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# Newborn pain: Evidence and implementation

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Preterm, sick, and healthy newborns are exposed to necessary but painful needles during their first weeks of life. All newborns undergo newborn screening, involving heel prick or venipuncture, and preterm and sick newborns undergo a mean of more than seven procedures with a range of two to 17 painful procedures daily.<sup>1</sup> Heel lances are the most frequently recorded painful procedures in newborn pain studies.<sup>1</sup> Evidence shows that repeated painful procedures put preterm and sick hospitalised newborns at risk of adverse developmental outcomes yet the majority of painful procedures are performed without provision of effective pain management strategies.<sup>1,2</sup> This is despite the exponential growth of research showing analgesic effects of the feasible, safe and cost effective strategies of breastfeeding,<sup>3</sup> skin-to-skin,<sup>4</sup> and small volumes of sweet solutions, with or without non-nutritive sucking.<sup>5,6</sup> These strategies are included in multiple guidelines and recommendations nationally and internationally.<sup>7,8</sup> Additionally, co-produced parent and staff-targeted educational videos with voice overs in multiple languages which are publicly available on YouTube, demonstrate these strategies in real life practice.<sup>9</sup>

Nurses, midwives, and phlebotomists working in newborn care are primarily responsible for performing the majority of painful procedures on newborns and are therefore at the forefront of working with parents and managing pain and distress in this vulnerable population. It is imperative that effective and recommended strategies are used consistently in the diverse settings where painful procedures occur. However, based on a scoping review of newborn pain practices during painful procedures, use of analgesic strategies do not seem to have improved over the past decades.<sup>1</sup> Some improvements however are evident, as demonstrated in two recently published multi-site implementation studies focusing on improving newborn

pain management practices.<sup>10,11</sup> Smith et al., in a pre-post intervention study including over 15,000 newborns (7801 pre-intervention and 7723 post intervention) showed that implementing a parent-targeted video (<https://www.youtube.com/watch?v=L43yoH6XEh4>) in eight maternal newborn units over a 6-month intervention period, resulted in a modest, yet statistically significant increase in use of sucrose or breastfeeding during newborn screening.<sup>10</sup> Specifically, use of sucrose increased in the larger units, which had larger numbers of sicker newborns, while use of breastfeeding increased in the smaller units, highlighting that acuity plays a role in choice of pain management strategies. Stevens et al., in a cluster randomised controlled trial of a multi-faceted pain implementation strategy driven by small teams in each of the 23 participating neonatal units showed a reduction in pain scores, reduced number of painful procedures, and an increase in use of non-pharmacological strategies (grouped together as breastfeeding, skin-to-skin, sweet solutions, non-nutritive sucking, facilitated tucking and swaddling) during painful procedures.<sup>11</sup> Both of these studies were conducted in Canada.

An Australian nationwide online survey of parents of sick hospitalised newborns showed that parents were infrequently involved during painful procedures, yet sucrose was frequently used.<sup>12</sup> Most of the 162 responding parents had not seen the publicly available parent-targeted newborn pain video prior to participating in the survey; only 25% and 37% respectively had previously used breastfeeding or skin-to-skin during a painful procedure yet 84% were aware that sucrose had been used. However, when asked about future intention to use each strategy, over 81% of parents reported breastfeeding, 88% reported they would advocate to use skin-to-skin, and 64% advocated sucrose. Again, these data highlight the more widespread use of sucrose rather than strategies

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involving parents' participation in care in settings where sick newborns are cared for. However parents report wishing to be involved in pain care but barriers to their involvement exist.<sup>12</sup> For example, being asked to leave the room when procedures are planned, and not being informed of how they can participate. Such barriers to parental involvement in their newborns' painful procedures have been reported in numerous other studies,<sup>10,13</sup> including a meta-synthesis of qualitative studies exploring parents' involvement in newborn pain.<sup>14</sup>

Solutions to providing optimal pain care to sick hospitalised infants are elusive. As per the beginning of this paper, we have the evidence and multiple arguments have been made that further trials of pain treatments during frequently occurring painful procedures, especially heel lances and venipunctures, with no treatment/placebo groups are unethical and unnecessary.<sup>15</sup> We have published recommendations to use breastfeeding or skin-skin care where possible and feasible, and sweet solutions and we have various knowledge translation interventions targeted at staff and parents. However, parents are rarely able to be present in neonatal units when routine painful procedures are performed. Firstly, timing of routine blood tests are often in the early mornings to suit hospital routines when many parents are not able to be in the unit with their infants. Secondly, most neonatal units are not set up to fully accommodate parents and visions of family centred care practices are not consistently operationalised in practice.<sup>16</sup> Thirdly, nurses and midwives report their preferences to perform heel lances and other procedures without parents being present.<sup>17</sup> Reasons may relate to both their comfort levels with working closely with parents, and barriers relating to physical positioning while performing procedures when infants are being held. It is no surprise therefore that the parent-led strategies of breastfeeding or holding skin-skin are less frequently used, compared to sucrose, despite parents wanting to be involved.<sup>12,14,18</sup> To address the research to practice gap of parental involvement in newborn pain management would require system-level changes, improved clinical education of staff who perform painful procedures, and improved communication with parents to empower and enable them to be present and confident during non-urgent routine painful procedures. Until such time as healthcare organisations and their maternal newborn units prioritise newborn pain as a strategic priority, and put into play system-wide changes, sub-optimal newborn and infant pain management and parent involvement in care is at risk of remaining the norm.

In conclusion, newborns undergo necessary but painful procedures, and preterm and sick newborns are exposed to large numbers of repeated procedures over the course of their hospitalisation. Such repeated procedures are associated with increased risk of poor neurodevelopmental outcomes. Evidence supports analgesic effects of breastfeeding, skin-skin care and sweet solutions, and

parent and staff-targeted videos and other resources exist demonstrating the use of these strategies in practice. Yet these strategies, especially breastfeeding and skin-skin, remain inconsistently used despite parents wishing to be involved during painful procedures. Implementation of system-level practice change ideally fosters a collaborative environment allowing staff members and families to embed sustained change into the culture of units and workflows. Prioritising system-level improvements in newborn care which fully empower parents in all aspects of care, including during painful procedures, will be the key to improving short and long-term newborn outcomes.

**Conflict of Interest:** Both authors declare there are no conflicts of interest. However, both authors have contributed to publications which are cited in this invited editorial.

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## REFERENCES

1. Bueno M, Rao M, Aujla P, Victor C, Stevens B. A scoping review of the epidemiology and treatment of painful procedures in hospitalized neonates: What has changed in the past three decades? *Eur J Pain*. 2024;(May):1-18. doi:10.1002/ejp.2294
2. Walker SM. Long-term effects of neonatal pain. *Semin Fetal Neonatal Med*. 2019;24(4):101005. doi:10.1016/j.siny.2019.04.005
3. Shah PS, Torgalkar R, Shah VS. Breastfeeding or breast milk for procedural pain in neonates. *Cochrane Database Syst Rev*. 2023;2023(8). doi:10.1002/14651858.CD004950.pub4
4. Johnston C, Campbell-Yeo M, Disher T, et al. Skin-to-skin care for procedural pain in neonates. *Cochrane Database Syst Rev*. 2017;2:CD008435. doi:10.1002/14651858.CD008435.pub3
5. Harrison D, Larocque C, Bueno M, et al. Sweet Solutions to Reduce Procedural Pain in Neonates: A Meta-analysis. *Pediatrics*. 2017;139(1):e20160955. doi:10.1542/peds.2016-0955
6. Yamada J, Bueno M, Santos L, Haliburton S, Campbell-Yeo M, Stevens B. Sucrose analgesia for heel-lance procedures in neonates. *Cochrane database Syst Rev*. 2023;8:CD014806. doi:10.1002/14651858.CD014806
7. Health Standards Organization Canada. *National Standard of Canada Pediatric Pain Management*; 2023.
8. Balice-Bourgeois C, Jaques C, Newman CJ, Simonetti GD. A Systematic Review of Clinical Practice Guidelines for Acute Procedural Pain on Neonates. *Clin J Pain*. 2020;36(5):390-398. doi:10.1097/AJP.0000000000000808
9. Harrison D, Bueno M. Translating evidence: pain treatment in newborns, infants, and toddlers during needle-related procedures. *Pain Reports*. 2023;8(2):E1064. doi:10.1097/PR9.0000000000001064
10. Smith MA, Dunn SI, Larocque C, et al. Increasing the Use of Newborn Pain Treatment Following the Implementation of a Parent-Targeted Video: An Outcome Evaluation. *Children*. 2024;Ahead of P:1-13. doi:10.3390/children11111360
11. Stevens B, Bueno M, Barwick M, et al. The implementation of infant pain practice change resource to improve infant procedural pain practices: A hybrid type 1 effectiveness-implementation study. *Pain*. 2024;Published:1-10. doi:10.1097/j.pain.0000000000003496

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12. Bujalka H, Cruz M, Ingate V, et al. Be Sweet to Babies: Consumer evaluation of a parent-targeted video aimed at improving pain-management strategies in newborn infants undergoing painful procedures. *Adv Neonatal Care*. 2023;23(1):E2-13. doi:10.1097/ANC.0000000000001031
13. Harrison D, Pope N, Jones S, et al. Multisite cross-sectional survey of nurses' perceptions of implementation of a parent-targeted video and recommended pain management, for improving newborn pain treatment. *J Neonatal Nurs*. 2024;30(5):482-491. doi:10.1016/j.jnn.2024.01.011
14. McNair C, Chinian N, Shah V, et al. Metasynthesis of Factors That Influence Parents' Participation in Pain Management for Their Infants in the NICU. *J Obstet Gynecol Neonatal Nurs*. 2020;49(3):263-271. doi:10.1016/j.jogn.2020.02.007
15. Harrison D, Cruz M, McKeever S. Why are we still doing sucrose trials for newborns? *J Child Heal Care*. 2024;Ahead of P:7-10. doi:10.1177/13674935241280854
16. Larocque C, Peterson WE, Squires JE, Mason-Ward M, Harrison D. Family-Centered Care in the Neonatal Intensive Care Unit: A Concept Analysis and Literature Review. *J Neonatal Nurs*. 2021;27(6):402-411. doi.org/10.1016/j.jnn.2021.06.014
17. Lavin Venegas C, Taljaard M, Reszel J, Harrison D. Barriers and facilitators to using pain treatment during newborn screening blood tests at a mother-baby unit. *J Neonatal Nurs*. 2019;25(3):139-144. doi:10.1016/j.jnn.2018.08.005
18. Lavin Venegas C, Taljaard M, Reszel J, et al. A parent-targeted and mediated video intervention to improve uptake of pain treatment for infants during newborn screening: A pilot randomized controlled trial. *J Perinat Neonatal Nurs*. 2019;33(1):74-81. doi:10.1097/JPN.0000000000000386

## RESEARCH ARTICLES

# Perceived barriers and facilitators to accessing sexual and reproductive health services among adolescents living with HIV: A qualitative thematic analysis

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**ABSTRACT**

**Objective:** This study aims to explore the perceived barriers and facilitators to accessing sexual and reproductive health services among adolescents living with HIV.

**Background:** Sexual and reproductive health is essential for adolescents' physical, emotional, and social wellbeing; enabling them to make informed health decisions. Nurses, as frontline healthcare providers, play a vital role in delivering sexual reproductive healthcare through counselling, contraception, and prevention of sexually transmitted infection. Despite the global prioritisation of sexual and reproductive health, research addressing factors influencing sexual and reproductive health services access among adolescents living with HIV remains scarce, particularly in Nigeria.

**Study design and methods:** A qualitative descriptive research method was employed in this study. Fifteen adolescents living with HIV (aged 15–19 years) and five nurses from the Nigerian Institute of Medical Research paediatric HIV clinic were recruited. In-depth interviews were conducted with participants using an interview guide to gather information. The data was analysed using a thematic approach.

**Results:** Three themes emerged from the nurses' responses: interpersonal dynamics and attitudes, stigma and discrimination, and support systems for SRH access. Similarly, four themes were identified from the responses of adolescents living with HIV: perception and misconception, cultural norms, empowerment through education and advocacy, and adolescent-friendly services. These themes were categorised as 'barriers' and 'facilitators' to accessing sexual and reproductive health services faced by adolescents living with HIV.

**Discussion:** The study identifies stigma, labelling, stereotyping, and gender roles as significant barriers to accessing sexual and reproductive health services for adolescents living with HIV. It emphasises the importance of integrating adolescent-friendly sexual and reproductive health services that are confidential and non-judgmental. The study also highlights the role of social media and peer influencers in promoting the sexual and reproductive health, and wellbeing of adolescents living with HIV, ensuring they are equipped with the knowledge and skills needed to make informed decisions about their health.

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**Conclusion:** By focusing on both the barriers and facilitators of SRH access, the findings underscore the importance of fostering a stigma-free environment and promoting accessibility, in overcoming the challenges faced by adolescents living with HIV and supporting healthier outcomes.

**Implications for research, policy, and practice:**

Nurses are encouraged to expand their roles in sexual and reproductive healthcare, offering more tailored, adolescent-friendly services that address the unique needs of adolescents living with HIV. Future research should also explore the specific challenges faced by healthcare professionals, particularly nurses in delivering these services, which will help in identifying effective strategies and interventions for quality of care.

**What is already known about the topic?**

- Adolescents living with HIV confront a multitude of challenges related to sexual and reproductive health, including unplanned pregnancies, abortion, and STIs.
- The sexual and reproductive health needs of adolescents living with HIV are similar to those of non-infected adolescents, with both groups encountering comparable challenges, desires, and requirements concerning their sexual and reproductive health.

**What this paper adds**

- The existing knowledge gap among nurses in providing sexual and reproductive health services to adolescents living with HIV represents a critical challenge in ensuring comprehensive and effective healthcare delivery.
- Adolescents living with HIV encounter significant challenges in accessing sexual and reproductive health SRH services due to the pervasive stereotype and stigma associated with HIV.
- The experiences of adolescents living with HIV (ALHIV) in accessing SRH services from the viewpoints of both nurses and the adolescents themselves are multifaceted and interconnected. These perspectives offer valuable insights into the challenges and opportunities in sexual and reproductive health care delivery for ALHIV.

**Keywords:** Adolescents living with HIV; adolescent-friendly services; nurses; sexual and reproductive health; stereotypes; stigma

## INTRODUCTION

### OBJECTIVE

This study aims to identify and understand the perceived barriers and facilitators in accessing sexual and reproductive health services among adolescents living with HIV.

### BACKGROUND

Sexual and reproductive health (SRH) refers to an individual's physical, emotional, mental, and social wellbeing related to sexuality.<sup>1</sup> It involves being free from unintended pregnancies, unsafe abortions, sexually transmitted infections (STIs), and all forms of sexual abuse and violence.<sup>1</sup> It is assumed that freedom from disease and dysfunction is the focal point of sexual health, but it also encompasses the physical, emotional, mental and social wellbeing of sexuality.<sup>2</sup> The World Health Organization (WHO) defines an adolescent as an individual aged 10 to 19 years.<sup>3</sup> The period of adolescence is characterised by major changes in both psychological, physiological aspects,<sup>4</sup> social development with lifestyle and sexual behavioural experimentation,<sup>5</sup> marking adolescence as a critical period for addressing SRH needs comprehensively.<sup>6</sup>

Globally, adolescents are among the groups most at risk of acquiring Human Immunodeficiency Viruses (HIV), with sub-Saharan Africa bearing the highest prevalence.<sup>7</sup> This vulnerability is influenced by factors such as limited access to SRH education, stigma, and socio-economic barriers.<sup>8</sup> Adolescents living with HIV (ALHIV) face a dual burden of managing their HIV status while navigating the complex challenges associated with SRH, including limited access to contraceptives, stigma in healthcare settings, lack of comprehensive sexual education, and concerns about disclosure and relationships.<sup>9</sup> Sexual and reproductive health (SRH) services are essential for equipping adolescents with the knowledge and skills to make informed decisions about their health.<sup>10</sup>

Nurses, as frontline healthcare providers in HIV care, play a critical role in promoting high-quality SRH services for ALHIV.<sup>11</sup> They are instrumental in providing antiretroviral therapy, routine care, and psychosocial support.<sup>12</sup> Additionally, nurses address SRH needs such as contraception and STI prevention and counselling, often serving as the primary point of contact for adolescents living with HIV.<sup>13</sup> While global initiatives have prioritised adolescent SRH, most of the focus has been on non-infected adolescents.<sup>14</sup>

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Emphasis has been placed on the importance of integrating comprehensive SRH care within HIV services to improve access and outcomes.<sup>15</sup> The health outcomes of ALHIV are shaped by intersecting medical, social, and cultural factors compounded by limited access to adolescent-specific SRH care.<sup>16</sup> In Nigeria, SRH services remain underutilised by ALHIV.<sup>5,17</sup> This has left a significant gap in understanding the factors influencing SRH access for ALHIV. By addressing this gap, the study aims to explore the barriers and facilitators of SRH access among ALHIV in Nigeria by examining insights from both ALHIV and nurses.

### METHODS

A qualitative descriptive design was employed in this study. The study involves ALHIV receiving care and nurses involved in the treatments and care of ALHIV in the paediatric HIV clinic of the Nigerian Institute of Medical Research in Lagos State, Nigeria. The Nigerian Institute of Medical Research (NIMR), the foremost Medical Research Institute in the country, is a HIV reference centre which provides treatment and care to over 10,000 people living with HIV including over 100 adolescents. Adolescents living with HIV are enrolled and access treatment and care in the Paediatric unit at the NIMR clinic.<sup>18</sup>

### PARTICIPANTS AND SAMPLE

The study was conducted at the paediatric HIV clinic of NIMR that provides care for individuals aged 0–19 years. Purposive sampling was utilised to recruit 15 adolescents living with HIV aged 15–19 years and 5 nurses. The ALHIV aged 15–19 years were included in this study because they represent a critical group transitioning into adult HIV care. Eligibility was based on the following criteria to ensure the appropriateness of the participants.

#### Inclusion criteria

- Adolescents living with HIV aged 15–19 years who are willing to participate and able to provide assent or consent.
- Nurses working with ALHIV in the paediatric HIV clinic.

#### Exclusion criteria

- Adolescents living with HIV with physical or cognitive impairment that could limit their ability to participate in the interview process.
- Adolescents living with HIV who are enrolled but not regular attendees of the paediatric HIV clinic.

### DATA COLLECTION

An in-depth interview guide was constructed to align with the objectives of the study covering SRH knowledge, barriers to SRH service access, and facilitators for improving SRH access. To ensure its validity and relevance, the guide was constructed based on existing literature on SRH for ALHIV and qualitative research methodologies.<sup>19,20</sup> The interview guide was further reviewed by experts specialising in adolescent health, HIV care, and qualitative research methods.

Interviews were conducted in a private, comfortable office to ensure privacy and confidentiality. Rapport was established with participants to encourage open discussions about the sensitive topic. The interview session was conducted by a single investigator, trained in qualitative interviewing techniques, to maintain consistency in data collection. Each interview lasted approximately 30–40 minutes and was audio-recorded with participants' permission.

### DATA ANALYSIS

The interviews were analysed using Braun and Clarke's thematic analysis approach.<sup>21</sup> While the transcription and initial coding were conducted manually, Microsoft Excel was used to organise socio-demographic data. To ensure confirmability, coding and thematic generation were conducted independently by two qualitative experts, followed by a collaborative review to resolve discrepancies. This process minimised subjective influences, while iterative refinement of themes ensured alignment with the dataset. Several themes were identified that revolve around the barriers and facilitators influencing the SRH experiences of adolescents living with HIV (ALHIV).

The following steps were implemented following the Braun and Clarke's thematic analysis approach:

#### Familiarisation

The data from the interviews were transcribed highlighting significant statements and recurring sentiments to gain a deep familiarity. The data provided insights into the respondents' experiences and perceptions.

#### Initial coding

The second phase involved coding the entire dataset systematically. The codes were generated line by line which focused on semantic and latent content. These initial codes were then put together into potential themes, reflecting broader patterns within the data.

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### Generating themes

There was a search for themes. Codes were sorted into potential themes at this stage. For example, codes relating to the facilitators influencing SRH access (like judgemental approach, labelling and stereotypes) were grouped into a broader theme.

### Reviewing themes

The generated themes were reviewed. Each theme was then reviewed and refined to ensure it accurately represented the corresponding coded extracts. This involved a recursive process where themes were checked against the dataset to confirm their validity. The theme of 'adolescent-friendly services' was supported by data indicating the importance of confidentiality and privacy. During this phase, researchers engaged in reflexivity by examining the findings and interpretations to identify potential biases. Regular team discussions ensured that themes were firmly grounded in the data.

### Defining themes

At this stage, themes were defined and refined. Each theme was named to succinctly describe the underlying central concept, and subthemes were developed from themes to reflect the complexity of the data.

### Producing the report

The report was produced. The final analysis was compiled into a narrative that synthesizes the themes into an insightful discussion of the data. Verbatim quotes were incorporated to support the findings.

## TRANSPARENCY AND CREDIBILITY

This study was planned and conducted based on transparency criteria.<sup>22</sup> In reporting the findings, the researchers were committed to transparency and honesty. Data saturation was reached when no new themes emerged from subsequent interviews. This point was identified after an iterative analysis of the transcripts, ensuring the data collected were sufficient to address the study. The positive and negative results were included to avoid bias. As a result, researchers used verbatim quotes to support their findings and confirm their veracity. Transparency was ensured as to the selection of the participants. To reduce individual bias and enhance the credibility of the findings, peer reviews were conducted to verify the accuracy of coding and theme development.

## ETHICAL CONSIDERATIONS

Ethical approval was obtained from the Nigerian Institute of Medical Research with project no. IRB/23/021 and the ethical committee board of Near East University with project no. NEU/2023/110-1689 before collecting data. Detailed consent procedures were followed, given the sensitive nature of the study and the involvement of minors. Adolescents living with HIV aged 15-17 provided assent, with parental and guardian consent obtained. For the participants aged 18-19, informed consent was obtained directly in line with ethical guidelines for research. Written informed consent was obtained from the nurses before their involvement. Participants were assured that their identities and sensitive information would be kept confidential and anonymous to protect their privacy and prevent potential harm. There was minimal attrition among the participants, especially the adolescents, who declined to participate due to the perceived sensitivity of the topic. To address this, the researchers adopted a responsive approach, ensuring the environment was supportive and nonjudgmental. Participants were provided with incentives and encouraged to share information at their own pace and comfort level, which helped reduce discomfort.

## RESULTS

### DEFINING CHARACTERISTICS OF THE NURSES AND ALHIV

Interviews were conducted with a total of five nurses, all of whom were female. The age of the nurses ranged from 23 to 45 years. All the participants reported having attained a bachelor degree as their highest educational level (see Table 1).

Fifteen adolescents were interviewed, among which were ten females and five males. All participants were single, and three responded that they had dropped out of school. Furthermore, the highest educational level attained by the participants was secondary, and the majority (n = 12) of the ALHIV reported being vertically infected with HIV (mother-to-child transmission), while three ALHIV were horizontally infected (person-to-person transmission) (see Table 2).

**TABLE 1: DEFINING CHARACTERISTICS OF THE NURSES**

Participants	P1	P2	P3	P4	P5
Age	32	32	45	24	23
Sex	Female	Female	Female	Female	Female
Educational level	BSc	BSc	BSc	BSc	BSc
Year of experience working as Nurse	9 years	5 years	11 years	2 years	2 years
Year of experience at the Centre	2 years	2 years	10 years	1 year	1 year



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TABLE 2: DEFINING CHARACTERISTICS OF ADOLESCENTS LIVING WITH HIV

Participants	Age	Sex	Marital status	Attending school	Educational status	Route of infection
P1	17	Female	Single	In school	Secondary	Vertical
P2	16	Female	Single	In school	Primary	Vertical
P3	18	Female	Single	Out of school	Secondary	Vertical
P4	15	Female	Single	In school	Secondary	Vertical
P5	15	Female	Single	In school	Secondary	Vertical
P6	19	Male	Single	In school	Secondary	Vertical
P7	15	Female	Single	In school	Secondary	Vertical
P8	19	Male	Single	Out of school	Secondary	Vertical
P9	18	Female	Single	In school	Secondary	Vertical
P10	19	Female	Single	Out of school	Secondary	Horizontal
P11	17	Female	Single	In school	Secondary	Horizontal
P12	19	Female	Single	In school	Secondary	Horizontal
P13	17	Male	Single	In school	Secondary	Vertical
P14	17	Male	Single	In school	Primary	Vertical
P15	18	Male	Single	In school	Secondary	Vertical

Themes and sub-themes are presented separately for nurses and adolescents focusing on barriers and facilitators. Based on the insights from both adolescents living with HIV and the nurses, the study identified distinct barriers and facilitators affecting ALHIV's access to SRH services. The summary table of the themes and sub-themes are provided below (see Table 3).

TABLE 3: SUMMARY OF THEMES AND SUB-THEMES ON BARRIERS AND FACILITATORS TO SRH ACCESS FOR ALHIV

Category	Themes	Sub-themes
Barriers	Interpersonal dynamics and attitudes	Parental attitude
		Reluctance from adolescents
	Stigma and discrimination	Social stigma related to HIV
		Disclosure of SRH issues
	Perception and misconception	Judgemental approach
		Labelling and stereotypes
	Cultural norms	Gender roles
Family and caregivers		
Facilitators	Support system for SRH access	Creating awareness
		Training of healthcare providers
		Advocacy
	Empowerment through education & advocacy	Health talk and counselling
		Social media
		Peer influences
	Adolescent-friendly services	Specialised staff
Privacy & confidential spaces		

## NURSES' PERCEPTIONS OF ACCESS TO SRH SERVICES BY ALHIV

### Interpersonal dynamics and attitudes

The participants expressed concerns about how interpersonal dynamics restricts ALHIV from engaging with and accessing SRH services.

#### Parental attitude

Participants believe that parents may not support adolescents in accessing SRH services until they reach adulthood.

*'In this part of the world, when a child or adolescent discusses sexuality, the attitude that parents might have could discourage further discussion. The child may avoid discussing it with their mother or father due to anticipated reactions.'* (P2, Nurse, 32 years).

#### Reluctance from adolescents

Participants believe that adolescents would be reluctant to access SRH services due to the sensitive nature of certain topics and activities, such as receiving condoms or discussing pregnancy. They believed that the adolescents may fear being judged by nurses, healthcare professionals, hospital staff, and their parents.

*'The adolescents exhibit a lackadaisical attitude, you know? They feel a sort of reluctance, not necessarily complete social withdrawal, but rather a hesitation to openly discuss sexuality.'* (P1, Nurse, 32 years)

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### Stigma and discrimination

The participants indicated that ALHIV feared being discriminated against if they sought access to SRH services.

#### Social stigma related to HIV

Participants stated that being HIV positive as an adolescent would limit access to SRH services that could improve their sexual health.

*'HIV is a sensitive topic. Some of ALHIV believe that since those around them don't have HIV, the only way to contract HIV and other STIs is through sexual activities. Therefore, they question the significance of the situation and wonder why they shouldn't be allowed to live their lives freely.'* (P3, Nurse, 45 years)

#### Disclosure of SRH issues

Participants believe that accessing SRH services would involve disclosing and discussing sensitive information; therefore, how these topics are addressed would be an indicator of the effectiveness of utilising SRH services.

*'So, they find it difficult to open up in some cases because they feel they don't know who you are, other than being their healthcare worker or nurse.'* (P2, Nurse, 32 years)

### Support system for SRH access

Participants emphasised the need to improve the knowledge base and equip the nurses and healthcare providers with basic information on SRH.

#### Creating awareness

They believe that utilising avenues such as social media, providing information in health facilities, and launching campaigns in society would raise awareness of SRH in the country.

*'There should be more awareness of sexual reproductive health, especially when it comes to adolescents, because whatever mistakes they make at that point stay with them for the rest of their lives.'* (P2, Nurse, 32 years)

#### Training of healthcare providers

Participants emphasised the need for orientation, training, and re-training of nurses and healthcare providers on sexual and reproductive health.

*'I would suggest prioritising the proper training of healthcare workers first, to teach them not to be judgmental. They require thorough training and proper counselling on how to approach adolescents without discrimination, segregation, or talking down to them.'* (P1, Nurse 32 years)

#### Advocacy

Participants stated that utilising peer adolescents, ambassadors, and role models will promote access and engagement.

*'We should ensure they understand that we are here for them, no matter what challenges they face. They are welcome to utilise our services at any time, and we should encourage them to continue seeking support as needed. Additionally, we can utilise their peers to help raise awareness among them.'* (P1, Nurse, 32 years)

## ALHIV PERCEPTION AND EXPERIENCES ON ACCESSING SRH SERVICES

### Perception and misconception

Adolescents shy away from discussing sexual and reproductive health because they fear they will be perceived and judged negatively.

#### Judgemental approach

Adolescents stated that based on their experiences of discussions on SRH and attempting to access services, it leads to negative outcomes such as being judged or reprimanded.

*'And most people's parents don't have time for themselves to educate their own children, even. Even though they want to bring up the matter to their parents, some of them will say, "Where did you hear that? Who taught you that?"'* (P1, ALHIV, 17 years)

*'Parents might think, "Why do you want to access the service? Maybe you want to get pregnant." So, parents might discourage us... They are expecting something negative to happen to you, which may lead you to withdraw from school.'* (P7, ALHIV, 15 years)

#### Labelling and stereotypes

Adolescents living with HIV have experienced stereotypes. At the same time, a few of the participants believe that SRH services are provided to prevent them from transmitting the virus, thus reminding them of their HIV status.

*'So here, they actually provide condoms to adolescents. For now, that's the only way they know they can help us to have protected sex, to stop spreading the virus. Like for adolescents that are living with the virus, they feel that having sex with someone skin to skin is not advisable because they might spread the virus.'* (P2, ALHIV, 16 years)

### Cultural norms

Participants' descriptions highlighted that SRH was seen as a delicate topic hinged on culture in African settings such as Nigeria, driven by norms and traditions.

#### Gender roles

Participants believe that gender roles and expectations are defined in the Nigerian culture and drive choices, principles, and practices for accessing SRH services.

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*'Because most parents feel it's not right for a girl to have sex before marriage, so many people believe their parents will discourage them, causing them not to listen because they fear that if they do, they might feel inclined to practice it.'*

(P2, ALHIV, 16 years)

### Family and caregivers

Parents' and healthcare providers' attitudes were reported to be barriers to accessing SRH services. This could be linked to traditions, norms, and practices involved in parents, relatives, caregivers, and healthcare providers believing there is a time for everything, and certain activities are linked to age timelines.

*'Firstly, the healthcare practitioners; if they're not welcoming to an adolescent... Additionally, I believe family members, such as relatives or the parents, could also discourage the adolescents.'*

(P9, ALHIV, 18 years)

*'Being judged, I think that's one of the major factors. If they feel like this healthcare provider would judge them, it would definitely discourage them from accessing these services. So, the attitude of the health care provider...'* (P11, ALHIV, 17 years)

### Empowerment through education and advocacy

Participants believe creating knowledge and awareness of SRH services would improve engagement and provide enlightenment for ADLHIV.

### Health talks and counselling

Health talks and counselling will help create awareness and link ADLHIV to SRH services.

*'I just feel that more platforms should be created, and they should be discreet, allowing adolescents to access them when they need it.'* (P9, ALHIV, 18 years)

### Social media

They believe that most adolescents are engaged on multiple social media platforms, and this would be an ideal strategy to link adolescents to SRH services.

*'It can be offered physically or online, to create awareness.'* (P4, ALHIV, 15 years)

*'I think through the Internet, because most people make use of Internet. They should upload all these services to the Internet.'* (P12, ALHIV, 19 years)

### Peer influencers

They believe they would be more likely to engage if they had peer influencers advocating for the provision and access to SRH services.

*'We would need those who have had previous experiences and require advice from someone, perhaps a counsellor or anyone who will not discriminate against us.'* (P13, ALHIV, 17 years)

### Adolescent-friendly services

Participants are of the opinion that providing adolescent-friendly and specific services for SRH service will improve the uptake of these services for ALHIV.

### Specialised staff

There is a need to employ and train staff and health care providers assigned to ALHIV to identify, understand, and be able to address adolescent issues regarding SRH services.

*'The approach of healthcare practitioners should be more welcoming and open-minded.'* (P9, ALHIV, 18 years)

*'Nurses who have knowledge and are proficient in the subject would be beneficial.'* (P14, ALHIV, 17 years)

### Private and confidential spaces

Participants stated that providing private and confidential spaces will enable them to open-up and interact freely, thus ensuring that all or most of their SRH needs are addressed, subsequently improving the quality of life and services provided.

*'The risk is that If I go to a certain place, I might encounter someone I know.'* (P11, ALHIV, 17 years)

## DISCUSSION

The study explores significant barriers and facilitators influencing access to sexual and reproductive health services among adolescents living with HIV. Parental attitudes and caregiver perspectives were identified as barriers to accessing SRH services. In Nigeria, cultural norms often discourage discussions about SRH, particularly with adolescents, as such conversations are perceived as inappropriate or suggestive of sexual activity.<sup>23</sup> This cultural reprimand limits adolescents' readiness to address SRH needs, leading to gaps in their understanding and hesitancy to seek appropriate care. These findings align with studies that underscore how sociocultural barriers inhibit ALHIV from emergency in SRH conversations.<sup>24,25</sup>

These challenges are exacerbated by the personal values and beliefs of healthcare professionals. In this present study, the nurses expressed that the adolescents' HIV-positive status could limit their access to SRH services due to stigma and discrimination. Similarly, ALHIV reported being stereotyped or labelled based on their health condition, consistent with research, where stigma often originates within familial.<sup>26</sup> Families were frequently unable to discuss SRH with adolescents due to the stigma with both HIV and sexuality.<sup>27,28</sup> This underscores the urgent need for interventions that support open communication

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Despite these barriers, several facilitators emerged. Raising awareness through health talks, counselling, and social media, was identified as a crucial step in connecting ALHIV to SRH services. Adolescents emphasised the importance of innovative approaches, such as peer-led programs, which allow them to discuss SRH issues without fear of judgement or rejection. As highlighted in studies, peer networking provides ALHIV with a safe space to share experiences and learn about sexuality through their peers.<sup>29</sup> Eliciting SRH information through media and support groups increase knowledge on SRH,<sup>27,30</sup> thereby empowering ALHIV to make informed decisions.<sup>31</sup> However, ensuring that the information shared in these settings is evidence-based and reliable remains a priority.

This study also emphasises the importance of adolescent-friendly healthcare services. Adolescents living with HIV advocated for supportive environments where healthcare workers are trained to understand and address adolescents' developmental and health needs.<sup>32</sup> In Zambia, similar calls for adolescent-friendly clinics have resulted in better outcomes for ALHIV,<sup>33</sup> suggesting that investments in healthcare provider training and leadership commitment are critical.<sup>34</sup> Adequate training for healthcare professional should focus on addressing personal biases and equipping them with the skills to provide adolescent-friendly SRH care, ensuring that ALHIV receive appropriate and comprehensive support.

Leadership commitment and capacity building are important in enhancing the quality of adolescent-friendly SRH services.<sup>35</sup> Such measures can reduce stigma, improve communication between healthcare providers and adolescents, and ensure that ALHIV have access to age-appropriate and culturally sensitive SRH services.<sup>17</sup>

### STRENGTHS AND LIMITATIONS

The inclusion of both adolescents and nurses as participants enhances the depth of the findings. This dual perspective allows for a more comprehensive understanding of the barriers and facilitators to SRH access. Although the study achieved data saturation, the small sample size, particularly for nurses may limit the generalisability of the findings. As the data were collected through interviews, participants may have been influenced by social desirability bias, potentially underreporting sensitive issues related to SRH.

### CONCLUSIONS

The study offers valuable contributions to the understanding of SRH access for ALHIV. It underscores the urgent need for culturally sensitive, adolescent-friendly healthcare interventions and highlights the critical role of nurses in supporting this vulnerable population. Future research should aim to address the identified limitations by including larger, more diverse samples and employing mixed methods approaches to further explore these findings.

### IMPLICATIONS FOR RESEARCH, POLICY AND PRACTICE

Nurses are encouraged to expand their roles in sexual and reproductive healthcare, offering more tailored, adolescent-friendly services that address the unique needs of adolescents living with HIV. Future studies should also explore the specific challenges faced by healthcare professionals, particularly nurses in delivering these services, which will help in identifying effective strategies and interventions for quality of care.

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### REFERENCES

1. Abdurahman C, Oljira L, Hailu S, Mengesha M. Sexual and reproductive health services utilization and associated factors among adolescents attending secondary schools. *Reprod Health*. 2022;19(161):1-10. Available from: <https://doi.org/10.1186/s12978-022-01468-w>
2. Leekuan P, Kane R, Sukwong P, Kulnitichai W. Understanding sexual and reproductive health from the perspective of late adolescents in Northern Thailand: a phenomenological study. *Reprod Health*. 2022;19(230):1-17. Available from: <https://doi.org/10.1186/s12978-022-01528-1>
3. World Health Organization (WHO). Strategic Guidance on Accelerating Actions for Adolescent Health in South-East Asia Region (2018–2022). World Health Organization. South-East Asia. 2018. [cited 2024 Jan 15]. Available from: <https://iris.who.int/handle/10665/274312>
4. Hung MV, Khoa DV, Tinh HQ, Thuy TH, Hung ND. Extra-curricular activities improved reproductive health knowledge of ethnic minority high-school students in Vietnam. *J Family Reprod Health*. 2019;13(2):80-85. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6969890/>
5. Yiltok ES, Ebonyi AO, Ejellogu EU. Sexual and reproductive health in HIV-positive adolescents. *Ann Med Res*. 2020;1(11):1-5. Available from: [https://doi.org/10.25259/anmrp\\_18\\_2020](https://doi.org/10.25259/anmrp_18_2020)
6. Liang M, Simelane S, Fortuny Fillo G, Chalasani S, Weny K, Salazar Canelos P, et al. The state of adolescent sexual and reproductive health. *J Adolesc Health*. 2019;65(6S):S3-S15. Available from: <https://doi.org/10.1016/j.jadohealth.2019.09.015>
7. Slogrove AL, Mahy M, Armstrong A, Davies MA. Living and dying to be counted: What we know about the epidemiology of the global adolescent HIV epidemic. *J Int AIDS Soc*. 2017;20:21520.
8. Lowenthal ED, Bakeera-Kitaka S, Marukutira T, Chapman J, Goldrath K, Ferrand RA. Perinatally acquired HIV infection in adolescents from sub-Saharan Africa: a review of emerging challenges. *Lancet Infect Dis*. 2014;14(7):627-39. Available from: [https://doi.org/10.1016/s1473-3099\(13\)70363-3](https://doi.org/10.1016/s1473-3099(13)70363-3)
9. Hamzah L, Hamlyn E. Sexual and reproductive health in HIV-positive adolescents. *Curr Opin HIV AIDS*. 2018;13(3):230-5.

## RESEARCH ARTICLES

10. Leekuan P, Kane R, Sukwong P, Kulnitichai W. Understanding sexual and reproductive health from the perspective of late adolescents in Northern Thailand: a phenomenological study. *Reprod Health*. 2022;19(230):1-17. Available from: <https://doi.org/10.1186/s12978-022-01528-1>
11. Guilam-Ramos V, Kaiser M, Benzekri A, Hidalgo A. Nurses at the frontline of public health emergency preparedness and response: lessons learned from the HIV/AIDS pandemic and emerging infectious disease outbreaks. *Elsevier Public Health Emerg Coll*. 2021;21(10):e326-e333.
12. Mohammed RA, Al-Rafay SS, Fathy Z. Nursing performance regarding care of children suffering from human immunodeficiency virus/AIDS. *Egypt J Health Care*. 2022;13(3):217-28.
13. Albright JN, Fair CD. Providers caring for adolescents with perinatally acquired HIV: current practices and barriers to communication about sexual and reproductive health. *AIDS Patient Care STDS*. 2014;28(11):587-93.
14. Plesons M, Cole CB, Hainsworth G, Avila R, Biaukula KV, Husain S, Janušonytė E, Mukherji A, Nergiz AI, Phaladi G, Ferguson BJ. Forward, together: a collaborative path to comprehensive adolescent sexual and reproductive health and rights in our time. *J Adolesc Health*. 2019;65(6 Suppl):S51-62
15. Warren CE, Mayhew SH, Hopkins J. The current status of research on the integration of sexual and reproductive health and HIV services. *Stud Fam Plann*. 2017;48(2):91-105.
16. Chem ED, Ferry A, Seeley J, Weiss H, Simms V. Health-related needs reported by adolescents living with HIV and receiving antiretroviral therapy in sub-Saharan Africa: a systematic literature review. *J Int AIDS Soc*. 2022;25:1-12. Available from: <https://doi.org/10.1002/jia2.25921>.
17. Folayan M, Harrison A, Odetoyinbo M, Brandon B. Tackling the sexual and reproductive health and rights of adolescents living with HIV/AIDS: A priority need in Nigeria. *Afr J Reprod Health*. 2014; 18(3): 102-108. Available from: <https://pubmed.ncbi.nlm.nih.gov/26050382/>
18. David AN, Salako AO, Gbaja-Biamila TA, Odubela OO, Opaneye BA, Wapmuk AE, Ezemelue PN, Musari-Martins TE. Pediatric HIV treatment outcome in Lagos: the Nigerian Institute of Medical Research experience. *Trends Res*. 2020;4:1-5
19. Jonas K, Crutzen R, Krumeich A, Roman N, Bore BV, Reddy R. Healthcare workers' beliefs, motivations and behaviours affecting adequate provision of sexual and reproductive healthcare services to adolescents in Cape Town, South Africa: a qualitative study. *BMC Health Serv Res*. 2018;18(1):1-13. Available from: <https://doi.org/10.1186/s12913-018-2917-0>.
20. Mkumba LS, Nassali M, Benner J, Ritchwood TD. Sexual and reproductive health needs of young people living with HIV in low- and middle-income countries: a scoping review. *Reprod Health*. 2021;18(219):1-14. Available from: <https://doi.org/10.1186/s12978-021-01269-7>.
21. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol*. 2006; 3(2): 77-101.
22. Aguinis H, Solarino AM. Transparency and replicability in qualitative research: the case of interviews with elite informants. *Strategic Manag J*. 2019;40(8):1291-315.
23. Mkumba LS, Nassali M, Benner J, Ritchwood TD. Sexual and reproductive health needs of young people living with HIV in low- and middle-income countries: a scoping review. *Reprod Health*. 2021;18(219):1-14. Available from: <https://doi.org/10.1186/s12978-021-01269-7>.
24. Lawrence S, Moraa H, Wilson K, Mutisya I, Neary J, Kinuthia J, et al. 'They just tell me to abstain': variable access to and uptake of sexual and reproductive health services among adolescents living with HIV in Kenya. *Front Reprod Health*. 2021;3:1-10. Available from: <https://doi.org/10.3389/frph.2021.644832>
25. Ndongmo TN, Ndongmo CB, Michelo C. Sexual and reproductive health knowledge and behavior among adolescents living with HIV in Zambia: a case study. *Pan Afr Med J*. 2017;26(71):1-12. Available from: <https://doi.org/10.11604/2Fpamj.2017.26.71.11312>
26. Kaunda-Khangamwa BN, Munthali A, Manderson L. Ethnographic understandings of sexual and reproductive health and HIV care for adolescents in Blantyre, Malawi. *Reprod Health Matters*. 2023;31(1):1-13. Available from: <https://doi.org/10.1080/26410397.2023.2209956>
27. Hodgson I, Ross J, Haamujompa C, Gitau-Mburu D. Living as an adolescent with HIV in Zambia – lived experiences, sexual health and reproductive needs. *AIDS Care*. 2012; 24(10): 1204-1210. Available from: <https://doi.org/10.1080/09540121.2012.658755>
28. Pettitt ED, Greifinger RC, Phelps BR, Bowsky SJ. Improving health services for adolescents living with HIV in Sub-Saharan Africa: A multi-country assessment. *Afr J Reprod Health*. 2013;17(4): 17-31
29. Sehnm GD, Pedro EN, Ressel LB, Vasquez ME. Adolescents living with HIV/AIDS: sexuality experiences. *Rev Gaúcha Enferm*. 2018; 39: 1-10. Available from: <https://doi.org/10.1590/1983-1447.2018.2017-0194>
30. Steiner RJ, Pampati S, Raspberry CN, Liddon N. 'Is it really confidential?' A content analysis of online information about sexual and reproductive health services for adolescents. *J Adolesc Health*. 2019; 64(6): 725-731. Available from: <https://doi.org/10.1016/j.jadohealth.2018.11.022>
31. Macharia P, Pere-Navarro A, Inwani I, Nduati R, Carrion C. An exploratory study of current sources of adolescent sexual and reproductive health information in Kenya and their limitations: Are mobile phone technologies the answer. *Int J Sex Health*. 2021; 33(3): 357-370. Available from: <https://doi.org/10.1080/19317611.2021.1918311>
32. Woollett N, Pahad S, Black V. 'We need our own clinics': Adolescents' living with HIV recommendations for a responsive health system. *PLoS One*. 2021; 16(7): 1-19. Available from: <https://doi.org/10.1371/journal.pone.0253984>
33. Mburu G, Hodgson J, Teltschik A, Ram M, Haamujompa C, Bajpai D, et al. Rights-based services for adolescents living with HIV: adolescent self-efficacy and implications for health systems in Zambia. *Reprod Health Matters*. 2013; 21(41): 176-185. Available from: [https://doi.org/10.1016/S0968-8080\(13\)41701-9](https://doi.org/10.1016/S0968-8080(13)41701-9)
34. Okawa S, Mwanza-Kabaghe S, Mwiya M, Kikulhi K, Jimba M, Kankasa C, et al. Sexual and reproductive health behaviour and unmet needs among a sample of adolescents living with HIV in Zambia: a cross-sectional study. *Reprod Health*. 2018;15(55):1-10. Available from: <https://doi.org/10.1186/s12978-018-0493-8>
35. Boku GG, Abeya SG, Ayers N, Abera M. Leadership commitment and the quality of adolescent-friendly sexual reproductive health services in public health facilities among pastoral districts of Guji Zone, Ethiopia. *J Healthc Leadersh*. 2024;16: 53-66. Available from: <https://doi.org/10.2147/JHL.S44195>

# Training with a peripheral intravenous catheter care algorithm to affect phlebitis and infiltration incidence: An interventional before-and-after study

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## ABSTRACT

**Objective:** This study attempted to determine the effect of training with a peripheral intravenous catheter care algorithm on nurses' knowledge level and the incidence of phlebitis and infiltration.

**Background:** Peripheral intravenous catheter insertion is a common nursing intervention for hospitalised patients. However, it causes many complications, of which phlebitis and infiltration are the most prevalent. Many factors affect the development of phlebitis and infiltration.

**Study design and methods:** This study was an interventional and cross-sectional -before and after study. This study was conducted with 19 nurses and 190 patients (who had 297 peripheral intravenous catheters). After the Peripheral Intravenous Catheter Care Algorithm was developed, the study was conducted in three stages: the prevalence of phlebitis and infiltration and the knowledge level of nurses before intervention was evaluated during the first stage; training and consultancy services were provided during the second; and the incidence of phlebitis and infiltration and the knowledge level of nurses after intervention was evaluated in the last stage.

**Results:** The nurses median scores regarding the knowledge test on phlebitis and infiltration improved significantly after their training. Despite the incidence of phlebitis decreasing after the training, it was not statistically significant. However, the grade of phlebitis proved significantly lower after the nurses' training. Furthermore, the incidence and grade of infiltrations decreased after training, but it was not statistically significant either.

**Conclusion:** It can be concluded that training with the Peripheral Intravenous Catheter Care Algorithm is effective in increasing the nurses' knowledge and reducing the grade of phlebitis. Accordingly, training nurses with the Peripheral Intravenous Catheter Care Algorithm, based on clinical guidelines, is recommended.

**Implications for research, policy, and practice:** An algorithm has been developed in this study to guide hospitals in clinics where peripheral intravenous catheter is applied. This is noteworthy that by preventing these complications, patients can be prevented from receiving treatment (medical treatment, surgical repair etc.) for complications, prolonged hospital stay, stress in patients and

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their relatives, increased workload of healthcare personnel, and increased health expenditures can be avoided by preventing these complications.

**Keywords:** Nursing care, Catheterisation, Peripheral, Algorithm, Phlebitis, Infiltration

#### What is already known about the topic?

- The prevalence of phlebitis varies in recent studies between 10% and 54.5%.
- The prevalence of infiltration varies in recent studies between 7% and 35%.
- Care protocols are available for peripheral intravenous catheter care.

#### What this paper adds?

- Although phlebitis developed in 16.1% of the peripheral intravenous catheter before the peripheral intravenous catheter care training, this rate decreased to 8.1% after the training.

While infiltration developed in 10.2% of the peripheral intravenous catheters before the peripheral intravenous catheter care training, it only developed in 3% of the peripheral intravenous catheters after the training.

- An algorithm has been developed in this study to guide hospitals in clinics where peripheral intravenous catheter is applied.
- The nurses median scores regarding the knowledge test on phlebitis and infiltration improved significantly after their training.
- This is noteworthy since the unnecessary diagnosis and treatment of patients, prolonged hospital stay, stress in patients and their relatives, increased workload of healthcare personnel, and increased health expenditures can be avoided by preventing these complications.

## BACKGROUND

Intravenous infusions are commonly used infusions for the diagnosis of the disease, and alleviation or elimination of symptoms in hospitalised patients.<sup>1</sup> A peripheral intravenous catheter (PIVC) is commonly used for these procedures. Although peripheral intravenous catheterization is a common practice, it can still cause several complications. These complications could subject patients to unnecessary diagnostic procedures and treatments, prolonged hospitalisations, increased stress (including for their relatives), health expenditures, and increase the workload of healthcare personnel. However, many of these complications can be prevented through evidence based PIVC insertion.<sup>1</sup>

The most common complications associated with PIVCs are phlebitis and infiltration. Phlebitis refers to an inflammation of the vein's tunica intima and is a largely preventable complication.<sup>2</sup> The prevalence of phlebitis varies between 10% and 54.5%.<sup>1-9</sup> Infiltration is also a common complication of PIVC insertions. It occurs when the PIVC lesions or perforates the vein layers, which causes non-vesicular solutions or drugs to seep into the tissues surrounding the catheter's insertion site and accumulate under the skin.<sup>6</sup> The infiltration rates range between 7% and 35%.<sup>2,4-6,10</sup>

To minimise PIVC complications, nurses must identify the relevant risk factors and provide care based on scientific evidence; this can be facilitated by increasing nurses' knowledge on the care of patients with PIVCs.<sup>1</sup> Furthermore, utilising the standards, algorithms, care packages, and guides regarding the care of PIVCs is crucial to prevent any complications.<sup>11</sup> The algorithms can both summarise clinical practice guidelines enabling nurses to make healthy,

evidence-based clinical decisions and be used as modern educational tools. Since algorithms clearly illustrate the thought process in a logical, step-by-step approach, they allow nurses to engage in critical thinking, clinical decision making, and develop practical clinical skills.<sup>12</sup> Moureau and Carr (2018) report that the use of an evidence-based Vessel Health and Preservation model in clinics improves the quality of acute care and patient outcomes by reducing infection, thrombosis and phlebitis through the selection of the most appropriate catheter and the insertion and management of the catheter by trained staff.<sup>13</sup> Keleekai et al. (2016) found significant improvements in nurses' knowledge, confidence, and skills when using a simulation-based mixed learning program for the placement of Peripheral Intravenous Catheters (PIVC).<sup>14</sup> In another study, a PIVC care algorithm specifically for newborns was developed.<sup>15</sup> Watterson et al. (2018) reported that using an IV Infiltration Prevention Bundle in children helped reduce the occurrence of infiltration.<sup>16</sup> Additionally, Ray-Barruel et al. (2020) developed the I-DECIDED clinical decision-making tool for PIVC assessment and safe removal,<sup>17</sup> which has been shown to be evidence-based, valid, and reliable.<sup>18</sup> Carr et al. (2017)<sup>19</sup> emphasized the need for further research to develop and test appropriate tools, clinical guidelines, and algorithms to improve PIVC insertion outcomes in clinical settings. Furthermore, Ray-Barruel et al. (2019) noted that while the effectiveness of implementing PIVC insertion and care bundles remains unclear, further research is necessary to identify which bundle components are most effective in reducing PIVC-related complications and infections.<sup>20</sup>

To address this dearth in research, a PIVC care algorithm was developed in this study for adult patients that addresses the general care of PIVCs as well as the most common PIVC

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complications, namely phlebitis and infiltration. The training provided by this algorithm can increase nurses' knowledge regarding the care of PIVCs as well as how to provide an appropriate standard of care to patients. Furthermore, since nursing interventions are included step by step in the algorithm, it functions as a guide for providing better nursing care for PIVCs, preventing complications, and providing the appropriate nursing care when complications arise in order to improve patient outcomes.

This study attempted to determine the effect of training with a peripheral intravenous catheter care algorithm on nurses' knowledge level and the incidence of phlebitis and infiltration.

Questions of the study:

- Is there a correlation between training with the PIVC Care Algorithm and level of nurses' knowledge regarding care of PIVCs?
- Is there an effect of training with the PIVC Care Algorithm on the development of phlebitis?
- Is there an effect of training with the PIVC Care Algorithm on the grade of phlebitis?
- Is there an effect of training with the PIVC Care Algorithm on the development of infiltration?
- Is there an effect of training with the PIVC Care Algorithm on the grade of infiltration?

## METHODS

### DESIGN, SETTING, AND PARTICIPANTS

This is an interventional and cross-sectional – before and after study conducted in the neurosurgery clinic and intermediate intensive care unit of a training and research hospital. The study was conducted with two different groups: two patient samples and a nurse sample. The first group consisted of two patient samples that were treated with PIVCs from relevant clinics. The first sample consisted of 118 patients who underwent 186 PIVC insertions and met the inclusion criteria during the prevalence study stage between November 1, 2019, and January 1, 2020. The second sample consisted of 72 patients who endured 111 PIVC insertions and met the inclusion criteria during the incidence study stage between February 1, 2020, and April 1, 2020.

For the prevalence study stage, the inclusion criteria for patients were as follows: suffered from cranial diseases and were hospitalised for at least 72 hours in the relevant clinics, agreed to participate in the study, over 18 years of age, and treated with any PIVCs, regardless of the clinics where PIVCs are inserted. While the exclusion criteria included patients without cranial diseases, that were hospitalised for less than 72 hours in the relevant clinics, under 18 years of age, refused to participate, or were not treated with PIVCs.

In the incidence study phase, the inclusion criteria for patients were as follows: suffered from cranial diseases and were hospitalised for at least 72 hours in the relevant clinics, agreed to participate in the study, over 18 years of age, and their PIVCs were applied solely by nurses in the relevant clinics. While the exclusion criteria included patients without cranial diseases, that were hospitalised for less than 72 hours, under 18 years of age, refused to participate, and those who were treated with PIVCs in different clinics.

The second group consisted of 19 nurses that worked in the relevant clinics between November 1, 2019, and April 1, 2020. All nurses who worked in the relevant clinics during the study, and who agreed to participate in the study, were included without any sample selection.

### DATA COLLECTION

The data for this study were collected through several forms.

Data collection form for patients: This form was created by the researchers of this study to collect data on patients in accordance with previous literature.<sup>15</sup> The data collection form consists of 10 question items: age, gender, weight, height, diagnosis, chronic disease, the hand used actively every day, any extremities that cannot be used with PIVCs, languages, and the presence of a situation that prevents communication.

Data collection form for peripheral intravenous catheters: This form was prepared by the researchers of this study in accordance with previous literature and containing factors affecting phlebitis and infiltration complications.<sup>21</sup> This form consists of 13 question items: the PIVC insertion date, PIVC termination date, PIVC type, PIVC number, dressing material, type of antiseptic solution, DosiFlow usage, extension set, liquid set, body part where PIVC was applied, body area where PIVC was applied, the frequency of intervention in the area where the PIVC was applied, the manner of drug administration, the intravenous drugs that were administered, the IV fluids which were administered, and the fluids' flow rate.

**Phlebitis scale:** This scale was developed by Gorski et al., to determine the status and severity of phlebitis.<sup>22</sup> This scale is graded from 0 to 4. Grade '0': No symptoms, Grade '1': Erythema at access site with or without pain, Grade '2': Pain at access site with erythema and/or edema, Grade '3': Pain at access site with erythema and/or edema, streak formation, palpable venous cord, Grade '4': Pain at access site with erythema and/or edema, streak formation, Palpable venous cord 1 inch in length and purulent drainage.

**Infiltration scale:** This scale was developed by the Infusion Nurses Society to determine the status and severity of infiltration.<sup>23</sup> This scale is graded from 0 to 4. Grade '0': No symptoms, Grade '1': Skin blanched, edema less than 1 inch in any direction, cool to touch, with or without pain, Grade '2': Skin blanched, edema 1 to 6 inches in any direction, cool to touch, with or without pain, Grade '3': Skin blanched,



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translucent, gross edema greater than 6 inches in any direction, cool to touch, mild to moderate pain, possible numbness, Grade '4': Skin blanched, translucent, skin tight, leaking, skin discoloured, bruised, swollen, gross edema greater than 6 inches in any direction, deep pitting tissue edema, circulatory impairment, moderate to severe pain, infiltration of any amount of blood product, irritant, or vesicant.

**Data collection form for nurses:** This form was developed by the current researcher, in accordance with previous literature, to collect data on nurses.<sup>24</sup> It consists of eight question items: gender, age, educational status, total service time, duration of working in a neurosurgery clinic, PIVC training status after graduation, feelings of competency regarding PIVC insertion skills, and the need for PIVC insertion training.

**Information form on nurses' peripheral intravenous catheter care:** This form was developed by the current researcher, in accordance with previous literature, to evaluate nurses' knowledge of PIVC care. It consists of 22 questions.<sup>6,22,25,26,27-30</sup>

**PIVC care algorithm:** This algorithm was developed by the researcher. Studies and guidelines published since 2014 were searched between July 2019 and September 2019 using Medline (US National Library of Medicine, Bethesda, MD), CINAHL (Western Adventist Health Services, Glendale, CA), The COCHRANE Library (The Cochrane Collaboration) and Google Scholar databases to create an evidence-based PIC Care Algorithm in line with the literature. Since the PIC Care Algorithm includes only phlebitis and infiltration complications, the literature was searched with appropriate search terms. To search the literature, 1468 publications and 5 guidelines containing the search terms 'phlebitis and

prevention, phlebitis and care, phlebitis and guidelines, phlebitis and algorithm, infiltration and prevention, infiltration and care, infiltration and guidelines, infiltration and algorithm' were reached. The titles and abstracts of all publications reached as a result of the search were examined by the researcher. As a result of the review, publications whose full text could not be accessed, repetitive publications in databases, publications whose publication language was not English or Turkish, and publications that were not related to the subject were not included in the review, and the full text of a total of 64 publications was analysed (Figure 1). Based on 59 studies,<sup>31-89</sup> and 5 guidelines,<sup>22,24,90-92</sup> an evidence-based Peripheral Intravenous Catheter Care Algorithm was developed and sent to seven experts for expert opinion. The experts were selected among nursing faculty members with training or experience in PIC care. In order to prove the content validity of the algorithm with numerical values, an evaluation criterion was developed by the researcher and sent to the experts. This evaluation criterion is a scoring form that includes all items of the form. In this form, the content validity index (CVI) developed by Waltz and Bausel was used for each item and a value ranging from 1 to 4 (1 = Not appropriate, 2 = Item needs to be adapted, 3 = Appropriate but minor changes are needed, 4 = Very appropriate) was asked to be given for each item and a space was allocated for each item to receive experts' suggestions.<sup>93</sup> The content validity index for each item was then obtained by dividing the number of experts who gave the item 3 and 4 points by the total number of experts. All experts gave only 3 or 4 points for each item. Therefore, the content validity index of the Peripheral Intravenous Catheter Care Algorithm was found to be 1. Necessary corrections were made in line with the suggestions of the experts and the Peripheral Intravenous Catheter Care Algorithm was finalised (Figure 2).

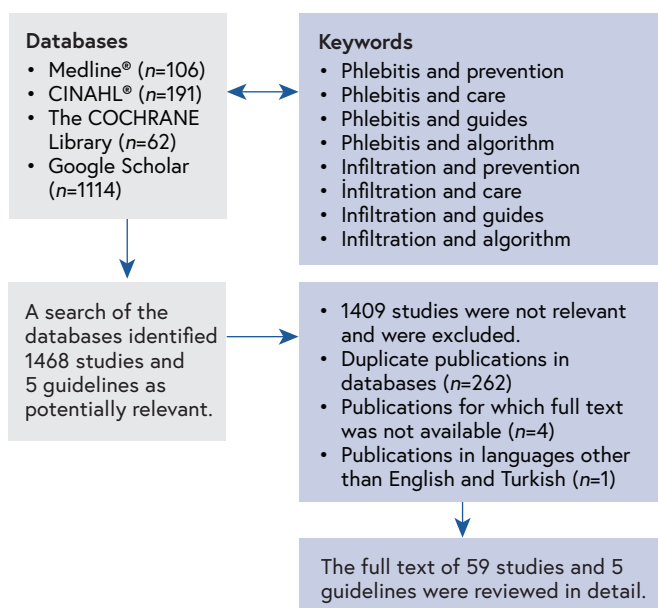


FIGURE 1. FLOWCHART OF THE LITERATURE USED IN THE DEVELOPMENT OF THE PIVC CARE ALGORITHM

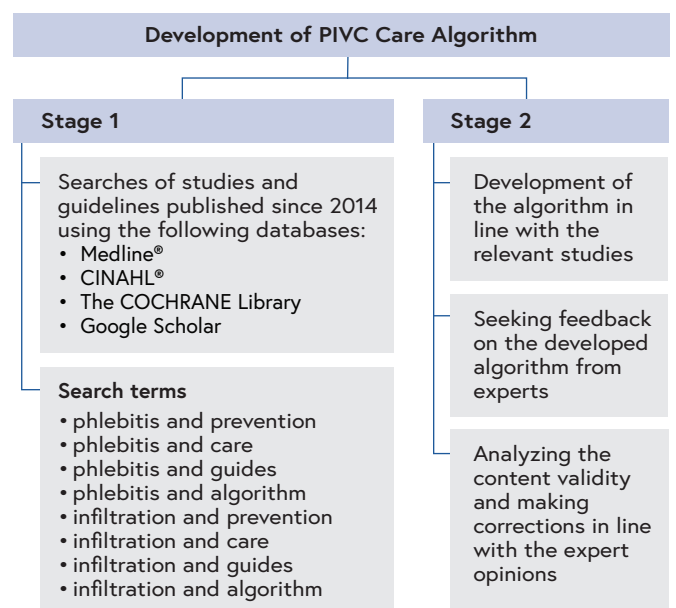


FIGURE 2. SCHEMATIC OF THE DEVELOPMENT OF THE PIVC CARE ALGORITHM

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This algorithm includes appropriate site selection for PIVC insertion, vein selection at appropriate areas for PIVC insertion, PIVC selection, dressing selection, PIVC care, assessment of PIVC, diagnosis of PIVC complications, phlebitis severity rating, infiltration severity rating, care suitable for the phlebitis's severity, care suitable for the infiltration's severity (see Supplementary Material).<sup>22,24,31,89–92</sup>

### INTERVENTION

The study was conducted in three stages.

**Prevalence study stage:** The researcher recorded the prevalence of phlebitis and infiltration, which are common PIVC complications, once a day for two months in those patients who were hospitalised at the relevant clinics and met the inclusion criteria.

**Training and consultancy stage:** The researcher provided one hour of training with the PIVC care algorithm to 19 nurses working in the relevant clinics. The training days and hours were planned according to the nurses' working hours; they were instructed in groups of 3–4 people. The PIVC care algorithm was distributed to the nurses after the training and hung on their clinics' walls for them to see.

After the training, the researcher provided a consultancy service for two weeks regarding the use of the PIVC care algorithm. During this consultancy service, the researcher evaluated the nurses' PIVC practices until the nurses provided care in accordance with the PIVC care algorithm. It was found that the problems experienced with the insertion of PIVC care stemmed from using non-sterile gloves, not washing hands before insertions, and not controlling the arterial flow when a tourniquet was applied. Accordingly, the nurses were informed of the compliance problems identified during the counselling process. After the information, it was determined that the nurses provided PIVC care in accordance with the entire algorithm.

**Incidence study stage:** Nurses evaluated the incidence of phlebitis and infiltration in patients who were hospitalised at the relevant clinics and met the study's inclusion criteria every eight hours for two months. The researcher monitored these evaluations every day. While evaluating the incidence of phlebitis and infiltration, the previously applied PIVCs at relevant clinics, as well as the PIVCs of patients who were transferred from different clinics, were not taken into consideration. However, those PIVCs applied by nurses at the relevant clinics after training were evaluated. Regardless, all patients with PIVCs received the necessary PIVC care even if they were not considered for the study. A transparent dressing material was used for PIVC fixations to facilitate the observation of PIVCs during the phlebitis and infiltration incidence evaluation.

### OUTCOME MEASURES

At prevalence study stage, 186 catheters were evaluated through the Data Collection Form for Patients, Data Collection Form for Peripheral Intravenous Catheters, Phlebitis Scale, and Infiltration Scale in order to collect data on the patients. At training and consultancy stage, The Data Collection Form for Nurses was administered to the nurses working at relevant clinics before the study commenced. The Information Form on Nurses' Peripheral Intravenous Catheter Care was administered to the nurses both before and after their training. During incidence stage, 111 catheters were evaluated using the Data Collection Form for Patients, Data Collection Form for Peripheral Intravenous Catheters, Phlebitis Scale, and Infiltration Scale. The Information Form on Nurses' PIVC Care was utilised to evaluate the long-term effectiveness of the training.

### ETHICAL CONSIDERATIONS

Both Gazi University Ethics Committee approval (09/08/2019-E.99239) and institutional permission from Dışkapı Yıldırım Beyazıt Training and Research Hospital (15/08/2019-E.32294) were obtained before conducting the study. Written consent was obtained from the nurses and patients or their relatives who agreed to participate in the study by adequately explaining the study's objective, duration, and process.

### DATA ANALYSIS

The data were analysed with the IBM SPSS Statistics 17.0 package program (IBM Corporation, Armonk, NY, USA). The fitness of discrete numerical variables, with regards to normal distribution, was examined by Shapiro-Wilk and Kolmogorov-Smirnov tests. Levene's test investigated whether the assumption of homogeneity of variances was achieved. Descriptive statistics were illustrated as mean  $\pm$  standard deviations or medians (minimum-maximum) for discrete numeric variables, and as the number of observations and percentages (%) for categorical variables (nominal and ordinal). The Mann-Whitney U Test, Cochran's Q test, Friedman test, and Continuity corrected  $\chi^2$  Test were used to evaluate the data.

## RESULTS

### NURSES' SOCIODEMOGRAPHIC CHARACTERISTICS

In the study, the mean age of the nurses was  $27.7 \pm 5.5$  years. The sociodemographic characteristics of these nurses are as follows: 17 (89.5%) were female, 10 (52.6%) had bachelor's degrees, 9 (47.4%) have been employed for 5 years or more, 13 (68.4%) worked in the brain surgery clinic for 1-5 years, 17 (89.5%) did not receive PIVC care training after graduation, and 16 (84.2%) felt the need for PIVC care training (Table 1).

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TABLE 1. SOCIODEMOGRAPHIC CHARACTERISTICS OF THE NURSES (N = 19)

Sociodemographic characteristics	n	%
<b>Age</b>		
Mean = 27.7 years; SD = 5.5		
<b>Gender</b>		
Female	17	89.5
Male	2	10.5
<b>Educational status</b>		
Vocational School of Health	2	10.5
Associate Degree	3	15.8
Bachelor's Degree	10	52.6
Vertical transfer after Associate Degree	3	15.8
Master/PhD	1	5.3

Sociodemographic characteristics	n	%
<b>Years in profession</b>		
Median = 5 years; (Min–Max) = (0.08–23 years)		
<1 year	4	21.0
1–5 years	6	31.6
>5 years	9	47.4
<b>Receiving PIVC training after graduation</b>		
No	17	89.5
Yes	2	10.5
<b>Having a need for PIVC training</b>		
No	3	15.8
Yes	16	84.2

TABLE 2. DISTRIBUTION OF THE NURSES CORRECT ANSWERS TO QUESTIONS CONCERNED WITH PIVC CARE BEFORE AND AFTER THE TRAINING (N = 19)

Questions on PIVC care	Before n (%)	After n (%)	After 2 months n (%)	p-value*
<b>PIVC application</b>				
1. Area selection	19 (100%)	19 (100%)	19 (100%)	N/A
2. Vein selection	6 (31.6%)	18 (94.7%)	19 (100%)	<0.001
3. Vein selection from lower extremities	8 (42.1%)	16 (84.2%)	19 (100%)	<0.001
4. PIVC selection	9 (47.4%)	19 (100%)	19 (100%)	<0.001
5. Dressing selection	4 (21.1%)	17 (89.5%)	19 (100%)	<0.001
<b>PIVC care and assessment</b>				
6. Asepsis principles in PIVC application	16 (84.2%)	19 (100%)	19 (100%)	0.050
7. Suitable antiseptic solution for PIVC application	10 (52.6%)	15 (78.9%)	19 (100%)	0.004
8. Highlights in PIVC care	10 (52.6%)	19 (100%)	17 (89.5%)	0.002
9. Highlights in PIVC assessment	6 (31.6%)	18 (94.7%)	17 (89.5%)	<0.001
10. Change times of infusion sets	2 (10.5%)	15 (78.9%)	17 (78.9%)	<0.001
11. Change times of PIVCs	9 (47.4%)	19 (100%)	19 (100%)	<0.001
12. Causes of PIVC removal	2 (10.5%)	19 (100%)	18 (94.7%)	<0.001
<b>Complication Management</b>				
13. Diagnosis of phlebitis	11 (57.9%)	19 (100%)	19 (100%)	<0.001
14. Phlebitis grading	8 (42.1%)	18 (94.7%)	17 (89.5%)	<0.001
15. Diagnosis of infiltration	7 (36.8%)	19 (100%)	19 (100%)	<0.001
16. Infiltration grading	7 (36.8%)	16 (84.2%)	16 (84.2%)	0.005
17. Diagnosis of 2ebitis	3 (15.8%)	19 (100%)	19 (100%)	<0.001
18. Phlebitis grading	6 (31.6%)	18 (94.7%)	18 (94.7%)	<0.001
19. Diagnosis of infiltration	6 (31.6%)	19 (100%)	19 (100%)	<0.001
20. Infiltration grading	8 (42.1%)	13 (68.4%)	15 (78.9%)	0.050
21. Appropriate care for phlebitis grade	3 (15.8%)	17 (89.5%)	17 (89.5%)	<0.001
22. Appropriate care for infiltration grade	9 (47.4%)	18 (94.7%)	19 (100%)	<0.001
<b>Total** Median (min–max)</b>	<b>9 (4–13)</b>	<b>21 (17–22)</b>	<b>21 (19–22)</b>	<b>&lt;0.001</b>

\* Cochran's Q test, N/A: No evaluation was made, \*\* Friedman test

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## NURSES' KNOWLEDGE

The median number of correct answers given by the nurses were 9 (min-max: 4-13), 21 (min-max: 17-22), and 21 (min-max: 19-22) before the training, after the training, and two months after the training, respectively. A statistically significant increase was found in the nurses' total number of correct answers to the questions concerned with PIVC care ( $p < 0.001$ ). No statistically significant differences were found between the test scores directly after the PIVC care training and those two months after the training ( $p > 0.999$ ) (Table 2).

The nurses' median test score before the PIVC care training was 38.1 (min-max: 14.3-57.1); their median test score after the training was 95.2 (min-max: 76.2-100); and their median test score two months after the training was 95.2 (min-max: 85.7-100). Therefore, statistically significant increases were found between the nurses' test scores before, after, and at two months after their PIVC care training ( $p < 0.001$ ) (Table 3).

**TABLE 3. DISTRIBUTION OF THE NURSES' MEAN KNOWLEDGE SCORES REGARDING PIVC CARE**

Knowledge test	Score					p-value**
	Mean	SD*	Median	Min	Max	
Before training	37.6	11.8	38.1	14.3	57.1	<0.001
After training	92.7	7.0	95.2	76.2	100	
2 months after training	95.2	3.5	95.2	85.7	100	

\*SD: Standard Deviation, \*\* Friedman test

## PHLEBITIS AND INFILTRATION

Although phlebitis developed in 16.1% of the PIVCs before the PIVC care training, this rate decreased to 8.1% after the training. Furthermore, before the PIVC care training 2nd-grade phlebitis developed in 5.4% of the PIVCs, while 1st-grade phlebitis developed in 5.4% of the PIVCs after the training. Although there was a decrease in the developmental rate of phlebitis after the training, this change was not statistically significant ( $p = 0.071$ ). Conversely, a statistically significant decrease was found in the grade of phlebitis after the training ( $p = 0.032$ ). While infiltration developed in 10.2% of the PIVCs before the PIVC care training, it only developed in 3% of the PIVCs after the training. Furthermore, 4.3% of the PIVCs exhibited a 2nd-grade infiltration before the PIVC care training, while 5.4% of the PIVCs exhibited first-grade infiltration after the training. Although there was a decrease in the rate of infiltration after the training, this decrease was not statistically significant ( $p = 0.347$ ). Moreover, despite the grade of infiltration also decreasing after the training, it did not prove statistically significant either ( $p = 0.200$ ) (Table 4).

Although it is not illustrated in the tables, both groups' data on PIVCs before and after the PIVC care training were similar.

**TABLE 4. DISTRIBUTION OF THE PREVALENCE AND INCIDENCE OF PHLEBITIS AND INFILTRATION BEFORE AND AFTER THE PIVC CARE TRAINING (N = 297)**

	Prevalence before training (n = 186)	Incidence after training (n = 111)	z-value	p-value
	n (%)	n (%)		
<b>Phlebitis</b>				
No	156 (83.9%)	102 (91.9%)		<b>0.071*</b>
Yes	30 (16.1%)	9 (8.1%)		
<b>Phlebitis grade</b>				
Grade 0	156 (83.9%)	102 (91.9%)	<b>2.142</b>	<b>0.032**</b>
Grade 1	8 (4.3%)	6 (5.4%)		
Grade 2	10 (5.4%)	3 (2.7%)		
Grade 3	9 (4.8%)	0 (0.0%)		
Grade 4	3 (1.6%)	0 (0.0%)		
<b>Infiltration</b>				
No	167 (89.8%)	104 (93.7%)		<b>0.347*</b>
Yes	19 (10.2%)	7 (6.3%)		
<b>Infiltration grade</b>				
Grade 0	167 (89.8%)	104 (93.7%)	<b>1.282</b>	<b>0.200**</b>
Grade 1	4 (2.2%)	6 (5.4%)		
Grade 2	8 (4.3%)	1 (0.9%)		
Grade 3	5 (2.7%)	0 (0.0%)		
Grade 4	2 (1.1%)	0 (0.0%)		
<b>Catheters</b>				
Number	Median (min-max)	Median (min-max)	<b>z-value</b>	<b>p-value</b>
	1 (1-3)	1 (1-4)	0.329	0.742**

\*  $\chi^2$  test with continuity correction, \*\* Mann-Whitney U test.

## DISCUSSION

In this study, a statistically significant increase was found between nurses' test scores before and after their PIVC care training. The importance of training healthcare personnel to determine the right techniques for PIVC insertion and care is stated in a guide from the Centers for Disease Control and Prevention (CDC).<sup>94</sup> Abraham (2018) stressed the necessity of training and providing healthcare professionals with knowledge and skills concerned with predicting and preventing PIVC complications.<sup>27</sup> A study reported that providing PIVC care training to nurses who care for children undergoing chemotherapy, in accordance with evidence-based practices and PIVC care guidelines, led to improvements in PIVC care for children with cancer.<sup>95</sup> Woody and Davis (2013) conducted an interventional study ( $n = 1200$ ) with the aim of increasing the peripheral intravenous treatment competence of nurses working in internal and surgical clinics.<sup>96</sup> They reported that no significant differences between the nurses' pre- and post-test scores were found. In a study by George and Muninarayanappa (2016), it was reported that there was no significant difference between

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the pre-test and post-test scores of nurses who participated in a structured training program on the prevention of intravenous catheter complications.<sup>97</sup> In our study, we posit that the increase in the PIVC care test scores was due to the training the nurses received since, as stated in the literature, the nurses' training greatly increased their knowledge.<sup>27,94</sup> Training the nurses with the PIVC care algorithm can contribute toward an increase in their knowledge regarding PIVC care. Therefore, it is recommended to periodically evaluate both the knowledge of nurses involved in the insertion and care of PIVCs as well as their compliance with current guidelines.<sup>98</sup>

In this study, it was determined that the development rate of phlebitis decreased from 16.1% to 8.1% after training in PIVC care. Previous studies have established that the rates of phlebitis vary between 10.0% and 54.5%.<sup>1-9</sup> The rate of phlebitis was within this range during the prevalence stage of this study; however, it fell below this range during the incidence study. In a study by Hontoria-Alcoceba et al (2023), it was reported that the use of the PIVC care bundle and algorithm reduced phlebitis rates from 14.8% to 4.9%.<sup>99</sup> Similarly, an interventional study conducted by Woody and Davis (2013) determined that phlebitis rates were 50% lower after the training. In this study, despite the seemingly clinical significance of phlebitis rates dropping after PIVC care training, no statistically significant differences were found.<sup>96</sup> A study evaluating the effectiveness of an intervention using protocols and education and performance feedback for healthcare professionals and patients to reduce PIVC failure rates in hospitalised patients reported that the multimodal intervention significantly reduced PIVC failure rates and potential PIVC complications for inpatients.<sup>100</sup> In this study, although grade 1, 2, 3, and 4 phlebitis cases were observed before the PIVC care training, the majority of these phlebitis cases were 2nd-grade cases (5.4%). Furthermore, after the training, 1st-grade phlebitis (5.4%) was observed the most. Accordingly, it can be said that the use of evidence-based practices such as the PIVC care bundle and algorithm improves PIVC care for catheterised patients.<sup>99</sup>

The PIVC care algorithm can motivate nurses to adopt evidence-based preventive care practices concerning phlebitis and inform them on the appropriate care and treatments associated with phlebitis.<sup>6,11</sup> Although the incidence of phlebitis did not exhibit a statistically significant decrease in this study, a significant decrease was found concerning the grade of phlebitis. This is an indicator of the effectiveness of the PIVC care algorithm developed in this study. Therefore, integrating the PIVC care algorithm into nurses' clinical practices can contribute toward the prevention of phlebitis.<sup>11</sup>

With regards to infiltration, this study observed that the infiltration incidence after training (6.3%) was clinically lower than before the training (10.2%). Previous studies have established that the rates of infiltration vary between 7% and 35%.<sup>2,4-6,10</sup> The infiltration incidence was within this range during the prevalence study stage before the PIVC care training; however, it fell below this range during the incidence study after the training. Similarly, Woody and Davis (2013) conducted an interventional study which determined that the infiltration incidence was 50% less after the training was than before.<sup>96</sup> In this study, the rate of infiltration after the PIVC care training was indeed; however, the difference did not prove statistically significant. Furthermore, although grade 1, 2, 3, and 4 infiltration cases were observed before the PIVC care training, most of these cases were 2nd grade infiltrations (4.3%). After the training only 1st and 2nd grade infiltrations were observed, where the majority of these cases were 1st-grade infiltrations (5.4%).

In an internal medicine clinic, Braga et al. (2018) conducted a cohort study ( $n = 526$ ) which found that first-grade infiltrations developed in 84.5% of the catheters, but that no 3rd or 4th-grade infiltrations were observed.<sup>6</sup> Simin et al. (2019) conducted a prospective observational study ( $n = 1428$ ) with adult patients which determined that most infiltration cases were 2nd grade.<sup>2</sup> Despite the grade of infiltration decreasing in this study after the training, the difference was not statistically significant. The algorithm-based training concerned with evidence-based PIVC care enabled nurses to administer safe practices during the diagnosis of infiltration and largely prevent PIVC complications. Therefore, it is thought that the incidence and grade of infiltration decreased after the training due to the nurses' PIVC care in line with the PIVC care algorithm and because the infiltration cases were diagnosed at an early stage. In order to diagnose the infiltration's development during an early period and to initiate the appropriate care and treatments, it is recommended to evaluate the infiltration status effectively and to determine the grading when infiltration first develops.<sup>11</sup>

## LIMITATIONS OF THE STUDY

Since this study was conducted with a patient group older than 18 years of age, the findings cannot be generalised to paediatric patients. Furthermore, the study was conducted in a neurosurgery clinic and intermediate intensive care unit, therefore, its results cannot be generalised to all patients. There are many risk factors that affect the development of phlebitis and infiltration. These risk factors may also have affected the study results.

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## CONCLUSION

In this study, although the decreases in the incidence of phlebitis and infiltration as well as the infiltration grading was not statistically significant, they may demonstrate the effectiveness of the PIVC care algorithm. In this context, training with this PIVC care algorithm developed can help to increase nurses' knowledge of PIVC care, improve the continuity and coordination of care, eliminate the differences in practice, provide care for patients according to the relevant techniques and standards, prevent complications, and improve patient outcomes when complications do develop. Accordingly, it is recommended that patients receive care facilitated by the PIVC care algorithm, and that its use should be generalised by nurses.

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## REFERENCES

- Beccaria LM, Contrin LM, Werneck AL, Machado BD, Sanches EB. Incidence of phlebitis in adult patients. *J Nurs UFPE on line*. 2018;12(3):745-52. <https://doi.org/10.5205/1981-8963-v12i3a230454p745-752-2018>.
- Simin D, Milutinović D, Turkulov V, et al. Incidence, severity and risk factors of peripheral intravenous cannula-induced complications: An observational prospective study. *J Clin Nurs*. 2019;28(9-10):1-15. <http://dx.doi.org/10.1111/jocn.14760>.
- Urbanetto JS, Peixoto CG, May TA. Incidence of phlebitis associated with the use of peripheral IV catheter and following catheter removal. *Rev Latino-Am Enfermagem*. 2016;24(e2746):1-9. <https://doi.org/10.1590/1518-8345.0604.2746>.
- Makafi SA, Marfega MACM. Peripheral intravenous catheter (PIVC) related local complications among patients in KFCH-Jizan. *Adv Practice Nurs*. 2017;2(3):138. <https://doi.org/10.4172/2573-0347.1000138>.
- Marsh N, Webster J, Mihala G, Rickard CM. Devices and dressings to secure peripheral venous catheters: A Cochrane systematic review and meta-analysis. *Int J Nurs Stud*. 2017;67:12-19.
- Braga LM, Parrreira PM, Oliveira AS, et al. Phlebitis and infiltration: vascular trauma associated with the peripheral venous catheter. *Rev Latino-Am Enfermagem*. 2018;26:e3002:1-8. <http://dx.doi.org/10.1590/1518-8345.2377.3002>.
- Salma U, Sarker MAS, Zafrin N, Ahamed KS. Frequency of peripheral intravenous catheter related phlebitis and related risk factors: a prospective study. *J Med*. 2019;20(1):29-33. <http://dx.doi.org/10.3329/jom.v20i1.38818>.
- Mandal A, Raghu K. Study on incidence of phlebitis following the use of peripheral intravenous catheter. *J Family Med and Prim Care*. 2019;8(9):2827-2831. [https://doi.org/10.4103/jfmpc.jfmpc\\_559\\_19](https://doi.org/10.4103/jfmpc.jfmpc_559_19).
- Tosun B, Arslan BK, Özen N. Phlebitis associated with peripheral venous catheter development and knowledge of nurses on evidence-based practices: Point Prevalence Study. *Turkiye Klinikleri J Nurs Sci*. 2020;12(1):72-82. <https://doi.org/10.5336/nurses.2019-70847>.
- Temizsoy E, Eriş Ö, Karakoç A, et al. Turkish validity reliability of the pediatric peripheral intravenous infiltration scale and its adaptation to newborns. *J Pediatr Res*. 2017;4(4):232-238. <https://doi.org/10.4274/jpr.78055>.
- McGuire R, Norman E, Hayden, I. Reassessing standards of vascular access device care: a follow-up audit. *Br J Nurs*. 2019;28(8):4-12.
- Jablonski MA, DuPen RA, Ersek M. The use of algorithms in assessing and managing persistent pain in older adults. *Am J Nurs*. 2011;111(3):34-45. <https://doi.org/10.1097/10.1097/01.NAJ.0000395239.60981.2f>.
- Moureau NL, Carr PJ. Vessel Health and Preservation: a model and clinical pathway for using vascular access devices. *Br J Nurs*. 2018;27(8):28-35. doi: 10.12968/bjon.2018.27.8.S28.
- Keleekai N, Schuster C, Murray C, King M, Stahl B, Labrozzi L, et al. Improving Nurses' Peripheral Intravenous Catheter Insertion Knowledge, Confidence, and Skills Using a Simulation-Based Blended Learning Program: a Randomized Trial. *Simul Healthc*. 2016;11(6):376-84.
- Wilder KA, Kuehn SC, Moore JE. Peripheral intravenous and central catheter algorithm. *Adv Neonatal Care*. 2014;14(6):E3-E7. <https://doi.org/10.1097/ANC.0000000000000125>.
- Watterson K, Hauck MJ, Auken A, Burns R, Greider J, Marlin M, et al. S.T.I.C.K.: A quality improvement pediatric IV infiltration prevention bundle. *Journal Of Pediatric Nursing*. 2018;41:38-41. doi: 10.1016/j.pedn.2018.01.003.
- 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. doi: 10.1136/bmjopen-2019-035239.
- Ray-Barruel G. I-DECIDED((R))-a decision tool for assessment and management of invasive devices in the hospital setting. *Br J Nurs*. 2022;31(8):37-43. doi: 10.12968/bjon.2022.31.8.S37.
- Carr PJ, Higgins NS, Rippey J, Cooke ML, Rickard CM. Tools, clinical prediction rules, and algorithms for the insertion of peripheral intravenous catheters in adult hospitalized patients: A systematic scoping review of literature. *J Hosp Med*. 2017;12(10):851-858.
- Ray-Barruel G, Xu H, Marsh N, Cooke M, Rickard CM. Effectiveness of insertion and maintenance bundles in preventing peripheral intravenous catheter-related complications and bloodstream infection in hospital patients: A systematic review. *Infect Dis Health*. 2019;24(3):152-68. doi: 10.1016/j.idh.2019.03.001.
- Abolfotouh MA, Salam M, Bani-Mustafa A, White D, Balkhy HH. Prospective study of incidence and predictors of peripheral intravenous catheter-induced complications. *Ther Clin Risk Manag*. 2014;10:993-1001. <http://dx.doi.org/10.2147/TCRM.S74685>.
- Gorski L, Hadaway L, Hagle ME, et al. Infusion therapy standards of practice. *J Infus Nurs*. 2016;39(suppl 1):1-159. <https://doi.org/10.1097/NHH.0000000000000481>.
- Infusion Nurses Society. Infusion nursing standards of practice. *J Infus Nurs*. 2006;29(1):59-60.
- Royal Collage of Nursing (RCN). Standards for infusion therapy. (4. Edition). Royal Collage of Nursing, London, 2018;34-64.

## RESEARCH ARTICLES

25. Chang WP, Peng YX. Occurrence of phlebitis a systematic review and meta-analysis. *Nurs Res*. 2018;67(3):252-260. <https://doi.org/10.1097/NNR.000000000000279>.
26. Nickel B. Peripheral intravenous access: applying infusion therapy standards of practice to improve patient safety. *Crit Care Nurse*. 2019;39(1):61-71. <https://doi.org/10.4037/ccn2019790>.
27. Abraham LM. Assessment of knowledge and practices of staff nurses regarding care of peripheral intravenous line in child care areas of selected hospital, Ludhiana, Punjab. *Int J Adv Nurs Manag*. 2018;6(1). <http://dx.doi.org/10.5958/2454-2652.2018.00008.2>.
28. Stevens C, Milner KA, Trudeau J. Routine versus clinically indicated short peripheral catheter replacement, An evidence-based practice project. *J Infus Nurs*. 2018;41(3):198-203. <http://dx.doi.org/10.1097/NAN.000000000000281>.
29. Webster J, Osborne S, Rickard CM, Marsh N. Clinically-indicated replacement versus routine replacement of peripheral venous catheters (Review). *Cochrane Database Syst Rev*. 2019;1(CD007798):14-20. <https://doi.org/10.1002/14651858.CD007798.pub5>.
30. Cooper AS. Clinically indicated replacement versus routine replacement of peripheral venous catheters. *Crit Care Nurse*. 2019;39(4):67-68. <https://doi.org/10.4037/ccn2019187>.
31. Ansel B, Boyce M, Embre JL. Extending short peripheral catheter dwell time. *The Art and Science of Infusion Nursing*. 2017;40(3):143-146.
32. Annisa F, Nurhaeni N, Wanda D. Warm water compress as an alternative for decreasing the degree of phlebitis. *Comprehensive Child and Adolescent Nursing*. 2017;40(1):107-113.
33. Arpa Y, Cengiz A. Determining of the knowledge levels of healthcare staff in the diagnosis and prevention of development of phlebitis and thrombophlebitis associated with intravenous infusion therapy. *Journal of Education and Research In Nursing*. 2014;13 (1):21-26.
34. Aydin S, Arslan GG. Evaluation of nurses' knowledge levels about peripheral intravenous catheter initiatives. *DEUHFED*. 2018;11(4):290-299.
35. Bernatchez SF. Care of peripheral venous catheter sites: advantages of transparent film dressings over tape and gauze. *JAVA*. 2014;19(4):256-261.
36. Braga LM, Parrreira PM, Oliveira AS, Monico LSM, Arreguy-Sena C, Henriques MA. Phlebitis and infiltration: vascular trauma associated with the peripheral venous catheter. *Revista Latino-Americana de Enfermagem*. 2018;26(e3002):1-8.
37. Brooks N. Intravenous cannula site management. *Nursing Standard*. 2015;30(52): 53-62.
38. Bolton D. Clinically indicated replacement of peripheral cannulas. *British Journal of Nursing*. 2015;24(19):1-5.
39. Gabriel J. Current thinking on catheter securement and infection prevention. *British Journal of Nursing*. 2018;27(2):15-16.
40. Carr PJ, Rippey J, Moore T, Ngo H, Cooke ML, Higgins NS, Rickard CM. Reasons for removal of emergency department-inserted peripheral intravenous cannulae in admitted patients: a retrospective medical chart audit in Australia. *Infection Control & Hospital Epidemiology*. 2016;37(7):874-876.
41. Carr PJ, Higgins NS, Cooke ML, Mihala G, Rickard CM. Vascular access specialist teams for device insertion and prevention of failure. *Cochrane Database of Systematic Reviews*. 2018;3(36): 1-38.
42. Chang WP, Peng YX. Occurrence of phlebitis a systematic review and meta-analysis. *Nursing Research*. 2018;67(3): 252-260.
43. Patidar AB, Choudhary M, Bindu K, Midha V. Comparative Efficacy of Heparin Saline and Normal Saline Flush for Maintaining Patency of Peripheral Intravenous Lines: a Randomized Control Trial. *International Journal of Nursing Education*. 2015;7(2):274-279.
44. Cooper AS. Clinically Indicated Replacement Versus Routine Replacement of Peripheral Venous Catheters. *Critical Care Nurse*. 2019;39(4):67-68.
45. Ford C. Cannulation in adults. *British Journal of Nursing*. 2019;28(13):838-841.
46. Gonçalves SC, Sanches SM, Bueno CT, Villela de Castro DL, Damascena A, Santos GRC. Incidence of Infusion site reactions in peripheral fosaprepitant Infusions. *Journal of Infusion Nursing*. 2017;40(6):380-383.
47. Gouveia SM. In-line pressure monitoring in IV infusions: benefits for patients and nurses. *British Journal of Nursing*. 2016;25(19):28-33.
48. Gorski LA, Hagle ME, Bierman S. Intermittently delivered IV medication and pH: reevaluating the evidence. *Journal of Infusion Nursing*. 2015;38(1):27-46.
49. Grace TYH, Stephanie TWL, BCom CS, Isabel NHL. Optimizing peripheral venous catheter usage in the general in-patient ward: A prospective observational study. *Journal of Infusion Nursing*. 2016;26(1-2):133-139.
50. Gunasegaran N, See MTA, Leong ST, Yuan LX, Ang SY. A randomized controlled study to evaluate the effectiveness of 2 treatment methods in reducing incidence of short peripheral catheter-related phlebitis. *Journal of Infusion Nursing*. 2018;41(2):131-137.
51. Hannibal GB. Peripheral phlebitis related to amiodarone infusion. *AACN Advanced Critical Care*. 2016;27(4):465-471.
52. Helm RE, Klausner JD, Klemperer JD, Flint LM, Huang E. Accepted but unacceptable. *Journal of Infusion Nursing*. 2015;38(3):189-203.
53. Helton J, Hines A, Best J. Peripheral IV site rotation based on clinical assessment vs. length of time since insertion. *Medsurg Nursing*. 2016;25(1):44-49.
54. Hergül FK, Giersbergen MY. Evaluation of patients and device selection for peripheral vascular access. *Journal of Ege University Nursing Faculty*. 2016;32(3):158-165.
55. Higgingson R. IV cannula securement: protecting the patient from infection. *British Journal of Nursing*. 2015;24(8):23-28.
56. Hugill K. Preventing bloodstream infection in IV therapy. *British Journal of Nursing*. 2017;26(14):4-10.
57. Kuş B, Büyükyılmaz F. Current evidence for prevention of the complications related to peripheral intravenous catheterization: systematic review. *Florence Nightingale Journal of Nursing*. 2017;25(3):210-217.
58. Kuş B, Büyükyılmaz F. Current guidelines recommendations in peripheral intravenous catheter administration. *Gümüşhane University Journal of Health Sciences*. 2019;8(3):326-332.
59. Lind J, Danski MTR, Lenzi L, Pedrolo E, Schwanke AA, Johann DA. Peripheral catheter with closed infusion system: technology implementation. *Journal of Nursing UFPE Online*. 2019;13(5):1208-1215.

## RESEARCH ARTICLES

60. Marsh N, Webster J, Mihala G, Rickard CM. Devices and dressings to secure peripheral venous catheters to prevent complications (Review). *Cochrane Database of Systematic Reviews*. 2015;12(6):1-55.
61. Marsh N, Webster J, Mihala G, Rickard CM. Devices and dressings to secure peripheral venous catheters: A Cochrane systematic review and meta-analysis. *International Journal of Nursing Studies*. 2017;67:12-19.
62. Mattox AE. Complications of Peripheral Venous Access Devices: Prevention, detection, and recovery strategies. *Critical Care Nurse*. 2017;37(2):1-14.
63. McGowan D. Peripheral intravenous cannulation: what is considered 'best practice'? *British Journal of Nursing*. 2014;23(14):26-28.
64. McGuire R, Norman E, Hayden I. Reassessing standards of vascular access device care: a follow-up audit. *British Journal of Nursing*. 2019;28(8):4-12.
65. Mihala G, Ray-Barruel G, Chopra V, Webster J, Wallis M, Marsh N, McGrail M, Rickard CM. Phlebitis signs and symptoms with peripheral intravenous catheters. *Journal of Infusion Nursing*. 2018;41(4):260-263.
66. Morrison K, Holt KE. The effectiveness of clinically indicated replacement of peripheral intravenous catheters: an evidence review with implications for clinical practice. *Worldviews on Evidence-Based Nursing*. 2015;12(4):187-198.
67. Murayama R, Uchida M, Oe M, Takahashi T, Oya M, Komiyama C, Sanada H. Removal of peripheral intravenous catheters due to catheter failures among adult patients. *Journal of Infusion Nursing*. 2017;40(4):224-230.
68. Nickel B. Peripheral intravenous access: applying infusion therapy standards of practice to improve patient safety. *Critical Care Nurse*. 2019;39(1):61-71.
69. Nyika LM, Mukona, D, Zvinavashe M. Factors contributing to phlebitis among adult patients admitted in the medical-surgical units of a central hospital in Harare, Zimbabwe. *Journal of Infusion Nursing*. 2018;41(2):96-102.
70. Ogston S. Patient safety and pain in IV therapy. *British Journal of Nursing*. 2014;23(2):10-11.
71. Perez CA, Figueroa SA. Complication rates of 3% Hypertonic Saline infusion through peripheral intravenous access. *Journal of Neuroscience Nursing*. 2017;49(3):191-195.
72. Purssell E. Preventing infection in intravenous catheters in the community. *British Journal of Community Nursing*. 2017;22(8):374-377.
73. Ray-Barruel G. Infection prevention: peripheral intravenous catheter assessment and care. *Infection Prevention and Control Practices / Wound Care*. 2017;24(8): 34.
74. Ray-Barruel G, Rickard CM. Helping nurses help PIVCs: decision aids for daily assessment and maintenance. *British Journal of Nursing*. 2018;27(8):12-18.
75. Rosenroll A. Peripheral intravenous catheters: improving outcomes through change in products, clinical practice and education. *Vascular Access*. 2017;11(1):7-12.
76. Sarı D, Eşer İ, Akbıyık A. Periferik intravenöz kateterle ilişkili flebit ve hemşirelik bakımı. *Journal of Human Sciences*. 2016;13(2):2905-2920.
77. Simin D, Milutinović D, Turkulov V, Brkić S. Incidence, severity and risk factors of peripheral intravenous cannula-induced complications: An observational prospective study. *Journal of Clinical Nursing*. 2018;28(9-10):1-15.
78. Sou V, McManus C, Mifflin N, Frost AS, Ale J, Alexandrou E. A clinical pathway for the management of difficult venous access. *BioMed Central Nursing*. 2017;16(64): 2-7.
79. Spencer S, Gilliam P. The KISSSS method of peripheral I.V. catheter care. *Nursing*. 2017;47(6):64.
80. Stevens C, Milner KA, Trudeau J. Routine versus clinically indicated short peripheral catheter replacement, An evidence-based practice project. *Journal of Infusion Nursing*. 2018;41(3):198-203.
81. Tanabe H, Takahashi T, Murayama R, Yabunaka K, Oe M, Matsui Y, Arai R, Uchida M, Komiyama C, Sanada H. Using ultrasonography for vessel diameter assessment to prevent infiltration. *Journal of Infusion Nursing*. 2016;39(2):105-111.
82. Ullman JA, Keogh S, Marsh N, Rickard CM. Routine versus clinically indicated replacement of peripheral catheters. *British Journal of Nursing*. 2015;24(2):14.
83. Wang R, Zhang MG, Luo O, He L, Li JX, Tang YJ, Luo YL, Zhou M, Tang L, Zhang ZX, Wu H, Chen XZ. Heparin saline versus normal saline for flushing and locking peripheral venous catheters in decompensated liver cirrhosis patients, a randomized controlled trial. *Medicine*. 2015;94(31):1-7.
84. Webster J, Osborne S, Rickard CM, Marsh N. Clinically-indicated replacement versus routine replacement of peripheral venous catheters (Review). *Cochrane Database of Systematic Reviews*. 2019;1(CD007798):14-20.
85. Webster J, Osborne S, Rickard CM, New K. Clinically-indicated replacement versus routine replacement of peripheral venous catheters. *Cochrane Database of Systematic Reviews*. 2015;14(8):9-19.
86. Wong G, Cooper A, Brown J, Boyd L, Levinson M. The prevalence of peripheral intravenous cannulae and pattern of use: a point prevalence in a private hospital setting. *Journal of Clinical Nursing*. 2018;27(1-2):363-367.
87. Yagnik L, Graves A, Thong K. Plastic in patient study: Prospective audit of adherence to peripheral intravenous cannula monitoring and documentation guidelines, with the aim of reducing future rates of intravenous cannula-related complications. *American Journal of Infection Control*. 2016;45(1):34-38.
88. Zhu A, Wang T, Wen S. Peripheral intravenous catheters in situ for more than 96h in adults: What factors affect removal? *International Journal of Nursing Practice*. 2016;22(6):529-537.
89. Erdoğan BC, Denat Y. Peripheral Intravenous Catheter Infiltration and Nursing Care. *Journal Of Education And Research in Nursing*. 2016;13 (2):157-162.
90. Loveday HP, Wilson JA, Pratt RJ, Golsorkhia M, Tinglea A, Baka A, Brownea J, Prietob J, Wilcox M. Epic3: national evidence-based guidelines for preventing healthcare-associated infections in NHS hospitals in England. *Journal of Hospital Infection*. 2014;86(1):1-70.
91. Gorski LA. The 2016 Infusion therapy standards of practice. *Wolters Kluwer Health*. 2017;35(1):10-18.
92. National Vascular Access Management Guide. *Turkish Journal of Hospital Infections*. 2019;23(Ek 1):1-54.
93. Erefe İ. Quality of Data Collection Tools., İ. Erefe. (Editors). *Research principles, processes and methods in nursing*. (4th Edition). Ankara: Odak Ofset Printing. 2012:169-188.
94. O'Grady PN, Alexander M, Burns LA, et al. Guidelines for the prevention of intravascular catheter-related infections. *Am J Infec Control*. 2011;39:1-34. <https://doi.org/10.1016/j.ajic.2011.01.003>.



## RESEARCH ARTICLES

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95. Mulemba T, Bank R, Sabantini M, Chopi V, Chirwa G, Mumba S, et al. Improving Peripheral Intravenous Catheter Care for Children with Cancer Receiving Chemotherapy in Malawi. *Journal of pediatric nursing*. 2021;56:13-7. doi: 10.1016/j.pedn.2020.09.019.
  96. Woody G, Davis BA. Increasing nurse competence in peripheral intravenous therapy. *J Infus Nurs*. 2013;36(6):413–419. <https://doi.org/10.1097/NAN.000000000000013>.
  97. George K, Muninarayanappa B. Effectiveness of structured teaching program on knowledge and practices of staff nurses on prevention of intravenous cannulae complications. *Archives of Medicine and Health Sciences*. 2013;1(2):115-119, doi: 10.4103/2321-4848.123020
  98. National Vessel Access Management Guideline (NVAMG) *Turk J Hosp Infect*. 2019;23(add1):1-54.
  99. Hontoria-Alcoceba R, Lopez-Lopez C, Hontoria-Alcoceba V, Sanchez-Morgado AI. Implementation of Evidence-Based Practice in Peripheral Intravenous Catheter Care. *J Nurs Care Qual*. 2023;10, 1097/NCQ.0000000000000688.
  100. Blanco-Mavillard I, de Pedro-Gomez JE, Rodriguez-Calero MA, Bennasar-Veny M, Parra-Garcia G, Fernandez-Fernandez I, et al. Multimodal intervention for preventing peripheral intravenous catheter failure in adults (PREBACP): a multicentre, cluster-randomised, controlled trial. *Lancet Haematol*. 2021;8(9):e637-e47. doi: 10.1016/S2352-3026(21)00206-4.

# Barlow, Ortolani and hippy dolls: Understanding child health nurses practice when screening for developmental dysplasia of the hip

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## ABSTRACT

**Objective:** To identify Child Health Nurses, Registered Midwives, Registered Nurses, or General Practice Nurses' individual practices, understand their practice and any enablers or barriers to their practice when screening for developmental dysplasia of the hip (DDH) in infants.

**Methods:** Online focus groups were held via Zoom. The focus groups were semi-structured and utilised a pre-developed guide to ensure the research aims and objectives were covered. The three focus groups were recorded transcribed, and data from the 11 participants analysed using a structured thematic analysis.

**Results:** Four themes were found to be important to practice when screening for DDH. Theoretical education and practical training of clinicians was viewed as essential and included consistency of training and ongoing education. Participants highlighted perceptions of practice and confidence in their own and others practice. Understanding screening, diagnosis and treatment was important, as was the role of other health care providers and best practice recommendations. Finally supporting families and the child was seen as an essential role especially during missed diagnoses.

**Conclusion:** Barriers to confidently screening for DDH are many, with enablers few. Child Health Nurses require ongoing training and education to confidently screen infants for DDH. This training should be evidence based which will require further research into the current education available. To support an evidence-based approach to screening a study of accuracy should be explored.

**Keywords:** Child Health, Mass Screening, Nurses,

### What is already known about the topic?

- Child health nurses in Australia screen infants for DDH as part of everyday practice.
- There is minimal evidence understanding nurses practice, barriers and enablers to practice, and experiences when screening for DDH.
- There is no recognised formal training for DDH screening.

### What this paper adds

- Nurses require ongoing training and education to confidently screen for DDH.
- Training for DDH screening should be evidence based and provided to all clinicians involved in screening for DDH.

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### OBJECTIVE

This study focuses on understanding the individual and collective experiences, screening practices, and barriers and enablers of CHNs, Registered Midwife, Registered Nurse, or General Practice Nurses who use physical assessment to screen infants and young children for DDH.

### BACKGROUND

Child health nurses (CHNs) in Australia are Registered Nurses who generally hold a postgraduate qualification and specialise in the domain of child and family health nursing.<sup>1</sup> Qualifications and training in child health varies between organisations. CHNs work primarily in community health care settings and provide care to infants, children, their parents, and families.<sup>2</sup> All Australian children can visit CHNs free of charge for support, assessment and education until the child starts school, generally five years old.<sup>2</sup> CHNs possess expertise and skill in specific areas that impact the growing child and family environment.<sup>2</sup> One specific area of knowledge that plays a large role in their daily practice is understanding and comprehensively assessing child health and development.<sup>2</sup> To facilitate this, in all states of Australia, children are provided with a coloured book at birth that outlines Universal Well Child Assessments (UWCA) at pre-identified intervals during the child's first five years of life.<sup>3-9</sup>

The UWCA focuses on measurements and screening tests to monitor children's health and development and identify any problems as early as possible.<sup>8</sup> One such screening test involves developmental dysplasia of the hips (DDH). Developmental dysplasia of the hips describes a spectrum of abnormalities where the femoral head and acetabulum are not in alignment, grow abnormally or a combination of both.<sup>10</sup> During infancy and early childhood clinicians can use physical assessment to screen for underlying abnormalities in hip anatomy and function that may indicate a low or high suspicion of DDH.<sup>11</sup> The aim of screening for DDH is to detect children with abnormal findings as early as possible to diagnose, treat or monitor appropriately.<sup>12</sup> In Australia, CHNs are the primary clinicians for DDH screening in infants and young children.<sup>10</sup> There is no recognised formal training for DDH screening; and currently few studies describing the knowledge, attitudes, practice, and confidence of child health nurses who use physical assessment to screen for DDH.<sup>10</sup>

### METHODS

#### AIM

The aims of this Australian study are to identify clinicians' individual practices, understand their practice and any enablers or barriers to their practice, when screening for DDH in infants.

### STUDY DESIGN

This study was exploratory due to a lack of published research on the area. Focus groups allowed the participants to use their own clinical experience and practice and identify topics that were important to them. Participants were then able to discuss and debate any points of interest or concern. Focus groups therefore facilitated discussion of a variety of topics and perspectives over a short period of time.

### SAMPLING AND RECRUITMENT

Participants were recruited through various means including authors' pre-existing networks, Australian professional child health nursing bodies, professional networking, and snowballing. To meet the inclusion criteria, clinicians had to identify as a CHNs, Registered Midwife, Registered Nurse, or General Practice Nurse and that screening for DDH is part of their daily practice. All participants provided written informed consent prior to being scheduled to a focus group.

### SETTING

Focus groups were held via Zoom and moderated by the first (LS) and third (LP) authors. All sessions were held in the evening and participants joined from either their home environment or child health clinic room. At the beginning of each focus group participants introduced themselves to the moderators, other participants in their group and confirmed they had provided written consent to participate in the research. Participants were asked to activate their cameras to enhance engagement and interaction. Participants received a gratitude payment for their time (AU \$50 online gift card).

### DATA COLLECTION

Three focus groups were held over a four-week period in May – June 2023, lasting a minimum of 45 minutes and a maximum of 70 minutes. The focus groups were semi-structured and utilised a pre-developed guide to ensure the research aims and objectives were covered. The guide was developed from the results of a literature review,<sup>10</sup> and researchers experience. The focus groups were recorded using Zoom audio recording and transcribed by the first author (LS). Focus groups were ceased when data saturation was reached, this was defined when no new categories were discussed by participants.

### ETHICAL CONSIDERATIONS

Ethical approval was obtained from the University of South Australia Human Research Ethics Committee (project number: 205417). All participants provided verbal and written informed consent prior to participation.

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### DATA ANALYSIS

The data analysis followed Braun & Clarke's six stage framework for thematic analysis,<sup>13</sup> additionally utilising a two-researcher approach for reliability of findings.<sup>14</sup> The focus group recordings were transcribed verbatim by the lead author (LS) to allow for data immersion. The second author (PKO) listened to the recordings while viewing the transcripts. These two researchers then coded the transcripts using NVIVO software.<sup>15</sup> Themes from these codes were identified independently by LS and PKO, with in depth discussions occurring to agree on the final themes and subthemes. The reliability of the findings was further enhanced by deep discussion with all authors, that included different health disciplines and currently practicing clinicians. This triangulation ensured the credibility of the data and reported findings were valid.<sup>16</sup>

### TRUSTWORTHINESS

The two researchers (LS & PKO), involved in the analysis of the data both have a nursing background, (PKO) a novice who has not practiced in the field and (LS) who has post graduate qualifications and has practiced extensively in the area. Data collection methods, analysis, and reporting of results in this current study are considered by the authors as truthful and an accurate representation of the population of focus.

## RESULTS

### PARTICIPANTS CHARACTERISTICS

A total of 11 participants consented to participate in focus groups. All participants identified as female, most participants had been screening for DDH for between 6 – 15 years (72.7%,  $n=8$ ), and all had post graduate education in the areas of midwifery or child and family health. The characteristics of participants are presented further in Table 1.

Four themes, with 12 sub themes were identified in the data and shown in Figure 1.

<b>Theoretical education and practical training of clinicians</b>	<ul style="list-style-type: none"> <li>Consistency of training</li> <li>Hippy Dolls for training and assessment</li> <li>Ongoing education and training</li> </ul>
<b>Perceptions of practice</b>	<ul style="list-style-type: none"> <li>Confidence in their own practice</li> <li>Confidence in other clinicians</li> <li>Doubting practice</li> </ul>
<b>Understanding screening, diagnosis and treatment</b>	<ul style="list-style-type: none"> <li>DDH is a developmental condition</li> <li>Role of other health care providers</li> <li>Best practice for screening, diagnosis and treatment</li> </ul>
<b>Supporting families and the child</b>	<ul style="list-style-type: none"> <li>Best practice for screening, diagnosis and treatment</li> <li>Emotional impact on families and the clinician</li> <li>Long term implications if a diagnosis is missed</li> </ul>

FIGURE 1: THEMES AND SUB THEMES

TABLE 1: PARTICIPANT CHARACTERISTICS

Characteristics	N	%	
Age	31-40 years	4	36.4
	41-50 years	2	18.2
	51+ years	5	45.5
	<b>Total</b>	<b>11</b>	<b>100.0</b>
Position	Child Health Nurse	7	63.6
	Midwife	1	9.1
	Midwife and Child Health Nurse	3	27.3
	<b>Total</b>	<b>11</b>	<b>100.0</b>
Education	Graduate Certificate	2	18.2
	Graduate Diploma	7	63.6
	Masters	1	9.1
	PhD	1	9.1
	<b>Total</b>	<b>11</b>	<b>100.0</b>
Experience	6-10 years	5	45.5
	11-15 years	3	27.3
	16-20 years	1	9.1
	21+ years	2	18.2
	<b>Total</b>	<b>11</b>	<b>100.0</b>

### THEORETICAL EDUCATION AND PRACTICAL TRAINING OF CLINICIANS

All participants discussed the consistency of training that they received both formally and as part of their ongoing clinical positions. There was a general perception that the training was inconsistent and did not meet their needs. Participants in all focus groups agreed that while they knew that there were recommended assessments, they were not always taught how to do them:

*'In terms of training for me... it was super basic it was literally just watching another midwife. What felt like just do an abduction, and just bring it back in and having a feel. There wasn't much, I don't even feel like Barlow and Ortolani were even mentioned, or you know... There was kind of no checking the height, leg lengths, any of those things. It was really very vague.'*

Every focus group spent time discussing the use of the 'hippy doll' during training and assessment. There was discussion about the cost of the doll and how the dolls may not be accurate, however ultimately participants felt they were useful to use when practicing skills:

*'Those dolls what everyone was saying, were a bit, aren't the best, at least that's better than nothing.'*

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Participants also expressed their need for ongoing training and recognising expertise in the area. For instance, some participants said they had spent time with paediatric consultants or physiotherapists to watch and learn from experts in the field. This lack of ongoing training could lead to frustration and a feeling that their own learning was inconsequential as evidenced in the focus groups:

*'I do think having that expert education for us nurses, I think we're well deserving of that and that should be prioritised ... I did the masters ... and there was nothing in there. You know, like at no point has there ever been any solid education other than the ... video, and a few nursing assessments along the way. And that's poor effort from my perspective.'*

### PERCEPTIONS OF PRACTICE

Most participants stated that they were confident in their own practice and after reflection and discussion began to doubt themselves. Participants discussed that they felt confidence was something that developed over time. There were also factors that altered that confidence, including the age and size of the child, staffing levels, the ability to 're-check' the infant and picking up on clinical signs that had less significance than an obvious dislocation or a clunk. One participant explained this well:

*'But a generally healthy baby, I feel fairly confident. After many, many, years. Like I think it takes a long time in the early stages. I definitely didn't have the same amount of confidence and even to the point of when you're doing your competency 's going 'Oh my gosh am I doing it right' and getting really nervous. But now I feel yeah confident that I'm doing it right after so long.'*

The role of other health professionals and the confidence in others practice was a topic that divided most groups. Participants spoke about the role of the general practitioner, physiotherapist, paediatricians, and other nurses. More than half of the participants stated that they had observed practice in other professionals that concerned them, whilst other participants held certain professionals' assessment skills in high regard:

*'People actually are just moving legs around, thinking that that's checking hips and not really understanding what they're trying to do when they are moving the hips.'*

All participants talked about self-doubt and the guilt they felt if they 'missed' a DDH during screening. For some participants the doubt was around infants they had referred on for further review and other professionals did not find abnormalities in physical assessment or imaging. For other participants it was doubting their own ability detect signs of DDH. Overwhelmingly, participants agreed that referring the infant to another health professional for review was reassuring:

*'I guess there's sometimes I do doubt myself if, you know there's perhaps a bit of a family history or somebody else's picked a click up or you know sometimes people feel their knees and they're like Oh no that's a click. Those type of situations then I perhaps doubt myself. But yeah, they're usually being referred anyway, so...'*

### UNDERSTANDING SCREENING, DIAGNOSIS, AND TREATMENT

Developmental dysplasia of the hip as identified in the name is a developmental condition. It may not be present at every assessment, and this was recognised in all focus groups with most participants including this in their discussions:

*'I think like the other thing we have to remember is... Not to feel guilty necessarily if we don't pick it up. Because it's called developmental hip dysplasia for a reason you know? And so I've heard people say why didn't that GP pick it up? Or why didn't that nurse pick it up? And I think about the actual pathophysiology and what that actually is.'*

Many participants considered the role of the general practitioner in the referral pathway and how they considered this to be inconsistent. Factors contributing to this included geographical locations, years of practice of the general practitioner, and conflicting priorities in appointment times. Some of the participant had found that they had to specifically request additional screening. One nurse confided to the group:

*'I find that so dependent upon the GP and that whether or not they will actually go and screen. And quite often we are now starting to write letters to the GP to say you know we strongly suggest an ultrasound is done. Because sometimes we'll see clients pop back to us at that eight week check and their GPs like no that's fine, baby's fine, I couldn't feel anything. And I've always found that a little bit concerning.'*

Discussion in all group interviews explored best practice and recommendations for prevention, screening, diagnosis, and treatment. Double nappies, ultrasound screening and the length of time immobilisation devices are worn were discussed. All participants agreed that best practice was varied and there was inconsistency between clinicians from different disciplines, and even clinicians in the same discipline. This included discrepancies on when to screen and how to screen. More than one interview identified CHNs as the clinicians who had to advocate for further screening, a diagnosis or treatment. One nurse explained:

*'What was so awkward with that one was, two paediatric consultants dismissed it. Our physio kept saying not good enough, it needs to be followed up. This little one needs to be in a harness. And then in the end it was... I felt I was the meat in the middle... I felt like I had to kind of be sneaky and ask her local GP could he refer to kids...'*

## RESEARCH ARTICLES

### SUPPORTING FAMILIES AND THE CHILD

Every participant discussed educating parents about what information is currently available, what information is needed, and what they need to do. Participants all agreed that when explaining what DDH is to parents, they use their hands to mime making a 'femoral head' and 'pelvis'. Participants discussed that while some parents will know what DDH is – and this is normally because of a diagnosed family member or friend's child, the majority of parents have not heard of the diagnosis. Clinicians identified that when parents were concerned or wanted more information about DDH, there were minimal non-acute resources available to them:

*I tend to use, when explaining it to the parents, I mean explain it's a ball and socket joint a lot like [Participant 7] was explaining and using my hands and things like that. And if there are concerns, I'll often just send them some of them, I'll email them some of the information from the Sydney Children's Hospital or something like that.'*

Clinicians identified the emotional impact that screening, diagnosis, and treatment had on an infant and their family. Whilst all participants alluded to guilt over late diagnoses, they continued to support and check on families and infants affected. One nurse spoke about the first time they saw an infant in a brace, and infants that were diagnosed later in childhood:

*'So, the other baby that was a late pick up, she was put into a rhino harness at six months and she's coming up to two and she's still in the harness. And for that family unfortunately this little one had other cardiac complications and so on. So, for them it's just been a really long journey and the wear and tear that is had on, on them as new parents and a new family has just been enormous.'*

There was general agreement that the long term implications of missing a diagnosis was a motivator to ensuring all infants were checked routinely. Long term implications for the child including the need surgery, uneven gait, delayed gross motor skills and problems as an adult were discussed:

*'You know it doesn't seem to be as bigger issue as other, you know other things that you can just as easily miss. But it just seems to have this real stigma about hips and that you're going to miss them. And it's all going to be tragic and they're not going to be found until they're one year old and treatments going to be quite excessive and long and all of this.'*

### DISCUSSION

Screening infants for DDH is an important component of infant assessment for CHNs and other health professionals that routinely see infants in clinical practice.<sup>17</sup> A 2015 study highlighted the need for continued education, competency and specialist knowledge for CHNs.<sup>1</sup> Our study also found that to confidently assess infants, CHNs and other health professionals should receive formal, ongoing training and education from leading experts in the field.

Bailey and Emory (2022) demonstrated that simulation increases clinician confidence and transfers to improved patient care and clinical performance.<sup>18</sup> The 'hippy dolls' simulation training while seen as a 'better than nothing resource' by the participants in this study, may become a valuable training and assessment tool if the ability to consistently manoeuvre the hips and not permanently dislocate them is improved. The 'hippy dolls' are only suitable when used for training or assessing clinicians in performing the Barlow or Ortolani manoeuvres.<sup>19</sup>

Our study indicated that participants perceived DDH screening to be an important component of infant assessment for both themselves, and other health professionals. CHNs working in this area have an advanced scope of practice.<sup>1</sup> International studies have found that collaborative relationships with other health care professionals is essential to a cohesive healthcare team and establishing models of care.<sup>1,20</sup>

Education and training to support clinical knowledge and skills in the area was identified as being inconsistent and a barrier to clinicians confidently assessing all infants. International studies have determined the accuracy of different professions when screening for DDH, in one study physiotherapists were more effective at screening for DDH than junior paediatric doctors.<sup>21</sup> While a 2021 study found that positive predictive value of DDH screening when performed by general practitioners is low and continuing to decline.<sup>22</sup> CHNs reported much of their knowledge and practice was learnt on the job and refined over many years of practice. The findings of Krikler and Dwyer would support that experience is valuable, however education and training should also be provided to increase overall screening accuracy.<sup>21</sup> In this study while learning from each other was important, there was a real desire to receive formal, consistent education and simulated practice from leading experts in the field. Thus, understanding how experience, education and training influence screening accuracy are key factors in the development and delivery of education and training to provide safe and effective nursing care that is underpinned by evidence.<sup>18,23</sup>

### IMPLICATIONS FOR PRACTICE

This study suggests that child health nurses require ongoing training and education to confidently screen infants for DDH. This training should be evidence based which will require further research into the current education available. There is currently no research into the accuracy of child health nurses screening for DDH. Studies that report on accuracy of screening assessments for DDH are predominantly conducted in tertiary settings and determine accuracy of practice for medical practitioners.

## RESEARCH ARTICLES

To support an evidence-based approach to screening a study of accuracy when child health nurses screen for DDH in the community should be explored. The results of a child health nurse-based accuracy study would provide an evidence base to determine an Australia wide approach to child health nurse education and training when screening for DDH.

### LIMITATIONS

There were limitations to this study, particularly it is recognised that these are the experiences and views of more experienced clinicians. Clinicians with less experience did not respond to ongoing requests to participate in the focus groups. The views of less experienced clinicians were therefore not included, and it is acknowledged by the authors that they may vary from these findings. Our results should inform further research and are not necessarily intended to be generalisable. Arguably, the sample size was small, however data saturation was reached.

### CONCLUSION

This study identified screening for DDH is an important role for clinicians. Barriers to confidently screening for DDH are many, with continuing and specialist education seen as the most important. The role of the hippy doll was seen as an important training tool, that could be improved to enhance clinical performance and confidence.

Clinicians highlighted the important role they had in not just screening but continued support and advocacy for the family if DDH was diagnosed in the infant.

All clinicians interviewed expressed a desire for ongoing training and professional development. The need for high quality resources not just for clinicians but for families, and consistent national, evidence based, approaches to competencies related to DDH screening for all health professionals.

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### REFERENCES

- Fowler C, Schmied V, Psaila K, Kruske S, Rossiter C. Ready for practice: What child and family health nurses say about education. *Nurse Educ Today*. 2015;35(2):e67-e72.
- Australian College of Nursing (ACN). Maternal, child and family health nursing – position statement [Internet]. Canberra (AU); 2021. [cited 15 Feb 2024]. Available from: <https://www.acn.edu.au/wp-content/uploads/position-statement-maternal-child-and-family-health-nursing.pdf>.
- ACT Health. *My ACT Personal Health Record*. ACT Government. 2018.
- Child and Family Health Service. *My Health and Development Record*. Government of South Australia. 2021.
- Department of Health. *My Health, Learning and Development*: Victoria State Government. 2017.
- NSW Ministry of Health. *My Personal Health Record*. NSW Government. 2021.
- NT Health. *NT Child Health Record*. Northern Territory Government. 2018.
- Queensland Health. *Personal Health Record*. Queensland Government. 2018.
- WA Health. *Purple Book*. Government of Western Australia. 2019.
- Smart L, Pelentsov L, Childs J, Williams N, Esterman A. Nurses assessment of development hip dysplasia: A scoping review. *J Child Health Care*. 2022;13674935221095647.
- Williams N. Improving early detection of developmental dysplasia of the hip through general practitioner assessment and surveillance. *Aust J Gen Pract*. 2018;47(9):615-9.
- Sewell M, Rosendahl K, Eastwood D. Developmental dysplasia of the hip. *BMJ*. 2009;339.
- Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol*. 2006;3(2):77-101.
- Maguire M, Delahunt B. Doing a thematic analysis: A practical, step-by-step guide for learning and teaching scholars. *All Irel J of High Educ*. 2017;9(3).
- NVIVO qualitative data analysis software. QSR International Pty Ltd. Version 1.7.1, 2024
- Santos KdS, Ribeiro MC, Queiroga DEUd, Silva IAPd, Ferreira SMS. The use of multiple triangulations as a validation strategy in a qualitative study. *Cienc Saude Colet*. 2020;25:655-64.
- Paton RW. Screening in developmental dysplasia of the hip (DDH). *Surgeon*. 2017;15(5):290-6.
- Bailey L, Emory J. High-fidelity simulation improves confidence in nursing students. *Teach Learn Nurs*. 2022;17(2):191-4.
- Eaby S, Sauerbrun J, Perry S. Developmental Dysplasia of the Hip Medical Trainer. 2022.
- Torrens C, Campbell P, Hoskins G, Strachan H, Wells M, Cunningham M, et al. Barriers and facilitators to the implementation of the advanced nurse practitioner role in primary care settings: a scoping review. *Int J Nurs Stud*. 2020;104:103443.
- Krikler SJ, Dwyer NS. Comparison of results of two approaches to hip screening in infants. *J Bone Joint Surg*. 1992;74(5):701-3.
- Husum HC, Maimburg RD, Kold S, Thomsen JL, Rahbek O. Self-reported knowledge of national guidelines for clinical screening for hip dysplasia: a web-based survey of midwives and GPs in Denmark. *BJGP Open*. 2021;5(4).
- King R, Taylor B, Talpur A, Jackson C, Manley K, Ashby N, et al. Factors that optimise the impact of continuing professional development in nursing: A rapid evidence review. *Nurse Educ Today*. 2021;98:104652.

# Perspectives of clinician nurses working in a nurse-led research team: Building nurse research capacity

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## ABSTRACT

**Objective:** To explore the perspectives of clinician nurses working as research assistants in a nurse-led research project.

**Background:** Supporting clinician nurses' exposure to nurse-led research encourages a culture of excellence, innovation and quality improvement and improves health outcomes. In a recent project, clinician nurses were provided an opportunity to gain exposure to nurse-led research by working as research assistants, screening and consenting participants, and collecting data.

**Study design and methods:** An exploratory qualitative descriptive approach was taken. Eight nurses participated in semi-structured interviews representing an exhaustive sample consisting of all eligible participants. Inductive content analysis was conducted.

**Results:** Three themes and seven categories were developed: (1) Making a difference to patients (Nurses at the bedside motivated to improve care, Hearing what patients had to say was rewarding); (2) How the role was laid out shaped the experience (Working closely with the research team, Flexibility of the

role, Working within the constraints of the clinical setting); and (3) Growing confidence as researchers (Encouraged to do more, Making opportunities and support accessible to ward-based nurses).

**Conclusion:** This study offers insights into how nurses can be supported to undertake and contribute to nurse-led research. Strategic support and monetary investment are needed to facilitate ongoing and broader strategies to develop the research-active clinician workforce.

### Implications for research, policy and practice:

Despite the recognised value of research-engaged clinicians, little is known about the existing opportunities and experiences of clinician nurses working in research. Nurses' motivations to engage in this initiative included the project's focus on their clinical specialty and the opportunity to improve patient care. Practical opportunities for clinician nurses to engage in research must be accompanied by systematic supports, including protected time and mentorship, to address known barriers. Strategic approaches to support clinician-led research have the potential to offer wide-spread benefits to the healthcare system.



## RESEARCH ARTICLES

### What is already known about the topic?

- Clinician nurses often lack skills, confidence and experience to develop and implement nurse-led research.
- Engaging clinician nurses in research improves quality of care, workforce morale and retention, and translation of research to practice. This promotes a culture of excellence, innovation and quality improvement.
- Little is known about what opportunities exist for the development of nurses' research skills in Australia and the experiences of registered nurses working in research projects.

### What this paper adds

- Clinician nurses valued opportunities to work as research assistants in nurse-led research.
- The opportunity strengthened their pre-existing interest, consolidated prior learning, and developed knowledge and confidence.
- Nurses expressed a desire for research opportunities, support and resources accessible in their clinical area, to fulfil their research aspirations.

**Keywords:** Qualitative research; Nurse clinician; Quality improvement; Clinical nursing research; Nursing research; Nursing

## OBJECTIVE

To explore perspectives of clinician nurses working as research assistants in a nurse-led research project.

## BACKGROUND

Contributing to research is professionally recognised as a component of nursing in Australia.<sup>1</sup> Furthermore, engaging nurses actively in research is a nursing and midwifery workforce priority and it is internationally recognised that the future development of the nursing profession requires leadership in the development of research skills.<sup>2,3</sup> In the recent report titled 'Research and innovation as core functions in transforming the health system', the Australian Academy of Health and Medical Sciences (AAHMS) explains a research-active workforce improves quality of care, workforce morale and retention and translation of research to practice and reduces mortality.<sup>4</sup> It is also recognised that evidence-based healthcare incorporating the implementation of research findings leads to a more cost-efficient healthcare system.<sup>4</sup>

According to AAHMS, health professionals such as nurses may engage in research as either clinician researchers or research-active health professionals. Clinician researchers are health professionals working in both clinical and research practice and are recognised as critical to contributing to the benefits of a research-driven healthcare system in Australia.<sup>4</sup> Furthermore, the Australian College of Nursing (ACN) officially recognise the role of the clinical research nurse as those who deliver clinical research to improve health care outcomes, participant experience and treatment pathways and significant work from the United Kingdom has also supported the value of this role.<sup>5,6</sup> While higher degree by research programs are one formal training avenue for clinical research nurses, it is recognised the career pathway is not yet universally described across Australia.<sup>5</sup>

Research-active health professionals are described by AAHMS as those who are involved in research less formally within their clinical roles.<sup>4</sup> These may include nurses, midwives and allied health professionals, such as those working in clinical practice, who either actively lead research, or participate in other roles, including as research assistants, in quality or practice improvement activities.<sup>4</sup> By doing so, they are fulfilling their professional responsibilities and contributing to research.<sup>1</sup>

Inherent in providing opportunities for clinicians to be involved in research activities is the concept of building research capacity.<sup>7</sup> Research capacity is described as the ability to conduct research activities in a sustainable manner to ensure the improvement of research skills amongst the nursing workforce into the future.<sup>7</sup> It is suggested that nurses working in clinical practice (clinician nurses) can be supported to contribute to quality nursing research through building competence, motivation, infrastructure and collaboration in research activity.<sup>7</sup> In Australia, there are approximately 390,000 registered nurses and midwives. Together, they represent the largest cohort (54%) of the total number of registered health professionals.<sup>8</sup> Investment into the further development of nurse research capacity represents an opportunity with considerable potential benefits because of nurses' proven record of yielding high investment returns through the delivery of quality research outcomes and expertise in evidence implementation.<sup>9</sup>

It is recognised that few clinician nurses are considered to be research-active and studies about this activity are limited.<sup>10</sup> There are known barriers to clinician nurses' involvement in research activity, such as a lack of leadership support and time,<sup>11</sup> and little is known about what opportunities exist for clinician nurses to develop research skills in Australia outside of the formal higher degree by research pathways. While some international and local level researcher training programs exist, in Australia, there is no formal pathway or governing body to support the development of clinician nurses' research skills and training despite being recognised as a key component of their professional work.<sup>4,12</sup>

## RESEARCH ARTICLES

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Furthermore, little is known about what opportunities exist for the development of clinician nurses' foundational research skills in Australia and their experience working in research projects.<sup>4</sup> One Australian study reported aiming to build the research capacity of clinical nurses through a participatory action research project.<sup>14</sup> Clinical nurse participants reported increased confidence and motivation to pursue further practice improvement ideas.<sup>14</sup> Additionally, a qualitative study from Ireland described the experiences of clinician nurses implementing a nurse-led clinical trial.<sup>15</sup> Focus groups conducted with eighteen nurses revealed clinical research was accessible and achievable in their clinical roles. Interestingly, prior to their involvement in the clinical trial, these nurses did not believe conducting clinical research was within their scope and approached the research with reservations.<sup>15</sup> This suggests there is a need for proactive engagement of nurses in conducting research.

Other literature investigating clinician nurses working in research has primarily focussed on evaluating research capacity, competence and culture, rather than the experience of nurses working in research activities. A scoping review investigated what factors improve research capacity amongst nursing and midwifery academics internationally,<sup>16</sup> however this review did not address nurses or midwives working in the clinical setting. In a scoping review of Australian and New Zealand nurse-led randomised controlled trials, the authors described a small number of nurse-led trials conducted by a limited group of researchers evidencing the opportunity to expand nurse-led research,<sup>17</sup> which could be addressed by improving research capacity amongst clinician nurses.

Barriers to developing research capacity amongst health staff including nurses, however, have been identified including a lack of time and access to resources such as protected time, competing clinical priorities, and a lack of research knowledge, confidence and skills.<sup>18,19</sup> Similar barriers have been reported regarding quality improvement competence. While knowledge and attitudes towards quality improvement competence amongst frontline nurses and leaders is reportedly high, skill proficiency is low, and barriers prevent engagement in these activities.<sup>20</sup> Recommended strategies to improve competence include creating a just culture and building infrastructure to support engagement with quality improvement.<sup>21</sup> Clinician nurses want research engagement opportunities but have difficulty finding them.<sup>22</sup> Despite recommendations to improve engagement amongst clinician nurses, evaluation of strategies to address these barriers is lacking.

To improve research capacity in the nursing and midwifery workforce, it is important to describe and evaluate the experience of clinician nurses working in research activities. During a recent research project at a tertiary hospital in Western Australia, clinician nurses with no required research experience were invited to work as research assistants, screening and consenting participants and collecting data.<sup>23</sup>

It may be challenging for clinicians seeking to work in research to transition from clinical to research roles without having had any prior exposure to working in research activities. This project provided an ideal opportunity to evaluate the experiences of the clinicians working as research assistants to inform needed investment in nurses as a confident, proficient, research-active workforce both within the health service and more broadly.

## STUDY DESIGN AND METHODS

### OBJECTIVE

This project aimed to explore the perspectives of clinician nurses working as research assistants in a nurse-led research project.

### DESIGN

To meet the research objective, an exploratory qualitative descriptive approach was selected to facilitate the description of the range of the clinician nurses' experiences in their own words, inclusive of the contextual factors which shaped their experiences.<sup>24</sup> The consolidated criteria for reporting qualitative research (COREQ) checklist was followed to ensure comprehensive and transparent reporting of results.<sup>25</sup>

### PARTICIPANTS & SETTING

The participants were clinician nurses who worked as research assistants for a nurse-led research project in a tertiary hospital in Western Australia.<sup>23</sup> This project was led by a team of nurse investigators who gained funding to pay nurses to work as research assistants, primarily to screen and consent participants and collect data using a survey tool. The nurses were not required to have any previous research experience as the goal was to contribute to the nurse research capacity of the organisation by exposing clinician nurses to nursing research activities. This opportunity was distinct from other research exposure opportunities, such as nurses working as research assistants on research projects led by medical colleagues where the premise of the investigation is medically, rather than nursing focussed.

Participants were invited by email to join in an individual interview, representing purposive sampling.<sup>26</sup> Individual interviews were chosen over focus groups to facilitate ease of attendance by nurses who often have conflicting clinical rosters. Nurses who expressed interest in participating were provided with a participant information and consent form outlining the aim of the project and explaining their participation was voluntary and data would remain confidential. All eight nurses who worked as research assistants on the project chose to participate in an interview, representing an exhaustive sample consisting of all eligible participants.

## RESEARCH ARTICLES

### DATA COLLECTION

Individual interviews, a common data collection method in qualitative descriptive studies, were conducted to explore the clinician nurses' perspectives.<sup>24</sup> Interviews were semi-structured following an interview guide composed of seven open-ended questions (see Supplementary Material). The interview guide was informed by pre-existing literature on this topic.<sup>27</sup> To support improving the research skill capacity of the nursing workforce, one of two independent research assistants conducted each interview with the clinician nurse participants. These female research assistants, including author IO, were graduate nurse midwives in their first year of clinical and research practice, allocated to this project by nurse research leaders in the nursing research department through which they were working in a graduate internship program. Study research assistants received training on interview skills prior to conducting interviews by a nurse midwife researcher (GG) who has seven years' experience in research. The nurse research assistants had not, at the time of interview, worked clinically with any of the research participants. The first interview was conducted as a pilot. As no changes were made to the interview guide following this interview, these data were included in the analysis.

The interviews were conducted between July and October 2022 in a private setting. Only the interviewer and participant were present during each interview. Prior to the interview, each clinician nurse participant confirmed they had read the participant information form and provided informed consent to participate and be audio-recorded. Participants completed a brief demographic survey providing information on past experience and training in research and quality improvement activities along with years of clinical experience.

Each participant was interviewed once with no repeat interviews deemed necessary. All consented to being audio-recorded. No field notes were documented however a verbal debrief was conducted between the interviewer and an experienced nurse researcher at the conclusion of each interview as a means of contextualising the interview. Original transcripts were not returned to participants for validation however results were presented back to participants and were verbally agreed as a true reflection of their experience. Participants were encouraged to contact the research team if they had any further information they wanted to share or clarify. No participants did so. Interviews lasted between seven and sixteen minutes. Data saturation was not discussed as all eight nurses who were eligible participants were included; however, there was repetition evident in the descriptions of participant experiences.

### DATA ANALYSIS

Interview recordings were transcribed to support analysis. Consistent with the purpose of the study, inductive content

analysis was conducted to explore nurses' individual experiences and inform a broader description of the experience of conducting research.<sup>28</sup> Two members of the research team (IO, GG) coded categories from the interview transcripts, following the steps outlined by Erlingsson and Brysiewicz.<sup>29</sup> Each researcher (IO or GG) independently coded each interview transcript and identified preliminary categories which were then discussed, including any discrepancies, until consensus was reached. Categories and themes were named and defined together, continually referring to the raw data. Themes were formulated to answer the questions of 'why, how, in what way and by what means' as appropriate when conducting inductive content analysis.<sup>29</sup> Figure 1 shows a sample of this process. Themes and categories are presented with supporting quotes in the findings.

Four themes, with 12 sub themes were identified in the data and shown in Figure 1.

<b>Meaning unit</b>	<ul style="list-style-type: none"> <li>'Confidence really just built up from there' (P1)</li> </ul>
<b>Condensed meaning unit</b>	<ul style="list-style-type: none"> <li>Confidence increased as recruiting increased</li> <li>Confidence increased with experience</li> </ul>
<b>Code</b>	<ul style="list-style-type: none"> <li>Confidence</li> <li>Overall confidence</li> </ul>
<b>Category</b>	<ul style="list-style-type: none"> <li>Encouraged to do more</li> </ul>
<b>Theme</b>	<ul style="list-style-type: none"> <li>Growing confidence as researchers</li> </ul>

FIGURE 1. SAMPLE OF INDUCTIVE CONTENT ANALYSIS

### ETHICAL CONSIDERATIONS

Written consent was provided by all participants prior to interview. All electronic and paper-based data were stored in accordance with the Australian Code for the Responsible Conduct of Research and the National Statement on Ethical Conduct in Human Research.<sup>30,31</sup> This project was reviewed by the Women and Newborn Health Service Human Research Ethics Committee and approved by the Quality Improvement Sub-Committee on 11 March 2022 (approval number 45197).

## RESULTS

### DEMOGRAPHIC CHARACTERISTICS

Each of the clinician nurses ( $n=8$ ) who were involved in the initial research project agreed to participate in an interview. The nurses held a range of clinical experience, spanning 2 to 51 years in total. All eight clinician nurses had either previous quality improvement (QI) or research experience or training. Previous QI or research experience included working as a research assistant previously ( $n=1$ , 12.5%) or at the time of the interview ( $n=1$ , 12.5%). Previous QI training included attending in-service ( $n=2$ , 25%) or completing a certificate ( $n=1$ , 12.5%). Participant characteristics are further detailed in Table 1.

## RESEARCH ARTICLES

TABLE 1. PARTICIPANT CHARACTERISTICS

Characteristic	Range of years
Clinical experience at the study site	2–35
Total clinical experience	2–51
	<b>n (%)</b>
Previous QI/research experience	5 (70)
Previous QI training	3 (30)

\*Ranges have been provided for the first two variables to prevent inadvertent identification of participants from this study

## THEMES AND CATEGORIES

Analysis of the data identified three themes and seven categories, shown in Figure 2 and described below. For further description and supporting quotes, see Supplementary Material.

<b>Making a difference to patients</b>	<ul style="list-style-type: none"> <li>Nurses at the bedside motivated to improve care</li> <li>Hearing what patients had to say was rewarding</li> </ul>
<b>How the role was laid out shaped the experience</b>	<ul style="list-style-type: none"> <li>Working closely with the research team</li> <li>Flexibility of the role</li> <li>Working within the constraints of the clinical setting</li> </ul>
<b>Growing confidence as researchers</b>	<ul style="list-style-type: none"> <li>Encouraged to do more</li> <li>Accessible opportunities and support for ward-based nurses</li> </ul>

FIGURE 2. THEMES AND CATEGORIES

## Theme 1: Making a difference to patients

The clinician nurses identified their key motivations for working as research assistants, encapsulated within the categories titled 'Nurses at the bedside motivated to improve care' and 'Hearing what patients had to say was rewarding'.

Category 1.1: Nurses at the bedside motivated to improve care

The clinician nurses were overwhelmingly motivated to work as research assistants by a desire to improve their professional practice and patient outcomes. '... Being part of something that helps the profession I work in as well as the patients that you work for' (P1). They acknowledged research and quality improvement as a component of their nursing roles, and key to improving professional practice and patient outcomes. Importantly, the focus of the research project within their chosen specialty provided the nurses with a sense of relevance and purpose. Participant 5 recounted this as a factor that held their interest in the project '... because it was specific to gynaec information and because I work on gynaec [gynaecology].'

Category 1.2: Hearing what patients had to say was rewarding

The clinician nurses enjoyed communicating with patients in an alternate role, whilst acknowledging patient interaction as a core component of their usual nursing roles, 'It's nice to do something from a different role occasionally... I enjoy talking to the patients because that's part of nursing...'. (P3). The research assistant role was described as facilitating meaningful communication without the clinical distractions that occur in their usual clinical roles, 'I quite liked just talking to patients, not doing nursing, you know, your nursing bits and pieces' (P8). They also highly valued patient opinion, with one nurse explaining 'talking to the patients to find out what their perspective is on that and why... I really thoroughly enjoyed sitting down with them and finding all that out' (P4).

Evaluating patient experience was a significant contributor to the clinician nurses' motivation to work in a research role. 'It was, like, really applicable to our patients, so it was important to know what they're getting and what they want, and what we could improve on' (P5). The nurses were conscious of their ethical obligations and patient receptiveness to participating, '... making sure they are informed before consenting and you know, that letting them know that it's anonymous and won't affect their treatment in any way' (P1).

## Theme 2: How the role was laid out shaped the experience

Clinician nurses discussed aspects of the role which facilitated or hindered their involvement in the project, ultimately shaping their experiences. 'Working closely with the research team', 'The flexibility of the role' and 'The constraints of the clinical setting' were identified as categories impacting their experience.

Category 2.1: Working closely with the research team

Close involvement with the research team was identified as important to the clinician nurses. Participant 8 stated, 'I felt I was well supported by the research team... I knew them and... we work quite closely, and then we could connect, you know, ask... questions...'. The nurses identified having time with the research team at the beginning of the project was crucial to their understanding and performance of the role: '[The nurse researcher] ran through how to do the questions... use the iPad and did some practice interviews with patients... that set you up to be able to do it easily on your own' (P6). The research assistant role was described as '...very clear what you had to do in it. Yeah, your role was very laid out from the get-go' (P2). The nurses appreciated having resources such as a script outlining how to approach potential research participants consistently to seek informed consent. They explained it increased their confidence, 'pretty much every shift before I started I would read that script before approaching the patients... made it a lot easier' (P1). Ongoing communication and the physical presence of the research team in their clinical area resulted in

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the nurses feeling informed and supported throughout the project. *'The researcher came up every Thursday and was present... also giving us updates through email'* (P4).

## Category 2.2: Flexibility of the role

Flexibility of the role was a significant determinant of whether the clinician nurses chose to take the opportunity to work as research assistants in the project and shaped their experience. Flexibility with rostering times allowed the nurses to partake despite competing priorities, *'...flexibility of the whole thing was one thing that made it easier for me to do it... if it was a thing where I have to take a whole day... I wouldn't be able to do this at all'* (P7). The flexibility to choose where to recruit within three clinical areas was also valued. However, the nurses overwhelmingly reported recruiting solely from their 'home ward' (P8) because, *'I felt easy because I could do the things where I work'* (P8). They also described benefiting from having peer support available when recruiting within their home ward *'...my colleagues were there... on the ward... I could ask some questions so, so it was good'* (P8). In contrast, unfamiliar clinical areas were treated as barriers to the role.

Other impactful flexible aspects of the project included the clinician nurses' attire, and type of survey tool. The nurses found their nursing uniform convenient, whilst simultaneously feeling it confused patients about their role. However, they also found issue with wearing civilian clothing, stating it *'...could be challenging going to the patient's room in my own clothes'* (P8). Using a tablet for digital data collection was popular, increasing the nurses' confidence levels, *'I thought the iPad was nice and easy and looked quite official and it was generally a very easy process to follow with the patients'* (P4); however, having the flexibility to use a paper format was also valued.

## Category 2.3: Working within the constraints of the clinical setting

Factors associated with the clinical setting were identified as key to the clinician nurses' experiences, with the ward busyness and patient acuity impacting their ability to recruit. They described the need to choose an appropriate time to approach patients to increase the chances of successful recruitment. One nurse explained, *'like I try to avoid... immediate post ops and pain and delirious patients and stuff like that'* (P7). Another consideration was the patient's environment, as the nurses were conscious of patient privacy and confidentiality. The COVID-19 pandemic was noted as negatively impacting the clinical setting, adding cognitive, emotional and physical demands which left the clinician nurses with little energy for their research role. *'It was quite tiring...with all the changes due to COVID... all these new policies and you are learning a lot in your everyday work; it wasn't just your work routine anymore... just got a bit hard'* (P1).

## Theme 3: Growing confidence as researchers

The clinician nurses increased in confidence throughout participation in the project. They described feeling encouraged to engage in future research activities whilst declaring a need for research opportunities and support to be made more accessible to ward-based clinician nurses.

## Category 3.1: Encouraged to do more

Working as research assistants created and nurtured interest in research and quality improvement whilst consolidating pre-existing skills. The clinician nurses unanimously described working in the project as a positive experience which increased their confidence as researchers, *'...it has given me more confidence... I have a few skills now to be able to do it again and I actually found it really interesting and, I got something from it'* (P2). The nurses indicated they would participate in a similar role in the future if given the opportunity, particularly if relevant to their home ward. *'...I will do it again... participating in the audit or in the project what's [sic] going on in the ward'* (P5).

## Category 3.2: Accessible opportunities and support for ward-based nurses

A lack of accessible support and opportunities was expressed by clinician nurses as a barrier that, prior to this opportunity, prevented them from participating in research and quality improvement. The nurses discussed wanting research opportunities to be disseminated to their clinical areas for ease of access. One nurse explained, *'being more advertised on the ward... I really wanted to get involved... I just didn't know where to start... make it not so hard to find these opportunities'* (P1). Additionally, they desired opportunities which are flexible, with strategies to combat the constraints of working clinically. One nurse suggested, *'protected time... from two until three, have that time to go sit down in front of a computer and work on your projects... that definitely makes it easier'* (P6).

The nurses wanted access to opportunities and resources which expand and consolidate their knowledge and experience, *'...at uni we got to learn a lot about, you know, research projects and practice writing them and QI, but it kind of seemed very abstract process'* (P1). The nurses aptly identified their knowledge gaps, requesting more accessible training to meet future research aspirations. Perceived training needs included research or quality improvement specific skills, as well as general skills, including computing, health informatics and academic writing skills. The nurses also wanted research and quality improvement mentors, stating *'...it's really good to have someone that you can... send an email and meet up with... I think on the ward, you can't always find someone who really can help guide you with a project'* (P6).

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## DISCUSSION

This study explored the perspectives of clinician nurses who worked as research assistants in a nurse-led research project. The eight nurses who participated reported they were motivated to conduct this work due to the focus on their specialty, a desire to contribute to their profession and, ultimately, to improve patient care. Involvement nurtured their pre-existing interest in learning about research work and enabled them to consolidate prior learning while gaining knowledge and confidence. Their experiences were described as predominantly positive, facilitated by the support and flexibility provided by the work and supporting team.

These results reflect research from the United States which suggests there is an appetite for clinician nurses to learn more about research and quality improvement, however many nurses are unsatisfied with the opportunities that exist.<sup>22</sup> An integrative review found that engaging nurses in research can be difficult, and many barriers exist.<sup>32</sup> For example, amongst orthopaedic nurses from the United Kingdom, some did not consider research to be a part of their role.<sup>33</sup> Other identified barriers to engagement in research reflect those articulated by nurses in this study such as a lack of knowledge or skills, time to participate, and a lack of access to opportunities, training and experienced research mentors.<sup>11,21,22,34</sup> It could also be considered that the recognised limited volume of nurse clinician-led research may have a down-stream effect where clinician nurses have less exposure to nurses leading research and opportunities to engage in nurse-led research projects.<sup>17</sup>

Contribution to quality improvement and research activities is recognised as a key criterion within both the Australian Registered Nurse Standards for Practice and the International Council of Nurses' Code of Ethics.<sup>1,12</sup> As registered health practitioners, nurses are recognised as professionals for whom participation in research is an integral part of their practice. It is encouraging to see the establishment of the Australasian Nursing and Midwifery Clinical Trials Network in 2020.<sup>35</sup> It is anticipated this network will provide much needed research skill development, training and networking opportunities amongst nurses who work as clinician researchers or research-active nurses.<sup>9,35</sup> Additionally, other specialty nursing societies and colleges have recognised the value of nurse research with the inclusion of a research committee as part of their organisational structure, including the Cancer Nurses Society of Australia and the College of Emergency Nursing Australasia.<sup>36,37</sup>

In their recent report, AAHMS recommends the development of a national strategy and implementation plan to build a clinician researcher workforce with a clear training and career pathway.<sup>4</sup> Eckert et al., echo that targeted supports and investment for nurses are urgently needed to assist in designing and conducting high-quality nurse-led research.<sup>9,17</sup>

In addition, it is recommended that for research-active health professionals, participation in research should be established as a core part of their position descriptions and they should be allocated dedicated time within their paid clinical roles to pursue these activities.<sup>4,9</sup> These recommendations were also reflected by the nurses in this study where suggestions were made to have protected time and access to training and mentors.

Literature describing practical initiatives to engage clinician nurses in quality improvement and research activities are limited, however, there is evidence to suggest that experiential learning, where clinician nurses are exposed to the practical application of research, can increase confidence and motivation to participate.<sup>32</sup> Our study presents a practical example of developing a research project which utilises funding to financially support the engagement of clinician nurses as active members of the research team. During this evaluation of their experience, the nurses shared that despite timely challenges such as the COVID-19 pandemic, they were intrinsically motivated to be involved and saw themselves as best positioned to conduct this research because they were nurses at the bedside and experts in the specialty. Their interest and uptake of the opportunity demonstrated that while nurses may not actively seek work in these roles, if they are presented directly to them, they are motivated to be involved. This strategy of presenting the opportunity directly to the clinician nurses, along with appropriate remuneration, was successful in overcoming some of the barriers to involvement such as heavy clinical workloads and a lack of time.

Our example demonstrates one strategy where clinician nurses can be supported to work as research assistants in a nurse-led research project to boost skills and engagement of clinician nurses in research. Australian cancer nurses recently identified career progression and professional development opportunities as predictors of higher job satisfaction and initiatives such as our example may help to address ongoing challenges with nursing workforce retention.<sup>38</sup> This example could be translated into other settings however, it is essential that system-wide support accompany these initiatives, such as the provision of dedicated mentors, appropriate remuneration, protected time and opportunities to gain skills and experience including funded research training programs.<sup>9</sup>

Opportunities to partner with universities to support the research study ambitions of clinician nurses should also be considered. Incorporating these system-wide support strategies into institutional policy, employment contracts, and enterprise bargaining agreements may assist to promote their future sustainability. One such example, is the implementation of a Graduate Midwifery Research Intern Programme at a tertiary hospital.<sup>39</sup> Evaluation of this initiative demonstrated how research capacity building of clinicians can be achieved with executive support and

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investment and have long term benefits of improving the culture of integrating research into clinical healthcare. Another model described in the United Kingdom integrates Embedded Researchers in the clinical setting to generate research and evaluation questions in a co-design model with clinicians and patients.<sup>13</sup> This model is suggested to have multiple benefits such as improving research capacity amongst health professionals, reducing the gap between the translation of evidence to practice and encouraging greater collaboration between academic and clinician driven research.<sup>13</sup> Future research to implement and evaluate innovative strategies such as these examples are needed in Australia to take advantage of the potential for benefits offered by a research active nursing workforce.

The benefits of initiatives for clinician nurses such as these demonstrate advantages, not only to improve workforce retention and job satisfaction but also clinical outcomes. A review of international literature investigating research engagement and healthcare outcomes by Boaz et al. suggested that when clinicians and healthcare organisations are engaged in research, healthcare performance improved.<sup>40</sup> In some studies, this included health outcomes such as reduced mortality and morbidity but most often related to processes of care. There is a need for further research, not only to investigate the capacity of health professionals such as clinician nurses and midwives to engage in research as recommended by AAHMS,<sup>4</sup> but also to demonstrate the advantages of these initiatives for both clinical performance and workforce benefits.

### STRENGTHS AND LIMITATIONS

This study represents a practical example of how clinician nurses positively engaged in an opportunity to undertake nurse-led research to learn and apply research skills. A strength of this evaluation is that it addresses a gap for which little published literature currently exists. The short length of the interviews may be considered a limitation along with the small sample size. However, the aim of this study was to provide a foundational understanding to inform further research in this area which is considered appropriate with a qualitative descriptive approach.<sup>24</sup> While the sample size was small, the participants represented all eight nurses who were eligible and was therefore exhaustive for this investigation. Rigour may have been improved by returning interview transcripts to participants for feedback along with documenting field notes after each interview. Using this data to develop a survey to assist in triangulation should be a consideration for future investigation.

## CONCLUSION

This study offers insights into how clinician nurses can be supported to undertake and contribute to nurse-led research. Despite challenges associated with clinical demands, the nurses who participated in this study were strongly motivated to contribute to improved patient care and to improve their research skills and knowledge. Strategic support and monetary investment are needed to facilitate ongoing and broader strategies to develop the research-active clinician workforce.

### IMPLICATIONS FOR RESEARCH, POLICY AND PRACTICE

Supporting clinician nurses to work in a nurse-led research team offers nurses the opportunity to learn new skills with appropriate training and mentorship and evidence suggests these initiatives have the capacity to improve job satisfaction, translation of research to practice and clinical outcomes. Service leaders and policy makers can benefit from these rewards by establishing sustainable solutions such as including protected time, mentorship, and research internship programs into their strategic plans. Future research should seek to implement and evaluate these strategies for their potential benefits of workforce improvements, job satisfaction and clinical outcomes along with investigation into the research capacity of the Australian nursing workforce.

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## REFERENCES

1. Nursing and Midwifery Board of Australia (NMBA). Registered nurse standards for practice 2016. Available from: <https://www.nursingmidwiferyboard.gov.au/Codes-Guidelines-Statements/Professional-standards/registered-nurse-standards-for-practice.aspx>.
2. Government of Western Australia Department of Health. Nursing and midwifery in Western Australia: a discussion paper. 2021.
3. World Health Organization (WHO). State of the world's nursing 2020: Investing in education, jobs and leadership. 2020.
4. Australian Academy of Health and Medical Sciences (AAHMS). Research and Innovation as Core Functions in Transforming the Health System: A Vision for the Future of Health in Australia. 2022.

## RESEARCH ARTICLES

- 5 Australian College of Nursing (ACN). Clinical Research Nurse (CRN): Australian standards for practice 2022. Available from: <https://www.acn.edu.au/wp-content/uploads/clinical-research-nurse-standards.pdf>.
- 6 Whitehouse CL, Smith H. The Whitehouse Report: Review of research nursing and midwifery structures, strategies and sharing of learning across the UK and Ireland in 2017. The Florence Nightingale Foundation; 2018.
- 7 Chen Q, Sun M, Tang S, Castro AR. Research capacity in nursing: a concept analysis based on a scoping review. *BMJ Open*. 2019;9(11):e032356-e.
- 8 Australian Institute of Health and Welfare (AIHW). Health workforce 2022. Available from: <https://www.aihw.gov.au/reports/workforce/health-workforce>.
- 9 Eckert M, Rickard CM, Forsythe D, Baird K, Finn J, Gilkison A, et al. Harnessing the nursing and midwifery workforce to boost Australia's clinical research impact. *Medi J Aust*. 2022;217(10):514-6.
- 10 Siedlecki SL, Albert NM. Research-active clinical nurses: against all odds. *J Clin Nurs*. 2017;26(5-6):766-73.
- 11 O'Hara S, Ackerman MH, Raderstorff T, Kilbridge JF, Melnyk BM. Building and sustaining a culture of innovation in nursing academics, research, policy, and practice: outcomes of the national innovation summit. *J Nurses Prof Dev*. 2022;43:5-11.
- 12 International Council of Nurses (ICN). The ICN code of ethics for nurses: Revised 2021. 2021. Available from: [https://www.icn.ch/sites/default/files/2023-06/ICN\\_Code-of-Ethics\\_EN\\_Web.pdf](https://www.icn.ch/sites/default/files/2023-06/ICN_Code-of-Ethics_EN_Web.pdf).
- 13 Whitehouse CL, Tinkler L, Jackson C, Hall H, Webster J, Hardy S, et al. Embedding research (ER) led by nurses, midwives and allied health professionals (NMAHPs): the NMAHP-ER model. *BMJ Lead*. 2022;6(4):323-6.
- 14 Alomari A, Wilson V, Lewis J. Action research: A mechanism for active engagement of clinical nurses in a program of research. *Nurs Health Sci*. 2020;22(3):539-47.
- 15 O'Brien C, Furlong E, Coughlan B, Fox P, Darley A. Building research capacity and culture: Exploring nurses' experience of implementing a nurse-led clinical trial. *J Nurs Manag*. 2022;30(4):1002-10.
- 16 Grant J, Robinson T, Laver S. Are we there yet? A scoping review of factors that increase academic research capacity in schools of nursing and midwifery. *Nurse Educ Pract*. 2022;63:103355-.
- 17 Eckert M, Kennedy K, Neylon K, Rickard CM, Keogh S, Gray R, et al. A scoping review of nurse-led randomised controlled trials. *J Clin Nurs*. 2023;32(17-18):5550-61.
- 18 Frakking T, Craswell A, Clayton A, Waugh J. Evaluation of research capacity and culture of health professionals working with women, children and families at an Australian public hospital: a cross sectional observational study. *J Multidiscip Healthc*. 2021;14:2755-66.
- 19 Morrison L, Johnston B, Cooper M. Mixed methods systematic review: Factors influencing research activity among nurses in clinical practice. *J Clin Nurs*. 2022;31(17-18):2450-64.
- 20 Tschannen D, Alexander C, Taylor S, Tovar EG, Ghosh B, Zellefrow C, et al. Quality improvement engagement and competence: A comparison between frontline nurses and nurse leaders. *Nurs Outlook*. 2021;69(5):836-47.
- 21 Alexander C, Tschannen D, Argetsinger D, Hakim H, Milner KA. A qualitative study on barriers and facilitators of quality improvement engagement by frontline nurses and leaders. *J Nurs Manag*. 2022;30(3):694-701.
- 22 Hagan J. Nurse satisfaction with opportunities to engage in research. *West J Nurs Res*. 2018;40(2):209-21.
- 23 [BLINDED FOR REVIEW]
- 24 Willis DG, Sullivan-Bolyai S, Knafelz K, Cohen MZ. Distinguishing features and similarities between descriptive phenomenological and qualitative description research. *West J Nurs Res*. 2016;38(9):1185-204.
- 25 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.
- 26 Campbell S, Greenwood M, Prior S, Shearer T, Walkem K, Young S, et al. Purposive sampling: complex or simple? Research case examples. *J Res Nurs*. 2020;25(8):652-61.
- 27 Liamputtong P. Qualitative research methods. Fifth edition. Docklands, Victoria: Oxford University Press; 2020.
- 28 Elo S, Kyngäs H. The qualitative content analysis process. *J Adv Nurs*. 2008;62(1):107-15.
- 29 Erlingsson C, Brysiewicz P. A hands-on guide to doing content analysis. *Afr J Emerg Med*. 2017;7(3):93-9.
- 30 The National Health and Medical Research Council [NHMRC], The Australian Research Council, Universities Australia. The Australian code for the responsible conduct of research. 2018.
- 31 The National Health and Medical Research Council (NHMRC), The Australian Research Council, Universities Australia. National Statement on Ethical Conduct in Human Research 2023. Canberra 2023.
- 32 Scala E, Price C, Day J. An integrative review of engaging clinical nurses in nursing research. *J Nurs Scholarsh*. 2016;48(4):423-30.
- 33 Bench S, Dowie-Baker J-A, Fish P. Orthopaedic nurses' engagement in clinical research; an exploration of ideas, facilitators and challenges. *Int J Orthop Trauma Nurs*. 2019;35:100699.
- 34 Mulkey MA. Engaging bedside nurse in research and quality improvement. *J Nurses Prof Dev*. 2021;37(3):138-42.
- 35 Australasian Nursing and Midwifery Clinical Trial Network (ANMCTN). About us: Australasian Nursing and Midwifery Clinical Trial Network 2024. Available from: <https://anmctn.com.au/about/>.
- 36 Cancer Nurses Society of Australia. Research Standing Committee 2024. Available from: <https://www.cnsa.org.au/ajcn/ajcn-research>.
- 37 College of Emergency Nursing Australasia (CENA). Research 2024. Available from: <https://www.cena.org.au/research/research/>.
- 38 Bradford N, Moore E, Taylor K, Cook O, Gent L, Beane T, et al. The cancer nursing workforce in Australia: a national survey exploring determinants of job satisfaction. *BMC Nurs*. 2023;22(1):461-.
- 39 Hauck YL, Lewis L, Bayes S, Keyes L. Research capacity building in midwifery: Case study of an Australian Graduate Midwifery Research Intern Programme. *Women Birth*. 2015;28(3):259-63.
- 40 Boaz A, Hanney S, Jones T, Soper B. Does the engagement of clinicians and organisations in research improve healthcare performance: a three-stage review. *BMJ Open*. 2015;5(12):e009415-e.



# 'Emotional roller coaster': Fertility nurses' stressors, wellbeing, burnout and work engagement through a mixed methods investigation

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## ABSTRACT

**Objective:** This study set out to examine the stressors and mental health of Australian Fertility Nurses who form a crucial part of the fertility journey.

**Design/Methods:** A mixed-methods approach was used to examine the stressors of 74 fertility nurses and their mental health outcomes. Open-ended qualitative questions were used to capture stressors and responses were analysed using Reflexive Thematic Analysis. Quantitative surveys were used to measure nurses' distress, wellbeing, and work engagement and statistical analysis was used to compare these results with normative data and comparison samples.

**Results:** The qualitative analysis indicated Fertility Nurses face a myriad of stressors, which were grouped under the themes of Interpersonal Stressors, Organisational Stressors, and Emotional Burdens. Fertility Nurses struggled with high workloads and conflicts with patients and other staff. They also faced difficulties in managing the painful discussions often present with unsuccessful fertility treatments. These stressors are reflected in the quantitative results which show that Fertility Nurses experience

high levels of burnout and low levels of wellbeing and workplace engagement. Some of these outcomes were worse than other healthcare populations.

**Conclusions:** The study offers an insight into Fertility Nurses' experiences – capturing the views of an under-researched group. The results have implications for Fertility Nurses, their patients, fertility clinics, and the wider sector, as nurses are central to patient experiences and successful treatment.

**Keywords:** Nursing, IVF, Mental Health, Stress, Engagement

### What is already known about the topic?

- The stress of fertility treatment for patients is well documented, but less is known about the stressors faced by the Fertility Nurses who care for patients.
- Existing qualitative research points to possible stressors for Fertility Nurses relating to organisational pressures, emotional burdens, and interpersonal conflict.
- Much remains unknown regarding stressors for Fertility Nurses as most studies focus on just one source of stress and there is no quantitative data available relating to Fertility Nurse mental health.

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**What this paper adds**

- We use a mixed methods approach to examine the unique mental health implications and stressors of Fertility Nurses – providing the first quantitative data with this under-researched group.
- Thematic analysis reveals Fertility Nurses face a wide range of stressors which fall under the

themes of interpersonal stressors, organisational stressors, and emotional burdens. Quantitative results show high levels of burnout and low levels of wellbeing and workplace vigour.

- The results have important implications for Fertility Nurses and clinics, with flow-on implications for fertility patients.

*'Some days it can be an emotional roller coaster with a change in emotions every hour.'*

(Participant 14, IVF Nurse Coordinator)

*'It is both stressful and very unsatisfying to not be able to give patients the level of care and attention we feel they deserve.'*

(Participant 28, IVF Nurse)

**INTRODUCTION**

Fertility treatment can be a complex and emotionally taxing journey for couples. Doctors and embryologists play critical roles, however, it is the Fertility Nurse who often serves as the linchpin for the whole process – providing the essential care, emotional support, and coordination needed by patients.<sup>1,2</sup> The Fertility Nurse is often the only staff member involved in patient care throughout the whole IVF cycle and their role is continually expanding and changing to meet the needs of couples and advancements in the field.<sup>2-4</sup> Nurses now undertake a wide range of medical roles formerly undertaken by medical officers, including initial consultations, ultrasound scanning, ovulation induction, intrauterine inseminations, administration of medication, sperm preparation and pregnancy tests.<sup>5,6</sup> They are also the primary contact point with patients – providing information, detailed planning, accurate documentation, and emotional support.<sup>2</sup> Although Fertility Nurses play a critical role in the management of infertility, there is little research documenting their specific stressors and mental health challenges.

**MENTAL HEALTH OF FERTILITY NURSES**

Most studies on the mental health of nurses focus on hospital nurses and there are few studies on Fertility Nurses; a distinct group who operate in unique circumstances.<sup>2</sup> While the stress of fertility treatment for patients is well documented,<sup>1</sup> less is known about the stressors faced by Fertility Nurses.

**Stressors**

Existing research points to a range of possible stressors for Fertility Nurses relating to organisational pressures, emotional burdens, and interpersonal conflict. Organisational pressures have increased for Fertility Nurses as their role expands to match the rapid advancement of

fertility treatment, without necessarily receiving appropriate training<sup>5-7</sup>. This can lead to work overload and time pressures.<sup>8</sup> These stressors are exacerbated by the heightened emotional context of fertility treatment.

The crisis invoked by infertility is rated equally to cancer and the death of a family member on the Life Events Scale.<sup>19</sup> Unlike most doctors and technicians, nurses often care for patients over an extended time, and must frequently deliver bad news to patients when treatment is unsuccessful.<sup>10</sup> Consequently, staff are often required to deal with negative emotional reactions from patients and past research indicates nurses can feel like co-passengers on a roller coaster ride of highs and lows.<sup>2,8</sup> There is also conflict with 'difficult patients' which can lead to intense feelings, lower job satisfaction, and higher burnout.<sup>11</sup> Despite this, many staff in fertility clinics report they feel inadequately trained to deal with patient complaints.<sup>12</sup>

Fertility Nurses have extensive contact with both patients and doctors and are often expected to hold together the multiple components of treatments.<sup>13</sup> Nurses may experience problems with colleagues as power imbalances are commonly documented between doctors and nurses in hospitals.<sup>14</sup> These imbalances may be further exacerbated in fertility clinics where doctors are also their direct manager or clinic owner. However, there is scarce research on such organisational stressors.

**CONSEQUENCES OF WORKPLACE STRESSORS**

Workplace stress among Fertility Nurses can negatively impact the quality of work and the patient experience. For example, past research indicates that many Fertility Nurses use noncaring (emotional distancing) to cope with the intense emotions associated with their work.<sup>15</sup> Initially, this defence mechanism may be effective but is unlikely to meet the needs of the patient who typically seeks positive relationships with sensitive and respectful staff.<sup>15-18</sup> Despite this, some patients indicate that nursing staff focus only on practical care.<sup>19</sup> This is unfortunate as patient-focused care is associated with higher pregnancy success rates,<sup>12</sup> lower patient distress, and decisions to continue treatment.<sup>1</sup>

The stressors faced by Fertility Nurses may also affect them on a personal level. Demands and pressures in healthcare often translate into frustration, burnout and low wellbeing.<sup>20</sup>

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We found no studies measuring these issues among Fertility Nurses, but one study within private IVF centres in Vietnam found that nurses experienced the highest levels of occupational stress when compared to doctors and IVF technicians.<sup>21</sup> This finding suggests high stress among Fertility Nurses and the current study further investigates the mental health outcomes of burnout, work engagement, and wellbeing.

Building knowledge on the mental health and stressors of Fertility Nurses is a key step toward improving their working life and wellbeing. This is important for nurses, and also for their patients, as poor mental health among healthcare staff can have detrimental effects on patient outcomes.<sup>22,23</sup> There are also organisational implications as high stress and burnout among nurses are associated with staff turnover, absenteeism, and loss of institutional knowledge.<sup>24</sup> Given this, there is a pressing need to better understand the experiences of Fertility Nurses, to help nurses, organisations, and patients.

### STUDY AIMS

This study aims to investigate the views of Fertility Nurses regarding their most common stressors while also documenting their levels of burnout, engagement, and wellbeing.

The study seeks to answer the following research questions:

- Which aspects of work do Fertility Nurses find most stressful? (*Qualitative data*)
- What is the state of burnout, work engagement and wellbeing among Fertility Nurses? (*Quantitative data*)

### METHODS

The study employs a mixed methods approach. Qualitative data on nurses' stressors is analysed using Reflexive Thematic Analysis, providing insights into their lived experiences. This is supplemented by quantitative analyses which identify their levels of burnout, engagement, and wellbeing. These mental health results are also compared to others with normative data and comparison samples. We interpret these mixed methods results by linking quantitative results to the qualitative themes.

### PROCEDURE

Participants were contacted through the Fertility Nurses of Australasia (FNA). The FNA emailed the survey information to their Australian members and also featured the study on their website. Participants who clicked on the link were taken to a survey webpage. After providing informed consent, participants were invited to complete an online survey which took approximately 15 minutes. Participation was entirely voluntary, and no financial or other compensation was provided.

The study was approved by the University of Queensland Health and Behavioural Science Ethics Committee and followed the Reporting Standard Mixed Methods Article Reporting Standards (JARS-MMARS, under the EQUATOR reporting guidelines).

### QUALITATIVE MEASURES

Participants responded to an open-ended question about stressors: 'We are particularly interested in aspects of your work that are stressful to you. Can you name at least two aspects of your work that you find most stressful?' They were also asked to provide examples: 'For the two stressful aspects you identified above, can you provide a specific example of when this happened and why it was stressful?'

### QUANTITATIVE MEASURES

#### Burnout

The Maslach Burnout Inventory MBI was used to assess three dimensions of burnout.<sup>25</sup> It has 22 items rated on a 7-point frequency scale ranging from 0 = 'Never' to 6 = 'Every day'. There are three subscales: emotional exhaustion, depersonalisation, and personal accomplishment. The subscales had good reliability (observed  $\alpha = .94$ ,  $\alpha = .86$ , and  $\alpha = .82$  respectively). While the three subscale scores cannot be summed together, they can be used to categorise high, medium, or low levels of overall burnout using cut-off scores. A high degree of burnout reflects high scores on emotional exhaustion and depersonalisation, and low scores on personal accomplishment.

#### Work engagement

The Utrecht Workplace Engagement Scale (UWES) was used to measure work engagement; observed  $\alpha = .91$ .<sup>26</sup> It has 17 items and three subscales of vigour, dedication, and absorption. Items are measured on a scale ranging from 0 = 'Never' to 7 = 'Always, every day'. The scale has good internal consistency (observed  $\alpha = .91$ ).

#### Wellbeing

The 14-item Mental Health Continuum-Short Form (observed  $\alpha = .91$ ) asks participants to indicate how often they have experienced wellbeing symptoms in the last month.<sup>27</sup> Items are rated on a 6-point scale ranging from 0 = 'Never' to 5 = 'Every day' and summed to provide a total wellbeing score between 0 and 70 with higher scores indicating greater wellbeing. Designated categories also enable the classification of participants into one of three wellbeing categories: flourishing (high wellbeing), languishing (low wellbeing) or moderate mental health neither flourishing nor languishing.<sup>27</sup>

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### Demographics

We also asked participants a series of questions related to their age, gender, education level, years of experience as a Fertility Nurse, role, and whether they currently worked in a public or private facility. Age and years of experience were recorded in ranges (e.g., 45–56 years old) to protect participant anonymity.

### DATA ANALYSIS

All data were de-identified, and participants were assigned a number to protect their anonymity.

#### Qualitative data – Reflexive Thematic Analysis

Qualitative data were analysed using Reflexive Thematic Analysis.<sup>28,29</sup> We utilised an inductive method; a ‘bottom-up’ approach that lets the data drive the themes rather than fitting the data to existing theory. This implies an essentialist framework and experiential orientation, in that it ‘gives voice’ to Fertility Nurses’ experiences reported in the data.<sup>28</sup>

Reflexive Thematic Analysis is an iterative process, requiring researchers to continually revisit and engage with the data to identify and interpret patterns of meaning.<sup>29</sup> The research team is situated as a central influence in the development of understanding and as such we note here key aspects of the research team’s positionality.

The first, third, and fourth authors were female psychology researchers with no exposure to the inner workings of the fertility sector, but with extensive experience in mental health within the workplace, including healthcare settings. The second author is a female Clinical and Health Psychologist who specialises in Fertility Counselling. This provided insight into the workings of this sector and the experiences of nurses and patients. While such insight can bias results, we endeavoured to remain neutral and set aside personal views and reactions, to listen to the perspectives of the nurses.

Reflexive Thematic Analysis, as detailed by Braun and Clarke has six steps of analysis.<sup>28</sup> These were followed by the first and second authors. The first step was familiarisation with the data followed by the development of initial codes to note meaningful elements in the data. In the second step, the authors formally coded the stressors contained in the qualitative responses to identify the key stressors. In step three, codes were sorted into overarching themes and sub-themes which explained large sections of the data. Themes were identified at the semantic or explicit level due to the brevity of responses. In the fourth step, themes were reviewed and refined. Step five involved defining and naming the themes. For the final sixth stage, exemplar quotes were chosen to illustrate the themes.

We conducted a validity check through the use of a co-rater (the third author) to provide multiple perspectives. The co-rater independently identified the codes, themes and sub-themes. All coders then discussed the findings extensively to reach a final agreement. The whole research team participated in regular discussions to ensure consistency over the coding procedures, with excerpts of the responses reviewed to ensure adequate representation of the code recorded. Coding was completed when the research team reached agreement.

#### Quantitative data analysis

Quantitative data were analysed using descriptive statistics and t-tests to contrast fertility nurse results with normative data and comparison samples. We employed listwise deletion for handling missing data. This included participants in each analysis only if they had complete data for the specific variables involved.

## RESULTS

### PARTICIPANTS

Participants were Australian Fertility Nurses aged over 18. The FNA emailed the survey information to their 307 Australian members and of these, a total of 74 participants enrolled in the study. This represented 24% of the membership which is a good level of representation. Of the participants who started, 62 completed the entire survey, indicating a small attrition rate of 16%. Participants were all female, and the most common age range was 36–45. Most respondents had completed university (74.6%). The vast majority of participants worked in the private sector (96%) and the most common work experience range selected was 5–10 years. **Further participant details are provided in the supplementary materials (Table S1).**

### QUALITATIVE RESULTS

#### Stressors

Through Reflexive Thematic Analysis of the qualitative data, we identified three core stressor themes: Interpersonal Stressors, Organisational Stressors, and Emotional Burdens. Thirteen sub-themes and 25 codes were identified within these three overarching Themes. These are detailed in Table 1 below and then discussed.

#### Interpersonal stressors

One of the most frequently articulated issues identified by 76% of Fertility Nurses were the interpersonal stressors experienced at work. Almost half of the nurses (48%) described challenging interactions with patients.

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**TABLE 1. FERTILITY NURSE STRESSORS AND PERCENTAGE OF PARTICIPANTS WHOSE RESPONSES RECEIVED THE CODE, SUB-THEME, AND THEME, WITH EXEMPLAR QUOTES**

Core themes	Sub-themes	Codes	Exemplar quotes
<b>Interpersonal stressors: (76%)</b> Difficult conversations due to lack of co-operation or appropriate response from the other person either because they are unhelpful or don't communicate well	Difficult patients (48%)	Patients not following instructions (11%)	'Clients that want to do their own thing, regardless of medical advice.' (P42)
		Angry patients (13%)	'Unsatisfied patients who direct negativity towards you.' (P26). 'I have had patients scream and yell at me for something that I have had nothing to do with or something that is not directly happened because of something that I have done.' (P43)
		Unreasonable expectations from patients (37%)	'Setting/managing unrealistic patient expectations. I feel that despite statistics, many patients fail to realistically assess their chances of success in IVF...the patient can't understand why it didn't work and may be angry or unreasonably upset by the result. It can be very stressful to work with people who lack insight or understanding of their situation.' (P28).
	Difficult colleagues (29%)	Interpersonal interactions with other colleagues (21%)	'Working with a "prickly" staff member.' (P35) 'With a small workforce personality clashes can make work difficult – I find myself avoiding people and places within the clinic.' (P5).
		Poor communication from colleagues (13%)	'A colleague is very loud and obnoxious, ... rude to us and patients. Good friend of management and therefore nothing gets done about it.' (P37)
	Difficult doctors (21%)	Poor communication from doctors (11%)	'Poor/difficult communication with doctors.' (P32) 'Most days a docto or patient will make unreasonable demands. This can have a massive impact on my day.' (P19)
		Doctor conduct (16%)	'Doctors constantly cancelling clinics at the last minute.' (P33) 'Taking direction from doctors and then have them change their mind or forget and make you look like an idiot.' (P45)
<b>Organisational stressors: (77%)</b> Related to the system in which the nurses work and the actual conditions that exist	Role issues (74%)	High workload (53%)	'Everyday my workload is huge ..... and I struggle to complete it within work hours often leading to many hours of overtime.' (P72) 'Unable to take any time off (annual leave) due to staffing constraints and workload.' <sup>5</sup> 'There is no nurse to patient ratio in our EBA and I feel that current patient loads are unreasonably high... It is impossible to deliver high level care to so many patients.' (P28)
		Poor clarity of roles (6%)	'Doctors and others in the office expecting the nurses to attend to administration duties instead of allowing us to focus on nursing duties.' (P27)
		Time constraints (26%)	'Not enough time to finish tasks.' (P40) 'Too much work to do for the amount of time in the day and demands of other people (doctors, patients).' (P22)
		Complexity of work (8%)	'Everyday the primary care nurse is responsible for – book treatment cycles, scheduled nursing appointments, see patients for nursing appointments, calling patients with transfer times, calling patients with fertilisation results, calling patients with cycle results and further instructions, calling patients with trigger details, following up general inquires etc. It is both stressful and very unsatisfying to not be able to give patients the level of care and attention we feel they deserve.' (P28).
		Feeling restricted by services (13%)	'I feel the patients need a lot more information about how their cycles work, and lifestyle changes that could assist their fertility. This is not really encouraged by management.' <sup>37</sup> 'I get frustrated/annoyed when the constraints of our service doesn't allow us to offer treatment to customers/clients.' (P34)

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**TABLE 1. FERTILITY NURSE STRESSORS AND PERCENTAGE OF PARTICIPANTS WHOSE RESPONSES RECEIVED THE CODE, SUB-THEME, AND THEME, WITH EXEMPLAR QUOTES (CONTINUED)**

Core themes	Sub-themes	Codes	Exemplar quotes
<b>Organisational stressors:</b> (77%) Related to the system in which the nurses work and the actual conditions that exist (continued)	Staffing issues (24%)	Stress from inexperienced colleagues (10%)	'Use of casual inexperienced nursing staff to fill vacancies and employment of grad (graduate) nurses and enrolled nurses as a cheap measure to fill gaps in staffing which increases the workload of existing staff as they have to upskill the nurses...' (P47)
		Understaffing (15%)	'Short staffed – most days are busy and we work on minimum staff, with very little back up for sick or annual leave.' (P53) 'Staffing level – working for private enterprise expected to provide high level of service to patients with minimal staff without systems in place to support this.' (P41)
		Dysfunctional teams (5%)	'Some staff not working as part of a team... Some staff not pulling their weight at work.' (P4)
	Invalidation (45%)	Unsupportive management (32%)	'I feel that there is a lack of care by management and very undervalued by management. I am unhappy with having to work extra hours that I am expected to do so my family then miss out on my time. I feel there is an extreme lack of positive reinforcement in the workplace .' (P25) 'Management and the doctor is 100% behind the patients and not his staff.' (P57)
		Remuneration issues (8%)	'Asking for a pay-rise and being emotionally blackmailed, constant mental degradation, not being recognised for my skillset and clinical experience. All subjects intermingle by paying me less and expecting more skill and experience for it, meantime making profit from clients with fertility issues.' (P74).
		Feeling devalued (18%)	'Working for a company that doesn't value its employees.' (P17)
	Physical work environment (5%)	Workspace environment (5%)	'No future planning, limited resources. Small work office space with several nurses accompanying it difficult hearing phone conversations with ambient noise, temperature control etc.' (P47)
	IVF as a business not a service (8%)	Predominance of business model (8%)	'Pressure from management to constantly "drive" the business model. It has become about money, not patient wellbeing.' (P12)
Documentation (6%)	Burden of documentation (6%)	'Paperwork, audits, quality management rubbish that goes on and on.' (P47)	
<b>Emotional burdens:</b> (47%) Emotionally challenging tasks and difficult feelings	Treatment failure (19%)	Burden of breaking bad news (19%)	'Giving bad news to already stressed highly emotional patients.' (P65) 'Having to care for a couple who had a confirmed clinical pregnancy at 7 weeks, and then no foetal heartbeat detected at 9 week scan. This was obviously incredibly stressful for them, and myself too.' (P49)
	Patients' demands (19%)	Burden of dealing with emotional or demanding patients (19%)	'When you have contact with patients who have suffered an extreme loss eg miscarriage, termination of pregnancy. Knowing how to respond for that particular person, "saying the right thing" and how to specifically provide support in a compassionate manner.' (P21)
	Capacity to provide optimal care (21%)	Responsibility of providing optimal care (21%)	'My own anxiety feeling I am not skilled enough at the same time knowing this to be incorrect.' (P35) 'Not being able to help all my patients.' (P4)
	Emotional entanglement (16%)	Emotional entanglement in patients' experience (16%)	'Having a caring, compassionate personality that wants to be patient advocate.' (P74) 'Emotional stress and anxiety, constantly exposed to the raw emotions of desperate patients – there is no support or debriefing available to nurses.' (P12)

Note: Participant numbers along with their demographics are provided in the [supplementary materials](#).

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*'Many clients have an attitude that the nurses are there to do everything for them and also to blame if things do not go to plan. Clients often have an unrealistic view of IVF and it's outcomes which makes them very difficult to deal with at times. ... We get a number of hostile, impatient and aggressive clients. Having said that we also get some absolutely lovely ones.'* (IVF Nurse Coordinator, 10–15 years experience)

Nurses often described 'difficult' patients:

*'Dealing with difficult patients who continually complain about everything despite your best efforts'* (IVF Nursing Team Leader, 10–15 years experience). Nurses spoke about patients failing to follow instructions and being blamed for treatment outcomes: *'I also have had problems with patients that do not listen or trust what I have told them. This can be very stressful as it is usually a situation that is out of my control.'* (Senior IVF Nurse Coordinator, 3–5 years experience)

Many nurses (29%) also spoke about the stress of working and communicating with colleagues. Some described a workplace culture of 'bitching and gossiping' (IVF Nurse Coordinator, 5–10 years experience) or overt animosity between team members:

*'My colleague is often brusque/ aggressive in her manner to her co-workers and sometimes patients; I want to tell her to "piss-off".'* (A/Nurse Unit Manager, 15+ years experience)

Participants often felt unsupported by their clinic management in dealing with difficult colleagues:

*'Animosity between staff members. No support from management. Ie -unsure on a particular result, asked for help and no support given from nurse manager. Had to speak with patient about something I felt was outside of my scope.'* (IVF Nurse, 1–3 years experience)

Many nurses (21%) described stress associated with working with impatient and overly demanding doctors, who increased nurses' workload and role scope. For example:

*'Doctors and others in the office expecting the nurses to attend to administration duties instead of allowing us to focus on nursing duties.'* (IVF Nurse, 5–10 years experience)

Other responses described abusive behaviour and unprofessional conduct:

*'A doctor we work closely with will regularly yell and swear at us – even if the situation is not related to our nursing work in any way and when we bring it up with management we are told it is not worthwhile to complain.'* (Senior IVF Nurse Coordinator, 10–15 years experience)

#### Organisational stressors

Fertility Nurses described organisational factors as their most common stressor (77% of respondents). The most frequently cited stressor in the entire study was workload. Fifty-three per cent identified this as a problem, e.g.: 'High workload is everyday' (Nurse Unit Manager, 10–15 years experience) and this affected patient care:

*'I feel that current patient loads are unreasonably high. It is impossible to deliver high level care to so many patients.'* (IVF Nurse, 1–3 years experience)

Many respondents (26%) also indicated time shortages did not allow for the complexity of the treatments:

*'The average time allocated to a 1st IVF meeting is 60 mins. I always take 75–90 mins to complete these meetings no matter how I try to alter my plan for discussions.'* (IVF Nurse Coordinator, 10–15 years experience)

Nurses emphasised they had to 'juggle' patient administration with complex treatment procedures and clinic processes. Other nurses felt overwhelmed by the knowledge they needed to acquire, combined with insufficient time or opportunity to access training. For example:

*'Learning new job with no training manual or attempts to provide training or reimbursement for training courses.'* (IVF Nurse Coordinator, less than 1 year experience)

Participants noted how organisational decisions impacted clients. For example, some participants indicated that IVF clinics focused too much on generating profit for the business and not enough on patient care:

*'Pressure from management to constantly "drive" the business model. It has become about money, not patient wellbeing.'* (Nurse Manager, 10–15 years experience)

Other respondents described feeling that patients were being disadvantaged by the limited services their clinics offered:

*'I get frustrated/annoyed when the constraints of our service doesn't allow us to offer treatment to customers/clients.'* (Associate Nurse Unit Manager, 15+ years experience)

Many nurses (32%) indicated they felt under-appreciated by their organisations' management team. They reported feeling that their contributions were either undervalued or under-remunerated. For example:

*'I feel that there is a lack of care by management and very undervalued by management...'* (IVF Nurse Coordinator, 5–10 years experience)

#### Emotional burdens

Almost half of nurses (46%) described the emotional burdens that resulted from the emotionally challenging tasks they undertook. For many of the respondents, the difficulty of delivering bad news was very stressful:

*'Recently had to give out 6 pregnancy results and all 6 were negative. 6 phone calls in a row, 6 really upset, sometimes angry pts (patients) who want answers that you can't give. Some of them hang up mid sentence because they are so upset but you may have to ring them back to give them drug instructions or whatever and you know they don't want to talk to you.'* (IVF Nursing Team Leader, 10–15 years experience)

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For some, these emotional burdens were exacerbated by a lack of support:

*'Emotional stress and anxiety, constantly exposed to the raw emotions of desperate patients – there is no support or debriefing available to nurses.'* (Nurse Manager, 10–15 years experience).

Many nurses (21%) also noted the emotional burden that came from providing sub-optimal care due to workplace constraints. This was experienced as a sense of personal or professional inadequacy. For example:

*'My own anxiety feeling I am not skilled enough at the same time knowing this to be incorrect.'* (IVF Nurse Coordinator, 3–5 years experience)

In some instances, there was an emotional connection between nurses and patients. Nurses expressed deep empathy for patients' which could result in large emotional swings:

*'We have celebrated a positive pregnancy with a couple after numerous IVF journey's – with that comes a new set of happy emotions. Then at a follow up ultrasound there is no foetal heart rate detected. With that comes a completely new set of emotions. Then the next patient comes through the door and that brings another set of emotions depending where they are on their journey. Some days it can be an emotional roller coaster with a change in emotions every hour.'* (IVF Nurse Coordinator, 10–15 years experience)

For others, these emotional experiences were expressed as anger towards the patient:

*'When the patients a[re] crying in the toilet at their workplace acting like a 3 year old child because she didn't receive her first donor sperm choice, and blames you even though its not your fault.'* (IVF Nurse Coordinator, 3–5 years experience)

Overall, emotional burdens, coupled together with organisational and interpersonal stressors were the key issues highlighted by Fertility Nurses. The experience of these stressors can be linked to their mental health results which are explored below.

## QUANTITATIVE RESULTS

### Mental health outcomes

Descriptive statistics and t-tests were used to analyse the quantitative mental health data and contrast the results of Fertility Nurses with comparison groups. We report results for burnout, work engagement, and wellbeing.

#### Burnout

No respondents reported high overall burnout – represented by the presence of high Emotional Exhaustion, high Depersonalisation, and low Personal Accomplishment – but 46% were at high risk of burnout on one of the three subscales. For example, 49% experienced moderate to high

Emotional Exhaustion, 61% reported moderate to high Depersonalisation, and 30% reported low to moderate Personal Accomplishment (see Table 2).

**TABLE 2. FREQUENCY OF FERTILITY NURSES IN BURNOUT CATEGORIES OVER THE THREE BURNOUT SUBSCALES**

Category	Emotional exhaustion		De-person-alisation		Personal accomplishment	
	n	%	n	%	n	%
Low	34	51	26	39	8	12
Moderate	15	22	17	25	12	18
High	18	27	24	36	47	70
<b>Total</b>	<b>67</b>		<b>67</b>		<b>67</b>	

We compared the Fertility Nurses to three other groups: registered nurses in Victoria with the Australian Nursing Federation medical normative data, and overall normative data.<sup>30,31</sup> The Fertility Nurses differed significantly from all three groups in that they had lower emotional exhaustion, higher personal accomplishment, and higher levels of depersonalisation (see Table 3).

#### Work engagement

Regarding work engagement, the majority of Fertility Nurses reported average to high dedication and absorption. The poorest scores were seen on the vigour sub-scale where 35% of participants reported very low to low vigour (See Table 4).

Using t-tests, we compared the results of the Fertility Nurses to previous research by Brunetto et al. (2013) who studied engagement among Australian and US nurses. The Fertility Nurses scored significantly lower on work engagement compared to the Australian nurses ( $t = -2.45$ ,  $p < .05$ ) but there was no significant difference with US nurses ( $t = -0.58$ ; see [Table S2 in the supplementary materials for the full results](#)).

#### Wellbeing

For overall wellbeing, there was only a small percentage (3.1%) who were 'languishing' (low wellbeing). Participants who were 'flourishing' (high wellbeing) and those with moderate mental health, each accounted for 48% (see Table 5). This indicates a moderate to high level of wellbeing among respondents.

There is no normative data or nursing results available for the MHC-SF wellbeing scale, so we compared the wellbeing of the Fertility Nurses to three university student groups<sup>32</sup>. The IVF Nurse participants had significantly lower wellbeing than students on all three scales (emotional, social and psychological wellbeing) with only one exception – the Fertility Nurses had similar levels of social wellbeing compared with Iranian students (see Table 7).



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**TABLE 3. BURNOUT DESCRIPTIVE STATISTICS AND COMPARISON OF IVF NURSE RESULTS WITH GENERAL NURSES AND NORMATIVE DATA**

Burnout subscale	Population	n	M	SD	Comparison t-test
Emotional exhaustion	Fertility nurses	68	17.96	11.58	
	Nurses (Vic, Australia)	571	21.84	11.40	2.65**
	Normative (medical)	1,104	22.19	9.53	3.51***
	<b>Overall normative sample</b>	<b>11,067</b>	<b>20.99</b>	<b>10.75</b>	<b>2.32*</b>
Depersonalisation	Fertility nurses	68	11.13	7.96	
	Nurses (Vic, Australia)	571	5.81	5.34	-7.32***
	Normative (medical)	1,104	7.12	5.22	-5.93***
	<b>Overall normative sample</b>	<b>11,067</b>	<b>8.73</b>	<b>5.89</b>	<b>-3.35***</b>
Personal accomplishment	Fertility nurses	68	39.81	6.44	
	Nurses (Vic, Australia)	571	37.56	6.88	-2.57-
	Normative (medical)	1,104	36.53	7.34	-3.60***
	<b>Overall normative sample</b>	<b>11,067</b>	<b>34.58</b>	<b>7.11</b>	<b>-6.05***</b>

Note: Comparisons to IVF Nurse group calculated through t-tests: \* = p <.05, \*\* = p <.01, \*\*\* = p <.001

**TABLE 4. FREQUENCIES OF WORK ENGAGEMENT CATEGORIES ACROSS THREE SUBSCALES**

Category	Vigour		Dedication		Absorption	
	n	%	n	%	n	%
Very low	9	14	1	2	1	2
Low	14	21	0	0	2	3
Average	22	33	22	33	16	24
High	15	23	32	49	34	52
Very high	6	9	11	17	13	20
<b>Total</b>	<b>66</b>		<b>66</b>		<b>66</b>	

**TABLE 5. WORK ENGAGEMENT DESCRIPTIVE STATISTICS AND COMPARISON OF IVF NURSE RESULTS WITH GENERAL NURSES AND NORMATIVE DATA**

	n	M	SD	Comparison t-test
Fertility nurses	67	4.38	1.02	
Australian nurses	510	4.69	0.71	-2.45*
USA nurses	718	4.45	0.78	-0.58

Note: Comparisons to IVF nurse group calculated through t-tests: \* = p <.05, \*\* = p <.01, \*\*\* = p <.001

**TABLE 6. FREQUENCIES OF MHC-SF WELLBEING CATEGORIES**

Category	n	%
Languishing	2	3
Moderate mental health	31	48
Flourishing	31	48
<b>Total</b>	<b>64</b>	

**TABLE 7. WELLBEING DESCRIPTIVE STATISTICS AND COMPARISON OF IVF NURSE RESULTS WITH THREE STUDENT GROUPS**

	n	Emotional wellbeing			Social wellbeing			Psychological wellbeing		
		M	SD	t-test	M	SD	t-test	M	SD	t-test
Fertility nurses	66	10.70	3.52		14.97	5.80		20.91	5.75	
Dutch students	308	13.40	1.01	11.50***	16.20	0.98	3.51***	25.30	0.93	12.71***
South African students	328	13.80	0.72	14.60***	18.00	0.90	8.98***	28.70	0.75	23.68***
Iranian students	484	12.00	1.23	5.94***	15.20	1.15	0.77	24.00	1.10	10.55***

Note: Comparisons to IVF nurse group calculated through t-tests: \* = p <.05, \*\* = p <.01, \*\*\* = p <.001

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### DISCUSSION

Fertility Nurses are a distinct group of professionals who fill an important role in fertility care. Our study provided much-needed insight into their lived experiences – highlighting key stressors and mental health outcomes.

#### STRESSORS

The key stressors identified by the nurses fall into the three themes of Interpersonal stressors, Organisational Stressors, and Emotional Burdens. Together these results paint a picture of Fertility Nurses who frequently feel treated poorly by management, patients, and colleagues, while also having to take on large workloads in an emotional context.

##### Interpersonal stressors

Interpersonal stress resulted from a perception that other people (doctors, colleagues, or patients) were being difficult, unreasonable, or simply poor communicators. Three-quarters of respondents commented on these issues, highlighting significant problems in interpersonal relationships. This is consistent with past research noting Fertility Nurses must resolve competing demands from both doctors and patients.<sup>13</sup> Nurses' most common interpersonal stressor (46%) was with 'difficult patients', some of whom directed their frustrations at staff. Past research and our results indicate this can lead to nurses experiencing intense feelings such as frustration, anxiety, guilt, and dislike.<sup>1</sup> Working with fertility issues can lead to emotionally fraught interactions between patients and nurses, but our research and past studies indicate many staff in fertility clinics feel inadequately trained to deal with patient complaints.<sup>12</sup>

It was concerning that a fifth of nurses reported difficult interactions with angry and demanding doctors. This may align with the power imbalances noted between doctors and nurses in healthcare more generally and which could be exacerbated in fertility clinics where the doctor can be the clinic director and owner – concerned with financial outcomes.<sup>14</sup> Our study also found that conflict with colleagues was an equally frequent stressor. This points to problems within teams and a lack of support from management.

##### Organisational stressors

Organisational challenges attracted the most comments with many nurses commenting on high workloads, time constraints, lack of role clarity, complex work, and the restricted services they could offer their patients. The high workload stems partially from the continually expanding role of fertility nurse which participants felt detracted from their nursing responsibilities.<sup>5-7</sup> Almost half participants felt their work was not sufficiently valued and identified specific issues around unsupportive management, insufficient remuneration, and feeling devalued. They noted that

there was insufficient organisational support, training, or leadership from management to help manage their load and improve patient care. This lack of organisational support led to a perception that clinics provide inadequate care for patients. Ethical concerns also arose from the business model which 'prioritised profit over patient care' and 'undervalued nurses' contributions; reflecting broader concerns around the ethics of the fertility industry.<sup>2,33</sup> In light of the many organisational issues, it was concerning to note that respondents indicated a lack of effective complaint mechanisms to bring about change.

##### Emotional burden

Around half of the respondents identified issues of emotional burdens. These included the burdens of breaking bad news, dealing with emotional patients, emotional entanglement, and the feeling of providing suboptimal care. Many participants described the heavy burden of managing patients' emotions and sometimes noted they were unable and undertrained to respond adequately. The nurses experienced a high emotional cost from delivering bad news to patients and this was exacerbated by the lack of debriefing options available. Some respondents experienced this emotional burden as feelings of anger or frustration towards 'difficult' patients, connecting to the depersonalisation elements of burnout. These emotional burdens alongside the organisational and interpersonal issues, can be linked to the mental health outcomes investigated.

#### MENTAL HEALTH OUTCOMES

The mental health results were mixed. While no participants reported high burnout on all three subscales (emotional exhaustion, depersonalisation, and personal accomplishment), around half were high on at least one of the three subscales.

Almost two-thirds of participants reported moderate to high depersonalisation, which involves cynical, callous, or excessively detached reactions. The levels of depersonalisation in the current study are higher than those in general healthcare worker comparative data sets. Depersonalisation is exemplified in our qualitative data where nurses discussed 'difficult', 'demanding' and 'unreasonable' patients – indicating a level of detachment and depersonalisation. Together, these results speak to high levels of compassion fatigue – where caregivers absorb the distress, anxiety, and fears of the patients.<sup>34</sup> The results align with past research on the noncaring (emotional distancing) coping mechanism employed by Fertility Nurses which can be effective in the short term,<sup>15,16</sup> but is likely to cause distress in patients,<sup>17,18</sup> and could lead to lower pregnancy success rates,<sup>12</sup> and decisions to end treatment or change clinics.<sup>1</sup> So, the high levels of depersonalisation noted in our study may impact both patient outcomes and organisational goals.

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In addition to high levels of depersonalisation, nearly half of the participants experienced moderate to high emotional exhaustion stemming from intrapersonal strain and depleted emotional reserves.<sup>35</sup> This aligns with our qualitative results which highlighted frequent interpersonal stressors and the heavy emotional burdens of fertility nursing; particularly the burden of delivering bad news.

Interestingly, the majority of the participants reported high levels of personal accomplishment – indicating feelings of competence, self-efficacy and productivity in work.<sup>36</sup> Their levels of personal accomplishment were significantly higher than comparison medical samples. This is good news considering the nurses also described a lack of training, support, and validation.

Regarding work engagement, our results indicate that the vast majority of participants had average to high dedication and absorption. However, when compared to other Australian nurses, the participants had lower overall engagement. The poorest scores were seen on the vigour sub-scale where around a third of participants reported very low, to low vigour. This outcome links to the high levels of emotional exhaustion noted above and may be caused by the emotional burdens described by respondents.

Wellbeing was a noted issue with the current study. Participants were significantly lower on all three scales (emotional, social and psychological wellbeing) compared to comparison samples of students. However, when examining overall wellbeing, only a small percentage of respondents were ‘languishing’ (low wellbeing) with the remainder being split between ‘moderate’ and ‘flourishing’ categories.

### IMPLICATIONS

Our results have important implications for nurses, clinics, and the wider fertility care sector. For individual nurses, findings from our research can be used to normalise stressors and prompt effective responses. Sharing common stressors is beneficial among health practitioners in general.<sup>37</sup> Fertility Nurses may particularly benefit from hearing about some of the less researched stressors such as conflict with colleagues and patients. It may also help nurses to be aware that depersonalisation of patients is common but can have unhelpful outcomes such as reduced treatment efficacy and patients leaving treatment.<sup>15,16</sup> If nurses can recognise their compassion fatigue as it is occurring, they may be in a better position to seek help. Therapeutic approaches may help staff to restore empathy for patients. For example, there is growing evidence that mindfulness interventions may improve wellbeing, empathy and quality of care in healthcare professionals, which can in turn reduce burnout.<sup>1,38</sup> While Fertility Nurses can undertake some actions to improve their own wellbeing, it is important to remember that many of the stressors were organisational and structural and as such should be addressed at that level, rather than giving more work to nurses.

IVF clinics can use the current results to inform improvements in organisational structures and staff support. Our respondents noted the ever-expanding responsibilities of Fertility Nurses. While it may be financially tempting for organisations to give staff more and more work, clinic management should consider the impact this has on staff burnout, turnover, and poor patient care – leading to hidden costs over time. When nurses are tasked with more technical medical roles, management could consider reducing their administrative tasks. Where the roles of nurses do expand, they should be given the time and support to undertake appropriate training and professional development. Managing nurses’ workloads better may include allowing more breaks and the establishment of realistic staffing ratios. Workload audits could be used to examine exactly what nurses are expected to do in a day, and how much they can actually achieve before either their standard of care declines or the nurse is adversely impacted.

Many nurses felt like the sole staff member on the emotional rollercoaster of patients’ experiences. To alleviate this, clinics could make better use of mental health support for both patients and staff. This could include patient support by psychological professionals who are better trained to manage emotional distress and mental health issues.<sup>1</sup> It would also ease the burden of delivering bad news for nurses who have many other medical roles to fill. For staff, debriefing sessions after difficult encounters could reduce the emotional distress and burnout described by nurses. This could include the provision of clinical supervision; which has been shown to lower burnout and increase job satisfaction and staff retention.<sup>39</sup> Debriefing could also involve mental health professionals, this could help Fertility Nurses cope with the rising and falling emotions common to fertility care and help them develop strategies to deal with negative patient emotions.<sup>1</sup>

Overall, the stressors discussed in our paper will be best addressed by good leadership responses, which seemed to be lacking for many Fertility Nurses. Practitioners leading IVF clinics should be aware of their organisational and management responsibilities, in addition to their medical role. Helpful responses could include management training or hiring additional staff to take on management roles. It is important that clinic leaders understand and mitigate the stressors faced by Fertility Nurses if they are to avoid staff burnout and turnover. While hiring additional staff or providing better organisational support may be costly, it will likely reduce staff stress, turnover, and detrimental effects on patient care, improving the commercial returns of the clinic in the long term.

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While many changes can be made at the organisational level, there are also improvements that could be undertaken within the wider IVF sector. Power imbalances that are commonly documented between doctors and nurses seemed to be heightened in fertility clinics.<sup>14</sup> Given the high level of stress that comes from difficult or abusive doctors, it is important that nurses can access an independent complaints system. It may also help nurses to have better representation in peak bodies so they can share their frontline experiences and seek solutions to the stressors they face as a group. Given the important roles nurses play within the fertility sector, the development of staff-care resources and guidelines could also be beneficial for nurses while providing clear guidance for clinics.

### STRENGTHS LIMITATIONS AND FUTURE RESEARCH

The current research focuses on an under-studied group and uses a mixed methods approach to investigate the experiences of Fertility Nurses. There are limitations, however, in that the quantitative data was cross-sectional and cannot point to causality. This could be resolved with future longitudinal studies. Another limitation relates to sampling in that we used convenience sampling and had a relatively small sample. While this sample provides a good representation of Fertility Nurses in Australia, it is not clear whether these results can be generalised outside of this context and future studies could seek out the views of Fertility Nurses in different countries. The comparison samples we used were existing data and future research could compare Fertility Nurses to a matched sample of other healthcare workers.

### CONCLUSION

Our study used a mixed methods approach to examine the unique mental health implications and stressors of Fertility Nurses. This captures the views of an under-researched group and offers a nuanced view of Fertility Nurses' experiences. Results indicate that nurses face a wide range of interpersonal stressors, organisational stressors, and emotional burdens. This links to the quantitative result which shows many Fertility Nurses are at risk of burnout and have low levels of wellbeing and workplace vigour. At its core, this study provides a platform to share Fertility Nurses' experiences of stressors and mental health outcomes. For individual Fertility Nurses, findings from our research can be used to normalise stressors and prompt effective responses. Organisations can use nurses' views to improve structures and staff support. In the wider IVF sector, results can inform staff-care resources and better representation. Given the importance of Fertility Nurses to fertility care, efforts to reduce staff stress can have flow-on benefits for patients and treatment efficacy.

**Data availability:** The data that support the findings of this study are available on request from the corresponding author, [TY]. The data are not publicly available due to restrictions e.g. their containing information that could compromise the privacy of research participants.

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### REFERENCES

1. Grill E. Role of the mental health professional in education and support of the medical staff. *Fertility and Sterility*. 2015;104(2):271-6.
2. Williams A. The experience of fertility nursing within the New Zealand context: Auckland University of Technology; 2008.
3. Breidahl V. The ART of fertility nursing in Australia. *Australian Nursing Journal*: ANJ, The. 2005;13(4).
4. Denton J. The nurse's role in treating fertility problems. *Nursing Times*. 1998;94(2):60-1.
5. Morris EJ. The role of infertility nurses in ovulation induction programmes. *Human Fertility*. 2001;4(1):14-7.
6. El-Adham AFM, Shaban RE. Effect of instructional guideline on fertility nurses' knowledge and attitude regarding invitro fertilization. *Journal of Nursing and Health Science*. 2020;9(1):33-46.
7. Libraro JL. The evolving role of the ART nurse: A contemporary review. *Textbook of Assisted Reproductive Techniques*. 2012:457-65.
8. Simpson R, Bor R. 'I'm not picking up a heart-beat': Experiences of sonographers giving bad news to women during ultrasound scans. *British Journal of Medical Psychology*. 2001;74(2):255-72.
9. Domar AD, Zuttermeister PC, Friedman R. The psychological impact of infertility: a comparison with patients with other medical conditions. *Journal of Psychosomatic Obstetrics and Gynaecology*. 1993;14:45-52.
10. Ferraretti AP, Goossens V, Kupka M, Bhattacharya S, de Mouzon J, Castilla JA, et al. Assisted reproductive technology in Europe, 2009: results generated from European registers by ESHRE. *Human Reproduction*. 2013;28(9):2318-31.
11. Macdonald M. Origins of difficulty in the nurse-patient encounter. *Nursing Ethics*. 2007;14(4):510-21.
12. Huppelschoten AG, Aarts JW, van Empel IW, Cohlen BJ, Kremer JA, Nelen WL. Feedback to professionals on patient-centered fertility care is insufficient for improvement: a mixed-method study. *Fertility and Sterility*. 2013;99(5):1419-27.
13. Payne D, Goedeke S. Holding together: caring for clients undergoing assisted reproductive technologies. *Journal of Advanced Nursing*. 2007;60(6):645-53.
14. Lokatt E, Holgersson C, Lindgren M, Packendorff J, Hagander L. An interprofessional perspective on healthcare work: physicians and nurses co-constructing identities and spaces of action. *Journal of Management & Organization*. 2019:1-17.

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15. Allan H. A 'good enough' nurse: supporting patients in a fertility unit. *Nursing Inquiry*. 2001;8(1):51-60.
16. Allan H, Barber D. Nothing out of the ordinary: advanced fertility nursing practice. *Human Fertility*. 2004;7(4):277-84.
17. Gameiro S, Boivin J, Domar A. Optimal in vitro fertilization in 2020 should reduce treatment burden and enhance care delivery for patients and staff. *Fertility and Sterility*. 2013;100(2):302-9.
18. Dancet EA, Nelen WL, Sermeus W, De Leeuw L, Kremer JA, D'Hooghe TM. The patients' perspective on fertility care: a systematic review. *Human Reproduction Update*. 2010;16(5):467-87.
19. Wilson C, Leese B. Do nurses and midwives have a role in promoting the wellbeing of patients during their fertility journey? A review of the literature. *Human Fertility*. 2013;16(1):2-7.
20. Lemaire JB, Wallace JE. Burnout among doctors. *BMJ: British Medical Journal (Online)*. 2017;358.
21. Khoa LD, Quang TN, Vinh DQ, Anh NTN, Tuong HM, Foster K. The prevalence of job stressors among nurses in private in vitro fertilization (IVF) centres. *Nursing Open*. 2019;6(1):39-49.
22. Halm M, Peterson M, Kandels M, Sabo J, Blalock M, Braden R, et al. Hospital nurse staffing and patient mortality, emotional exhaustion, and job dissatisfaction. *Clinical Nurse Specialist*. 2005;19(5):241-51.
23. Schlak AE, Aiken LH, Chittams J, Poghosyan L, McHugh M. Leveraging the work environment to minimize the negative impact of nurse burnout on patient outcomes. *International Journal of Environmental Research and Public Health*. 2021;18(2):610.
24. Daouk-Öyry L, Anouze A-L, Otaki F, Dumit NY, Osman I. The JOINT model of nurse absenteeism and turnover: a systematic review. *International Journal of Nursing Studies*. 2014;51(1):93-110.
25. Maslach C, Jackson SE, Leiter MP. Maslach burnout inventory: Scarecrow Education; 1997.
26. Schaufeli WB, Bakker AB. Utrecht work engagement scale: Preliminary manual. Occupational Health Psychology Unit, Utrecht University, Utrecht. 2003;26(1):64-100.
27. Keyes CL. Mental illness and/or mental health? Investigating axioms of the complete state model of health. *Journal of Consulting and Clinical Psychology*. 2005;73(3):539.
28. Braun V, Clarke V. Thematic analysis: American Psychological Association; 2012.
29. Braun V, Clarke V. One size fits all? What counts as quality practice in (reflexive) thematic analysis? *Qualitative research in psychology*. 2021;18(3):328-52.30.
30. Patrick K, Lavery J. Burnout in nursing. *Aust J Adv Nurs*. 2007;24(3).
31. Maslach C, Jackson SE, Leiter MP. Maslach burnout inventory manual. 3rd ed. Palo Alto, Calif. 577 College Ave., Palo Alto 94306: Consulting Psychologists Press; 1996.
32. Joshanloo M, Wissing MP, Khumalo IP, Lamers SM. Measurement invariance of the Mental Health Continuum-Short Form (MHC-SF) across three cultural groups. *Pers Individ Dif*. 2013;55(7):755-9.
33. Balendra J. Four Corners. The Baby Business: ABC; 2016.
34. Bush NJ, editor Compassion fatigue: Are you at risk? Oncology nursing forum; 2009: Oncology Nursing Society.
35. Maslach C, Schaufeli WB, Leiter MP. Job burnout. *Annu Rev Psychol*. 2001;52(1):397-422.
36. Awa WL, Plaumann M, Walter U. Burnout prevention: A review of intervention programs. *Patient Educ Couns*. 2010;78(2):184-90.
37. Farrington A. Suicide and psychological debriefing. *Br J Nurs*. 1995;4(4):209-11.
38. Krasner MS, Epstein RM, Beckman H, Suchman AL, Chapman B, Mooney CJ, et al. Association of an educational program in mindful communication with burnout, empathy, and attitudes among primary care physicians. *JAMA*. 2009;302(12):1284-93.
39. Martin P, Lizarrondo L, Kumar S, Snowdon D. Impact of clinical supervision on healthcare organisational outcomes: A mixed methods systematic review. *PLoS one*. 2021;16(11):e0260156.