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## Pediatric nursing-sensitive outcomes in lower and medium complexity care units: A Delphi study

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### ABSTRACT

**Background:** The effectiveness of pediatric care is made more challenging to analyze by the need for specialist nursing and by the specific characteristics of pediatric patients, as opposed to adult patients, such as ongoing rapid growth and development, and different physical, cognitive, and emotional demands. Previous research has identified "Pediatric Nursing-Sensitive Outcomes" (PNSOs) in intensive care unit settings, though pediatric intensive care beds only represent a very limited percentage of hospital beds. To improve care quality and safety for a larger population of patients, this study aims to identify PNSOs in lower and medium-complexity care units (LMCCUs).

**Methods:** This study uses the Delphi method to gather expert opinion on priority PNSOs in LMCCUs, with a 75 % consensus pass threshold. A preliminary list of PNSOs was identified from a literature review and used as inputs for two Delphi rounds conducted between January and March 2023.

**Results:** 27 panelists were recruited and passed 17 PNSOs: pressure injury; failure to rescue; patient/family experiences; central line-associated bloodstream infections; surgical site infections; healthcare-associated infections; medication errors; hospitalization breastfeeding continuity; peripheral intravenous infiltrate or extravasation; pediatric falls; pain assessment and management; vital sign monitoring; nutrition; discharge planning; family-centered care practice; healthcare environment; nurse voluntary turnover.

**Conclusion:** This study contributes to research on PNSOs and builds consensus on priorities for LMCCUs. Future research should clinically evaluate these PNSOs and their association with organizational and professional variables often investigated in an adult but not a pediatric setting.

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### Introduction

The World Health Organization (WHO) has asserted that nurses are core personnel in healthcare systems and in determining effective patient outcomes (The Lancet, 2020; Wakefield et al., 2021). In adult wards, the quality of nursing care has been measured by "Nursing-Sensitive Outcomes" (NSOs) (Doran et al., 2003; Griffith et al., 2008), with studies demonstrating that hospitals with improved and stimulating work environments and adequate nurse-to-patient ratios are associated with better quality-of-care and outcomes (Aiken et al., 2011; Aiken et al., 2014). NSOs can therefore be used to measure nursing and patient care quality (Oner et al., 2021).

To effectively identify how to improve clinical practice and quality of care in different specific settings, NSOs need to be contextualized by

patient characteristics, such as age, clinical condition, and intensity of care (Korniewicz & Duff, 2000). Taking care of pediatric patients is different from adults, and many aspects should be considered by pediatric nurses (Chelazzi et al., 2023). Children are often hospitalized to manage complex symptoms and rare diseases that can start early, such as before birth, and, depending on their age and maturity, they have different levels of understanding, vocabulary capability, social integration, and emotional development (Paul et al., 2018). They are dependent on their parents, beyond the simple informed consent responsibility. Parents' involvement in the caring process influences the healthcare professional's performance, the children's adaptation to the hospitalization, and the creation of a "positive" environment where they trust healthcare professionals (Buka et al., 2022). For these reasons, nursing-sensitive outcomes may be different for pediatric patients, depending on their peculiarities, developmental stages, and physical, cognitive, and emotional demands (Betz et al., 2007; Buka et al., 2022; Chelazzi et al., 2023; Paul et al., 2018), than for adult patients. Accordingly, the specific traits of pediatric populations influence the processes,

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diagnoses, and treatments requiring advanced nursing care, and analyzing their effectiveness is a specific challenge.

The Iowa Outcomes Project developed the first Nursing Outcomes Classification (NOC) system, defining nursing outcomes as measurable conditions, behaviors, or perceptions of the patient or family, and conceptualizing them as variables sensitive to nursing care (Moorhead and Iowa Outcomes Project (A. c. Di), 2008). As research turned to investigating nursing outcomes (Aiken et al., 1999), the conceptualization was reworked under the term nursing-sensitive outcomes (NSOs) (Doran et al., 2003). Doran defined an NSO as an “outcome for which the individual nurse can be held accountable ... relevant, based on nurses’ scope and domain of practice and for which there is empirical evidence linking nursing inputs and interventions to the outcome”, and therefore as the consequence of nursing interventions on patients. NSOs have, furthermore, proved useful in measuring care quality (Fiorini et al., 2022; Oner et al., 2021).

In the pediatric care setting, just as in the adult care setting, many studies have focused on outcomes involving the length of stay (LOS) in the hospital, mortality rates, healthcare-associated infections (HAIs, or nosocomial infections), and pressure injury (Aiken et al., 2014; Kane et al., 2007; McCrory et al., 2017). For example, a 2018 retrospective cohort study on pediatric patients with an LOS of 14 days or longer identified that 52 patients (22 %) had acquired one or two HAIs (Ping Kirk et al., 2018). In another study, during their hospitalization, pediatric patients developed ventilator-associated pneumonia (VAPs; 53.1 %) and catheter-associated urinary tract infections (CAUTIs; 28.1 %) (García Mancebo et al., 2021). Just as in adult patients, immobility, friction, and shearing are risk factors for the development of pressure injuries in pediatric patients. One of the most recorded PNSOs is the development of pressure injuries (Amatt et al., 2023). Beyond the common risk factors, pediatric patients have delicate, immature skin and often several medical devices attached to them, worsening the predisposing condition for the pressure injury’s development (Marufu et al., 2021). Accordingly, growing evidence has reported an increase in the rates of medical equipment-related pressure injury (Şimşek, Demir, Semerci, & Karadağ, 2023; Young, 2018), and has identified certain risk factors (e.g., females, aged two years or younger, longer hospital stays, oedema, infections, surgery) for developing Medical Adhesive-Related Skin Injuries (MARSIs) (Wang et al., 2019).

While some outcomes have been well documented, others remain less explored, such as the experiences of pediatric patients, despite evidence suggesting that children and adolescents wish to receive more medical information on their condition and are, in fact, able to contribute to health-related discussions (Montreuil et al., 2023; Peña & Rojas, 2014). However, exploring nursing outcomes in the pediatric setting is a field in rapid expansion. Two recent literature reviews in particular have tried to assess the current state of play in the field of pediatric NSO (PNSO) research (Amatt et al., 2023; Danielis et al., 2021). The first of these identified a range of PNSOs and compared their measuring methods. Furthermore, it broke down the conceptualization of PNSOs in terms of attributes of outcome (e.g., pressure injury, central line-associated bloodstream infections, medication errors, pneumonia), process (e.g., pain assessment and management, nutrition, vital sign monitoring), and structure (e.g., environment, nurse voluntary turnover, skill mix). However, heterogeneity in the measurement and reporting of study results made meta-analysis problematic, and the authors noted a high number of NSOs with a great variety of investigated variables in the pediatric clinical area. The second literature review mapped PNSOs in pediatric intensive care units (PICUs), identifying three performance goals in nursing care for critically ill pediatric patients: 1) improvement of clinical performance, measured by clinical outcomes (e.g., pain and distress); 2) assurance of patient care safety, measured by safety outcomes (e.g., unplanned/accidental extubations); and 3) promotion of fundamental care needs, measured by functional outcomes (e.g., nutritional status). Similarly to previous research that has identified and classified a high number of PNSOs (Amatt et al.,

2023; Danielis et al., 2021), this review focused only on the intensive care setting, where patients are characterized by high complexity, clinical instability, and variability, where the ratio nurses/patients are 1:2 and the decisional process and interventions are timely changeable (Huber et al., 2021). Therefore, precedent research has excluded lower and medium complexity care units (LMCCUs), such as internal medicine or surgical wards, that are clinical settings hosting clinically stable patients, and where the length of hospitalization is predictable, and the ratio of nurses/patients is more than 1:6 (Bandini et al., 2018). Although pediatric intensive care is much more expensive, especially in high-income countries, the number of intensive care beds represents only about 10 % of total hospital beds (Kaur et al., 2021). To our knowledge, there is currently no international consensus on priority PNSOs in pediatric LMCCUs, even though these account for a high percentage of total hospital beds. The main aim of this research is therefore to identify relevant PNSOs to provide nursing managers with indicators to assess the quality of nursing care in LMCCUs over time and to contribute to a complete assessment of nursing outcomes and their comparison across different settings.

## Methods

### Study design

An observational study has been conducted using the Delphi method (Vernon, 2009) to collect the opinions of experts on the use and prioritization of PNSOs in LMCCUs, aiming for a 75 % consensus on each outcome (Baker et al., 2006). This method was chosen to overcome the limitations of previous research and facilitate the measurement and comparison of nursing efficacy in these and other pediatric settings. This study has been conducted and reported following the recent guidelines for Delphi techniques in Health Science Research (Gattrell et al., 2023; Spranger et al., 2022).

### Sampling

The sampling strategy employed a purposive technique, aiming to harness the collective wisdom of experts in the field and generate robust insights and perspectives on the LMCCUs PNSOs (Hasson et al., 2000). To guarantee different experts’ representation, the following inclusion criteria have been used: (1) expertise in pediatric clinical and organizational practice for at least six months, (2) geographical (from Northern, Central, and Southern Italy), (3) educational level (Bachelor, Master, Doctorate) and (4) professional background diversity (registered nurses, nurses specialized in pediatric caring, nursing managers, nursing university professors). Potential participants were identified through academic publications, congress participation on this topic, and suggestions from these field experts. A researcher not directly involved in the research contacted via email these potential participants, by explaining the purpose, scope, and potential impact of this Delphi. They have been invited to be part of the expert panel and requested their availability and informed consent to participate.

### Data collection

A preliminary search of the databases PUBMED, CINAHL, and SCOPUS was conducted to build a list of candidate PNSOs, using search terms such as “pediatric nursing”, “patient outcome assessment”, “nursing-sensitive outcome”, “nosocomial infection”, “medication error”, “peripheral intravenous infiltration”, “mortality”, “infant”, “newborn”, “adolescent”, “youth”, and “child”. Two literature reviews were found to correspond to the search and the aim of this study (Amatt et al., 2023; Danielis et al., 2021), identifying respectively 57 and 46 PNSOs. A preliminary consensus was sought from a panel of two pediatric healthcare organization nursing managers and two university professors with expertise in pediatrics on which of the PNSOs corresponded

specifically to lower and medium complexity care settings, thus eliminating non-relevant outcomes ( $n = 46$ ; e.g., outcomes-specific to intensive care units, such as ventilator-associated pneumonia, and the use of physical restraints, which, with children, are strictly limited to specific needs, such as administering medication and preventing interference with intravenous lines). After removing duplicates ( $n = 39$ ), the expert panel therefore identified 18 PNSOs in the LMCCU setting suitable for this research. The 18 PNSOs were then organized according to the Amatt et al. (2023) classification of 1) *outcome attributes*: pressure injuries, (bedsores), failure to rescue (FTR), patient/family experiences, central line-associated bloodstream infections (CLABSIs), postoperative cardiopulmonary complications, surgical site infections (SSIs), healthcare-associated infections (HAIs, or nosocomial infections), medication errors, hospitalization breastfeeding continuity, peripheral intravenous infiltrate or extravasation, and pediatric falls; 2) *process attributes*: pain assessment and management, vital sign monitoring, nutrition, discharge planning, and family-centered care practice; and 3) *structure attributes*: healthcare environment (on the practice environment scale), and nurse voluntary turnover.

A draft questionnaire was administered to the same panel as above, to check comprehensibility, and the results were included in the final sample. The checked questionnaire was then delivered via e-mail and completed online by the panel of recruited nursing experts, in two rounds, between January and March 2023.

In each round, the panelists expressed their agreement on the list of potential outcomes as appropriate indicators of nursing quality in pediatric lower and medium-complexity care settings, using a four-point Likert response scale (ranging from disagree = 1 to agree = 4). Panelists were also invited to add a comment at the end of the questionnaire and suggest additional outcomes in Round 1 for Round 2. A definition of each outcome was provided to limit the potential for different interpretations.

Each round was available for two weeks, and reminders were e-mailed out at the beginning and end of the second week. Two weeks were allowed to pass between Round 1 closing and Round 2 opening. The results from Round 1, summarized in descriptive statistics, were sent to the participants as input for Round 2. The questionnaire took approximately 10 min to complete each time, and demographic data were collected at the same time.

#### Data analysis

The collected data were analyzed using the statistical analysis software SPSS (Version 25; IBM SPSS, Chicago, IL, USA), and a descriptive analysis was conducted of the sociodemographic variables and the responses regarding each NSO (Hasson et al., 2000). The Likert responses of each round were converted into dichotomous variables, with scores of 1 and 2 converted to “disagree”, and of 3 and 4 converted to “agree”. Frequencies were converted into percentages (dividing the frequency by the total number of participants and multiplying the result by a hundred), and outcomes were considered relevant when the consensus reached  $\geq 75\%$  (Polit & Beck, 2017). PNSOs suggested at the end of the questionnaire by participants were analyzed by a qualitative analysis dividing the answers up by thematic area and identifying keywords.

#### Ethical considerations

This research is an extension of the study protocol entitled “Nursing Leadership in Clinical Practice, Its Efficacy and Repercussions on Nursing-Sensitive Outcomes: A Cross-sectional Multicenter Protocol Study” (Fiorini et al., 2022), which had already been approved by the Ethics Committee of the University Hospital of Rome Tor Vergata (Reference: 143.21).

The anonymity of respondents was guaranteed in each round by administering the questionnaire anonymously and presenting the results in aggregate form.

## Results

### Sample characteristics

Overall, twenty-seven nursing experts became panelists and participated in at least one round. Twenty-six completed two rounds. The data were collected in Northern ( $N = 12$ ; 44.4%), Central ( $N = 14$ ; 51.8%) and Southern ( $N = 1$ ; 3.7%) Italy. The panelists, most of them women, worked in a variety of wards or departments, including clinical ( $N = 15$ ; 55.6%), organizational ( $N = 6$ ; 22.2%), and educational ( $N = 6$ ; 22.2%). Pediatric nursing experience years ranged from 5 to 38 (SD = 11.66), and all participants had a post-graduate degree. Table 1 outlines the main characteristics of the panelists.

### Round 1

The number of respondents in the first round was twenty-seven. The 18 PNSOs were rated with mean scores (and standard deviations) ranging from 3.74 (SD = 0.45) to 2.44 (SD = 0.80). The outcome of post-operative cardiopulmonary complication did not reach the 75% consensus threshold (registering only 33.3%) and was therefore excluded, leaving the remaining 17 PNSOs (classified as 10 outcome attributes, 5 process attributes, and 2 structure attributes).

Five other PNSOs identified in the comments of the panelists and thematically analyzed were eliminated. Two of them were eliminated because they dealt with staff training and technology (e.g., “good training improves support”, or “information technology improves the success of care planning”), and the other three of which were eliminated. After all, they were related to discharge planning, patient/family experiences, family-centered care practice, and medication errors (e.g., “Patients and their families report their satisfaction with treatments”, or “Errors made during the preparation of the therapy”). The panelists also proposed the use of physical restraints as a new PNSO, but this had already been excluded from the preliminary consensus as not relevant enough to the pediatric population (Kirwan & Coyne, 2017). Only the outcome of gastrointestinal infections was included in Round 2.

### Round 2

Round 2 had twenty-six respondents (99%). The 18 NSOs were rated with mean scores (and standard deviations) ranging from 3.77 (SD = 0.51) to 2.65 (SD = 0.80). The gastrointestinal infection outcome, added after the first round, did not reach the consensus threshold (registering only 61.5%) in Round 2 and was therefore eliminated. The remaining outcomes achieved overlapping consensus results between the first and second rounds, except for three: failure to rescue, peripheral intravenous infiltrate or extravasation, and nutrition. Consensus was reached for 17 outcomes, classified as 10 outcome attributes, 5 process attributes, and 2 structure attributes (Table 2). No other comments

**Table 1**  
Main characteristics of the panelists.

	N (%)	MEAN (SD)
Age		42.07 (10.63)
Sex		
Female	22 (81.5)	
Male	5 (18.5)	
Work experience years		19 (11.55)
Profession		
Pediatric nurse	17 (63)	
Registered nurse	10 (37)	
Educational level		
Master's degree	17 (63)	
PhD	5 (18.5)	
Post-graduate course	5 (18.5)	

**Table 2**  
Outcome consensus.

Classification	Nursing-sensitive outcomes	Round 1(27)	Round 2(26)
Outcome attributes	Pressure injury	25 (92.6 %)	26(100 %)
	Failure to rescue (FTR)	24 (88.9 %)	20 (77 %)
	Patient/family experiences	24 (88.9 %)	22 (84.7 %)
	Central line-associated bloodstream infections	27 (100 %)	25 (96.2 %)
	Postoperative cardiopulmonary complications	9 (33.3 %)	–
	Surgical site infections	22 (81.4 %)	23 (88.4 %)
	Nosocomial infections (HAIs)	26 (96.3 %)	25 (96.2 %)
	Medication errors	27 (100 %)	24 (92.3 %)
	Hospitalization breastfeeding continuity	26 (88.8 %)	22 (84.6 %)
	Peripheral intravenous infiltrate or extravasation	25 (92.6 %)	21 (80.8 %)
	Pediatric falls	21 (77.8 %)	20 (76.9 %)
	Gastrointestinal infections	–	16 (61.5 %)
	Pain assessment and management	26 (96.3 %)	25 (96.2 %)
Process attributes	Vital sign monitoring	26 (96.3 %)	25 (96.1 %)
	Nutrition	23 (85.2 %)	20 (76.9 %)
	Discharge planning	26 (96.3 %)	24 (92.3 %)
	Family-centered care practice	27 (100 %)	25 (96.1 %)
Structure attributes	Environment (practice environment scale)	23 (85.2 %)	24 (92.3 %)
	Nurse voluntary turnover	25 (92.5 %)	23 (88.5 %)

were reported. Table 2 summarizes the Delphi panel ratings for the different PNSOs in each round.

## Discussion

This study aimed to identify and find consensus on pediatric nursing-sensitive outcomes (PNSOs) in lower and medium complexity care unit (LMCCU) settings. Seventeen outcomes reached the consensus of the panelists, of which ten were classified as outcome attributes (pressure injury, failure to rescue, patient/family experiences, central line-associated bloodstream infections, surgical site infections, healthcare-associated infections, medication errors, hospitalization breastfeeding continuity, peripheral intravenous infiltrate or extravasation, and pediatric falls), five were classified as process attributes (pain assessment and management, vital sign monitoring, nutrition, discharge planning, and family-centered care practice), and two were classified as structure attributes (healthcare environment, and nurse voluntary turnover).

The identified PNSOs do not lead to a significant discrepancy with the existing literature. Even if most of the outcomes are sharable for intensive unit and LMCCU, such as pressure injury or infections, other PNSOs are specific for the settings that have been evaluated. For example, hospitalization breastfeeding continuity was found only in one article in a precedent literature review (Amatt et al., 2023), but the expert panel has identified it as one of the relevant outcomes for the LMCCU. The fact that it has been under-reported as an outcome in intensive settings probably implies that in these contexts it is not possible to practice it, perhaps due to critical conditions of the children or because breastfeeding could generate fatigue in children (e.g., during bronchiolitis). On the other hand, in LMCCU settings such as pediatric surgery or pediatrics, this is a common and useful practice to establish a good relationship mother-child and make the child's hospitalization as less traumatic as possible (Bartick et al., 2021).

From the Delphi results, it is interesting to note that the highest consensus was reached for pressure injury. Pressure injuries are common in nursing practice, and an important nursing-sensitive outcome in adult patients (Machado et al., 2022; Tuinman et al., 2021). This outcome has also been identified in pediatric intensive care unit (PICU) settings (Danielis et al., 2021), classified in the safety domain (Doran et al., 2003; Doran & Sasso, 2013) together with nosocomial, or healthcare-associated, infections (HAIs). The incidence and prevalence of pressure injury in pediatric settings (Schlüer et al., 2012; Zhang et al., 2022), indeed, brought attention to the care for pediatric patients' fragile skin. For this reason, the prevention and treatment of pressure injury is a particular focus for global healthcare (Rasmus & Bergquist-Beringer, 2017),

as reflected in various international guidelines (e.g., (European Pressure Ulcers Advisory Panel (EPUAP), National Pressure Injury Advisory Panel, and Pan Pacific Pressure Injury Alliance, 2019). Furthermore, studies have highlighted that the development of pressure injuries in children causes pain and discomfort, reduces their quality of life, and prolongs the length of their hospital stays. From a purely healthcare management perspective, caring for pediatric patients with pressure injuries also increases costs and the need for treatment interventions (Marufu et al., 2021).

In the present study, high consensus percentages were also observed for healthcare-associated infections (nosocomial infections, or HAIs), including, in turn, surgical site infections (SSIs) and central line-associated bloodstream infections (CLABSIs). This confirms the previous research of Palese et al. (2021) in PICUs, and the results of similar Delphi studies (Brenner et al., 2019; Wilson et al., 2012). Indeed, HAIs represent a process indicator outcome in every pediatric setting, and several individual and clinical factors have been identified as predisposing to HAIs. Age is one of these individual factors, as identified by Wilson et al. (2013), due to the developing immune systems of the pediatric population, making infants, in particular, more susceptible to these infections than both adolescents and adults (Simon et al., 2015). Furthermore, for pediatric just as for adult patients, HAIs are associated with morbidity, mortality, high costs, and complex treatments (Benenson et al., 2020; Kollef, 2012; Liu & Dickter, 2020). Therefore, future research should look to develop instruments for predicting, for example, septicemia in pediatric lower and medium complexity care settings, using and adapting instruments already validated in PICUs, such as the Sequential Organ Failure Assessment (SOFA) (Hickey et al., 2016; Moreno et al., 2023).

Medication error is another PNSO to have reached a high consensus in the LMCCU setting. Accordingly, medication error rates in children and infants have been reported to be above 70 %, with children and infant patients having a 3 % higher risk of experiencing an inpatient medication error compared to adult patients (Bannan & Tully, 2016; Elliott et al., 2021). In particular, among the most frequently reported errors are prescribing errors. In adult care, prescribing errors come down to dosing, calculations, organizational factors, and technology (Kuitunen et al., 2021; Mahomedradja et al., 2023). On the other hand, demonstrating a need for pediatric-specific education, research, and policy, Conn et al. (2019) identified the six main causes of prescribing errors in pediatric patients as children's fundamental differences leading to individualized dosing and calculations; off-license prescribing; medication formulations; communication with children; and experience working with children (Conn et al., 2019).

The outcomes of failure to rescue (FTR) and peripheral intravenous infiltrate or extravasation reached a lower panel consensus in Round 2 than in Round 1. This may partly be explained by the fact that they are infrequently mentioned in nursing documentation due to poor error culture, also in the adult population (Chegini et al., 2020; Mardon et al., 2010). FTR has, however, long been recognized as a quality and outcome indicator (Griffiths et al., 2013), and has been promoted by the Agency for Healthcare Research and Quality (AHRQ) for studies on healthcare quality and safety, with special software developed for FTR measuring and monitoring in healthcare organizations (Agency for Healthcare Research and Quality, 2019). Furthermore, regular assessment and monitoring of vascular access have been shown to reduce potential complications (Gallant & Schultz, 2006; Simona, 2012), and this can be achieved through the use of validated tools in the pediatric LMCCU setting, such as the Visual Infusion Phlebitis (VIP) scale (Büyükyılmaz et al., 2019).

Pediatric falls only slightly exceeded the 75 % consensus cut-off. This may be explained by the frequent presence of a parent or caregiver near the pediatric patient during hospitalization, assuring care continuity and compliance, in addition to the need for informed consent for many procedures. Nonetheless, recent studies have shown that, regarding pediatric patients, falls are the most frequent type of accident, mostly from their beds, with patients in the 1–3 years age group having the most head traumas, with prognoses of up to 5 days (AlSowailmi et al., 2018; Parker et al., 2020). Patient falls are also among the leading causes of healthcare claims (Strini et al., 2021). Therefore, a falling risk assessment should be performed in all pediatric settings, using a validated instrument, such as the Humpty Dumpty Fall Scale (Ciofi et al., 2020), and a fall reporting and monitoring system should be considered essential in all healthcare organizations.

New outcomes, not in the pediatric context (Wilson et al., 2012), but compared to the adult one, were hospitalization breastfeeding continuity, for which the panelists of the present study came out positively in agreement with the literature (Bartick et al., 2021), and family-centered care practice (FCC) (Dall'Oglio et al., 2018). Family and home settings are the prevalent environments within which the outcome presents itself and resolves itself (Schmeer & Yoon, 2016). As parents are the primary caregivers, they have a fundamental role to play in the well-being of children, which is also influenced by their fears, worries, and desire for protection. Accordingly, nurses must recognize the uniqueness of each family, understand its strengths and weaknesses, and then implement a care plan where the patient and caregiver are the focus. Children's reactions to disease are, indeed, closely related to the family's reaction and the coping strategies they implement (Coats et al., 2018; Park et al., 2018).

Lastly, the healthcare environment and nurse voluntary turnover in the pediatric setting are outcomes aligned with the effective functioning of a healthcare organization. Both refer to the creation of an environment in which there is organizational well-being, where the turnover rate and counterproductive work behaviors (CWB) are low, and job satisfaction and commitment are high (Zaghini et al., 2020; Zaghini & Fida, 2016). In such an environment, patients and caregivers tend to express an improved quality of care and feel safe during hospitalization (Brenner et al., 2019). The creation of a comfortable environment for the patient and their caregivers is a particularly important requirement in pediatric settings. For example, when they experience poor sleep quality on a ward, due to ward routines, lighting, and noise, parent-child relationships tend to be more emotionally unstable and challenging, and difficulties can arise in coping and in parents making decisions about the care of their children (Lee et al., 2017; Stickland et al., 2016). In the adult care context, reduced sleep quality has also been correlated with various disturbance factors, such as the discomfort associated with the disease, the fulfillment of physiological needs, concern regarding the disease, boredom, and a sense of dependency (Burger et al., 2022).

### Limitations

The results of this study should be interpreted considering certain limitations. All the experts enrolled in this study were enrolled at the national Italian level, and therefore the representativeness of their expertise may be limited to this healthcare setting. Additionally, no clinical study has been carried out to evaluate the identified PNSOs. The reliability and validity of our results should be backed up by empirical analysis, to confirm the role of the identified PNSOs in LMCCU settings.

### Strengths

A strength of this study was that the consensus of experts was reached after only two rounds, with the consensus percentage threshold set to a relatively high 75 %. No concrete recommendations for setting the threshold are evident in the literature, with different thresholds set from study to study (Baker et al., 2006; Chang et al., 2010; Hasson et al., 2000). Our study included 27 experts, and two rounds, with the literature having demonstrated that low-round Delphi studies with a smaller expert group tend to yield a more accurate consensus (Baker et al., 2006).

### Implications

The results of this study contribute to the ability of nursing managers and healthcare organizations to evaluate the quality of nursing care. Previous research has only focused on a small percentage of pediatric hospital beds, especially in the intensive care setting (Danielis et al., 2021). This study identified 17 pediatric nursing-sensitive outcomes that healthcare organizations and managers can evaluate and monitor in low and medium-complexity care settings, to improve the care quality of the largest proportion of pediatric patients.

### Conclusion

The present study identified 17 pediatric nursing-sensitive outcomes in lower and medium-complexity care settings. Previous studies mapped the state of the art of pediatric nursing-sensitive outcomes by focusing only on intensive care units and classified identified outcomes by attributes of outcome, process, and structure. This study's panel confirmed, for pediatric patients and lower and medium complexity care settings, several of the indicators commonly used for adults and already validated in the pediatric intensive care unit setting. The results of this study will facilitate the monitoring and quantification of the quality of care and safety offered to the largest proportion of pediatric patients and their caregivers in lower and medium-complexity care settings. Future research should evaluate these NSOs and investigate their association with organizational and professional variables, as done in adult settings.

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### CRedit authorship contribution statement

**Martina Batino:** Writing – original draft, Visualization, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Jacopo Fiorini:** Writing – original draft, Visualization, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Francesco Zaghini:** Writing – original draft, Visualization, Methodology, Formal analysis, Data curation, Conceptualization. **Eleonora Moraca:** Writing – original draft. **Simona Frigerio:** Writing – review & editing, Supervision, Methodology, Conceptualization. **Alessandro Sili:** Writing – review & editing, Supervision, Methodology, Conceptualization.

## Declaration of competing interest

We declare, as authors of this article, that we have neither any competing interest nor conflict of interest.

## References

- Agency for Healthcare Research and Quality (2019). PSNet—Failure To Rescue. <https://psnet.ahrq.gov/primer/failure-rescue>.
- Aiken, L. H., Sloane, D. M., Bruyneel, L., Van den Heede, K., Griffiths, P., Busse, R., ... Sermeus, W. (2014). Nurse staffing and education and hospital mortality in nine European countries: A retrospective observational study. *The Lancet*, 383(9931), 1824–1830. [https://doi.org/10.1016/S0140-6736\(13\)62631-8](https://doi.org/10.1016/S0140-6736(13)62631-8).
- Aiken, L. H., Sloane, D. M., Clarke, S., Poghossyan, L., Cho, E., You, L., ... Aunguroch, Y. (2011). Importance of work environments on hospital outcomes in nine countries. *International Journal for Quality in Health Care*, 23(4), 357–364. <https://doi.org/10.1093/intqhc/mzr022>.
- Aiken, L. H., Sloane, D. M., Lake, E. T., Sochalski, J., & Weber, A. L. (1999). Organization and Outcomes of inpatient AIDS care. *Medical Care*, 37(8), 760–772. <https://doi.org/10.1097/00005650-199908000-00006>.
- AlSowailmi, B. A., AlAkeely, M. H., AlJutaily, H. I., Alhasoon, M. A., Omair, A., & AlKhalaf, H. A. (2018). Prevalence of fall injuries and risk factors for fall among hospitalized children in a specialized childrens hospital in Saudi Arabia. *Annals of Saudi Medicine*, 38(3), 225–229. <https://doi.org/10.5144/0256-4947.2018.225>.
- Amatt, N. G., Marufu, T. C., Boardman, R., Reilly, L., & Manning, J. C. (2023). Pediatric nurse-sensitive outcomes: A systematic review of international literature. *International Nursing Review*, 70(2), 160–174. <https://doi.org/10.1111/inr.12805>.
- Baker, J., Lovell, K., & Harris, N. (2006). How expert are the experts? An exploration of the concept of 'expert' within Delphi panel techniques. *Nurse Researcher*, 14(1), 59–70. <https://doi.org/10.7748/nr2006.10.14.1.59.c6010>.
- Bandini, F., Guidi, S., Blaszczyk, S., Fumarulo, A., Pierini, M., Pratesi, P., Spolveri, S., Padeletti, M., Petrone, P., Zoppi, P., & Landini, G. (2018). Complexity in internal medicine wards: A novel screening method and implications for management. *Journal of Evaluation in Clinical Practice*, 24(1), 285–292. <https://doi.org/10.1111/jep.12875>.
- Bannan, D. F., & Tully, M. P. (2016). Bundle interventions used to reduce prescribing and administration errors in hospitalized children: A systematic review. *Journal of Clinical Pharmacy and Therapeutics*, 41(3), 246–255. <https://doi.org/10.1111/jcpt.12398>.
- Bartick, M., Hernández-Aguilar, M. T., Wight, N., Mitchell, K. B., Simon, L., Hanley, L., ... Lawrence, R. M. (2021). ABM clinical protocol #35: Supporting breastfeeding during maternal or child hospitalization. *Breastfeeding Medicine: The Official Journal of the Academy of Breastfeeding Medicine*, 16(9), 664–674. <https://doi.org/10.1089/bfm.2021.29190.mba>.
- Benenson, S., Cohen, M. J., Schwartz, C., Revva, M., Moses, A. E., & Levin, P. D. (2020). Is it financially beneficial for hospitals to prevent nosocomial infections? *BMC Health Services Research*, 20(1), 653. <https://doi.org/10.1186/s12913-020-05428-7>.
- Betz, C. L., Cowell, J. M., Craft-Rosenberg, M. J., Krajicek, M. J., & Lobo, M. L. (2007). Health care quality and outcome guidelines for nursing of children and families: Implications for pediatric nurse practitioner practice, research, and policy. *Journal of Pediatric Health Care*, 21(1), 64–66. <https://doi.org/10.1016/j.pedhc.2006.08.008>.
- Brenner, M., Browne, C., Gallen, A., Byrne, S., White, C., & Nolan, M. (2019). Development of a suite of metrics and indicators for children's nursing using consensus methodology. *Journal of Clinical Nursing*, 28(13–14), 2589–2598. <https://doi.org/10.1111/jocn.14845>.
- Buka, S. L., Beers, L. S., Biel, M. G., Counts, N. Z., Hudziak, J., Parade, S. H., ... Drury, S. S. (2022). The family is the patient: Promoting early childhood mental health in pediatric care. *Pediatrics*, 149(Supplement 5), Article e2021053509L. <https://doi.org/10.1542/peds.2021-053509L>.
- Burger, P., Van Den Ende, E. S., Lukman, W., Burchell, G. L., Steur, L. M. H., Merten, H., ... Gemke, R. J. B. J. (2022). Sleep in hospitalized pediatric and adult patients – A systematic review and meta-analysis. *Sleep Medicine: X*, 4, Article 100059. <https://doi.org/10.1016/j.sleepx.2022.100059>.
- Büyükyılmaz, F., Şahiner, N. C., Çağlar, S., & Eren, H. (2019). Effectiveness of an intravenous protection device in pediatric patients on catheter dwell time and phlebitis score. *Asian Nursing Research*, 13(4), 236–241. <https://doi.org/10.1016/j.anr.2019.09.001>.
- Chang, A. M., Gardner, G. E., Duffield, C., & Ramis, M. -A. (2010). A Delphi study to validate an advanced practice nursing tool: Advanced practice role delineation. *Journal of Advanced Nursing*, 66(10), 2320–2330. <https://doi.org/10.1111/j.1365-2648.2010.05367.x>.
- Chegini, Z., Kakemam, E., Asghari Jafarabadi, M., & Janati, A. (2020). The impact of patient safety culture and the leader coaching behaviour of nurses on the intention to report errors: A cross-sectional survey. *BMC Nursing*, 19(1), 89. <https://doi.org/10.1186/s12912-020-00472-4>.
- Chelazzi, C., Villa, G., Lanini, I., Romagnoli, S., & Latronico, N. (2023). The adult and pediatric palliative care: Differences and shared issues. *Journal of Anesthesia, Analgesia and Critical Care*, 3(1), 1. <https://doi.org/10.1186/s44158-023-00085-8>.
- Ciofi, D., Albolino, S., Dagliana, G., Biermann, K., Savelli, A., Frangioni, G., ... Festini, F. Collaborative Study Group, T. P. F. (2020). Prevalence and multicenter observational study on falls of hospitalized children and Italian, linguistic-cultural validation of the humpty dumpty fall scale. *Professioni Infermieristiche*, 73(4), 296–304. <https://doi.org/10.7429/pi.2020.734296>.
- Coats, H., Bourget, E., Starks, H., Lindhorst, T., Saiki-Craighill, S., Curtis, J. R., ... Doorenbos, A. (2018). Nurses' reflections on benefits and challenges of implementing family-centered Care in Pediatric Intensive Care Units. *American Journal of Critical Care*, 27(1), 52–58. <https://doi.org/10.4037/ajcc2018353>.
- Conn, R. L., Kearney, O., Tully, M. P., Shields, M. D., & Dornan, T. (2019). What causes prescribing errors in children? Scoping review. *BMJ Open*, 9(8), Article e028680. <https://doi.org/10.1136/bmjopen-2018-028680>.
- Dall'Oglio, I., Di Furia, M., Tiozzo, E., Gawronski, O., Biagioli, V., Di Ciommo, V. M., ... Raponi, M. (2018). Practices and perceptions of family centered care among healthcare providers: A cross-sectional study in a pediatric hospital. *Journal of Pediatric Nursing*, 43, e18–e25. <https://doi.org/10.1016/j.pedn.2018.07.015>.
- Danielis, M., Castellano, A., Mattiussi, E., & Palese, A. (2021). Nursing-sensitive Outcomes among patients cared for in Paediatric intensive care units: A scoping review. *International Journal of Environmental Research and Public Health*, 18(18), 9507. <https://doi.org/10.3390/ijerph18189507>.
- Doran, D., Almost, J., & (A c. Di). (2003). *Nursing sensitive outcomes: The state of the science*. Jones and Bartlett Publishers.
- Doran, D., & Sasso, L. (2013). *Nursing outcomes: Gli esiti sensibili alle cure infermieristiche* (1. ed. italiana sulla 2. ed. canadese). McGraw-Hill.
- Elliott, R. A., Camacho, E., Jankovic, D., Sculpher, M. J., & Faria, R. (2021). Economic analysis of the prevalence and clinical and economic burden of medication error in England. *BMJ Quality and Safety*, 30(2), 96–105. <https://doi.org/10.1136/bmjqs-2019-010206>.
- European Pressure Ulcers Advisory Panel (EPUAP), National Pressure Injury Advisory Panel & Pan Pacific Pressure Injury Alliance (2019). Prevention and treatment of pressure ulcers/injuries: clinical practice guidelines. The international guideline, 3rd edition, Osborne Park, Australia: Pan Pacific Pressure Injury Alliance. <https://internationalguideline.com/2019>.
- Fiorini, J., Zaghini, F., Mannocci, A., & Sili, A. (2022). Nursing leadership in clinical practice, its efficacy and repercussion on nursing-sensitive outcomes: A cross-sectional multicentre protocol study. *Journal of Nursing Management*, 30(7), 3178–3188. <https://doi.org/10.1111/jonm.13739>.
- Gallant, P., & Schultz, A. A. (2006). Evaluation of a visual infusion phlebitis scale for determining appropriate discontinuation of peripheral intravenous catheters. *Journal of Infusion Nursing*, 29(6), 338–345. <https://doi.org/10.1097/00129804-200611000-00004>.
- García Mancebo, J., de la Mata Navazo, S., López-Herce Arteta, E., Montero Mateo, R., López Esteban, I. M., Mazzuchelli Domínguez, A., ... González Cortés, R. (2021). A comparative two-cohort study of pediatric patients with long term stay in ICUs. *Scientific Reports*, 11(1), 4631. <https://doi.org/10.1038/s41598-021-84248-z>.
- Gattrell, W. T., Logullo, P., Van Zuuren, E. J., Price, A., Hughes, E. L., Blazey, P., ... Harrison, N. (2023). ACCORD (Accurate Consensus reporting document): A reporting guideline for consensus methods in biomedicine developed via a modified Delphi [preprint]. Health Systems and Quality Improvement. <https://doi.org/10.1101/2023.08.22.23294261>.
- Griffith, P., Maben, J., Murrells, T., et al. (2008). *State of the art metrics for nursing: A rapid appraisal*. National Nursing Research Unit, King's College, University of London.
- Griffiths, P., Jones, S., & Bottle, A. (2013). Is "failure to rescue" derived from administrative data in England a nurse sensitive patient safety indicator for surgical care? Observational study. *International Journal of Nursing Studies*, 50(2), 292–300. <https://doi.org/10.1016/j.ijnurstu.2012.10.016>.
- Hasson, F., Keeney, S., & McKenna, H. (2000). Research guidelines for the Delphi survey technique. *Journal of Advanced Nursing*, 32(4), 1008–1015.
- Hickey, P. A., Pasquali, S. K., Gaynor, J. W., He, X., Hill, K. D., Connor, J. A., ... Hirsch-Romano, J. C. (2016). Critical care Nursing's impact on pediatric patient Outcomes. *The Annals of Thoracic Surgery*, 102(4), 1375–1380. <https://doi.org/10.1016/j.athoracsur.2016.03.019>.
- Huber, E., Kleinknecht-Dolf, M., Kugler, C., & Spirig, R. (2021). Patient-related complexity of nursing care in acute care hospitals – An updated concept. *Scandinavian Journal of Caring Sciences*, 35(1), 178–195. <https://doi.org/10.1111/scs.12833>.
- Kane, R. L., Shamliyan, T., Mueller, C., Duval, S., & Wilt, T. J. (2007). Nurse staffing and quality of patient care. *Evidence Report/Technology Assessment*, 151, 1–115.
- Kaur, A., Jayashree, M., Prinja, S., Singh, R., & Baranwal, A. K. (2021). Cost analysis of pediatric intensive care: A low-middle income country perspective. *BMC Health Services Research*, 21(1), 168. <https://doi.org/10.1186/s12913-021-06166-0>.
- Kirwan, L., & Coyne, I. (2017). Use of restraint with hospitalized children: A survey of nurses' perceptions of practices. *Journal of Child Health Care*, 21(1), 46–54. <https://doi.org/10.1177/1367493516666730>.
- Kollef, M. H. (2012). Prevention of ventilator-associated pneumonia or ventilator-associated complications: A worthy, yet challenging, goal\*. *Critical Care Medicine*, 40(1), 271–277. <https://doi.org/10.1097/CCM.0b013e318232e41d>.
- Korniewicz, D. M., & Duff, J. (2000). Essential concepts for staff nurses: The Outcomes imperative. <https://www.jurispro.com/files/articles/Korniewicz-Essential.pdf>.
- Kuitunen, S., Niittynen, I., Airaksinen, M., & Holmström, A. -R. (2021). Systemic causes of in-hospital intravenous medication errors: A systematic review. *Journal of Patient Safety*, 17(8), e1660–e1668. <https://doi.org/10.1097/PTS.0000000000000632>.
- Lee, S., Narendran, G., Tomfohr-Madsen, L., & Schulte, F. (2017). A systematic review of sleep in hospitalized pediatric cancer patients: Sleep in hospitalized pediatric cancer patients. *Psycho-Oncology*, 26(8), 1059–1069. <https://doi.org/10.1002/pon.4149>.
- Liu, J. -Y., & Dickter, J. K. (2020). Nosocomial infections. *Gastrointestinal Endoscopy Clinics of North America*, 30(4), 637–652. <https://doi.org/10.1016/j.giec.2020.06.001>.
- Machado, A. M. S. F., Oliveira, B. F., Alves, I. M., Teixeira, J. M. B., Teixeira, J. P. F., Silva, N. M. T. D., & Sardo, P. M. G. (2022). Prevalence and incidence of pressure ulcers/injuries in emergency services: A systematic review protocol. *Journal of Tissue Viability*, 31(1), 58–61. <https://doi.org/10.1016/j.jtv.2021.10.005>.
- Mahomedradja, R. F., Schinkel, M., Sigaloff, K. C. E., Reuerman, M. O., Otten, R. H. J., Tichelaar, J., & Van Agtmael, M. A. (2023). Factors influencing in-hospital prescribing errors: A systematic review. *British Journal of Clinical Pharmacology*, 89(6), 1724–1735. <https://doi.org/10.1111/bcp.15694>.

- Mardon, R. E., Khanna, K., Sorra, J., Dyer, N., & Famolaro, T. (2010). Exploring relationships between hospital patient safety culture and adverse events. *Journal of Patient Safety*, 6(4), 226–232. <https://doi.org/10.1097/PTS.0b013e3181fd1a00>.
- Marufu, T. C., Setchell, B., Cutler, E., Dring, E., Wesley, T., Banks, A., ... Manning, J. C. (2021). Pressure injury and risk in the inpatient paediatric and neonatal populations: A single Centre point-prevalence study. *Journal of Tissue Viability*, 30(2), 231–236. <https://doi.org/10.1016/j.jtv.2021.02.004>.
- McCrory, M. C., Spaeder, M. C., Gower, E. W., Nakagawa, T. A., Simpson, S. L., Coleman, M. A., & Morris, P. E. (2017). Time of admission to the PICU and mortality\*. *Pediatric Critical Care Medicine*, 18(10), 915–923. <https://doi.org/10.1097/PCC.0000000000001268>.
- Montreuil, M., Fortin, J., & Racine, E. (2023). Children's assent within clinical care: A concept analysis. *Journal of Child Health Care*, 27(2), 266–278. <https://doi.org/10.1177/1367493520976300>.
- Moorhead, S., & Iowa Outcomes Project (A c Di) (2008). *Nursing outcomes classification (NOC)* (4. ed.). Mosby.
- Moreno, R., Rhodes, A., Piquilloud, L., Hernandez, G., Takala, J., Gershengorn, H. B., ... Vincent, J. -L. (2023). The sequential organ failure assessment (SOFA) score: Has the time come for an update? *Critical Care (London, England)*, 27(1), 15. <https://doi.org/10.1186/s13054-022-04290-9>.
- Oner, B., Zengul, F. D., Oner, N., Ivankova, N. V., Karadag, A., & Patrician, P. A. (2021). Nursing-sensitive indicators for nursing care: A systematic review (1997–2017). *Nursing Open*, 8(3), 1005–1022. <https://doi.org/10.1002/nop2.654>.
- Palese, A., Conforto, L., Meloni, F., Bordei, V., Domenighini, A., Bulfone, E., ... Gonella, S. (2021). Assessing pain in children with autism spectrum disorders: findings from a preliminary validation study. *Scandinavian Journal of Caring Sciences*, 35(2), 457–467.
- Park, M., Giap, T. -T., Lee, M., Jeong, H., Jeong, M., & Go, Y. (2018). Patient- and family-centered care interventions for improving the quality of health care: A review of systematic reviews. *International Journal of Nursing Studies*, 87, 69–83. <https://doi.org/10.1016/j.ijnurstu.2018.07.006>.
- Parker, C., Kellaway, J., & Stockton, K. (2020). Analysis of falls within Paediatric hospital and community healthcare settings. *Journal of Pediatric Nursing*, 50, 31–36. <https://doi.org/10.1016/j.pedn.2019.09.026>.
- Paul, M., O'Hara, L., Tah, P., Street, C., Maras, A., Ouakil, D. P., ... McNicholas, F. (2018). A systematic review of the literature on ethical aspects of transitional care between child- and adult-orientated health services. *BMC Medical Ethics*, 19(1), 73. <https://doi.org/10.1186/s12910-018-0276-3>.
- Peña, A. L. N., & Rojas, J. G. (2014). Ethical aspects of children's perceptions of information-giving in care. *Nursing Ethics*, 21(2), 245–256. <https://doi.org/10.1177/0969733013484483>.
- Ping Kirk, A., Sng, Q., Zhang, L., Ming Wong, J., Puthuchery, J., & Lee, J. (2018). Characteristics and Outcomes of long-stay patients in the pediatric intensive care unit. *Journal of Pediatric Intensive Care*, 07(01), 001–006. <https://doi.org/10.1055/s-0037-1601337>.
- Polit, D. F., & Beck, C. T. (2017). *Nursing research: Generating and assessing evidence for nursing practice* (Tenth ed.). Wolters Kluwer Health.
- Razmus, I., & Bergquist-Beringer, S. (2017). Pressure injury prevalence and the rate of hospital-acquired pressure injury among pediatric patients in acute care. *Journal of Wound, Ostomy, and Continence Nursing*, 44(2), 110–117. <https://doi.org/10.1097/WON.0000000000000306>.
- Schlüter, A. -B., Halfens, R. J., & Schols, J. M. G. A. (2012). Pediatric pressure ulcer prevalence: A multicenter, cross-sectional, point prevalence study in Switzerland. *Ostomy/Wound Management*, 58(7), 18–31.
- Schmeer, K. K., & Yoon, A. J. (2016). Home sweet home? Home physical environment and inflammation in children. *Social Science Research*, 60, 236–248. <https://doi.org/10.1016/j.ssresearch.2016.04.001>.
- Simon, A. K., Hollander, G. A., & McMichael, A. (2015). Evolution of the immune system in humans from infancy to old age. *Proceedings of the Royal Society B: Biological Sciences*, 282(1821), 20143085. <https://doi.org/10.1098/rspb.2014.3085>.
- Simona, R. (2012). A pediatric peripheral intravenous infiltration assessment tool. *Journal of Infusion Nursing*, 35(4), 243–248. <https://doi.org/10.1097/NAN.0b013e31825af323>.
- Şimşek, E., Demir, A. S., Semerci, R., & Karadağ, A. (2023). The incidence and prevalence of medical device-related pressure injuries in pediatric patients: Systematic review and meta-analysis. *Journal of Pediatric Nursing*, 72, e130–e138. <https://doi.org/10.1016/j.pedn.2023.06.019>.
- Spranger, J., Homberg, A., Sonnberger, M., & Niederberger, M. (2022). Reporting guidelines for Delphi techniques in health sciences: A methodological review. *Zeitschrift für Evidenz, Fortbildung und Qualität im Gesundheitswesen*, 172, 1–11. <https://doi.org/10.1016/j.zefq.2022.04.025>.
- Stickland, A., Clayton, E., Sankey, R., & Hill, C. M. (2016). A qualitative study of sleep quality in children and their resident parents when in hospital. *Archives of Disease in Childhood*, 101(6), 546–551. <https://doi.org/10.1136/archdischild-2015-309458>.
- Strini, V., Schiavolin, R., & Prendin, A. (2021). Fall risk assessment scales: A systematic literature review. *Nursing Reports*, 11(2), 430–443. <https://doi.org/10.3390/nursrep11020041>.
- The Lancet (2020). The status of nursing and midwifery in the world. *The Lancet*, 395(10231), 1167. [https://doi.org/10.1016/S0140-6736\(20\)30821-7](https://doi.org/10.1016/S0140-6736(20)30821-7).
- Tuinman, A., De Greef, M. H. G., Finnema, E. J., & Roodbol, P. F. (2021). A systematic review of the association between nursing staff and nursing-sensitive outcomes in long-term institutional care. *Journal of Advanced Nursing*, 77(8), 3303–3316. <https://doi.org/10.1111/jan.14840>.
- Vernon, W. (2009). The Delphi technique: A review. *International Journal of Therapy and Rehabilitation*, 16(2), 69–76. <https://doi.org/10.12968/ijtr.2009.16.2.38892>.
- Wakefield, M. K., Williams, D. R., Le Menestrel, S., Flaubert, J. L., & National Academies of Sciences, Engineering, and Medicine (U.S.) (A c Di) (2021). *The future of nursing 2020–2030: Charting a path to achieve health equity*. The National Academies Press. <https://www.ncbi.nlm.nih.gov/books/NBK573910/>.
- Wang, D., Xu, H., Chen, S., Lou, X., Tan, J., & Xu, Y. (2019). Medical adhesive-related skin injuries and associated risk factors in a pediatric intensive care unit. *Advances in Skin & Wound Care*, 32(4), 176–182. <https://doi.org/10.1097/01.ASW.0000553601.05196.fb>.
- Wilson, S., Bremner, A. P., Hauck, Y., & Finn, J. (2013). Evaluation of paediatric nursing-sensitive outcomes in an Australian population using linked administrative hospital data. *BMC Health Services Research*, 13(1), 396. <https://doi.org/10.1186/1472-6963-13-396>.
- Wilson, S., Hauck, Y., Bremner, A., & Finn, J. (2012). Quality nursing care in Australian paediatric hospitals: A Delphi approach to identifying indicators. *Journal of Clinical Nursing*, 21(11–12), 1594–1605. <https://doi.org/10.1111/j.1365-2702.2011.04004.x>.
- Young, M. (2018). Medical device-related pressure ulcers: A clear case of iatrogenic harm. *British Journal of Nursing*, 27(15), S6–S13. <https://doi.org/10.12968/bjon.2018.27.15.S6>.
- Zaghini, F., Biagioli, V., Proietti, M., Badolamenti, S., Fiorini, J., & Sili, A. (2020). The role of occupational stress in the association between emotional labor and burnout in nurses: A cross-sectional study. *Applied Nursing Research*, 54, Article 151277. <https://doi.org/10.1016/j.apnr.2020.151277>.
- Zaghini, F., & Fida, R. (2016). What is behind counterproductive work behaviors in the nursing profession? A systematic review. *Journal of Clinical Research & Bioethics*, 7(4). <https://doi.org/10.4172/2155-9627.1000277>.
- Zhang, H., Ma, Y., Wang, Q., Zhang, X., & Han, L. (2022). Incidence and prevalence of pressure injuries in children patients: A systematic review and meta-analysis. *Journal of Tissue Viability*, 31(1), 142–151. <https://doi.org/10.1016/j.jtv.2021.07.003>.