgins N, Rickard CM. Predicting and preventing peripheral intravenous cannula insertion failure in the emergency department: Clinician 'gestalt' wins again. *Emerg Med Australas* 2016;28(6):658–65. <https://doi.org/10.1111/1742-6723.12695>.
- [12] Xu HG, Rickard C, Takashima M, Butterfield M, Pink E, Ullman A. Exploring Australian emergency department clinicians' knowledge, attitudes, and adherence to the national peripheral intravenous catheter clinical care standard: a cross-sectional national survey *Emerg Med Australas*. 2023; Accepted for publication on March 2023.
- [13] Ruegg L, Faucett M, Clawson A, Subedi S. Reducing the prevalence of antecubital fossa peripheral intravenous cannulation. *Br J Nurs* 2022;31(2).
- [14] Ray-Barruel G, Cooke M, Chopra V, Mitchell M, Rickard CM. The I-DECIDED clinical decision-making tool for peripheral intravenous catheter assessment and safe removal: a clinimetric evaluation. *BMJ Open* 2020;10(1):e035239.
- [15] Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): A 32-item checklist for interviews and focus groups. *Int J Qual Health Care* 2007;19(6):349–57.
- [16] Graneheim UH, Lundman B. Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Educ Today* 2004;24(2):105–12. <https://doi.org/10.1016/j.nedt.2003.10.001>.
- [17] Ebben RH, Vloet LC, Schalk DM, Mintjes-de Groot JA, van Achterberg T. An exploration of factors influencing ambulance and emergency nurses' protocol adherence in the Netherlands. *J Emerg Nurs* 2014;40(2):124–30. <https://doi.org/10.1016/j.jen.2012.09.008>.
- [18] McElroy M, Wicking K, Harvey N, Yates K. What challenges and enablers elicit job satisfaction in rural and remote nursing in Australia: An Integrative review. *Nurse Educ Pract* 2022;64:103454. <https://doi.org/10.1016/j.nepr.2022.103454>.
- [19] Egerton-Warburton D, McAllan F, Ramanan R, Lim ZJ, Nagle D, Dendle C, et al. Human factor-designed multimodal intervention reduces the rate of unused peripheral intravenous cannula insertion. *Emerg Med Australas* 2019;31(3):372–7. <https://doi.org/10.1111/1742-6723.13165>.
- [20] Evison H, Carrington M, Keijzers G, Marsh NM, Sweeny AL, Byrnes J, et al. Peripheral intravenous cannulation decision-making in emergency settings: a qualitative descriptive study. *BMJ Open* 2022;12(3):e054927.
- [21] Castro-Sanchez E, Charani E, Drumright LN, Sevdalis N, Shah N, Holmes AH. Fragmentation of care threatens patient safety in peripheral vascular catheter management in acute care—a qualitative study. *PLoS One* 2014;9(1):e86167.
- [22] Bourgault AM, Penoyer DA, Uppvall MJ. It Depends: Decision-Making for Insertion and Removal of Short Peripheral Catheters. *J Infus Nurs* 2021;44(2):103–12. <https://doi.org/10.1097/nan.0000000000000418>.
- [23] Ioannidis JP. Why Most Clinical Research Is Not Useful. *PLoS Med* 2016;13(6):e1002049.