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ABCD before E-verything else—Intensive care nurses' knowledge and experience of pressure injury and moisture-associated skin damage

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Abstract

Patients in intensive care units are at high risk of developing pressure injuries and moisture-associated skin damages. Prevention and care rely much on intensive care nurses' competency and attitudes. This study explored intensive care nurses' experience, knowledge and bedside practice in prevention and care of pressure injuries and moisture-associated skin damages with a descriptive qualitative design. Six focus groups (n = 25) were carried out in three University hospitals, two in Norway and one inIceland. Interviews were guided by a questioning route, recorded and transcribed verbatim before an inductive content analysis. Three interconnected main categories related to nurses' experience, knowledge and bedside care were identified: (a) nursing; (b) context; and (c) patients. Intensive care nurses recognise patients' risk of developing pressure injuries, as well as their continuous need of personal hygiene because of leakage of body fluids. Nurses were therefore attentive to skin inspection and preventive care but felt insecure and in need of expert help in pressure injury wound care. It varied whether nurses had access to suitable beds and mattresses and experts in wound care. ABCD had to be before E-verything else, but the skin had higher priority in long-stay compared with short-stay patients.

KEYWORDS

critical care nursing, focus groups, knowledge, moisture-associated skin damage, pressure injury/ulcer

Key Messages

- intensive care patients are at high risk of developing pressure injuries because of a complex set of internal and external factors, leading to increased morbidity and mortality
- limited research exists on intensive care nurses' knowledge and experience of prevention and treatment of pressure injuries, including moisture-associated skin damages

- six focus groups were carried out to explore intensive care nurses' experience, knowledge and bedside practice in prevention and care of pressure injuries and moisture-associated skin damages
- nurses' opinion was that all ICU patients were at risk of developing pressure injuries, making them attentive to preventive care
- it varied whether nurses had access to high-tech beds and mattresses to avoid pressure injuries as well as experts to support them in wound care

1 | INTRODUCTION

The skin is the largest organ in the human body and its vital function is to protect the body from pathogens.[1] Patients in the intensive care unit (ICU) are at high risk of developing skin damage such as pressure injuries (PI) and moisture-associated skin damage (MASD) because of a complex set of internal and external factors.[1-5] This can lead to increased morbidity[6] and mortality.[2,6]

PI is localised damage to the skin/and or underlying tissue because of pressure or pressure combined with shearing forces.[7] A PI is usually found over a bony prominence; however, they may occur elsewhere because of pressure and/or shearing forces from medical devices or other objects.[7] Mucosal PIs are found on mucous membranes and are most likely caused by medical devices.[7] In the ICU, device-related PIs most likely involve respiratory devices, cervical collars, endotracheal tubes, nasogastric tubes, splints, intravenous catheters, pulse oximeters, casts and stockings.[4,8] PIs, except for those found in mucous membranes, are staged according to the extent and depth of the tissue damage (Table 1).[7] With PI category 1, the skin may stay intact if the cause of the injury is identified and pressure and shearing forces removed.[7]

Although most PI and MASD are preventable, skin breakdown may occur in intensive care patients because of their complex health situation.[2] There may be a need to prioritise life-threatening conditions and treatments that cannot be discontinued[9] based on an Airway, Breathing, Circulation, Disability and Exposure (ABCDE) approach (Table 2),[10] above PI preventive initiatives.[11] This may explain why a recent study including intensive care patients from 90 countries found a PI prevalence of 26.6%, of which 16.2% occurred in the ICU.[2] In the study of Labeau, Afonso,[2] six out of the 16.2% of ICU-acquired PIs, were Category 1.

Whereas PIs are caused by damage initiated in soft tissues below the skin ("bottom up injury"), MASDs are "top down injuries" involving irritant contact dermatitis because of friction, sweating or contact with body fluids.[12-14] MASD is an umbrella term including incontinence-associated dermatitis (IAD) (dermatitis because of urine and/or faeces), peristomal dermatitis (relating to colostomy/ileostomy/urostomy/tracheostomy), intertriginous dermatitis (were two skin areas touch or rub each other) and periwound maceration.[13] MASD are typically shallower than severe PIs.[15] PI and IAD may also coexist,[12] leaving it difficult for health care workers to distinguish red skin caused by pressure from red skin caused by urine and/or faeces (IAD) in the private parts.[16]

MASD was recently investigated among Norwegian ICU patients, identifying an overall prevalence of 13%, with 5% being related to urine and/or faeces (IAD).[3] According to other publications, as many as 21% to 36% of ICU patients may suffer from IAD.[11,17-19] The extent of

TABLE 1 Pressure injury classification

Pressure injury[a]	
Category 1	Non-blanchable erythema. Intact skin
Category 2	Partial-thickness skin loss. Shallow open ulcer with a red/pink wound bed or a blister
Category 3	Full-thickness skin loss. Subcutaneous fat may be visible
Category 4	Full-thickness tissue loss. Subcutaneous tissue with visible or palpable muscle, tendon or bone
Unstageable	Depth unknown. Wound covered by eschar or slough
Deep tissue injury	Depth unknown. Purple or maroon localised area under intact skin

[a]The classification system for pressure injury of the skin cannot be used to categorise mucosal pressure injury.

TABLE 2 ABCDE approach in patient assessment

A	Airway assessment and protection
B	Breathing and ventilation assessment
C	Circulation assessment
D	Disability assessment (perform basic neurologic evaluation)
E	Exposure, with environmental control (undress patient and search everywhere for possible injury, while preventing hypothermia)[a]

[a]Skin assessment included.

IAD in ICU patients could relate to the fact that many have liquid stools,[3] which is more damaging to the skin compared with formed stools.[20]

Intensive care nurses offer uninterrupted care to critically ill patients[21] and they most likely inspect patients' skin at least once per shift.[22] The maintenance of skin integrity is therefore an important part of critical care nursing; however, the practice relies on staff's knowledge and attitudes.[7] In a recent review, it was concluded that PI training had a positive effect on staff working in ICUs regarding knowledge, ability to identify and categorise PI as well as distinguish PI from IAD.[23] Studies into ICU nurses' knowledge of prevention and treatment of PI and MASD are however scant, with a few studies showing low levels of knowledge but positive attitudes towards PI prevention.[24-26] Şahin et al[27] found low levels of knowledge among nurses working in ICUs regarding factors associated with prevention and treatment of IAD. A significant association between knowledge and attitude was found for PI, meaning that the more knowledgeable nurses in ICU were the more positive they were towards PI prevention.[25] A recent study, not only aiming at ICU nurses, found that nurses scored higher in PI prevention compared with PI wound care.[28] Outside ICU, clinical experience and participation in PI training has also been identified to influence positively on nurses' knowledge with PI prevention and treatment.[29]

Acknowledging the high risk of PI and MASD in the ICU patient population and that the prevention and care rely heavily on ICU nurses' competency and attitudes; the aim of this descriptive qualitative study was to explore ICU nurses' experience and knowledge of PI and MASD prevention and treatment. In addition, to discover ICU nurses´ practice in supporting bedside PI/MADS prevention and treatment to patients in ICU. This insight is valuable for educators and health care leaders as PI and MASD are largely preventable.

2 | MATERIALS AND METHODS

This is a descriptive qualitative design with focus groups.

2.1 | Setting

The study was conducted in three University hospitals, two in Norway and one in Iceland. The interviews were carried out in late autumn 2019 and during January 2020. Participants were recruited from six ICU wards, two wards within each of the participating hospitals.

In Norway, the focus groups were conducted in the wards whereas in Iceland, the focus groups were conducted at the University. The interviews were carried out in participants' first language, Norwegian and Icelandic respectively. Two researchers are fluent in Icelandic (EJ, RJJ and three researchers are fluent in Norwegian (EJ, IMB, RL).

2.2 | Participants and recruitment

Information about the study and recruitment of participants was carried out through e-mail, a contact nurse in each ICU as well as face-to-face. In all six ICU wards, there was a blend of formally qualified intensive care nurses and registered nurses. All nurses, regardless of work experience and educational level, were invited to participate in the focus groups. The participants were 28 to 57 years old with between 3 and 33 years of nursing experience and most were formally qualified ICU nurses.

Six focus groups, with four to five nurses participating in each interview (N = 25) were conducted. Each interview lasted between 44 and 60 min (mean 53 min).

2.3 | Data collection

The moderator was the same for all six focus groups (EJ) as she is fluent in both languages. One to two observers (IMB, RJJ, RL) participated in the focus groups to enhance the trustworthiness of the study by supplementing it with notes on non-verbal cues, agreements or disagreements, interest/disinterest and group dynamics.

A questioning route was used to create consistency and to ensure that important topics were covered in the focus groups.[30] This route was developed using previous research on the study topic and by brainstorming questions with nurses familiar with the topics. The questions were open-ended, sequenced and arranged with care spending from general, neutral introductory topics to a few key questions.[30] Also, questions were phrased in a positive way first, then participants interacted in the groups to develop all aspects of the topic, including experiences of less quality skin care and how skin care had to be deprioritized because of emergent tasks. All the interviews were recorded and transcribed verbatim.

2.4 | Data analysis

Immediately following each focus group, the researchers developed mind maps on a whiteboard to visually organise the information that was revealed in the focus groups. In Norway, the mind maps were written in Norwegian as all researchers could read simple Norwegian.

In Iceland, the mind maps were written in English so that all researchers could understand the information. All focus groups discussed the key questions broadly. In addition, through interactions in the groups, participants discussed relevant topics that the researchers had not foreseen or asked about. This first analytic step was documented with a photo of the white board and stored at the study secured research platform. Then, an inductive content analysis of the focus group transcripts following Lindgren et al[31] was conducted to identify the manifest content of relevance to the research questions. Two researchers individually analysed the Norwegian (EJ, RL) and the Icelandic (EJ, RJJ) transcribed focus groups to identify meaning units. The meaning units from the Icelandic interviews were recorded in Norwegian, before two researchers met to come to a consensus on codes, sub- and main categories from all six interviews (EJ, RL). Thereafter, the remaining two researchers validated the categories and sub-categories (Table 3) from all six interviews.

2.5 | Ethics

The study was registered and approved by the Norwegian Data Protection Agency (number 123033) on behalf of both countries. In addition, research ethics and data protection regulations were obtained according to each hospitals' requirements. Participants were informed that participation in the study was voluntary and that interview texts would be anonymised, kept confidential and reported anonymously. Participants consented in written to take part in the study.

TABLE 3 Categories and subcategories

ICU nursing
ABCD before E-verything else
Daily skin inspection and consulting
Managing and protecting skin from body fluids
Experience-based practice
Tuned in on turning
ICU context
Skin focus appear and disappear with projects
High-tech beds
ICU patients
All at risk of PI
Too sick to turn
PI present on ICU admission
Device-related wounds
Skin-to-skin and body fluid leakage

Abbreviations: ABCD, Airway, Breathing, Circulation, Disability; E, Exposure; ICU, intensive care unit; PI, pressure injuries.

3 | RESULTS

The analysis showed three main categories related to nurses' experience and knowledge of PI and MASD prevention and treatment, as well as bedside support (Table 2). Although the categories stood out individually, the categories are clearly intertwined and therefore partly presented as such.

The referring to participants from the focus groups is marked as P (participants) from FG (focus group 1–6) to attend to confidentiality.

3.1 | Good at preventing, but lost when it comes to PI care

The ICU nurses acknowledged that the patients in ICU were all at risk of developing PIs, leaving them dedicated to PI prevention through daily skin inspection and care:

> "We observe the skin every time we care for or turn the patient. Looks at, touches and keeps it clean (the skin) (FG1, P2)....so inherent that you hardly think about it, it's like a spinal cord reflex" (FG2, P1).

Skin inspection, included looking for PI:

> "When we wash patients we talk...we look... here he is a little bit red, blue...this does not look good... It's a natural part of caring for patients, observes that he need to lie on the other side because it's red (skin)" (FG2, P1).

Nurses participating in the study made a clear distinction between knowledge and experience with prevention and treatment of PI/MASD wounds respectively. While explaining how they treated MASD and also fungal skin infections, they felt lost in relation to PI treatment:

> "We are always preventing, however when it comes to treatment (of wounds), then there is something else" (FG3, P5).

The nurses clearly needed consultation by a wound care specialist if a patient had a wound:

> "I do not know where to turn, have to call 'name', she is an expert from the wound care team" (FG3, P2).

> "...writes a consultation request. Then a procedure is made by a plastic surgeon, or whoever comes to assess" (FG2, P1).

Access to consultation and procedures developed by wound care specialists varied, however, within and between institutions. In some contexts, nurses had access to pressure injury teams or wound care experts who readily supported them and made wound care procedures for patients. This collaboration with experts or wound care teams did not only provide them with care plans but an increased insight as the experts shared their wound care knowledge while consulting.

Other nurses described how they mainly used each other, mostly based in personal experiences and opinions leading to "learning-by-doing". A lack of competency in wound assessment and care could lead to:

> "It is a bit like the blind leading the blind. Nobody is particularly good at it (wound care)" (FG3, P2).

None of the nurses remembered that their intensive care training programme focused on PI or MASD, but some could remember that it was taught in their basic nursing programmr.

ICU nurses described how they were focused on repositioning patients. If a patient in ICU had to have surgery, some nurses focused on avoiding unchanged patients´ position before, during and after the surgery. Others highlighted how early mobilisation was of particular importance:

> "We are very keen on turning (patients). It is also the first question, whether there are any restrictions of mobilising the patient" (FG5, P2).

> "This (focus) has been evident as long as I have been working here" (FG5, P4).

Although these nurses were tuned in on turning, it was not only to prevent PI. Repositioning was important for respiratory and circulatory reasons. To follow ABCDE was a priority for these nurses, leaving skin inspection and preventive initiatives most often not first on their priority list. The ABCDE approach was particularly important on patients' ICU arrival. The nurses agreed that for newly admitted ICU patients, the skin was among the last topics on the priority list. However, skin care and prevention had a higher priority in the long-stay patients:

> "The skin has higher priority among long-stay patients because you follow them up over time" (FG2, P3).

3.2 | Protecting the skin from body fluids

The nurses discussed how they were continuously occupied in changing sheets and caring for patients because of sweating and leakage of body fluids:

> "Always changing sheets to prevent that people are lying in moisture and we are always cleaning and drying patients" (FG3, P3).

> "Yes, we are in a continuous process of offering personal hygiene somehow" (FG3, P1).

The overweight patients were mentioned in particular because of their risk of skin lesions in skin folds and groin. In addition, moisture lesions (MASD) were common in the private parts, armpits and under breast. The nurses described that patients could be admitted with MASD possibly from lying sick at home for some while. In identifying fungal infections in moisture lesions, nurses described how location and appearance did define whether they thought it was fungal infection or not. The treatment of fungal infections varied within and between hospitals as to how the nurses involved medical doctors.

The nurses were further challenged with drainage systems and wet bandages coming loose. It was not difficult for the nurses to identify themselves with body leakage and moisture lesions in intensive care patients:

> "....when you are lying captured in a bed and there are fluids everywhere, then it will be sore" (FG2, P1).

The nurses pointed out that incontinence briefs and underpads sometimes were put under patients from head to toe as a precautionary principle in case of leakage of body fluids. This could lead to unnecessary moist environments and this was referred to as unnecessary prophylactic use of underpads.

Much attention was, however, given to liquid stools, external and rectal faecal management systems. They talked about how some patients had constant runny liquid stools, leaving them to change up to three external faecal management systems in just one shift. Other nurses had

experience from colleagues who declined to change faecal systems, although the flange was moist and the skin exposed to faeces, because it felt like a huge project to remove and replace. Nurses acknowledged that the external faecal management system was sometimes a mess as they did not necessary leak but still damaged the skin:

> "In a way it's good that patients are not swimming in faeces, of course, but at the same time the skin (close to anus) is dipped in pooh" (FG2, P4).

> "It's best if it (the flange) comes loose by itself because if you have to tear it off it quickly grabs some skin" (FG2, P2).

The nurses discussed how external faecal management systems were impossible to use when the skin around anus had peeled off. Rectal catheters for faecal management were an alternative, although they were expensive and also contraindicated in some patients', for example, because of coagulation problems. Others said: "we spread around us with money so there are no restrictions for them (rectal catheters) to be used" (FG5, P3).

MASD was particularly found in new tracheostomies and when patients had much mucus from lungs. In preventing moisture lesions around a tracheostomy, nurses varied as to how they handled it. Some focused on frequent dressing changes and other nurses used barrier products:

> "...protect the skin with barrier products" (FG1, P1).

> "No, I have never done that" (FG1, P4).

> "Not? I have done that several times" (FG1, P1).

Experience and personal preferences guided nurses' use of skin care products for MASD and they discussed how ICU nurses work very independently and have their own strong opinions of best practice care.

Although skin care and PI prevention were integrated part of intensive care nursing, they experienced facilitating and inhibiting factors to PI prevention related to contextual and patient-related factors.

3.3 | Contextual factors

Access to appropriate mattresses and beds varied within and between health care institutions, leaving nurses with unequal contextual premises for best preventive care. From being able to provide all patients with a high-tech ICU bed in one ward, other nurses struggled to provide critically ill patients with appropriate beds. Nurses with access to high-quality beds described how it made it easier for them to prevent PIs.

When nurses had limited access to appropriate beds, they felt bad not being able to provide best care to patients because standard mattresses were hard. With limited access to appropriate beds, they aimed for best preventive care with what they had:

> "We do the best we can with what we have... we should have had much better beds because our patients are seriously ill" (FG6, P4).

> "...and you become so happy if you find a viscoelastic mattress for a patient, have to search a bit though" (FG6, P1).

As well as being aware of the high cost of high-tech ICU beds, they discussed the need to be skilled to use them correctly. Nurses described how mattresses were used wrongly and some admitted they needed more insight into how to use them. The need for repositioning and mobilisation despite having these high-tech beds was also highlighted:

> "...the air mattresses may somehow give false security, some nurses just activate rotation and it may be reasons for it you know, if patients are unstable, but I think it's always better to reposition even though they have an air mattress" (FG4, P2).

The ICU nurses discussed that much PI is based on the quality of beds, mattresses and repositioning; however, PIs were also related to devices often used in the ICU. The BIPAP-mask was a classic threat for PI development, followed by nasogastric tubes, ECMO cannulas, cervical collars, cooling vests, pulse oximeters, external fixations and compression stockings. Nurses seldom saw PI on mucous membranes from endotracheal tubes.

In addition, focus on PIs seemed to appear and disappear with campaigns or projects. At the end of a project or a campaign, things went quiet or slipped:

> "It was a campaign, the one on pressure injuries...we registered every pressure ulcer as a mistake...suddenly it was just over" (FG1, P2).

3.4 | Too sick to turn

Nurses acknowledged that all intensive care patients were at some risk of getting PIs and were concerned

about those patients that were seriously ill and unable to turn. Although it was rare, some patients were simply too sick to turn because of serious illness, circulatory instability or a risk of getting increased intracranial pressure:

> "...haemodynamic unstable, don't tolerate repositioning, or neuro-intensive care patients that get high intracranial pressures" (FG6, P4).

> "...can't tolerate anything, pressure, breathing and circulation. For example, when the aorta-balloon-pump has just been removed" (FG4, P2).

If patients were too sick to turn, PI occurred at other places than heels or in the sacral area:

> "...if they are very sick, then you see pressure injuries more other places, not on heels and like that, but neck and ears" (FG6, P4).

Nurses discussed episodes and patients that had got PIs because of critical illness and having to stay in the same position over time. Some nurses were unsure whether they could have made small adjustments in patients´ positioning to avoid the PI but admitted they did not make small adjustments in patients' positioning. Other nurses discussed how they could make small alterations by lifting the feet, move elbows, gently move the head, adjust pillows and use rotation settings on the bed. They highlighted that testing of patients' tolerance to repositioning should be done during daytime when there was enough staff to handle potential complications. Nurses also discussed the importance of regularly re-assessing patients' tolerance to re-positioning to avoid unnecessary immobilisation:

> "Maybe it had been possible to start earlier to turn and mobilise" (FG3, P5).

> "I am afraid that we wait too long. When we finally try, the patient has long been ready" (FG3, P2).

A consensus across the interviews was however that if patients had serious PIs, they most likely had them on ICU arrival:

> "Those with serious pressure injuries have them on arrival, they don't get them here (in the ICU). If they get pressure injuries here, it's only category 1" (FG1, P3).

> "They may have PI on arrival...but seldom they get them here (in the ICU)" (FG1, P2).

If patients did get PIs while in the ICU, nurses believed that they had implemented poor ICU nursing practice and failed.

4 | DISCUSSION

4.1 | From ABCD to E-verything else

The nurses in this study acknowledged that patients in ICU were all at risk of getting PI and they were highly attentive to skin care and PI prevention. However, they emphasised that the ABCDE approach must have priority at all times for ICU patients, particularly on ICU admission.[10] Patients in need of ICU treatment have life-threatening illnesses[32] and 60% may need ventilator support.[33] This support nurses' argument that the ABCDE approach is a priority in ICU contexts and lead to situations where the skin may be last on the priority list. In clinical situations where airways (A) and breathing (B) have priority, patients could be predisposed to unavoidable PIs.[34] This could partly explain why a large-scale multicentre study found that 16% had ICU acquired PIs, in which ventilator support on admission was independently associated with PI.[2]

According to the participants in this study, when patients are in need of long-term rather than short-term ICU treatment, the skin is higher on the priority list. Although most patients stay only 24 h in the ICU,[33] it has been reported that some patients stay much longer[2] and that between 1% and 5% stay more than 2 weeks in the ICU.[33,35] Even though only a small proportion of patients stay long in the ICU, they may use up to 12% of all bed-days,[35] meaning that long-term patients are an important group of patients in the ICU.[36] In considering PI, length of ICU stay >3 days has shown to be an increasing risk factor for PI[2] and typically, PI prevalence increases by length of stay.[37] According to Olivo et al,[37] it was however a decline in PI prevalence for patients staying longer than a month. A decline in PI prevalence in long-term patients partly supports nurses in this study describing how the skin could have a higher priority in long-stay patients when the ABCD-approach could safely be complemented with everything else (E, exposure) (Table 2).

4.2 | Varied access to recommended beds and mattresses

In the focus groups, nurses discussed how they did not have the same access to appropriate beds and mattresses, within and between hospitals, affecting the opportunity to prevent PI. Nurses who had high-tech beds admitted

that it made it easier to prevent PIs. Indeed, even without optimal equipment, nurses seem to work hard to aim for best care for patients. Nurses were worried about the quality of their mattresses and spent time searching for better quality mattresses to avoid "rock solid" standard mattresses to critically ill patients. Bearing in mind that PI prevention is anchored in national campaigns and international guidelines,[7,38-40] it is surprising to find substantial variations in access to recommended beds and mattresses within and between ICU units. Indeed, inappropriate beds and mattresses which should be easy to improve, may actually hamper ICU nurses in providing optimal care to critically ill patients. It should be of concern as this study showed that some patients could be too sick to offer change in position in bed because of serious illness, circulatory instability and the risk of getting increased intracranial pressure. Although a lack of high-tech mattresses has previously been identified[41] and improved,[42] this study indicates that there seems to still be a potential for improvements regarding access to recommended beds to critically ill patients.[7]

Previous research suggests that patients who are not repositioned may develop physiologic changes resulting in intolerance to repositioning.[43] This study showed that nurses used rotation function in high-tech beds for unstable patients but admitted that they sometimes waited too long to re-try to reposition instable patients. Because of the negative effects from non-repositioning[43] and paucity in evidence regarding incremental positioning and/or weight shifts,[44] patients in the ICU may benefit from more research and an evidence-based guideline for safe use of rotation function in high-tech beds, repositioning and when to retry repositioning in patients given strict bed rest.

4.3 | Treating PI and MASD

PIs are staged according to their extent and depth and Category 1 involves unbroken skin with non-blanchable erythema.[7] According to a study involving nurses working in ICU, there is a lack of knowledge among nurses in diagnosing, preventing and treating Category 1 PI.[45] According to our study, several nurses were familiar with Category 1 PI and described how they assessed the skin and looked for PI every time they repositioned patients. The nurses meant that PI category 1 was the only category that was formed in the ICU. The nurses' opinion was that if patients had deeper or more extensive PI than Category 1, they were present on ICU admission. A recent study found, however, that most PIs among ICU patients were ICU acquired, and more than half were more severe than Category 1.[2] Category 1 PI should be easy to detect and eliminated because ICU nurses offer uninterrupted care[21] and most likely inspect patients' skin at every shift.[22] Although the redness present in Category 1 is not purple or maroon as seen in deep tissue injury,[7] it could be challenging for nurses to distinguish PI category 1 from deep tissue injury if they have insufficient knowledge or experience in PI classification.[46] Because PI can lead to increased morbidity and mortality,[2,6] treatment of Category 1 is particularly important and also to distinguish it from deep tissue injury. Not only will any skin breakdown reduce ICU patient's protection from pathogens,[1] but it is important to notice that mortality increases proportionally with PI severity.[2]

Nurses informing this study made a clear distinction between their own competency and confidence in prevention and treatment of PI, not least when PIs involved skin breakdown (Category 2–4). While acknowledging that skin assessment, skin care and prevention of skin breakdown was something they did at all times, if a patient was present with a severe PI they felt lost. Fulbrook et al[28] had similar findings as nurses were more knowledgeable in PI prevention compared with PI wound care.

Although it could be argued that ICU nurses should have basic skills in wound assessment and care, PI may be extensive and deep, involving muscles, tendons and bones (Category 4).[7] Deep and extensive PI should be consulted or cared for by wound care specialists. However, according to this study, wound care expertise may not always be readily available in the ICU. Meanwhile nurses may rely upon formal and informal sources of knowledge to shape wound care practice, making it ritualistic and historic.[47] In this study, nurses admitted that wound care practice could be a situation in which the blind leads the blind because of a lack of knowledge.

According to this study, it varied between and within hospitals as to whether they had access to wound care teams or experts or not. Some nurses had easy access to wound care experts, and it did not only benefit patients, but their own wound care competency. Some nurses admitted that they had no such access to wound care experts in the ICU. In general, none of the nurses admitted that they had written wound care procedures readily available to support them in bedside decisions. Similar findings were made by Lee et al,[22] identifying that formal protocols for IAD management were rare in an ICU setting in Australia. This lack of standard protocols could explain why nurses in this study admitted how personal preferences guided the choice of practice in prevention and treatment of MASD in particular.

An important finding regarding MASD was also how nurses seem to be more confident in initiating treatment

of MASD compared with PI, even when they considered it to also involve fungal infections. It varied among the nurses whether they involved medical doctors or not before antifungal creams were applied. MASD is typically not as deep and extensive as PI,[15] and treatment may most likely be limited to various creams. This may explain why they believed more secure in treating MASD compared with PIs involving skin breakdown (Category 2–4).

4.4 | Time for low-tech focus in high-tech ICU nursing training?

In this study, nurses could not remember that wound care or PI/MASD prevention had been taught in their intensive care nursing education; however, they re-called it from their basic nursing programme. Indeed, nurses admitted that insight and focus into PI/MASD in the ICU appeared with projects or campaigns making them focused on how to avoid for example PI by taping nasogastric tubes correctly. However, the nurses described how the focus on PI/MASD disappeared at the end of the projects.

Intensive care patients are typically seriously ill[32] and present with mainly intrinsic factors making them at risk of ICU acquired PI.[2] Because of sweating, need for various types of stomas, risk of skin getting in contact with body fluids, including liquid stools,[3] patients in the ICU may also be at risk of getting MASD.

The unique combination of knowledge, skills, attitudes and competencies that intensive care nurses must hold are not typically included in pre-registration nursing education.[48,49] This supports the need to focus on chronic critical ill, including PI/MASD prevention and skin/wound care, in ICU nurses education.[36] A lack of focus on tissue injuries and wound care in postgraduate ICU nurses' education care may partly explain why some publications found a lack of knowledge into PI and MASD among ICU nurses.[24-27]

4.5 | Limitations and further research

Although this is a qualitative study, it is based on six focus groups with 25 nurses working clinically with ICU patients in six different ICU units. This provides the study with an in-depth information on the study topic that may be transferable to other care contexts. However, because of variations in contextual factors found within and between hospitals in this study, the transfer of findings to other contexts should be considered with care. Further studies could therefore benefit from a quantitative approach including a wide variety of intensive care settings.

In considering the results from this study, it is important to know that all focus groups were carried out before the covid-19-pandemic. Nurses' experiences from seriously ill covid-19 patients most likely in need of prone positioning for several hours, muscle relaxation and long-term ventilator care are therefore not included in this study. Further studies could benefit from investigating PI and MASD in chronic critical ill intensive care patients, effective interventions and nurses' experiences and practice.

5 | CONCLUSION

This study found that nurses in the ICU acknowledged that most ICU patients were at risk of developing PIs as well as being in need of continuous help with personal hygiene because of leakage of body fluids. The PI risk made nurses attentive to skin inspection, repositioning and providing critically ill patients with appropriate beds. Although nurses admitted it was rare, they were sometimes unable to reposition patients because of serious illness and they shared stories of PI in these critically ill patients. Access to suitable beds and mattresses to avoid PI varied however between and within hospitals and in some contexts, nurses worked hard to find a suitable bed.

While being knowledgeable and experienced in prevention of PI/MASD and treatment of MASD, they felt insecure and in need of expert help in the treatment of wounds caused by PI. The experience of nurses informing this study was also that MASD and serious PIs were most likely present on ICU admission rather than originated in the ICU. Nurses' access to wound care experts varied between ICU units; however, those who had support from experts in wound care also gained increased personal knowledge because of the bedside support.

In this study, nurses' opinion was that ABCD had to have priority in ICU patients. E-verything else, including skin inspection and care, had to come last on the priority list except for long-term patients.

This study could be helpful for educators and leaders in providing ICU nurses with necessary knowledge, expert support, and access to necessary equipment to avoid preventable wounds among ICU patients.

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CONFLICT OF INTERESTS

The authors declare no potential conflict of interest.

DATA AVAILABILITY STATEMENT

Authors elect to not share data.

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