

Bridging the gap: ICU nurses' experiences in detecting pressure injuries across diverse skin tones

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ABSTRACT

Background: Pressure Injury detection remains a challenge in patients with darker skin tones due to the absence of visible erythema, resulting in delayed diagnosis and poorer patient outcomes. Despite international guidelines, nurses face barriers in early recognition due to knowledge gaps and inadequate training in skin tone diversity. A timely assessment is critical for effective treatment. This necessitates that healthcare professionals recognise how early pressure ulcer signs may present in patients of all skin tone types.

Aim: To explore ICU nurses' experiences in assessing pressure areas in patients with dark skin tones and identify challenges and solutions.

Methodology: Following ethical approval, semi-structured interviews were conducted with 11 ICU Nurses. Interview data were analysed using thematic analysis using NVivo software.

Findings: Three key themes emerged: (1) Gaps in education and training on diverse skin tones, (2) Challenges in early detection due to "white normativity" in assessment tools, and (3) The need for inclusive education and advanced diagnostic tools to mitigate disparities.

Conclusion: Urgent improvements in nursing curricula and clinical training are required to ensure equitable pressure injury detection for all skin tones. The study advocates for greater inclusivity in educational materials, continuous professional development, and the integration of advanced tools like infrared thermography and subepidermal moisture scanners.

1. Introduction

Hospital-acquired pressure injuries (PIs) represent a significant challenge in healthcare, with an incidence rate of 8.4 % and a global prevalence of 12.8 % [1]. These statistics underscore the widespread nature of PIs in healthcare settings and their profound impact on patient outcomes. Pressure injuries can have debilitating effects on individuals, restricting their ability to engage in social and physical activities, maintain comfortable body positions, walk, or participate in rehabilitation [2]. Moreover, patients who acquired a PI during their hospitalisation exhibited a notably higher 30-day mortality rate and a greater propensity for readmission [3]. There is also a clear association between pressure injuries and prolonged ICU/hospital stays, further contributing to escalating healthcare costs [3]. In Ireland, the mean cost of managing a pressure injury is estimated at €878 per patient, with expenses rising as severity progresses [4]. This financial burden places additional strain on healthcare systems, emphasising the need for effective prevention and

early detection strategies. Despite well-established prevention guidelines, disparities persist in early detection, particularly among patients with darker skin tones, where traditional assessment criteria—such as non-blanchable erythema—are less visible, leading to delayed intervention and poorer outcomes [4].

The terms 'pressure ulcer' and 'pressure injury' are used interchangeably throughout the literature. The National Pressure Injury Advisory Panel (NPIAP) officially replaced 'pressure ulcer' with 'pressure injury' in 2016 to better reflect the spectrum of skin and tissue damage, including both intact and open wounds [5]. The European Pressure Ulcer Advisory Panel (EPUAP) and the Pan Pacific Pressure Injury Alliance (PPPIA) have also adopted this terminology shift, although 'pressure ulcer' remains widely used in the literature and clinical settings [4,6]. Other terms such as 'decubitus ulcer' and 'bed-sores' have been historically used but are now considered outdated [7].

The European Pressure Ulcer Advisory Panel (EPUAP) staging system comprises four categories for the sequential appearance of PI over time

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and two additional categories for unknown PI depths. Category I, the initial and most rudimentary indication, examines non-blanchable erythema. This is evident in areas of the skin where local blood flow has been obstructed by prolonged pressure, resulting in inflammation [6]. However, in patients with darkly pigmented skin, erythema may not be visible, complicating early detection [7]. This delay in identification can hinder timely intervention and exacerbate patient outcomes.

The 2022 Irish census indicates that 242,558 individuals, approximately 5 % of the population belong to ethnic groups such as Indian, Pakistani, Bangladeshi, Arab, Black or Black Irish-African, Asian or Asian Irish-Chinese, other Asian, or other/mixed ethnicities, excluding White Irish, Irish Travellers, and other White categories [8]. With 5 % of the Irish population identifying as non-White, addressing these disparities is both a clinical necessity and an ethical imperative.

Accurate evaluation and early identification are critical factors for the effective management of PIs [9]. Yet, evidence suggests that patients with darker skin tones are disproportionately diagnosed at more advanced stages of PI development due to inadequate evaluation and delayed recognition [10]. Studies have also shown a lack of diversity in education materials and the reinforcement of “whiteness” in nursing education which limits the ability of healthcare professionals to recognise and address the presentation of PIs across diverse skin tones [11–14]. To address these disparities, it is imperative that healthcare professionals enhance their knowledge and understanding of how PIs manifest across different skin tones and to develop the skills necessary for accurate and timely diagnosis [15]. This study seeks to bridge these gaps by exploring the factors contributing to delayed PI identification in individuals with darker skin tones and proposing strategies to improve evaluation and care practices from a nursing perspective.

2. Methods

2.1. Study design and participant recruitment

This study employed a qualitative approach using semi-structured interviews to explore ICU nurses' experiences in detecting pressure injuries in patients with darker skin tones. A non-probability convenience sampling method with purposive elements was used, ensuring that participants met predefined inclusion criteria: (1) a minimum of three years of ICU experience and (2) direct involvement in pressure injury assessment. This aligns with Benner's (1982) Novice to Expert Theory, which supports the selection of experienced nurses capable of providing in-depth insights into clinical challenges [16].

Recruitment was conducted within a single large academic teaching hospital in Ireland, using a combination of posters in ICU units, digital flyers, and study information packs disseminated by a designated gatekeeper. From a pool of approximately 175 nurses, 11 participants were recruited. To ensure rich data collection, the principle of data saturation was applied. While the initial target sample size was flexible, saturation was determined inductively, new participants were recruited until no new themes emerged in the data [17]. Data collection was conducted via semi-structured, in-person interviews facilitated by a nurse researcher with ICU experience. The interview questions were collaboratively designed with an expert in qualitative research and explored nurses' experiences in assessing pressure areas in patients with dark skin tones. The interviews were recorded, transcribed verbatim, and managed using NVivo (v.14) software for thematic analysis, ensuring rigorous coding and consistent identification of themes [18].

2.2. Data analysis

This study employed Braun and Clarke's six-phase thematic analysis framework to ensure a systematic and rigorous approach to qualitative data interpretation [19–21]. **Phase 1: Familiarisation with the Data** involved immersion in the data by transcribing and re-reading interview transcripts. Conducting manual transcription deepened familiarity with

the content. Field notes capturing non-verbal cues were integrated to enrich the analysis [22]. **Phase 2: Generating Initial Codes** included systematically coding the data to identify meaningful segments. Using NVivo (v.14) software, the researcher organised and visualised codes, creating an initial list of 32 codes that reflected significant patterns in the dataset. **Phase 3: Searching for Themes** entailed grouping codes into overarching themes. The 32 initial codes were categorised into three broad themes: Experiences in Learning, Experiences in Practice, and Ways to Improve. Thematic maps helped explore relationships among codes. **Phase 4: Reviewing Themes** involved refining the themes to ensure coherence and alignment with the research questions. By consolidating and eliminating codes, three final themes emerged: Skin Tone Disparity, The Role of Education, and Opportunities for Improvement. **Phase 5: Defining and Naming Themes** involved a detailed review of the data to identify sub-themes and articulate their narratives. Each theme was defined to convey its central message clearly. Finally, in **Phase 6: Producing the Report**, the researchers synthesised findings into a cohesive report, showcasing thematic insights supported by the extracted data.

2.3. Trustworthiness

The researchers ensured trustworthiness by adhering to Lincoln and Guba's criteria of credibility, confirmability, transferability, and dependability [23]. Credibility was established through prolonged engagement in the ICU field and by allowing the participants to review and approve their transcripts. Confirmability measures included maintaining an audit trail, peer reviews, and pilot testing to refine interview techniques. Transferability was supported by detailed thick descriptions of participants' social and cultural contexts, ensuring findings could resonate beyond the study's setting. Dependability was reinforced through collaboration with a qualitative research expert, ensuring consistency and rigour in the research process.

2.4. Ethical considerations

Ethical standards were upheld, by obtaining a university ethical approval. Informed consent was secured, confidentiality maintained via pseudonyms and secure data storage, and participant well-being was prioritised with debriefing resources and clear rights to withdraw. These measures collectively ensured the study's methodological integrity.

3. Findings

3.1. Demographics

All participants were registered nurses currently working in a 26-bed Intensive Care Unit at a large academic teaching hospital in Ireland. The group comprised six Caucasian nurses and five nurses of South and Southeast Asian descent. Participants held a range of academic qualifications, from bachelor's degrees to master's degrees, with their undergraduate degrees obtained from various countries with diverse cultural and ethnic backgrounds (Fig. 1).

Before joining the healthcare workforce in Ireland, most participants had worked in different parts of the globe, including Australia, India, Saudi Arabia, Singapore, the UK, and the Philippines. This diverse professional background enriched the study by providing a global perspective on ICU nursing practices. The participants also brought varying levels of ICU experience to the study, ranging from 3 to 14 years as shown in Table 1.

3.2. Themes

3.2.1. Main themes and their sub-themes

The three themes that emerged in this study were The Role of Education, Skin Tone Disparity, and Opportunities for Improvement (Fig. 2).

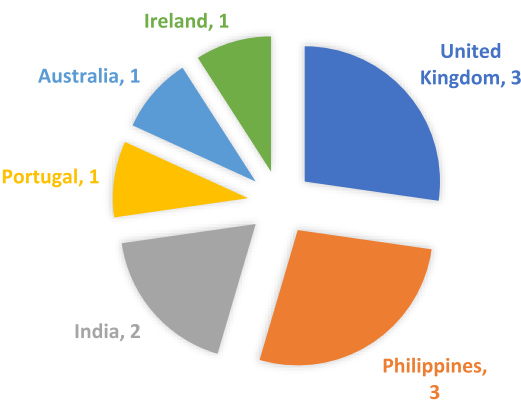


Fig. 1. Countries where participants completed their undergraduate studies.

Table 1
Years of ICU experience of the Participants.

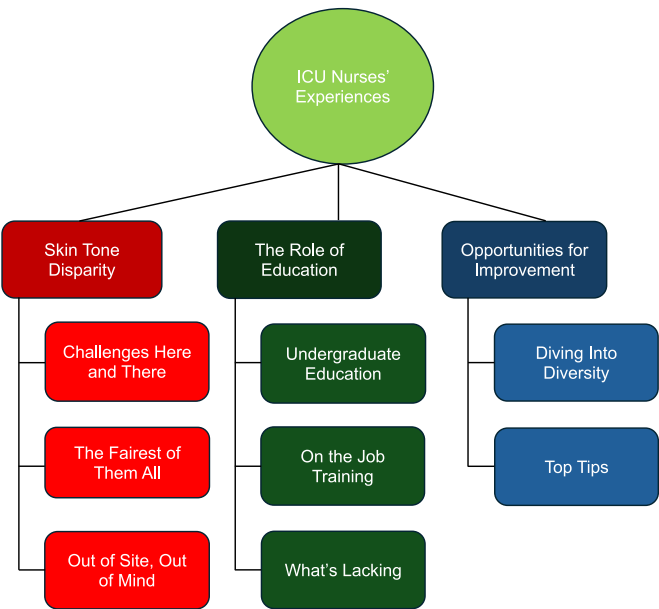
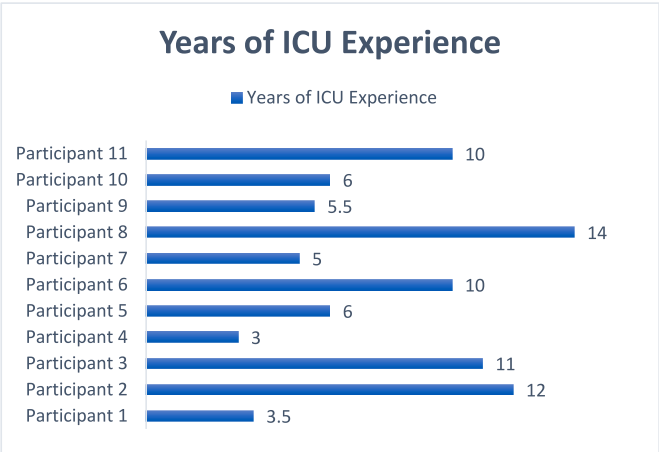


Fig. 2. Themes and sub-themes.

These themes illustrate the challenges and barriers nurses face in assessing pressure injuries in patients with darker skin tones.

3.2.2. Theme 1: The Role of Education

This theme encapsulates the participants' overall experiences regarding how education and training influenced their ability to assess pressure injuries, particularly in patients with dark skin tones.

3.2.2.1. Sub-theme 1: undergraduate education. This sub-theme highlights the foundational role of undergraduate education in equipping student nurses with the knowledge and skills necessary for effective pressure ulcer prevention. Participants frequently described their initial exposure to pressure ulcer assessment as occurring early in their nursing education, often within foundational courses:

"Pressure ulcer assessment is something that came up very early on from my memory in the first year. One of our subjects was foundation nursing, where we learned a lot of the basics." (P2)

Despite this early exposure, many participants admitted feeling unprepared to assess pressure injuries in patients with dark-skin tones. This lack of confidence stemmed from gaps in educational content and resources, which largely focused on lighter skin tones:

"I wouldn't say I'm 100 % confident in someone with darker skin in assessing their skin just from that education that I've had... even from the pictures I've seen in [name of college]." (P10)

Additionally, some participants highlighted the absence of adequate support and learning aids during their undergraduate studies. Participant 4 commented:

"I don't think there is kind of enough highlighted in my student years that would kind of give me what I needed to know in order to assess properly and appropriately." (P4)

This sub-theme underscores the critical need to enhance undergraduate nursing curricula by particularly addressing the assessment of pressure areas across diverse skin tones.

3.2.2.2. Sub-theme 2: on the job training. The participants highlighted the value of workplace initiatives, such as pressure ulcer prevention groups and tissue viability nurses, which provided practical and context-specific learning opportunities. These supports played a pivotal role in their clinical practice:

"We have like a local level pressure ulcer prevention group. They are quite good at like pressure area care like in general." (P1)

"The big thing is with the tissue viability nursing group. Their group lead is really hands-on on and she's great whenever she is on duty. Anyone who kind of has pressure injuries that might be very difficult to assess or difficult to grade. She would kind of make a point of coming around". (P4)

Participant 8 shared their personal experience, noting that they gained more familiarity with pressure injuries since moving to the ICU:

"It was a renal transplant unit, and we hardly had patients in for more than two or three days. I don't remember doing the pressure area assessment like I do now." (P8)

Participant 9 emphasised the value of a themed education month to raise awareness and promote best practices in pressure ulcer prevention and management:

"So, actually we take quite a role in doing the education for pressure ulcers. So, we have a pressure ulcer awareness month. We do talks on the unit. We try and embed it in clinical practice." (P9)

This sub-theme illustrates the value of experiential learning, peer support, and structured workplace initiatives in bridging knowledge

gaps and enhancing nurses' confidence and competence in pressure ulcer prevention and management.

3.2.2.3. Sub-theme 3: What's lacking. This sub-theme focuses on the lack of diversity and inclusivity in educational materials and initiatives related to pressure ulcer prevention and management. Most participants noted that little emphasis is placed on educating nurses about skin tone diversity in pressure ulcer education:

"I suppose [short pause] my education in pressure ulcer doesn't look at different skin tones." (P9)

The lack of diverse depictions in teaching aids led to discrepancies amongst staff in agreeing on the stage of a PI. Participant 4 explained:

"I think that's why there was such a discrepancy between different staff as to what was in each stage because not everyone fit the characteristics for each stage perfectly. There was no kind of diversity in any of the pictures that were used." (P4)

Participant 7 noted a default approach to teaching skin assessment that neglected the needs of black-skinned patients:

"No, they're not given emphasis, but I think they should as well because we get these patients and I don't know [shrugs shoulder] it has just... I feel like it's just become a default to everybody. Like, OK, teach the skin assessment, but... they don't go into this specific cohort of black-skinned as well." (P7)

Despite working in a diverse hospital, the educational materials primarily focused on a narrow demographic:

"I think it was all kind of white... lighter skin tones in the pictures. To be honest, like if they're using any examples like... a mannequin or something, it's a mannequin with light skin tone." (P1)

The findings in this sub-theme highlight an urgent need for more inclusive educational resources and training to address the discrepancies in pressure ulcer assessment, particularly for patients with darker skin tones.

3.2.3. Theme 2: skin tone disparity

In this theme, the nurses expounded on the challenges that they face when assessing pressure areas of dark-skin tone patients. The nurses also share how unconscious bias negatively impacts such patient cohort and some reasons why a lack of diversity is observed in pressure area/ulcer assessment education.

3.2.3.1. Sub-theme 1: challenges here and there. The participants consistently expressed a lack of confidence when assessing pressure injuries in patients with darker skin tones, citing challenges in detecting early-stage pressure injuries and associated symptoms. Participant 3 succinctly stated:

"With dark skin tones, as I've said, it still remains a great challenge for me." (P3)

Several participants noted that erythema—an essential early indicator of pressure injuries—is harder to detect in darker skin tones due to the lack of visible redness:

"I think recognizing the early stages, I would definitely say is a weakness and I'd probably miss a fair bit... like the blanching erythema level and then even so the stage one is quite difficult." (P2)

"It all starts with redness... but it's quite difficult to spot that with those who are people of colour." (P3)

Participant 6 recommended being extra vigilant in assessing dark-skinned patients to avoid missing skin changes:

"We have to be a little bit more vigilant than the fairer skin because we couldn't appreciate mostly the stagings like the haematoma or the erythema and those kind of changes."

Even experienced nurses, like Participant 10, admitted feeling unsure about their assessments despite extensive nursing experience:

"I wouldn't be 100 % confident [referring to assessing pressure areas of dark skin patients] even though I have like 10 years nursing experience." (P10)

Inconsistencies in pressure ulcer reporting among staff were also a recurring issue. Participants noted variations in how mentors and colleagues interpreted and documented pressure ulcer stages, which exacerbated their uncertainty. Participant 4 reflected on these discrepancies:

"It would vary from mentor to mentor. You might think you have all the stages mapped out in your head. You're like, OK, I know the chart, that's fine. And then you'll work with another nurse and she'll kind of say, oh, no, that's actually a different stage. And you're like, oh, well, I would have said this stage, you know, so it's kind of... It was very mentor-dependent." (P4)

Overall, in this sub-theme Participants reported significant difficulties in detecting early-stage pressure injuries in patients with darker skin tones, particularly due to the lack of visible redness and other clear indicators. These challenges, compounded by inconsistent reporting practices among staff, underscore the need for improved training and standardisation to enhance care quality and accuracy.

3.2.3.2. Sub-theme 2: out of sight, out of mind. In this sub-theme, the participants emphasised that the lack of specific training negatively impacts patient care, often resulting in delayed detection of pressure injuries in dark-skinned patients. Participant 7 explained:

"If you're not trained into looking into a darker skin cohort of patients, then it could definitely affect them negatively." (P7)

The late detection of pressure injuries among dark-skinned patients was identified as a significant risk, often leading to worsened patient outcomes. Several participants noted that these injuries were typically only recognised when skin breakdown occurred:

"In my experience... pressure injuries aren't really noticed until there's kind of a break in the skin ..." (P1)

This delay exacerbates pain and discomfort for patients and extends their hospital stay. Participant 11 expressed concern about the impact on patient well-being:

"It's really unfair on the patients, detecting it at a much later stage, it would, affect not only their skin but also like their stay in the hospital and like the pain wise and the discomfort."

The findings also revealed the role of unconscious bias in perpetuating disparities. Many participants acknowledged that they had not considered the unique challenges faced by dark-skinned patients until prompted during the study:

"It's not something I suppose I would have necessarily thought about, but it's a good point. Like in fact, it's not something I've actually thought about before this interview." (P9)

Participant 7 described the interview as an eye-opening experience, recognising that educational materials often default to lighter skin tones, leaving staff unprepared to meet the needs of diverse populations:

"This is an eye-opener. I think it's really more on educating the staff. Like I feel bad because this interview has made me realise that I've educated myself, but by default only, like in a certain skin colour." (P7)

This sub-theme underscores how late detection and unconscious bias impacts the care received by patients with dark skin, and the need for these issues to be addressed to provide equitable care.

3.2.3.3. Sub-theme 3: the fairest of them all. The study highlighted the dominance of light-skinned examples in pressure ulcer teaching and assessment materials. Participants noted that educators often prioritised these examples, assuming they were easier for students to understand and recognise. This practice, however, marginalises darker-skinned patients and perpetuates disparities in care. As Participant 10 observed:

“They [referring to educators] presume it’s easier to show the different stages with pressure damage that maybe it’s more obvious, but that was... I’ve never seen... any other than a white person.” (P10)

While some participants acknowledged the practicality of using light-skinned examples, they emphasised that such materials fail to reflect the growing diversity in patient demographics. Participant 8 remarked:

“It’s quite straightforward when it comes to a fair-skinned person. You could relate it to the picture, but then nowadays, we see a lot of mixed [referring to both light and dark-skinned patients].” (P8)

This reliance on light-skinned examples may lead to unintentional biases in clinical practice. Participant 2 explained that in high-pressure ICU settings, quick assessments often focus on visible changes, which are more apparent in lighter skin tones:

“In a busy intensive care unit, it’s quite easy to do quick skin assessments and for the lighter skins it’s fairly easy to see if there’s any reddening, and I think a lot of the times I probably do take that quick assessment... and I probably don’t take as long on the darker skins, when I probably should.” (P2)

These insights underscore the urgent need to diversify teaching materials and emphasise thorough assessments for all skin tones to ensure unbiased care across patient populations.

3.2.4. Theme 3: Opportunities for Improvement

This theme encapsulates the participant’s ideas on how to address the gaps in pressure injury care.

3.2.4.1. Sub-theme 1: diving into diversity. All participants emphasised the importance of embracing diversity in nursing practice to address disparities in pressure ulcer care and improve outcomes for all patients. They advocated for individualized culturally sensitive approaches, and inclusive assessment tools that consider variations in skin tones. Participant 4 emphasised the need for individualized care:

“We’re always saying that not two patients are the same. We have to individualise our care plans and make them holistic.” (P4)

With the increasing diversity of patient populations, participants stressed the urgency of adapting nursing education and bedside assessments to reflect this demographic shift. Participant 10 noted:

So obviously with people from all across the world, in Ireland and in Dublin, I feel like that should be better representative, in terms of pressure damage [assessment techniques] even for someone from other countries. Like, without the typical white skin. We should be more diverse because nursing is so diverse within itself, so why don’t we relay that also into examples and through education.” (P10)

Participants also identified a need for inclusive assessment tools to support bedside education and clinical practice. Participant 1 suggested:

“Dublin is such a big city and it’s got a very multicultural kind of population. And I would say it is quite diverse in terms of like dark skinned, Asian skin, light skin ‘cause we have people coming from all

continents into ICU. I suppose inclusion of that assessment in the bedside education is probably important to highlight this and we could probably develop something that isn’t being taught too often” (P1)

The role of nurses as patient advocates was a recurring theme. Participants emphasised, that failing to properly assess patients based on skin colour could lead to inequities in care and adverse outcomes. Participant 10 highlighted the ethical implications:

“If I can’t fully assess my patient, then I’m not going to be able to advocate and look after them and give them the appropriate care that I should be able to give any person. It shouldn’t be based upon your skin colour if I can give you proper care. It puts everybody at a disadvantage who isn’t white.” (P10)

This sub-theme accentuates advocating for diversity in nursing practice and education so that nurses are well equipped to provide culturally sensitive care across the board.

3.2.4.2. Sub-theme 2: top tips. ICU nurses strongly emphasised the need to reform pressure injury education by incorporating diverse skin tones into training materials. Participant 11 proposed integrating inclusive visual aids into educational resources:

“So maybe in the [name of teaching slides] we could include how to assess dark skinned individuals. Even in the pictures printed in the ICU, ‘cause those examples are only for fair skin, white skin individuals. So maybe add dark skin and how to detect it at a much earlier stage... more inclusive visual aids.” (P11)

Participants stressed the importance of thorough assessments, particularly for dark-skinned patients. They noted that additional time and vigilance are often required to ensure accurate evaluations. Participant 7 highlighted the challenges:

“Pay more attention and allocate more time. It’s actually sometimes challenging because, especially intubated patients, you have to turn the patient to assess the skin of the back.” (P7)

Participant 8 reinforced the need for extra care, emphasising vigilance to avoid missing subtle signs:

“For a dark-skinned person you just have to be that extra vigilant to see how they are like, otherwise there is a chance that you could easily miss anything.” (P8)

The use of advanced diagnostic tools was suggested as a solution to address these challenges. Infrared thermography and photographic documentation were highlighted as promising methods. Participant 5 recommended:

“There are ways of doing it which is more advanced such as infrared thermography.” (P5)

“I know we are doing photographs. But we are not able to access those. And say if a non-blanching has worsened to grade one or a grade two, we just have by word of mouth to get it. You’re like verbally explaining at hand over. Unless there’s a document where we see the photographs ourselves, we can be more sure of the consistency.” (P8)

Finally, the need for further research to bridge knowledge gaps and enhance nursing practices was highlighted. Participant 1 suggested:

“Probably more research as well in terms of nurses’ attitudes and beliefs and that kind of thing towards it. So people know more about it and do more about it.” (P1)

This sub-theme highlights actionable strategies to improve pressure injury care, including diversifying educational materials, adopting advanced tools, and conducting further research to enhance clinical

practices.

4. Discussion of findings

This study underscores the critical role of education in equipping nurses with the knowledge and skills needed for effective pressure ulcer prevention. Participants emphasised the value of both formal education and hands-on learning in clinical settings, where collaboration with experienced colleagues enhances their competencies. However, gaps in knowledge during undergraduate and professional training were identified, aligning with prior research that highlights deficiencies in nurses' understanding of pressure injury prevention [24–26].

In addition, a significant concern identified in this study is the prevalence of "white normativity" in educational materials. Participants reported that visual examples predominantly featured light-skinned individuals, marginalizing patients with dark skin tones. This pattern, supported by Pusey-Reid et al. (2023) and Oozageer Gunowa et al. (2021), reflects broader systemic biases in nursing education [11,14,27,28]. Addressing these disparities requires diversifying educational resources and fostering critical analysis of biases, which is essential for preparing culturally competent nurses and improving equitable healthcare outcomes [29,30].

The findings highlight disparities in pressure ulcer detection and care due to skin tone differences, with participants noting challenges in identifying erythema in dark-skinned patients. Research supports these observations, emphasising that individuals with darker skin often exhibit reduced blanching reactions, complicating early-stage pressure ulcer detection [31]. Delayed detection can exacerbate inequalities, leading to poor outcomes such as pain, discomfort, and psychological burdens [32]. Unconscious bias amongst nurses was found to be a contributor to skin tone disparity. Participants were unaware of the lack of diversity in educational materials until it was highlighted, reflecting insufficient focus on equity and inclusivity in healthcare education. A lack of diverse visual examples in textbooks perpetuates bias, disadvantaging non-white patients and limiting nurses' cultural competence [33,34]. The participants emphasised the importance of incorporating diverse and multicultural perspectives into nursing education to address disparities in pressure injury detection. This approach involves not only acquiring knowledge about the physiological variations in skin tones but also comprehending the social factors that influence health, cultural attitudes, and institutional obstacles that could affect healthcare accessibility and results [35–37].

Technological advancements were also proposed to enhance pressure injury assessment. Infrared thermography, as suggested by participants, can detect temperature variations on the skin's surface, aiding early identification of pressure spots [38–41]. Studies support its potential for providing non-invasive, immediate, and unbiased assessments [38,41]. However, challenges such as patient discomfort due to acclimation requirements have been noted [42,43]. Alternatively, subepidermal moisture (SEM) scanners are highlighted by experts as a reliable tool [44–46]. These devices measure interstitial fluid changes, allowing early detection of tissue damage irrespective of skin pigmentation [44,46].

The implications of these findings extend beyond education and into clinical practice, policy development, and healthcare equity. Addressing disparities in pressure ulcer detection requires a multifaceted approach, including curriculum reforms that integrate diverse skin tone representations, enhanced clinical training on early-stage pressure injury identification in patients with darker skin tones, and widespread adoption of objective assessment tools, such as subepidermal moisture scanners [13,14,44,45]. Healthcare organisations must prioritise inclusivity in training programs and resource allocation to ensure that all patients, regardless of skin tone, receive equitable care [47]. Additionally, raising awareness about unconscious biases through structured training initiatives can foster a more culturally competent nursing workforce, ultimately reducing health disparities and improving patient

outcomes [48,49].

5. Conclusion

This study highlights the critical need for inclusive nursing education and equitable clinical practices in pressure injury detection. The findings emphasize how gaps in education, lack of diverse training resources, and unconscious bias contribute to delayed detection of pressure injuries in patients with darker skin tones. These disparities reinforce systemic inequities in healthcare, necessitating immediate action at both educational and institutional levels. Recommendations include diversifying curricula, integrating images of various skin tones, fostering continuous learning, and using advanced tools to aid prompt detection of PUs among dark skinned patients. The study calls for addressing gaps in knowledge, promoting inclusivity, and conducting further research on the impact of diverse skin tones in various nursing specialties. These measures aim to equip healthcare practitioners with the skills to deliver equitable, high-quality care to all patients.

6. Limitations

This study was conducted exclusively in a single hospital in Ireland, limiting its generalisability to other healthcare settings or regions with different practices and demographics. The findings reflect the perspectives of ICU nurses, whose experiences may not fully represent those in other nursing specialties. Additionally, potential self-selection bias must be considered, as nurses with stronger opinions or prior awareness of the challenges in pressure ulcer assessment for patients with darker skin tones may have been more inclined to participate. This could have influenced the range of perspectives captured in the study.

While the study provides valuable insights into ICU nursing practice, its applicability to other settings, such as general medical-surgical wards, long-term care facilities, or outpatient wound care clinics, remains uncertain. Further research involving a broader sample across multiple institutions and specialties is recommended to enhance the generalisability of these findings.

Declaration of competing interest

The authors declare that they have no known conflicts of interest that could have influenced the research, analysis, or conclusions presented in this manuscript.

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