post-ICU pathways

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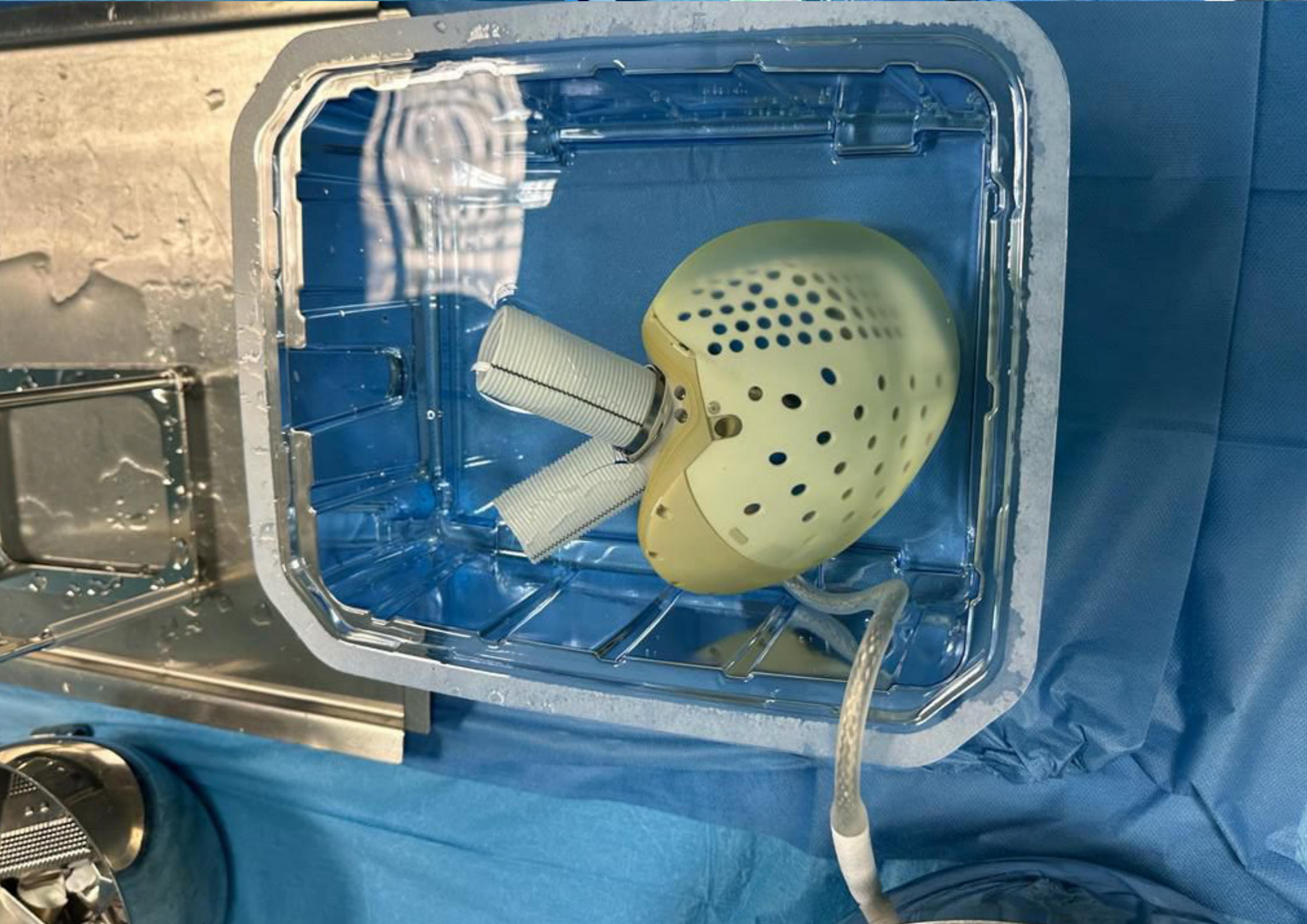

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Reported by: Simone Amato
Heart Transplant Centre and ECMO, Azienda Ospedaliera San Camillo Forlanini, Rome, Italy

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Editorial

"All Roads Lead to Rome": a Call to Implementation of ICU Follow-Up Services

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Post Intensive Care syndrome (PICS) is a complex clinical condition characterised by severe alterations in the physical, cognitive, and psychological spheres in patients who survived critically ill conditions and were treated with organ and system support in the intensive care clinical setting.[1] There are several symptoms included in PICS, and recently, fatigue and chronic pain were added to the list, particularly affecting the ability of patients to return to work.[2,3] PICS was present in 64% of patients at 3-months discharge from hospital and in 56% after 12 months. The main risk factors for PICS are respiratory failure, mechanical ventilation, shock, prolonged sedation and use of neuromuscular blocking agents.[1,4]

Post Sepsis Syndrome – PSS is a relatively new pathological state involving changes in cognitive, psychological, physical, and medical conditions following severe sepsis.[5] Typical manifestations of PSS include fatigue, post-sepsis dysphagia, muscle wasting due to mitochondrial and satellite cell dysfunction, cardiovascular complications, cognitive impairments, and psychological and emotional problems, which affect the quality of life.[6] Although PSS resembles PICS, it has a distinct pathophysiological mechanism and remains separate from PICS. However, some authors have found significant overlap between the characteristics of PICS and PSS.[5] As with PICS, PSS shows features affecting family members and caregivers (PICS-F). Approximately 75% of patients who survived severe sepsis developed alterations in at least one dimension of PSS.[6] Currently, a better understanding of the causal mechanisms, prevention, and management of post-sepsis syndrome are priority topics for sepsis research.[7]

Lastly, a new syndrome emerged from the recent SARS-CoV2 pandemic: post-acute sequelae of COVID-19 (PASC).[8] PASC seems to be similar to PSS, as it is featured by lasting respiratory, cardiovascular, renal, and neurological dysfunctions. In contrast, the alterations typically shown only by PASC are fatigue, chest pain, muscle and joint pain, ageusia, and anosmia.[8] PASC affects 50% of COVID-19 survivors.[8]

Beyond the typologies of syndromes occurring after survivorship to critical illnesses, there is a large burden of patients' issues that need to be addressed after discharge from the hospital and their return home.

In response, healthcare systems established follow-up services delivered by ICUs personnel. Follow-up services for ICU survivors have been implemented for 30 years, although to date, there is still no strong evidence of their effectiveness on patient outcomes.[9] There are differences among the operative delivery of post-ICU follow-up

services: follow-up clinics, telemedicine, home visits, telephone, or mail follow-up.[10] In addition, there are many differences among organisations, management, and standards of care delivery. Currently, no typology of establishing follow-up services has been shown to be better than the others.[10]

However, there are many important reasons to implement follow-up services: patients surviving critically illnesses deserve to be monitored for their sequelae through a multidisciplinary approach (anaesthesiologists, pulmonologists, cardiologists, neurologists, physiatrists, nurses, physiotherapists, occupational therapists, psychologists, and psychiatrists).[4] Post-ICU follow-up services aim to improve the recovery and satisfaction of survivors, guarantee the continuity of healthcare, and provide essential feedback about the quality of multidisciplinary care provided by the team during the patients' ICU stay. Feedback about the delivered care in the ICU can be pivotal in stimulating case discussions among team members and identifying which area of care, prevention of complications, and adverse events should be improved, focusing on sensitive outcomes.[11]

Follow-up services for ICU survivors deliver many types of interventions, such as ward visits, telephone calls, interdisciplinary team assessment, care plans tailored to individual needs, referral to territorial resources, ICU diaries,[12] clinical assessment of physical functioning, psychiatric issues, cognitive status, quality of life, and social reintroduction.[13] Nurses involvement is pivotal as their activities cover assessment, referral to counselling when needed, and education to self-monitored cognitive and physical exercises to be practised at home.[13]

Recently, an interesting concept has emerged from the follow-up service: it has become an opportunity to also develop a form of empathetic support among peers who survived a critically ill condition and ICU stay, adding therapeutic value from reciprocal sustenance based on deep respect for personal experiences.[4,14]

Currently, post-ICU follow-up services are present mainly in the United Kingdom, Europe, Australia, and North America, and more recently in Asia.[10,11] However, they should be widely implemented.

Therefore, all pathological conditions that bring patients to critical illness that require a stay in the ICU and the supportive care delivered by the technology and multidisciplinary team can determine the development of syndromic conditions (PICS, PSS, PASC). These conditions must be prevented through attentive personalized care planning, including interventions during the ICU stay, which can

Infographic. Components of post-ICU follow-up services.

only be identified by reflections from post-ICU follow-up services. Nurses are committed to the best implementation of this continuity of care instruments, that are also a source of motivation and satisfaction of the work done during the acute phases of the critical illness.[15]

As the old proverb says "All roads lead to Rome", beyond the cause of long term sequelae of ICU stay, there is the need to enhance the presence of post-ICU follow-up services worldwide, and, possibly, the set-up of a core set of diagnostic and interventional tools that could offer guidelines for a common approach to patients on the basis of their problems (PICS, PSS, Post COVID) to improve the comparation of data, and the benchmarking, searching for the optimal strategy to give back persons their best as possible quality of life.

References

1. Bornemann-Cimenti H, Lang J, Hammer S, et al. Consensus-Based Recommendations for Assessing Post-Intensive Care Syndrome: A Systematic Review. *J Clin Med.* 2025; 14(10):3595. https://doi.org/10.3390/jcm14103595
2. Hiser SL, Fatima A, Ali M, Needham DM. Post-intensive care syndrome (PICS): recent updates. *J Intensive Care.* 2023;11(1):23. https://doi.org/10.1186/s40560-023-00670-7
3. Inoue S, Nakanishi N, Amaya F, et al. Post-intensive care syndrome: Recent advances and future directions. *Acute Med Surg.* 2024;11(1):e929. https://doi.org/10.1002/ams2.929
4. Maley JH, Mikkelsen ME. *The Post-Intensive Care Syndrome.* In: Hyzy RC, McSparron J, eds. Evidence-Based Critical Care. Springer International Publishing; 2020:813-817. https://doi.org/10.1007/978-3-030-26710-0_109
5. Mostel Z, Perl A, Marck M, et al. Post-sepsis syndrome – an evolving entity that afflicts survivors of sepsis. *Mol Med.* 2020;26(1):6. https://doi.org/10.1186/s10020-019-0132-z
6. Van Der Slikke EC, Beumeler LF, Holmqvist M, et al. Understanding Post-Sepsis Syndrome: How Can Clinicians Help? *Infect Drug Resist.* 2023;16:6493-6511. https://doi.org/10.2147/IDR.S390947
7. McPeake J, Ahmad N, Bradley K, et al. Top 10 research priorities for sepsis research determined by patients, carers and clinicians. *Anaesthesia.* Published online June 5, 2025. https://doi.org/10.1111/anae.16634
8. Holmes D, Colaneri M, Palomba E, Gori A. Exploring post-SEPSIS and post-COVID-19 syndromes: crossovers from pathophysiology to therapeutic approach. *Front Med.* 2024;10:1280951. https://doi.org/10.3389/fmed.2023.1280951
9. Rosa RG, Ferreira GE, Viola TW, et al. Effects of post-ICU follow-up on subject outcomes: A systematic review and meta-analysis. *J Crit Care.* 2019;52:115-125. https://doi.org/10.1016/j.jcrc.2019.04.014
10. Zhang R, Xu Y, Tian Y, He L, Chu Y. ICU follow-up services and their impact on post-intensive care syndrome: a scoping review protocol. *BMJ Open.* 2024;14(11):e089824. https://doi.org/10.1136/bmjopen-2024-089824
11. Zhang F, Chen Z, Xue D, Zhang R, Cheng Y. Barriers and facilitators to offering post-intensive care follow‐up services from the perspective of critical care professionals: A qualitative study. *Nurs Crit Care.* 2024;29(4):682-694. https://doi.org/10.1111/nicc.13002
12. Villa M, Morale V, Valverde B, et al. Exploring the Impact of ICU Diary on ICU Survivors' Emotions and Feelings: A Qualitative Study. *Dimens Crit Care Nurs.* 2025;44(1):20-27. https://doi.org/10.1097/DCC.0000000000000673
13. Lasiter S, Oles SK, Mundell J, London S, Khan B. Critical Care Follow-up Clinics: A Scoping Review of Interventions and Outcomes. *Clin Nurse Spec.* 2016;30(4):227-237. https://doi.org/10.1097/NUR.0000000000000219
14. Oh E, Lucchini A, Nydahl P. Personalized approaches to ICU Distress: Moving beyond Survival toward holistic recovery. *Intensive Crit Care Nurs.* 2025;89:104091. https://doi.org/10.1016/j.iccn.2025.104091
15. Flinterud SI, Moi AL, Gjengedal E, Narvestad Grenager L, Muri AK, Ellingsen S. The creation of meaning – Intensive care nurses' experiences of conducting nurse-led follow-up on intensive care units. *Intensive Crit Care Nurs.* 2019;53:30-36. https://doi.org/10.1016/j.iccn.2019.03.009

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Nurse TAVI Coordinator: Clinical Insights, Competence Management, and Future Directions

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Introduction

Severe aortic stenosis (AS) is the most common valvular disease in developed countries, with an increasing incidence due to the aging of the population. Its prevalence among individuals over 65 years of age ranges from 2.5% to 7%.[1] Although patients may remain asymptomatic for years, the disease progresses inexorably. In its advanced stages, it leads to dyspnea, angina and syncope, alongwithanincreasedriskofheartfailureandhigh mortality if untreated.[2] Once symptoms develop, the survival rate drops dramatically to just 2- to 4-years , with mortality reaching up to 50% without treatment.[3] The therapeutic management of aortic stenosis (AS) is determined by each patient's risk profile and includes three key options.[4] Medical therapy helps control symptoms but does not alter the disease's progression. Surgical aortic valve replacement (SAVR) remains the gold standard for low-risk patients, while transcatheter aortic valve implantation (TAVI) has revolutionized treatment for the 30–40% of patients deemed unsuitable for surgery due to comorbidities, frailty, or high surgical risk, offering a minimally invasive alternative.[5] TAVI significantly reduces hospital stay, minimizes the use of healthcare resources and optimizes clinical outcomes without increasing complications compared to SAVR. Furthermore, its reduced surgical impact allows safe discharge after an uncomplicated hospital stay, allowing patients to fully benefit from it in terms of survival and quality of life.[5] However, a seamless continuum of care, from pre-procedural to long-term follow-up, is essential.[6] Accordingly, Lean approaches to healthcare organization adopt best practices that improve efficiency, enhance safety in TAVI pathways, reduce waiting times and healthcare costs, and strengthen multidisciplinary collaboration in all phases of care.[7] This integrated vision aims to maximize benefits through accelerated discharge, improved quality of life, and increased patient safety.[8] This synergy promotes robust outcomes for TAVI recipients, reinforcing the importance of streamlined processes and holistic multidisciplinary collaboration.[8]

TAVI Nurse Coordinator: Competence Management

The increasing adoption of TAVI requires the

establishment of dedicated multidisciplinary programs to ensure appropriate patient selection, risk assessment, procedure planning and post-procedural management.[8] The establishment of these specialized teams, commonly known as the Heart Team (HT) or TAVI Team (TT), has been instrumental in addressing organizational challenges and enhancing clinical outcomes. Within this framework, the TAVI Nurse Coordinator (TC) has emerged as a pivotal figure, significantly contributing to organizational efficiency, quality of care, and patient satisfaction.[9] Experience from various international centers reveals that advanced practice nurses with expertise in case management, including geriatric assessment, patient education and early discharge planning, can reduce readmission rates and improve subjective health perception.[10]

The role of the TC integrates clinical, organizational and educational skills, acting as a link between multiple specialists involved in decision-making and therapy.[11] This expanded role goes beyond traditional nursing responsibilities to encompass care coordination, preoperative optimization, and comprehensive postoperative follow-up. As a result, the implementation of the TAVI Nurse Coordinator (TC) has been linked to greater procedural efficiency, enhanced patient experience, and improved clinical outcomes. Additionally, the TC provides seamless oversight throughout the entire care continuum—from initial referral to postprocedural follow-up—ensuring effective communication, continuous support within the team, and strong engagement with patients and caregivers.[8] The primary responsibilities include (Figure 1):

1. Care Pathway Management

The TC is responsible for monitoring and coordinating the waiting list, scheduling diagnostic tests, and facilitating specialist consultations. This ensures an optimal workflow, reduces wait times, and improves both the efficiency and appropriateness of interventions.

2. Clinical and Functional Assessment

Meticulous patient selection is critical for the success of any TAVI programme. In collaboration with the HT, the TC conducts a thorough pre-procedural screening, which includes medical history collection, physical assessment, and risk factor analysis. This process also involves frailty evaluation using tools that assess activities of daily living (ADL) and instrumental activities of daily living (IADL), along with strength, mobility, and nutritional status assessments. This comprehensive evaluation enables a more accurate functional prognosis and guides the development of a personalized rehabilitation plan. In addition, the TC coordinates specialist consultations (eg, radiology, vascular team) to refine both the multidimensional assessment and the care plan.

3. Active participation in the Heart Team

The TC participates in the HT meetings, contributing to patient selection and the ongoing review of clinical protocols. Their nursing experience provides an essential perspective on care needs, particularly for older adults or those with complex comorbidities.

4. Intraoperative Support

During the procedure in the cardiac catheterization lab the TC facilitates communication between various professionals, promoting efficient organization. The TC is also trained and authorized to perform valve crimping on the catheter, ensuring correct device preparation prior to implantation.

5. Development and optimization of care protocols

In collaboration with other team members, the TC contributes to the definition and updating of clinical and care protocols, promoting standardized practices to improve quality and safety. A key aspect involves the incorporation of tools to monitor both clinical and process outcomes.

6. Patient and caregiver education

Providing clear information about the benefits and potential risks of TAVI is essential to set realistic expectations and outline postoperative management. This educational support promotes adherence to treatment and a better understanding of the care pathway, reducing the likelihood of complications and facilitating a smoother transition back home. Preoperative education has proven to be particularly beneficial, enriched by structured informational materials (brochures, videos, multimedia resources) and dedicated counselling sessions

Figure 1. The role and responsibilities of Tavi Nurse Coordinator.

for caregivers.

The TAVI Nurse Coordinator Clinical Insights

The HT is a globally adopted multidisciplinary model for managing patients with severe aortic stenosis undergoing TAVI. Within this structure, the TC plays a central role in ensuring seamless care from initial assessment to post-discharge follow-up. Beyond managing diagnostic tests and multidisciplinary consultations, the TC leverages telemedicine for remote follow-ups, benefiting patients with limited access to hospital services. Through remote monitoring, vital signs can be tracked, treatment adherence assessed, and early signs of clinical deterioration promptly identified, reducing the risk of rehospitalization. In this capacity, the TC not only fulfills operational duties but also takes on a leadership role in patient management, coordinating resources, professionals, and care pathways to ensure a personalized, evidence-based approach.

Taking care of patient

The initial phase of the care process occurs in the TAVI outpatient clinic. Here, the CT collaborates closely with the interventional cardiology physician and other members of the HT to perform a comprehensive initial assessment. The care pathway begins by collecting the patient's medical history and evaluating frailty, quality of life and self-care capacities.[12] These instruments help define an individualized care plan that accounts for each patient's unique needs and baseline conditions of each patient.

From the very first outpatient visit, the TC initiates discharge planning by coordinating home support and engaging caregivers to facilitate safe and timely return home. This strategy, aligned with the new core curriculum, enables the early identification of potential social and health challenges, thereby minimizing readmission risk.[11] A central objective is also to organise all required diagnostic tests and multidisciplinary consultations prior to hospital admission, ensuring that each step is carried

out efficiently and in a coordinated manner. In addition, the TC manages the waiting list and clinical triage, working with cardiology case managers and family and community nurses (IFEC) to promote seamless integration between hospital and community settings.

- *Intraoperative Phase*

During this stage, the TC assumes an active role not only in organizational oversight but also in direct patient care. Their participation in the preprocedural briefing with the HT is pivotal for outlining operational details and ensuring that all aspects of the procedure are meticulously planned. The TAVI nurse typically has advanced expertise in interventional cardiology and operating room procedures and in some centres is authorized to perform valve crimping, reflecting a high degree of specialization. Furthermore, the TC closely monitors any intraprocedural complications and ensures the strict adherence to safety protocols to optimize procedural outcomes.

- *Postoperative Phase*

The postoperative period is critical to ensure optimal patient recovery and prevent complications. After the procedure, the patient is monitored in the post-acute care unit for two hours before transfer to the ward. Here, the TC oversees continuous clinical monitoring and coordinates early mobilization, focusing on arrhythmia detection and control of bleeding at femoral closure sites during the first two hours. Structured monitoring in these initial hours allows for early detection of the so-called "Big 5" complications, which require rapid identification and management.[7] These early complications include stroke, signaled by neurological changes such as facial asymmetry, speech difficulties, unilateral weakness; paravalvular leak, resulting from suboptimal valve positioning or calcifications and manifesting as hemodynamic changes; and acute kidney injury, related to contrast agents and pre-existing kidney disease. Conduction blocks occur frequently, given the proximity of the aortic valve to the cardiac conduction system, resulting in atrioventricular or bundle branch block; careful ECG monitoring is essential. In addition, bleeding at the vascular access site, especially femoral, complicates early mobilization unless a hematoma or haemorrhage is present. Therefore, the TC applies shared protocols for the rapid identification and treatment of each critical situation, coordinating medical interventions and providing precise information to patients and healthcare professionals, thus improving prognosis and accelerating recovery.

- *Early mobilization promotion*

Early mobilization represents one of the pillars of the TAVI pathway aimed a rapid and safe discharge. The use of light sedation or local anaesthesia, combined with minimizing invasive lines, promotes rapid physical reconditioning immediately after the procedure.[13] In particular, TC plays a key role: first, coordinating the multidisciplinary team to assess patient clinical status and define the time of post-procedural mobilization. Subsequently, the TC collaborates with nursing staff and physical therapists to initiate a gradual exercise protocol: initially, the patient is seated 30–45 degrees within 2 hours after the procedure. Then a gradual transition to sitting on the edge of the bed is encouraged within 4 hours after the procedure, accompanied by continuous monitoring of stability, pain, and effort tolerance. Once these conditions are verified, active lower-limb exercises are introduced and, if well tolerated, assisted standing is performed within 6 hours, paying particular attention to hemodynamic and arrhythmic parameters. Finally, the patient is encouraged to walk short distances, gradually increasing ambulation based on clinical response. The goal of this strategy is to minimize risks associated with immobilization (such as deep vein thrombosis, decreased perfusion, and loss of muscle mass), while simultaneously promoting faster functional recovery.[12] This process is supported by standardized checklists and continuous monitoring of vital signs. Due to this approach, many centres have documented a reduction in length of stay, reducing the costs of hospitalization and an increase in patient satisfaction, given smoother recovery and improved return to daily activities.

- *The Follow-Up*

In this phase, the TC also plays a leadership role in managing the continuity of care, actively collaborating with IFEC and other healthcare professionals to plan a safe and effective discharge. Evaluating socio-family support is essential to arrange a protected discharge plan

that may include, if necessary, the participation of caregivers. The patient's path does not end with discharge but continues through a structured follow-up, including nursing consultations at one, three and six months, and up to one year post-procedure.[14] The TC is responsible for monitoring patient quality of life and therapeutic adherence, taking immediate action in case of clinical deterioration by consulting the HT. Furthermore, by using validated tools to measure changes in quality of life and improvements following the intervention to contribute to early identification of care and clinical evaluations. Through the use of tele-nursing and tele-rehabilitation programmes, it is possible to ensure effective remote monitoring, reducing the risk of rehospitalization, and optimizing the personalized care pathway.

Future Direction

The future directions of the role of nurse TC are focused on improving patient outcomes, improving interdisciplinary cooperation and embracing technological advances.[15] As TAVI continues to develop, nurse TAVI coordinators will play an important role in managing complex patient care pathways, ensuring timely assessments, and facilitating individualized training for patients involved in the procedure6. As digital tools and telemedicine are increasingly used, nurses and TC need to adapt through virtual consultation, remote monitoring, and data management.[16] In addition, greater emphasis will be placed on the management of competences, where continuing education, certification and interprofessional training will be essential in order to maintain high standards of care. Nurses in this role will also advocate patient-centered care to ensure that patients receive complete support before, during and after the procedure. In the future, leadership and strategic planning will likely be more focused as part of the multidisciplinary efforts of the TAVI programmes.[17]

Conclusions

Integration of the TC with other healthcare professionals is a key factor in ensuring the quality and effectiveness of care. Nursing leadership in this context goes beyond operational coordination and extends to the ability to drive continuous innovation and improvement. Advanced clinical competencies with effective organisational and relational management makes it possible to improve the effectiveness of the care pathway, ensuring personalized care based on the best available practices. For this reason, nursing leadership is essential to foster a Lean-orientated approach that, when applied to nursing care, optimizes resources, reduces length of stay, and improves clinical outcomes. Coordination with family and community nurses, along with the adoption of telemedicine tools, promotes continuity of care and proactive follow-up, thus significantly contributing to improving patient quality of life. In a constantly evolving healthcare setting, the TC emerges as a fundamental point of reference, capable of combining innovation, efficiency, and patient-centredness in a highly specialized care pathway.

References

1. Aluru JS, Barsouk A, Saginala K, Rawla P, Barsouk A. Valvular Heart Disease Epidemiology. *Medical Sciences.* 2022;10(2):32. http://doi.org/10.3390/medsci10020032.
2. Chen Q, Shi S, Wang Y, et al. Global, Regional, and National Burden of Valvular Heart Disease, 1990 to 2021. *JAHA.* 2024;13(24):e037991. http://doi.org/10.1161/JAHA.124.037991.
3. Vahanian A, Beyersdorf F, Praz F, et al. 2021 ESC/EACTS Guidelines for the management of valvular heart disease. *European Heart Journal.* 2022;43(7):561-632. http://doi.org/10.1093/eurheartj/ehab395.
4. Nettersheim FS, Baldus S. Precision medicine in the management of valvular heart disease. *Herz*. Published online March 4, 2025. http://doi.org/10.1007/s00059-025-05299-w.
5. Gonnah AR, Khokhar AA, Chow JJ, et al. Reducing Length of Hospital Stay Following Transcatheter Aortic Valve Implantation. *JCM*. 2024;13(18):5433. http://doi.org/10.3390/jcm13185433.
6. Bohmann K, Burgdorf C, Zeus T, et al. The COORDINATE Pilot Study: Impact of a Transcatheter Aortic Valve Coordinator Program on Hospital and Patient Outcomes. *JCM*. 2022;11(5):1205. http://doi.org/10.3390/jcm11051205.
7. Lauck SB, McCalmont G, Smith A, et al. Setting a Benchmark for Quality of Care. *Critical Care Nursing Clinics of North America.* 2022;34(2):215-231. http://doi.org/10.1016/j.cnc.2022.02.009.
8. Cantey C. Transcatheter Aortic Valve Replacement: Clinical Update for Nurse Practitioners. *The Journal for Nurse Practitioners.* 2021;17(8):926-931. http://doi.org/10.1016/j.nurpra.2021.05.019.
9. González Cebrián M, Valverde Bernal J, Bajo Arambarri E, et al. Consensus document on the figure of the TAVI nurse in the haemodynamic working group of the Spanish Association of Nursing in Cardiology. *Enferm Cardiol.* Published online May 2022:14-21. http://doi.org/10.59322/86.1421.IQ2.
10. Lauck SB, McGladrey J, Lawlor C, Webb JG. Nursing leadership of the transcatheter aortic valve implantation Heart Team: Supporting innovation, excellence, and sustainability. *Healthc Manage Forum.* 2016;29(3):126-130. http://doi.org/10.1177/0840470416632004.
11. Hawkey MC, Lauck SB, Perpetua EM, et al. Transcatheter aortic valve replacement program development: Recommendations for best practice. *Cathet Cardio Intervent.* 2014;84(6):859-867. http://doi.org/10.1002/ccd.25529.
12. González-Cebrian M, Cruz-González I, Meléndez SA, et al. IMPLEMENTATION OF THE TAVI NURSE FIGURE: SELECTION, EVALUATION, COORDINATION, FOLLOW-UP AND EFFECTIVENESS. *JHS.* 2023;3(89):2-11. http://doi.org/10.22533/at.ed.1593892323105.
13. Wood DA, Lauck SB, Cairns JA, et al. The Vancouver 3M (Multidisciplinary, Multimodality, But Minimalist) Clinical Pathway Facilitates Safe Next-Day Discharge Home at Low-, Medium-, and High-Volume Transfemoral Transcatheter Aortic Valve Replacement Centers. *JACC: Cardiovascular Interventions.* 2019;12(5):459-469. http://doi.org/10.1016/j.jcin.2018.12.020.
14. Brocki BC, Andreasen JJ, Aarøe J, Andreasen J, Thorup CB. Exercise-based real-time telerehabilitation for older patients recently discharged after transcatheter aortic valve implantation: An extended feasibility study. *Journal of Geriatric Cardiology.* 2023;20(11):767-778. http://doi.org/10.26599/1671-5411.2023.11.003.
15. Pardo Sanz A, Zamorano Gómez JL. How to improve patient outcomes following TAVI in 2024? Recent advances. *Pol Heart J.* 2024;82(7-8):696-701. http://doi.org/10.33963/v.phj.101399.
16. Haleem A, Javaid M, Singh RP, Suman R. Telemedicine for healthcare: Capabilities, features, barriers, and applications. *Sensors International.* 2021;2:100117. http://doi.org/10.1016/j.sintl.2021.100117.
17. ACNAP Essentials 4 You. *European Journal of Cardiovascular Nursing.* 2020;19(1_suppl):S1-S68. http://doi.org/10.1177/1474515120952021.

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Research

Dealing with Central Vascular Access Devices: A Qualitative Study on Cancer Patients' Experiences

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Abstract

Introduction. Central vascular access devices are widely used in oncology settings due to the significant side effects of chemotherapy on blood vessels. Despite the methodological robustness of the literature, the enhanced integration of patients' perspectives would enrich the evidence on this topic. This study explores oncology patients' experiences with cVADs (PICC and TIVAD), from insertion to daily life management.

Methods. We conducted a generic qualitative interview study with thematic analysis. Adult patients with a Peripherally Inserted Central Catheter or a Totally Implantable Venous Access Device receiving oncological treatment at the Oncology Department of the Azienda USL – IRCCS of Reggio Emilia were included, as also those who completed the treatment plan.

Results. The emerging themes were categorized into three main areas: (1) catheter implantation, (2) catheter maintenance, and (3) "daily life" with the catheter. Patients reported a high degree of satisfaction with the information and the education received by healthcare professionals: this appeared crucial in reducing anxiety and fear during the device placement and its daily management. However, patient engagement in the device selection appeared less consistent. The devices were well tolerated and had a low impact on their daily activities. All participants perceived the devices as helpful and safe during their care pathway.

Discussion. The study confirmed the importance of central venous access devices to minimize patient discomfort during chemotherapy treatment. The competence and empathy of healthcare professionals, along with adequate information and education, contribute to reducing patient's anxiety. Improving patients' engagement in the device choice is necessary. Patients reported a positive experience, enabling them to cope with the device, even at home.

Keywords: Qualitative Research, Oncology, Vascular Access Devices, PICC Line Catheterization, Port-A-Cath

Introduction

In oncology settings, central Vascular Access Devices (cVADs) are widely used due to the toxicities on blood vessels of cancer treatment. Depending on treatments, patients could live with these devices for a long time. CVADs can be inserted centrally into the subclavian or jugular vein, with or without tunneling, or implanted through a subcutaneous port. Alternatively, they can be inserted into one of the peripheral veins of the upper extremities.[1] Peripherally Inserted Central Catheters (PICCs) and Totally Implantable Venous Access Devices (TIVADs) are safe and valid options but have specific advantages and disadvantages: PICCs offer the advantage of being easy to insert and less invasive, but they require frequent monitoring and are more prone to infections.[2] On the other hand, TIVADs are ideal for long-term treatments, reducing the risk of infections and requiring less maintenance, but they involve a surgical procedure for implantation, making them more invasive. Both require specific expertise for proper management. Healthcare professionals must possess solid skills to guide patients toward the most suitable choice through shared decision-making.[2] Patients should learn to manage cVADs and adapt their habits accordingly.[3] Increasing attention has been given to the involvement of patients and their families in clinical decisions, highlighting the importance of this collaborative approach.[4-11]

Research on cVADs has primarily focused on their appropriateness, positioning, and management,[4-11] but fewer studies have addressed patient experience and satisfaction. A recent qualitative study found that patients generally accepted the cVAD as part of their treatment, particularly those who had previously undergone chemotherapy through peripheral veins, finding it more convenient and less painful. TIVADs were described as more manageable and safer than other cVADs, with minimal impact on quality of life.[12] Ritchie et al.[4] also emphasized that TIVADs better preserve daily life priorities, such as freedom of movement and body image integrity, than other devices.

However, the discomfort and complications associated with TIVAD insertion and management are often underestimated by patients, who rely on professional guidance to handle these issues.[4] In contrast, PICCs may impact privacy and body image more, with many oncology patients advised to conceal the device during social interactions.[13-15] Moreover, PICC management requires adherence to aseptic techniques.[13-15] Patient education and involvement are crucial in improving skills, compliance, satisfaction, and perceived safety.[13,15,16] Therefore, nursing competence in cVAD management and training is essential.[15] Despite the methodological robustness of the literature,[17] the enhanced integration of patients' perspectives would enrich the evidence on this topic.[10] This study explores oncology patients' experiences with cVADs (PICC and TIVAD), from insertion to daily life management.

Methods

Study design

We conducted a generic qualitative interview study with thematic analysis, a flexible, open-ended approach to explore people's experiences and perceptions. It doesn't follow a strict theoretical model but aims to gain a practical and in-depth understanding of participants' perspectives, especially in healthcare settings.[18,19] To define the problem of interest precisely and to orient the interviews, an overview of the recently available evidence on the topic was performed.

The research question arises from the existing literature, which highlights gaps and areas not fully explored regarding patient experiences with vascular access in oncology settings, thus justifying the need for further investigation into these aspects. All participants had detailed instructions and information about the study procedures; informed consent to the study attendance and data utilization was collected before all procedures. The study followed the COREQ (Consolidated Criteria for Reporting Qualitative Research) guidelines.[20]

Fidelity

Methodological rigor and fidelity to the data were pursued through various strategies. Audio recording of the interviews, verbatim transcription by an author (MG), and independent analysis ensured data accuracy and contributed to the credibility of the research material. A postdoctoral researcher (MG) with significant experience in qualitative research supervised the work during the interviews and analyses. Two researchers (GM, MF) conducted the interviews and performed the analyses; neither had worked directly with any participants before the interviews. The interviewers had at least a master's degree in research methodology and received specific training on the study method and how to approach oncology patients before the study started. The participants received complete information on methods; the interviewers disclosed their backgrounds and interests to the participants before starting each interview. In addition, the interviewers reflected on their experiences and biases about the research topic throughout the study. The interview was developed for this study; its structure is reported in Supplementary File 1.

Setting and participant selection

In-patients and out-patients who underwent PICC or TIVAD positioning at the Oncology Department of the Azienda USL – IRCCS of Reggio Emilia were recruited. All patients were adults enrolled in the early follow-up phase after completing their chemotherapy plan in stable conditions. All of them received detailed information and health education on cVAD management before the implant. The study participants were recruited adopting a convenience method. Eligible patients were identified by consulting the Oncology Department's clinical documentation and selecting those who experienced PICC or TIVAD positioning. The type of cancer, disease stage, and treatment plan were not considered for patient selection. The sample size was adapted during the research process based on data saturation.

Data collection

Patients were approached through semi-structured face-to-face interviews, during which they were free to share their thoughts and experiences, with the interviewer playing only a guiding role. Data were collected through these interviews and recorded with the participant's consent. The recordings were then transcribed verbatim to ensure accuracy. All personal information was handled confidentially and in compliance with privacy regulations, and the data were anonymized to protect participants' identities. Sociodemographic data of participants were collected. The interview scheme was structured based on the results of the available literature in the oncology field.[12,21] The interview guide (Supplementary File 1) focused on themes related to vascular access management, such as patients' experiences with different types of devices, the daily challenges in the care and maintenance of the access points, and the potential psychological impact.

The questions also explored patients' perceptions regarding the duration of treatment, difficulties in communication with healthcare professionals, and coping strategies for adapting to the use of vascular access devices during their treatment journey. Each interview was planned to be 20-30 minutes long and performed when the patient had a hospital visit. The presence of the family caregiver was allowed whether the patient desired it. A dedicated room was used for the interviews to create a comfortable environment, and the appointments were scheduled in advance. The interviewer supported the patient's storytelling by adopting an active listening technique, and field notes were collected to record non-verbal behaviors. All the interviews were recorded and transcribed verbatim. The patient's availability for any subsequent interview to clarify unclear concepts was obtained. To protect the participant's privacy, the recording files were deleted after the fidelity evaluation of their verbatim transcription and before the analysis.

Data analysis

Sociodemographic data of participants were analysed through frequencies and percentages. A thematic analysis identified key concepts, themes, and sub-themes relevant to the research objectives.[22,23] Two independent researchers read the transcripts multiple times to identify emerging themes and to extract and categorize concepts and content. The data were tabulated and manually analyzed. Consistency between the main themes, content categories, and transcript data was assessed through an iterative process. Researchers combined an inductive and deductive approach during the analysis, identifying meaningful statements representing themes and categories. The analysts met regularly to group the identified labels and define sub-themes and overarching themes.[24] To ensure methodological rigor, researcher triangulation was adopted by comparing the results obtained by multiple analysts to enhance data credibility.[25] Additionally, bracketing was applied, meaning that researchers set aside their own biases and expectations to minimize the influence of personal experiences on data interpretation.[26] Finally, the analyses were compared among the researchers, and any discrepancies were discussed until consensus was reached. A third researcher supervised the entire process, intervening in case of conflicts to ensure the reliability of the analysis.

Ethical considerations

The article discusses the ethical problems encountered during qualitative research, emphasizing the importance of ethical principles throughout the research process. The authors reflect on the complexities of adhering to these principles, illustrating the challenges and decisions made during the study.[27] The study protocol was approved by the Area Vasta Emilia Nord ethic committee (n°.124594/28.10.2019).

Rigour and reflexivity

As the fidelity paragraph shows, rigour is essential to ensure the credibility, dependability, and transferability of findings that inform patient care and clinical practice. Guidelines have been followed.[20] Reflexivity was considered, by engaging in ongoing researchers' self-reflection, acknowledging their influence on data collection and interpretation.[26]

Results

Sample characteristics

Twenty patients were interviewed between April and August 2020; almost all provided a one-shot interview, and only one participant required a follow-up clarification. The whole group (females N = 16; males N = 4) had an average age of 70 years (range: 39-82 years). Cancer types were breast (N = 5), bowel (N = 4), lung (N = 3), prostate (N = 3), head and neck (N = 2), bone (N = 1), and gastric (N = 2).

Theme: catheter implantation

<u>A choice not always shared</u>

The participants reported what they experienced with catheter choosing. The majority have been involved in the decision process, except for a small portion of them who received information on positioning but had not participated in the choice. Patients recognized the expertise in proposing the best caring strategy, leading some to trust the clinical decision.

> *"They just told me that the PICC line was more suitable for my therapy." [Pt. 4].*
>
> *"The doctor decided, he told me that the port was more convenient and gave me the appointment." [Pt. 10].*

<u>Effective information, always</u>

All patients reported to have had a full explanation of the VAD placement procedure from both the positioning team and the oncology team. The information was considered exhaustive and comprehensive by all participants.

> *"The procedure was explained to me by the vascular access team... They were very skilled. [Pt. 5]"*

<u>All was ok, no pain</u>

Despite the differences between PICC and TIVAD placing techniques, the emotional pathways reported by the participants were similar. Several of them reported fear and agitation before the placement. However, the provided information and the anesthesia were favorable factors that helped them to deal with their symptoms, perceiving an overall good experience.

> *"When I was in the room, I was quite worried; but the nurse who placed the catheter was very kind and professional. I have to tell, I* did not

feel any pain during the intervention, so I calmed down... I felt a sort of protection. [Pt. 8]"

A special attention to care

The humanity and listening skills of the healthcare professionals on the vascular access team are claimed to be appreciated by patients, helping patients to have a better experience.

"When I went there [vascular access ambulatory, Ed.], I was really worried. The nurses took time to reassure me. They reassured me a lot. [Pt. 6]"

"During the catheter placement, I felt good. The nurses made a good work, it was a very intimate moment, and they took particular attention to care. It was painless. [Pt. 15]"

Theme: catheter maintenance

Detailed instructions and a bit of luck

Patients considered the information on catheter maintenance and management clear and comprehensive. All patients demonstrated competence in the management of their catheter during the interviews. Some interviewees appreciated the vascular access team's attention in reducing the device-related discomfort.

"The PICC maintenance includes disinfection and dressing change once a week, and flushing. [Pt. 17]"

"I was informed it needed to be managed every week, and nurses would have taken blood samples and changed the dressing (PICC) when I would be there for a visit. [Pt. 4]"

"I must flush the Port [TIVAD, Ed.] every two months when it is not used. [Pt. 18]"

Additionally, some other factors emerged clearly during the catheter maintenance activities: relational and professional items such as the patient's preference for such professionals instead of others, the recognition of nurses' expertise, and the cVAD utility.

"I have a personal relationship with the nurses. During my unlucky journey, I met very competent professionals; however, since I removed the PICC when I needed blood tests, I hope to find someone with a gentle touch. [Pt. 1]"

"I was lucky to meet a ward nurse who showed great competencies, a welcoming attitude, and attention to avoid the pain. So, for my dressing change, I tried to choose her at each access [Pt. 8]"

Almost all patients knew the procedures to manage the cVAD at home. During the interviews, patients with a PICC discussed the need to keep it dried during body hygiene using a special waterproof sleeve to protect the emerging site. In contrast, patients with a TIVAD highlighted the need to avoid bumps. Only one patient was not informed about the management of the device.

"They explained to me how to use the "Limbo" [a special protective sleeve for the PICC line, Ed.] for showering. [Pt. 4]"

"My wife is afraid of hurting the port [TIVAD, Ed.] during intimacy, so she is very careful. [Pt. 2]"

"No healthcare education was provided to me regarding the maintenance of the port [TIVAD, Ed.], and I didn't ask anything. Maybe, I will inquire about it once my journey will be finished. [Pt. 10]"

No serious complications, but the adhesive dressing is unbearable

Many patients did not develop catheter-related complications. One experienced a deep vein thrombosis that resolved quickly with anticoagulant therapy. Ten out of 14 participants with PICC have had adhesive dressing-related skin toxicity, including itching and blisters development. In all cases, the problem was resolved by changing the dressing. Nursing monitoring of skin toxicities was essential to detect the problem early.

"I suffered a lot because of the adhesive dressing; I changed it three times, the first one caused blisters. [Pt. 4]"

"I had only one complication, skin blisters caused by the dressing. Fortunately, the nurses were very skilled and found the right adhesive. [Pt. 16]"

Two patients mentioned discomfort around the TIVAD port area caused by the car seatbelts; this sub-cohort reported no further issues.

"Since I have the port [TIVAD, Ed.], I have to pay attention to my movements, and the seatbelt bothers me. [Pt. 2]"

Theme: "daily life" with the catheter

A necessary evil

Half of the cohort reported minimal impact of the catheter on daily life; some said they forgot they had it. Its presence conditioned daily activities at some specific moments, such as body hygiene and during some household tasks.

"For example, when making the bed, I felt a tug on my arm when I pulled up the sheets; then,

I remembered it and tried to make this thing slower. [Pt. 6]"

"I remembered it when I lifted heavy things, like groceries, or used the garden shear. It was bothersome. [Pt. 7]"

Two patients referred catheter-related continuous awareness, emphasizing that it was a visible medical device. Some individuals associated its presence with a constant reminder of their illness.

"During the treatment phase, I could see it on my arm every time; it was a tangible item of my problem. It was like a part of the treatment cycle. [Pt. 8]"

A nearly normal life

Half of the patients reported they did not have to modify daily habits, excluding some precautions necessary for safety (e.g., maintaining a dried dressing or avoiding bumps). However, some patients adapted their daily routine to the catheter maintenance schedule and family needs.

A sense of protection towards the medical device to prevent accidental complications has been observed. Participants who were mothers reported distress towards their children due to fear of pain or complications from mother-child interactions such as hugging or playing. The mothers tried to contain fear-related expressions when interacting with their children to protect them from what they were going through.

"I changed my way of doing some things. For example, I am very careful to avoid catheter bumps when carrying groceries or holding my nephew because children are unpredictable. [Pt. 2]"

"My son hugged me; he hurt me squeezing my arm; it was a bother thing. Moreover, I had a dressing-related skin reaction during the treatment period; when my son saw it, he was very scared, so I tried to hide it. We should consider how to explain these problems to children. [Pt. 7]"

In most cases, the medical device did not pose any aesthetic problems. Some patients covered it with PICC covers that matched their clothing or wore loose shirts to avoid it being visible. Only two patients with the port mentioned having problems because the wound was visible.

"It bothers me a bit because the wound is visible, but I get over it; I pretend it is nothing. My wife is afraid of hurting me during intimacy, so she is careful. [Pt. 2]"

Although the participants denied important aesthetic issues, the devices seemed to affect their body image, and their loved ones perceived that. The medical device was evident and tangible, exposing patients to judgments, preventing them from discreetly living with their illness, and making it "uncomfortable" for family and social stakeholders. Many patients covered it up to avoid families' upsetting and social stress.

"... it is a visible element and clearly draws the attention of those who do not know it, so certainly it can be a problem for those who want to live the illness with privacy. [Pt. 8]"

Small aids

Half of the participants did not need help managing the catheter, while the other half needed help only covering their arm for the shower.

"When I took a shower, my husband would lend me a hand because I could not cover it on my own. [Pt. 5]"

Finally, participants were asked, "Do you want to share anything about your experience?" PICC and TIVAD patients underlined the device's benefits in reducing blood vessel damage and improving safety.

Discussion

This study informs the scientific community about patients' perspectives on cVADs, which are essential in targeting resources, education needs, and clinical decisions. cVADs are commonly used to ensure adequate venous access during anticancer treatment. They consent to reduce the risk of severe side effects due to the drug toxicity on peripheral veins and to prevent drug extravasation and tissue damage.[28] However, the cVAD positioning can cause complications such as infections, deep vein thrombosis, pain, and discomfort, and its management needs can affect a patient's life activities leading to coping issues.[9] Our study provided valuable insights describing oncology patients' experience living with cVADs: we underline the essential role of nurses in supporting the device's choice and daily life management. A qualitative approach was adopted as we agreed that this method was still under-explored in this setting, enhancing precious patient points of view.

It was evident that although participants perceived this medical procedure as a "necessary evil" in the context of the anticancer treatments,

the presence of a cVAD conditioned their daily activities, and they constantly remembered their illness. The results showed that healthcare professionals had a good attitude in informing and educating patients about these medical devices' placement and daily maintenance. Nevertheless, structured patient education programs promoting coping might be helpful: patients will demonstrate safer behaviors and stable adherence to the recommendations. In this scenario, the availability of new knowledge on patients' psycho-adaptive abilities and the health professionals' educational role becomes fundamental. However, only some studies explored the patients' experience in this setting; existing literature seems elusive in reporting the educational skills of healthcare professionals, particularly those working outside the oncology department or in community settings.[12,15] As revealed by our findings, some patients tended to play passive roles during healthcare decision-making processes in line with what was reported by literature: they preferred to rely on clinicians' decisions.[29,30] Despite their knowledge of available options, they decided not to contribute to the choice. However, our findings highlighted professionals' scarce attitude toward involving patients in the process, especially regarding the device's choice. These findings consistently support the need to improve information effectiveness and timing to amend the overall quality of our informed consent processes. Not only clinical factors can influence decisions, such as the device's choice. Professionals should be comfortable with patients' perspectives and preferences, as patient engagement should be integral to caring.[31]

Although it did not emerge as a central theme from the interviews, all patients expressed a sense of vulnerability due to anxiety about cVAD positioning as an invasive procedure and concerns about their clinical condition. The importance of a personalized approach to the patient's needs and the attention to the relationship becomes evident, as referred by interviewees. It would be necessary to adopt strategies to enhance patients' needs, understanding, fears, and adaptive methods, enhancing awareness and perceived safety. Patients' concerns were frequently addressed through active listening, facilitated by a stable therapeutic relationship, particularly with nurses. These factors influence the quality of nursing care, leading to higher patient satisfaction. This study provided important information that will be useful to correct behaviors and organization plans to ensure greater patient engagement in caring and emphasize the importance of a patient-centered approach.

Strength and limitation

This qualitative study allowed the authors to deeply understand patients' experiences and perceptions regarding vascular access, providing a patient-centered perspective and revealing unexpected aspects of care. However, the authors may not encompass all potential interpretations of the data when analyzing the themes. Moreover, results refer to the Italian context. While the study is valuable for developing patient-centered interventions, the authors suggest integrating it with quantitative approaches to address clinical issues more precisely and comprehensively.

Implication for nursing practice, research and organizations

Nurses should adopt a patient-centered approach, addressing not only the technical aspects of vascular access but also patients' emotional and psychological needs. Clear communication, education, and personalized care plans are essential to improving patients' daily lives and treatment adherence.

Future studies should explore the long-term effects of vascular access on quality of life and compare different types of access. It is important to develop interventions to reduce complications and improve patient comfort, integrating both qualitative and quantitative methods for a comprehensive understanding. Healthcare organizations should invest in continuous staff training and promote patient-centered protocols to improve vascular access management. Supporting research on innovative technologies and fostering collaboration among professionals are crucial for optimizing patient outcomes.

Conclusion

The study increased knowledge of the perception and experience of patients undergoing stressful medical procedures such as cVAD positioning and management. It confirms the importance of cVADs during anticancer treatment, as it reduces discomfort and complications. Furthermore, it highlighted the need for a more inclusive and personalized approach to patients: the nurses have a crucial role in the device's choice,

activating coping strategies and promoting effective home management. This may facilitate patients' assuming of greater awareness of their oncology pathway and make them feel safer.

References

1. Ho C, Spry C. *Central Venous Access Devices (CVADs) and Peripherally Inserted Central Catheters (PICCs) for Adult and Pediatric Patients: A Review of Clinical Effectiveness and Safety.* Ottawa (ON): Canadian Agency for Drugs and Technologies in Health; 2017. Accessed via NCBI Bookshelf. PMID: NBK470810.
2. Sansivero GE. Features and selection of vascular access devices. *Semin Oncol Nurs.* 2010;26(2):88–101. doi: https://doi.org/10.1016/j.soncn.2010.02.006
3. Ivziku D, Gualandi R, Pesce F, De Benedictis A, Tartaglini D. Adult oncology patients' experiences of living with a central venous catheter: a systematic review and metasynthesis. *Support Care Cancer.* 2022;30(7):3773–3791. doi: https://doi.org/10.1007/s00520-022-06819-8
4. Ritchie M, Kelly LJ, Moss J, Paul J, Shaw R. Exploring attitudes towards a randomised controlled trial of venous access devices – a nested pre-trial qualitative study. *J Vasc Access.* 2015;16(5):407–412. doi: https://doi.org/10.5301/jva.5000447
5. Madabhavi I, Patel A, Sarkar M, Kataria P, Kadakol N, Anand A. A study of the use of peripherally inserted central catheters in cancer patients: A single-center experience. *J Vasc Nurs.* 2018;36(3):149–156. doi: https://doi.org/10.1016/j.jvn.2018.05.00
6. Linnemann B. Management of complications related to central venous catheters in cancer patients: an update. *Semin Thromb Hemost.* 2014;40(3):382–394. doi: https://doi.org/10.1055/s-0034-1371005
7. Yacobovich J, Ben-Ami T, Abdalla T, Tamary H, Goldstein G, Weintraub M, et al. Patient and central venous catheter related risk factors for blood stream infections in children receiving chemotherapy. *Pediatr Blood Cancer.* 2015;62(3):471–476. doi: https://doi.org/10.1002/pbc.25281
8. Pu YL, Li ZS, Zhi XX, Shi YA, Meng AF, Cheng F, et al. Complications and costs of peripherally inserted central venous catheters compared with implantable port catheters for cancer patients: A meta-analysis. *Cancer Nurs.* 2020;43(6):455–467. doi: https://doi.org/10.1097/ncc.0000000000000742
9. Taxbro K, Hammarskjöld F, Thelin B, Lewin F, Hagman H, Hanberger H, et al. Clinical impact of peripherally inserted central catheters vs implanted port catheters in patients with cancer: an open-label, randomised, two-centre trial. *Br J Anaesth.* 2019;122(6):734–741. doi: https://doi.org/10.1016/j.bja.2019.01.038
10. Wang Y, Wang X, Qiu X. Indwelling experience and coping strategies of upper arm infusion ports in patients with cancer: a qualitative study. *BMJ Open.* 2023;13(3):e069772. doi: https://doi.org/10.1136/bmjopen-2022-069772
11. Patel GS, Jain K, Kumar R, Strickland AH, Pellegrini L, Slavotinek J, et al. Comparison of peripherally inserted central venous catheters (PICC) versus subcutaneously implanted port-chamber catheters by complication and cost for patients receiving chemotherapy for non-haematological malignancies. *Support Care Cancer.* 2014;22(1):121–128. doi: https://doi.org/10.1007/s00520-013-1941-1
12. Ryan C, Hesselgreaves H, Wu O, Moss J, Paul J, Dixon-Hughes J, et al. Patient acceptability of three different central venous access devices for the delivery of systemic anticancer therapy: a qualitative study. *BMJ Open.* 2019;9(7):e026077. doi:10.1136/bmjopen-2018-026077
13. Robinson-Reilly M, Paliadelis P, Cruickshank M. Venous access: the patient experience. *Support Care Cancer.* 2016;24(3):1181–1187. doi: https://doi.org/10.1007/s00520-015-2900-9
14. Parás-Bravo P, Paz-Zulueta M, Santibañez M, Fernández-de-las-Peñas C, Herrero-Montes M, Caso-Álvarez V, et al. Living with a peripherally inserted central catheter: the perspective of cancer outpatients—a qualitative study. *Support Care Cancer.* 2018;26(2):441–449. doi: https://doi.org/10.1007/s00520-017-3815-4
15. Alpenberg S, Joelsson G, Rosengren K. Feeling Confident in Using PICC Lines: Patients' Experiences of Living With a PICC Line During Chemotherapy Treatment. *Home Health Care Manag Pract.* 2015;27(3):119–125. doi: https://doi.org/10.1177/1084822314566300
16. Sharp R, Grech C, Fielder A, Mikocka-Walus A, Cummings M, Esterman A. The patient experience of a peripherally inserted central catheter (PICC): A qualitative descriptive study. *Contemp Nurse.* 2014;48(1):26–35. doi: https://doi.org/10.5172/conu.2014.48.1.26
17. Wu O, Boyd K, Paul J, McCartney E, Ritchie M, Mellon D, et al. Hickman catheter and implantable port devices for the delivery of chemotherapy: a phase II randomised controlled trial and economic evaluation. *Br J Cancer.* 2016;114(9):979–985. doi: https://doi.org/10.1038/bjc.2016.76
18. Caelli K, Ray L, Mill J. 'Clear as mud': toward greater clarity in generic qualitative research. *Int J Qual Methods.* 2003;2:1–13. doi: https://doi.org/10.1177/160940690300200201
19. Kahlke RM. Generic qualitative approaches: pitfalls and benefits of methodological mixology. *Int J Qual Methods.* 2014;13:37–52. doi:10.1177/160940691401300119
20. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health Care.* 2007;19(6):349–357. doi: https://doi.org/10.1093/intqhc/mzm042
21. Nagel T. Satisfaction and quality of life: a survey-based assessment in patients with a totally implantable venous port systemic. *Eur J Cancer Care* (Engl). 2012;21(2):197–204. doi: https://doi.org/10.1111/j.1365-2354.2011.01275.x

22. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol.* 2006;3:77–101. doi: https://doi.org/10.1191/1478088706qp063oa
23. Braun V, Clarke V. Reflecting on reflexive thematic analysis. Qual Res Sport Exerc Health. 2019;11(4):589–597. doi: https://doi.org/10.1080/2159676X.2019.1628806
24. Sasso L, Bagnasco A, Ghirotto L. *La ricerca qualitativa. Una risorsa per i professionisti della salute.* Milano: EDRA; 2015.
25. Guion LA, Diehl DC, McDonald D. *Triangulation: Establishing the Validity of Qualitative Studies.* EDIS. 2011. doi: https://doi.org/10.32473/edis-fy394-2011
26. Chan ZC, Fung Y, Chien W. Bracketing in phenomenology: only undertaken in the data collection and analysis process. *Qualitative Report.* 2013;18(30):1–9. doi: https://doi.org/10.46743/2160-3715/2013.1486
27. Reid AM, Brown JM, Smith JM, et al. Ethical dilemmas and reflexivity in qualitative research. *Perspect Med Educ.* 2018;7:69–75. doi: https://doi.org/10.1007/s40037-018-0412-2
28. Park EJ, Park K, Kim JJ, Oh SB, Jung KS, Oh SY, et al. Safety, efficacy, and patient satisfaction with initial peripherally inserted central catheters compared with usual intravenous access in terminally ill cancer patients: a randomized phase II study. *Cancer Res Treat.* 2021;53(3):881–888. doi: https://doi.org/10.4143/crt.2020.1008
29. Arora NK, McHorney CA. Patient preferences for medical decision making. Who really wants to participate? *Med Care.* 2000;38(3):335–341. doi: https://doi.org/10.1097/00005650-200003000-00010
30. Jasvinder A, Singh JA, Sloan PJ. Preferred roles in treatment decision making among patients with cancer: a pooled analysis of studies using the Control Preferences Scale. *Am J Manag Care.* 2010;16(9):688–696.
31. Krist AH, Tong ST, Aycock RA, Longo DR. Engaging patients in decision-making and behavior change to promote prevention. *Stud Health Technol Inform.* 2017;240:284–302. doi: https://doi.org/10.3233/ISU-170826

Review

Use of Ultrasound-Guided Nurse Technique for the Placement of Peripheral Venous Access in the Emergency Room Versus the Standard "Blind" Technique: a Systematic Review

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Abstract

Introduction. In the Emergency Department, it is increasingly necessary to be able to find stable venous access when managing acute patients. This study aims to investigate the effectiveness of ultrasound-guided nursing compared to the standard "blind" technique.

Methods. A comprehensive literature search was undertaken using PubMed, Cochrane, and EMBASE. The results were then evaluated according to the JBI checklists.

Results. 9 studies are considered for this review. This review showed the effectiveness of the ultrasound-guided cannulation procedure (53-91.75%) compared to the standard blind technique. It also indicated a reduction in adverse events, a decrease in the number of attempts needed for successful cannulation (1-2.2 punctures), an increase in success on the first attempt (78.9-83%), greater user satisfaction with the ultrasound-guided technique, and reduced pain perception.

Discussions. The effectiveness of the ultrasound-guided cannulation procedure compared to the standard blind technique is aligned with the literature. The innovation of this review is the evaluation of nurse execution, time analysis, user satisfaction, reported pain, and the technique's success.

Keywords: Ultrasound, Emergency Room, Intravenous, Vascular Access, Peripheral

Introduction

In the emergency room setting, due to the urgency and complexity of care, establishing stable venous access is often a critical component in the management of acutely ill patients.[1] According to the literature, more than 50% of patients who present to the emergency department require peripheral venous access for purposes such as blood sampling, medication administration, or diagnostic procedures.[2] This is one of the most frequently performed procedures by emergency room nurses. However, despite its routine nature, peripheral venous cannulation is not always straightforward. Certain patient populations—such as those with obesity, a history of intravenous drug use, end-stage renal disease, or sickle cell anaemia—often present with poor venous access.[3] These patients are classified as having Difficult Intravenous Access (DIVA).[4] In emergency settings, patients with DIVA may undergo multiple percutaneous attempts before successful cannulation is achieved. In some cases, this leads to the use of central venous catheters, which carry higher risks and should ideally be avoided. Although ultrasound guidance can enhance the safety and efficacy of peripheral access, it is not without its own set of challenges and risks.[5-7] Over the past decade, numerous studies have supported the use of ultrasound-guided techniques over blind or more invasive alternatives. For central venous catheter placement, the use of ultrasound guidance by physicians is now widely recommended due to increased success rates and reduced complications.[8-10] More recently, this approach has also been applied to peripheral venous access. A study by Keyes et al. reported a 91% success rate in patients with two previous failed cannulation attempts using ultrasound guidance.[11] Another study found that ultrasound-guided peripheral cannulation by physicians resulted in greater success, shorter procedure times, fewer attempts, and higher patient satisfaction compared to the blind technique in patients with DIVA.[12] Several studies have also explored training emergency room nurses to perform ultrasound-guided peripheral cannulation, reporting encouraging outcomes such as reduced treatment time, lower complication rates, improved patient satisfaction, and increased professional autonomy.[13,14] Despite this, the literature lacks direct comparisons between ultrasound-guided cannulation and the traditional blind technique specifically in nursing practice for patients with DIVA. This review aims to analyze current evidence on this topic, focusing on emergency room nurses who typically rely on the blind technique.

Methods

On June 9, 2025, a search was conducted on the leading international databases ("PubMed", "EMBASE", and "Cochrane CENTRAL") for a systematic review. Table 1 outlines the PICOS framework (Population, Intervention, Comparison, Outcome, Study Design) used for study selection. The search strategy is summarized in Table 2. The first author conducted the initial literature search, while the second was responsible for quality assessment.

Table 1. The PICO question.

Description	Scope
Population	Nurses
Intervention	Use of ultrasound-guided nurse technique for the placement of peripheral venous access.
Comparison	Standard "blind" technique.
Outcomes	Success with ultrasound-guided technique, Adverse Events Number of percutaneous puncture attempts (average), Time of procedures or access to the procedure (average), User Satisfaction Pain perception, Success on the first try.
Study design	Only primary studies were considered.

Table 2. Summary of search strings.

Cochrane Library CENTRAL	"vascular access" in Title Abstract Keyword AND "ultrasound" in Title Abstract Keyword OR "echography" in Title Abstract Keyword AND "emergency department" in Title Abstract Keyword AND nurs* in Title Abstract Keyword	735 results
PubMed	(("nurs*"[All Fields] AND ("echography"[All Fields] OR "ultrasonography"[MeSH Terms] OR "ultrasonography"[All Fields] OR "echographies"[All Fields])) OR "ultrasound-guided"[All Fields]) AND (("vascular access" OR "vascular"[All Fields] OR "vascular device"[All Fields] OR "cannulation"[All Fields]) AND ("access"[All Fields])) AND ("emergency"[All Fields] OR "emergence"[All Fields] OR "emergences"[All Fields] OR "emergencies"[MeSH Terms] OR "emergencies"[All Fields] OR "emergency room"[All Fields] OR "first aid"[All Fields] OR "E&A"[All Fields] OR "ED"[All Fields])	256 results
Embase	('vascular access') AND ('echography) AND ('nurse') AND ('emergency')	29 results

Inclusion criteria

- Patients aged over 18 years who presented to the emergency department requiring peripheral venous access.
- Studies conducted in emergency or pre-hospital settings where ultrasound-guided cannulation was performed exclusively by nursing staff.
- Studies reporting on at least one of the following outcomes: cannulation success rate, number of percutaneous attempts, procedure time, incidence of adverse events, patient satisfaction, or pain perception.

Exclusion criteria

- Reviews or non-primary research articles.
- Studies not published in English or Italian.
- Studies involving patients under 18 years or those not requiring peripheral venous access.
- Studies conducted outside the emergency setting (e.g., ICU or medical wards), or where ultrasound was performed by non-nursing personnel such as physicians or paramedics.
- Studies assessing only training efficacy or operator comfort, without direct clinical outcome measures

Data extraction included: first author, year of publication, study design, training methods, participant demographics (number, sex, profession, country, and age range or median), and key outcomes. The second author conducted the quality assessment using the JBI Critical Appraisal Tools (https://jbi.global/critical-appraisal-tools). Five articles used RCT checklists,[15] and four observational studies used prevalence checklists.[16,17]

Results

According to the inclusion criteria, eight studies were selected for this review (Figure 1). Table 3 presents a summary of the results, while Table 4 provides a comparison of the primary outcomes.

In the article by Salleras-Duran et al., the success of insertion using the ultrasound-guided technique was greater than the conventional procedure (91.75% versus 89.9%; p = 0.04).[18] The number of attempts was fewer with the US-guided technique (1,29 vs 1.81 with the "blind" technique), the pain was similar between groups (NRS 4,5), and satisfaction was higher in DIVA patients with the US-guided technique (7,59 vs 6,69 with the standard technique).

In the study by Weiner et al., key findings are presented.[21] The authors confirm that, on average, approximately two puncture attempts

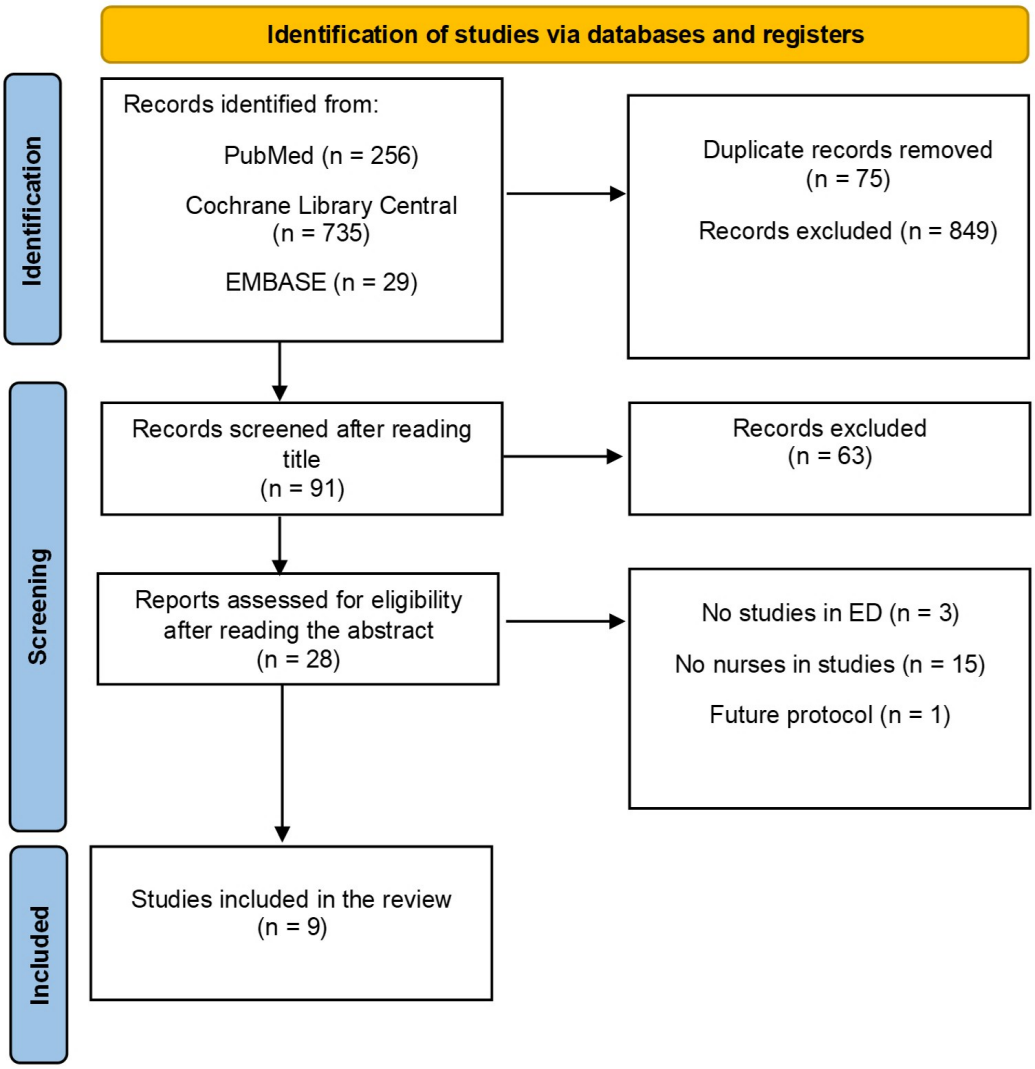

Figure 1. PRISMA flow chart showing the stages of review and item selection.

are made before transitioning to an ultrasound-guided approach. Interestingly, even with ultrasound guidance, the number of puncture attempts remains around two, indicating no significant reduction in the number of attempts between the two techniques. However, the study contributes important secondary outcomes that enhance understanding of clinical applicability. The average duration of the ultrasound-guided procedure was 27.6 minutes (95% CI: 16.0–39.1), compared to 26.4 minutes (95% CI: 16.8–36.0) for the blind technique, suggesting minimal difference in time required. Despite the similar procedure durations, patient satisfaction significantly increased with ultrasound guidance, rising from 63.2% for the blind technique to 86.2% for the ultrasound-guided approach. Additionally, pain perception was slightly lower in the ultrasound group, at 4.9% (95% CI: 3.6–6.1), compared to 5.5% (95% CI: 4.1–6.9) in the blind technique group.21

The study by Davis et al. (2021),[19] one of the most comprehensive to date, analyzed data from 150,710 emergency department patients. It aimed to assess potential delays in care when venous access was obtained using ultrasound guidance by either nurses or physicians. All findings were statistically significant ($p < 0.001$) and highlighted clear benefits of nurse-performed ultrasound-guided cannulation in patients with DIVA. For instance, the average time to establish venous access in DIVA patients was 1.64 hours (IQR: 0.79–3.08) when performed by nurses, compared to 2.51 hours (IQR: 1.46–4.07) when performed by physicians. Similarly, the time to obtain lab results was 1.53 hours (IQR: 0.93–2.78) for nurse-inserted lines and 2.18 hours (IQR: 1.26–3.60) for physician-inserted lines. When the catheter was

Table 3. Summary of search strings.

Nr.	Author(s)	Study Design	Professionals	Intervention/Control (if required)	Setting	JBI Evalution
1	Salleras-Duran et al., 2024[18]	RCT	Nurses	Compare the ultrasound-guided technique versus conventional peripheral intravenous catheterization in patients with difficult intravenous access (DIVA)	Emergency Department, USA	12/13
2	Davis et al., 2021[19]	Retrospective observational study	Nurses and Physicians	Use of the ultrasound-guided technique performed by nurses vs the same technique performed by doctors in the DIVA patient	Emergency Department, USA	9/9
3	Bahl et al., 2016[20]	Single-center-opened RCT study	Nurses	Use of the ultrasound-guided technique vs blind technique in assigned patients with difficult venous access	Emergency Department, USA	8/13
4	Weiner et al., 2013[21]	Multicenter opened RCT study	Nurses	Independent positioning of ultrasound-guided venous access with reduction of medical intervention, such as control of cannulation with blind technique plus evaluation with a questionnaire for users	Emergency Department, USA	5/13
5	Carter et al., 2015[22]	Quasi-randomized, single-center opened study	Nurses	"Non-inferiority" study on the positioning of ultrasound-guided venous access by nurses compared to doctors	Emergency Department, USA	6/13
6	Yalçınlı et al., 2022[23]	Three-arm, single-center, double-blind RCT study	Nurses	Three-arm study with cannulation with standard, ultrasound-guided, and infrared techniques. Evaluate the three variables with statistical associations regarding success and cannulation time	Emergency Department, Turkey	13/13
7	Adhikari et al., 2010[24]	Retrospective observational study	Nurses	Comparison of the frequency of infections and risks secondary to cannulation with standard technique and with ultrasound-guided technique	Emergency Department, USA	8/9
8	Chinnock et al., 2007[25]	Prospective observational study	Nurses and Physicians	Study on the success of ultrasound-guided venous cannulation performed by nurses in DIVA patients	Emergency Department, USA	6/9
9	Brannam, 2004[3]	Prospective observational study	Nurses	Use of the ultrasound-guided technique to evaluate the success of the procedure and any adverse events	Emergency Department, USA	4/9

Table 4. Comparison of the primary outcomes.

First Author	Success with the UGT	Adverse Events	Nr of percutaneous puncture attempts (average)	Time of procedures or access to the procedure (average)	User Satisfaction	Pain perception Evalution	Success on the first try
Salleras-Duran et al., 2024[18]	UGT: 91.75% BT: 89.9%	N/I	UGT: 1.29 BT: 1.81	UGT: 7.89 min BT: 5.1 min	UGT: 7.59 (SD 2.04) BT: 6.69 (SD 2.28)	UGT: 4.66 (SD 2.75) BT: 4.33 (SD 2.91)	N/I
Davis et al., 2021[19]	N/I	N/I	N/I	Time from access to the ER to the UGT performed by nurses: 1.64 hours (IQR 0.79 – 3.08) Time from access to the ER to the UGT performed by physicians: 2.51 hours (IQR 1.46 – 4.07)	N/I	N/I	N/I
Bahl et al., 2016[20]	UGT: 76% BT: 56%	N/I	UGT: 1.52 BT: 1.71	UGT: 20.7 min BT: 15.8 min	N/I	N/I	N/I
Weiner et al., 2013[21]	N/I	N/I	UGT: 2.0 [95% CI 1.5-2.4] BT: 2.1 [95% CI 1.6 – 2.6]	UGT: 27.6 min [95% CI 16.0-39.1] BT: 26.4 min [95% CI 16.8 – 36.0]	UGT: 86.2% BT: 63.2%	UGT: 4.9% [95% CI 3.6 – 6.1] BT: 5.5% [95% CI 4.1 – 6.9]	N/I
Carter et al., 2015[22]	Success Rate Nurses: 86%	5% complications only in the physicians group	N/I	N/I	N/I	N/I	N/I
Yalçınlı et al., 2022[23]	N/I	N/I	UGT: 1 p [IQR 1,25 – 1,64] BT: 1 [IQR 1,35 – 1,74]	UGT: 107 seconds [IQR 69 - 228] BT: 72 seconds [IQR 47 - 134]	N/I	N/I	UGT: 78,9% BT: 62,2%
Adhikari et al., 2010[24]	N/I	UGT: 0.52% BT: 0.78%	N/I	N/I	N/I	N/I	N/I
Chinnock et al., 2007[25]	53% (95% CI= 44 - 62%)	5 (5%)	N/I	N/I	N/I	8%	UGT: 83%
Brannam, 2004[3]	87%	4 (1,2%)	BT: 2.2 (95% CI = 1.9 – 2.4)	N/I	N/I	N/I	N/I

Legend. **UGT**: Ultrasound-Guided Technique; **BT**: Blinded Technique; **N/I**: Not investigated; **ER**: Emergency Room.

intended for analgesia, the time to pain relief was slightly shorter for nurse-performed procedures (3.46 hours, IQR: 1.78–7.23) compared to those performed by physicians (3.49 hours, IQR: 2.15–7.15).[19]

In the study by Carter et al., outcomes related to success and complications in ultrasound-guided venous access were evaluated among nurses and physicians. The success rate was 86% for nurses and 85% for physicians, with no statistically significant difference. However, complications occurred only in the physician group (5%), while no adverse events were reported in the nurse group.[23]

Bahl et al. studied patients with difficult intravenous access (DIVA), reporting a 76% success rate for ultrasound-guided cannulation compared to 56% with the blind technique. The average number of attempts was lower with ultrasound (1.52) than with the blind method (1.71). Procedure times, including preparation, were 20.7 minutes for ultrasound-guided cannulation and 15.8 minutes for the blind technique.[20]

In a study published in 2007 by Chinnock et al., conducted when ultrasound use was not yet widespread among emergency physicians, nurses achieved a 53% success rate (95% CI: 44–62%) using ultrasound guidance. Notably, 5% of cases involved arterial puncture, and 8% of patients reported pain during the procedure. Impressively, 83% of successful cannulations with ultrasound occurred on the first attempt, a significant improvement over the blind technique.[25]

Yalçınlı et al. investigated ultrasound and blind techniques, as well as infrared guidance (the latter not included in this review). Their study found a first-attempt success rate of 78.9% for the ultrasound-guided group, compared to 62.2% for the blind technique ($p = 0.010$). However, ultrasound-guided procedures took longer—107 seconds vs. 72 seconds for the blind method. Notably, both techniques required only one puncture attempt on average in this study.[23]

Lastly, in a study by Adhikari et al., infection rates were assessed between catheters inserted using ultrasound-guided and blind techniques. The infection rate was 0.52% for ultrasound-guided insertions, compared to 0.78% for the blind technique.[24]

Discussion

The effectiveness of the ultrasound-guided cannulation procedure ranges from 53 to 91.75%, compared to the standard blind technique. It also indicated a reduction in adverse events, a decrease in the number of attempts required for successful cannulation (from 1 to 2.2 punctures), an increase in success on the first attempt (ranging from 78.9% to 83%), greater user satisfaction with the ultrasound-guided technique, and reduced pain perception.

This systematic review highlights the effectiveness of the ultrasound-guided cannulation procedure compared to the standard blind technique. These findings align with another systematic review that found the efficacy of the ultrasound-guided peripheral intravenous cannulation procedure in comparison to the standard of care (the landmark and palpation method): the ultrasound-guided cannulation had a two-times higher likelihood of first successful cannulation, fewer attempts, and greater patient satisfaction.[26] Another meta-analysis examined ultrasonographical guided peripheral intravenous cannulation in children and adults across various settings. Ultrasound guidance reduced the number of attempts and the risk of failure on the first attempt execution.[27]

The evidence from this review carries substantial implications for emergency care, where time-sensitive vascular access is critical for administering fluids, medications, and resuscitative therapies.[28] Integrating the ultrasound-guided cannulation procedure in both adult and paediatric populations is essential.[26,27]

This review innovates by evaluating nurse execution, time analysis, user satisfaction, reported pain, and the technique's success. The ultrasound-guided technique requires more execution time but increases user satisfaction rates. However, only a few selected studies investigate user satisfaction and pain perception.

The need for nurse training deserves careful consideration, as several studies have demonstrated higher success rates in vascular access placement in DIVA patients by adequately trained nurses.[29,30] Specifically, Burton et al. conducted a systematic review that objectively highlighted the positive impact of training allied health professionals in ultrasound-guided vascular access placement within hospital settings.[30]

Limits of the study

The study's limitations are represented by the potential for poor sample selection and notable heterogeneity, which may occur due to inaccurate sampling in some cases, and the possibility of bias. Using only a few international databases and a single source of gray literature may have significantly reduced the number of selectable studies. The small sample size of some studies and the limitation that most studies are conducted in a single location, which is therefore monocentric, reduces the generalizability of the results. Only some studies have a high quality.

Conclusions

It is therefore clear how the use of the ultrasound-guided technique performed by Emergency Room Nurses for patients with DIVA is decisive and effective in terms of safety for the patient, with a reduction in adverse events, a consequent increase in user satisfaction, and a decrease in perceived pain. Furthermore, the literature shows the efficacy of training among nurses. However, the main limitation of the ultrasound-guided procedure is the increased time required for procedure execution. However, there is still a limited presence of research studies in this area. At the end, conducting further studies to confirm or refute some results would be helpful and necessary.

References

1. Alexandrou E, Ray-Barruel G, Carr PJ, et al. Use of short peripheral intravenous catheters: characteristics, management, and outcomes worldwide. *J Hosp Med.* 2018;13(5). http://doi.org/10.12788/jhm.3039
2. Gledstone-Brown L, McHugh D. Idle 'just-in-case' peripheral intravenous cannulas in the emergency department: Is something wrong? *Emerg Med Australas.* 2018;30(3):309–326. http://doi.org/10.1111/1742-6723.12877
3. Brannam L, Blaivas M, Lyon M, Flake M. Emergency nurses' utilization of ultrasound guidance for placement of peripheral intravenous lines in difficult-access patients. *Acad Emerg Med.* 2004;11(12):1361–1363. http://doi.org/10.1197/j.aem.2004.08.027
4. Jacobson AF, Winslow EH. Variables influencing intravenous catheter insertion difficulty and failure: an analysis of 339 intravenous catheter insertions. *Heart Lung.* 2005;34(5):345–359. http://doi.org/10.1016/j.hrtlng.2005.04.002
5. Sou V, McManus C, Mifflin N, et al. A clinical pathway for the management of difficult venous access. *BMC Nurs.* 2017;16:64. http://doi.org/10.1186/s12912-017-0261-z
6. Fields JM, Piela NE, Au AK, Ku BS. Risk factors associated with difficult venous access in adult ED patients. *Am J Emerg Med.* 2014;32(10):1179–1182. http://doi.org/10.1016/j.ajem.2014.07.008
7. Pare JR, Pollock SE, Liu JH, et al. Central venous catheter placement after ultrasound guided peripheral IV placement for difficult vascular access patients. *Am J Emerg Med.* 2019;37(2):317–320. http://doi.org/10.1016/j.ajem.2018.11.021
8. Hind D, Calvert N, McWilliams R, et al. Ultrasonic locating devices for central venous cannulation: meta-analysis. *BMJ.* 2003;327(7411):361. http://doi.org/10.1136/bmj.327.7411.361
9. Miller AH, Roth BA, Mills TJ, et al. Ultrasound guidance versus the landmark technique for the placement of central venous catheters in the emergency department. *Acad Emerg Med.* 2002;9(8):800–805. http://doi.org/10.1111/j.1553-2712.2002.tb02168.x
10. Ortega R, Song M, Hansen CJ, Barash P. Videos in clinical medicine. Ultrasound-guided internal jugular vein cannulation. *N Engl J Med.* 2010;362(16):e57. http://doi.org/10.1056/NEJMvcm0810156
11. Keyes LE, Frazee BW, Snoey ER, et al. Ultrasound-guided brachial and basilic vein cannulation in emergency department patients with difficult intravenous access. *Ann Emerg Med.* 1999;34(6):711–714. http://doi.org/10.1016/S0196-0644(99)70095-8
12. Costantino TG, Parikh AK, Satz WA, Fojtik JP. Ultrasonography-guided peripheral intravenous access versus traditional approaches in patients with difficult intravenous access. *Ann Emerg Med.* 2005;46(5):456–461. http://doi.org/10.1016/j.annemergmed.2004.12.026
13. Blaivas M, Lyon M. The effect of ultrasound guidance on the perceived difficulty of emergency nurse-obtained peripheral IV access. *J Emerg Med.* 2006;31(4):407–410. http://doi.org/10.1016/j.jemermed.2006.04.014
14. Maiocco G, Coole C. Use of ultrasound guidance for peripheral intravenous placement in difficult-to-access patients: advancing practice with evidence. *J Nurs Care Qual.* 2012;27(1):51–55. http://doi.org/10.1097/NCQ.0b013e31822b4537
15. Barker TH, Stone JC, Sears K, et al. The revised JBI critical appraisal tool for the assessment of risk of bias for randomized controlled trials. *JBI Evid Synth.* 2023;21(3):494–506. Published March 1, 2023. http://doi.org/10.11124/JBIES-22-00430
16. Munn Z, Moola S, Lisy K, Riitano D, Tufanaru C. Methodological guidance for systematic reviews of observational epidemiological studies reporting prevalence and cumulative incidence data. *Int J Evid Based Healthc.* 2015;13(3):147–153. http://doi.org/10.1097/XEB.0000000000000054
17. Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ.* 2021;372:n71. http://doi.org/10.1136/bmj.n71
18. Salleras-Durán L, Fuentes-Pumarola C, Fontova-Almató A, et al. Pain and satisfaction perceptions of ultrasound-guided versus conventional peripheral intravenous catheterization: a randomized controlled trial. *Pain Manag Nurs.* 2024;25(1):e37–e44. http://doi.org/10.1016/j.pmn.2023.07.010
19. Davis EM, Feinsmith S, Amick AE, et al. Difficult intravenous access in the emergency department: performance and impact of ultrasound-guided IV insertion performed by nurses. *Am J Emerg Med.* 2021;46:539–544. http://doi.org/10.1016/j.ajem.2020.11.013
20. Bahl A, Pandurangadu AV, Tucker J, Bagan M. A randomized controlled trial assessing the use of ultrasound for nurse-performed IV placement in difficult access ED patients. *Am J Emerg Med.* 2016;34(10):1950–1954. http://doi.org/10.1016/j.ajem.2016.06.098
21. Weiner SG, Sarff AR, Esener DE, et al. Single-operator ultrasound-guided intravenous line placement by emergency nurses reduces the need for physician intervention in patients with difficult-to-establish intravenous access. *J Emerg Med.* 2013;44(3):653–660. http://doi.org/10.1016/j.jemermed.2012.08.021
22. Carter T, Conrad C, Wilson JL, Dogbey G. Ultrasound guided intravenous access by nursing versus resident staff in a community-based teaching hospital: a "noninferiority" trial. *Emerg Med Int.* 2015;2015:563139. http://doi.org/10.1155/2015/563139

23. Yalçınlı S, Karbek Akarca F, Can Ö, et al. Comparison of standard technique, ultrasonography, and near-infrared light in difficult peripheral vascular access: a randomized controlled trial. *Prehosp Disaster Med.* 2022;37(1):65–70. http://doi.org/10.1017/S1049023X21001217
24. Adhikari S, Blaivas M, Morrison D, Lander L. Comparison of infection rates among ultrasound-guided versus traditionally placed peripheral intravenous lines. *J Ultrasound Med.* 2010;29(5):741–747. http://doi.org/10.7863/jum.2010.29.5.741
25. Chinnock B, Thornton S, Hendey GW. Predictors of success in nurse-performed ultrasound-guided cannulation. *J Emerg Med.* 2007;33(4):401–405. http://doi.org/10.1016/j.jemermed.2007.02.027
26. Tran QK, Fairchild M, Yardi I, et al. Efficacy of ultrasound-guided peripheral intravenous cannulation versus standard of care: a systematic review and meta-analysis. *Ultrasound Med Biol.* 2021;47(11):3068–3078. http://doi.org/10.1016/j.ultrasmedbio.2021.07.002
27. Heinrichs J, Fritze Z, Vandermeer B, Klassen T, Curtis S. Ultrasonographically guided peripheral intravenous cannulation of children and adults: a systematic review and meta-analysis. *Ann Emerg Med.* 2013;61(4):444–454.e1. http://doi.org/10.1016/j.annemergmed.2012.11.014
28. Elshikh ST, Thomas B, Taha M, et al. Evaluating the accuracy of point-of-care ultrasound for peripheral intravenous cannulation in emergency and trauma patients: a systematic review. *Cureus.* 2025;17(5):e83625. Published May 7, 2025. http://doi.org/10.7759/cureus.83625
29. Amick AE, Feinsmith SE, Davis EM, et al. Simulation-based mastery learning improves ultrasound-guided peripheral intravenous catheter insertion skills of practicing nurses. *Simul Healthc.* 2022;17(1):7–14. http://doi.org/10.1097/SIH.0000000000000545
30. Burton SO, Donovan JK, Jones SL, Meadley BN. Can non-physician providers use ultrasound to aid in establishing peripheral IV access in patients who are difficult to cannulate? A scoping review. *Prehosp Disaster Med.* 2022;37(4):535–546. http://doi.org/10.1017/S1049023X22000796

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Case Report

Nursing Management Strategies for a Patient With an Aeson CARMAT® Total Artificial Heart: a Case Report

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Abstract

Introduction. Total artificial heart (TAH) devices are a viable bridge to transplantation in patients with end-stage biventricular heart failure. Among these, the Aeson CARMAT® TAH offers pulsatile flow and biocompatible materials to enhance physiological compatibility and reduce thromboembolic risks.

Case Presentation. We describe the case of a 62-year-old male with ischemic cardiomyopathy and NYHA Class IV symptoms, deemed ineligible for immediate heart transplant. The patient underwent Aeson TAH implantation following multidisciplinary evaluation and was admitted to the cardiac surgery intensive care for postoperative management.

Clinical Findings. Postoperative care focused on six core areas: (1) hemodynamic monitoring, including continuous tracking of pressures and device-derived values; (2) anticoagulation and

bleeding control with INR-based dosing; (3) infection prevention via strict asepsis and respiratory therapy; (4) device monitoring, including waveform interpretation and alarm management; (5) patient and caregiver education on device handling and complication signs; and (6) early mobilization to prevent ICU-related complications and support functional recovery.

Discussion. The case highlights the nurse's central role in managing TAH patients, integrating technical competence with holistic support. Early identification of complications and structured education contributed to a successful recovery and preparation for transplant listing.

Keyword: Aeson CARMAT®, Total Artificial Heart, Nursing Care, Mechanical Circulatory Support, Heart Failure

Introduction

Heart failure (HF) is a complex clinical syndrome characterized by the heart's inability to pump sufficient blood to meet the body's metabolic demands. Despite advances in pharmacological and device therapies, end-stage HF is still associated with a 1-year mortality rate of up to 70%.[1] Heart transplantation remains the gold standard treatment; however, donor organ shortages have led to the development of mechanical circulatory support systems such as the total artificial heart (TAH) as a bridge to transplant.[2]

Among these, the Aeson CARMAT® is a bioprosthetic device designed to replicate the anatomical shape and physiological function of the native heart, offering pulsatile blood flow and biocompatible materials to reduce thromboembolic risks and improve patient quality of life.[3,4]

Aeson TAH is indicated as a bridge to transplantation in patients with end stage biventricular heart failure (INTERMACS 1-4) who are unresponsive to maximal medical therapy. Patients must have adequate chest measurements to accommodate the device to be eligible for this treatment. The device is certified for 180 days of usage, after which a heart transplant will be necessary.[5]

This case report describes the nursing management of a patient with an Aeson TAH, with a focus on the critical role of nurses in postoperative care, complication prevention, patient and family education.

Case Presentation

The CARE guidelines were used for the case description.[6]

A 62-year-old male with a history of ischemic cardiomyopathy and progressive biventricular heart failure was admitted to a cardiac surgery unit. The patient was symptomatic with NYHA Class IV dyspnea, fatigue, peripheral edema, and recurrent hospitalizations due to decompensation. He was deemed unsuitable for immediate transplantation due to donor shortage and was evaluated for Aeson TAH implantation as a bridge to transplant.

The Aeson TAH consists of a motor-pump unit with two micropumps that move silicone fluid across membranes to simulate systole and diastole. Each ventricular chamber is divided by a membrane into a blood compartment (made of biocompatible material) and a silicone fluid compartment. Integrated electronics, including microprocessors and sensors, allow the device to autonomously adjust blood flow based on the patient's physiological demands. Like the native heart, each ventricle contains biological prosthetic valves to ensure unidirectional flow and connects to the pulmonary artery and aorta via dacron grafts. A driveline provides power and enables continuous monitoring of key parameters such as ventricular output, heart rate, and systolic/diastolic pressures.[7]

Following a multidisciplinary evaluation, the patient underwent median sternotomy, cardiopulmonary bypass, and implantation of the Aeson TAH. Intraoperative findings included severely dilated ventricles and poor

myocardial contractility. The native ventricles and atrioventricular valves were excised, and the bioprosthetic device was connected to the atrial cuffs and great vessels using Dacron grafts.[7]

The patient was admitted to the cardiac surgery intensive care unit (CICU) and underwent invasive multiparametric monitoring, including invasive blood pressure and central venous pressure. Hourly fluid balance and blood loss were monitored via mediastinal drains. Routine blood tests and serial blood gas analysis were performed. The patient was connected to invasive mechanical ventilation and bladder temperature was monitored via Foley. Respiratory weaning was completed without adverse events and the patient was transferred to the ward after 96 hours of intensive monitoring.

Clinical Findings

Postoperative nursing management focused on six critical domains: hemodynamic monitoring, infection prevention, anticoagulation management, device assessment, patient and family education and early mobilization.

Hemodynamic Monitoring

The nursing team constantly monitored the patient's central venous pressure, invasive arterial pressure, heart rate and oxygen saturation to detect early signs of complications.[8] The Aeson TAH uses an internal electro-hydraulic system that regulates the flow rate based on preload and afterload conditions, ventricular flow rate, heart rate and systolic and diastolic pressure of the left and right ventricles were the main values detected on the device throughout the post- and intra-operative period.

Anticoagulation and Bleeding Management

Due to the bioprosthetic nature of the device, anticoagulation was managed cautiously with daily International Normalized Ratio checks and dose adjustments. Strict monitoring was essential to prevent bleeding events, which are common in the early postoperative period.[9]

Infection Control

Nurses followed strict aseptic protocols and used personal protective equipment for care and dressing changes, especially near the exit points from the transmission line. Respiratory physiotherapy were implemented to reduce the risk of pneumonia.[10]

Device Monitoring

Nurses were trained to assess waveform readings, check for full ejection and partial filling, and recognize alarm signals from the external console. Monitoring included interpreting the COMDU display, which provides flow data based on air displacement through the drive lines.[9]

Patient and Family Education

The patient and caregivers received structured training on daily care, alarm management, battery replacement, and signs of complications. Psychological support was offered to address anxiety related to device dependency and altered body image.[11]

Early Mobilization

Early mobilization is a key nursing intervention in patients supported with the Aeson TAH. In collaboration with the cardiocirculatory perfusion technician, the patient is mobilized as soon as clinically stable to reduce the risk of immobility-related complications such as deep vein thrombosis, pulmonary complications,

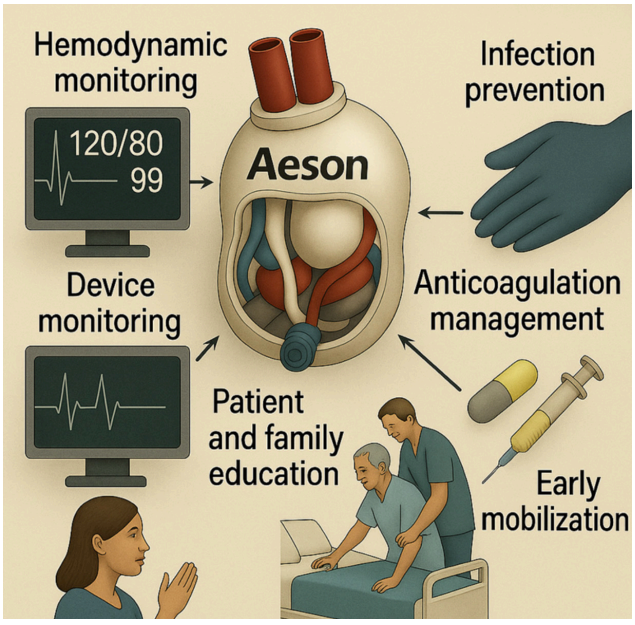

Figure 1. Nursing management of the patient with Aeson TAH - Nursing care priorities in the postoperative management of a patient with the Aeson TAH. The infographic highlights six essential nursing interventions: hemodynamic monitoring, device monitoring, anticoagulation management, infection prevention, patient and family education and early mobilization.

pressure injuries, and muscle deconditioning. Evidence supports that early mobilization in critically ill patients contributes to improved functional outcomes and reduced ICU-related morbidity.[12]

Discussion

The Aeson TAH distinguishes itself from other devices through its use of biocompatible bovine pericardium for internal surfaces and its physiological pulsatile flow. Nursing care is central to ensuring the success of TAH therapy not only through technical monitoring but also through holistic care addressing emotional, functional, and educational needs.[9]

Evidence supports the role of specialized nursing care in reducing hospital readmissions, promoting early complication detection, and improving long-term outcomes in patients with advanced HF and TAH support.[8,9,12] Primary nursing principles were applied to ensure continuity and individualized care planning throughout the patient's hospitalization.[13]

Nursing surveillance was essential to detect early signs of renal dysfunction, which may result from impaired renal perfusion or hemolysis, and to adapt fluid management accordingly.[8,14,15]

Nutritional assessment and psychological support were also essential, especially during the transition to less ICU.[16,17] At discharge, the patient was clinically stable and awaiting inclusion on the cardiac transplant list, under close follow-up by the heart failure team.

Conclusion

This case demonstrates the pivotal role of nurses in managing patients with Aeson TAH systems. Their responsibilities range from vigilant monitoring and infection control to detailed patient education and emotional support. TAH therapy is a complex, multidisciplinary process, but nursing care remains the linchpin to successful recovery and preparation for heart transplantation.

References

1. Esper SA, Subramaniam K. Heart failure and mechanical circulatory support. *Best Pract Res Clin Anaesthesiol.* 2012;26(2):91-104. doi: https://doi.org/10.1016/j.bpa.2012.03.003
2. Zhou AL, Etchill EW, Giuliano KA, et al. Bridge to transplantation from mechanical circulatory support: a narrative review. J Thorac Dis. 2021;13(12):6911-6923. doi: https://doi.org/10.21037/jtd-21-832
3. Martin AC, Moussa MD, Panholzer B, et al. Initial Experience With Aeson Total Artificial Heart in Cardiogenic Shock Patients on Extracorporeal Life Support. *JACC Heart Fail.* doi: https://doi.org/10.1016/j.jchf.2025.01.023
4. Mohacsi P, Leprince P. The CARMAT total artificial heart. *Eur J Cardiothorac Surg*. 2014;46(6):933-934. doi: https://doi.org/10.1093/ejcts/ezu333
5. Henn MC, Mokadam NA. Total artificial heart as a bridge to transplantation. *Curr Opin Organ Transplant.* 2022;27(3):222-228. doi: https://doi.org/10.1097/MOT.0000000000000982
6. Gagnier JJ, Kienle G, Altman DG, et al. The CARE guidelines: consensus-based clinical case reporting guideline development. *Headache*. 2013;53(10):1541-1547. doi: https://doi.org/10.1111/head.12246
7. Schroder JN, McCartney SL, Jansen P, et al. The First Autoregulated Total Artificial Heart Implant in the United States. *Ann Thorac Surg Short Rep.* 2022;1(1):185-187. doi: https://doi.org/10.1016/j.atssr.2022.09.007
8. Arabia FA, Copeland JG, Pavie A, Smith RG. Implantation technique for the CardioWest total artificial heart. *Ann Thorac Surg.* 1999;68(2):698-704. doi: https://doi.org/10.1016/s0003-4975(99)00540-8
9. Hravnak M, George E. Nursing considerations for the patient with a total artificial heart. *Crit Care Nurs Clin North Am*. 1989;1(3):495-513.
10. Pasha AK, Lee JZ, Desai H, Hashemzadeh M, Movahed MR. In-hospital complications associated with total artificial heart implantation in the United States between 2004 to 2011. *Am J Cardiovasc Dis.* 2022;12(5):278-282.
11. Östman M, Bäck-Pettersson S, Sundler AJ, Sandvik AH. Nurses' experiences of continuity of care for patients with heart failure: A thematic analysis. *J Clin Nurs.* 2021;30(1-2):276-286. doi: https://doi.org/10.1111/jocn.15547
12. Schweickert WD, Pohlman MC, Pohlman AS, et al. Early physical and occupational therapy in mechanically ventilated, critically ill patients: a randomised controlled trial. *Lancet.* 2009;373(9678):1874-1882. doi: https://doi.org/10.1016/S0140-6736(09)60658-9
13. McDonagh TA, Metra M, Adamo M, et al. 2023 Focused Update of the 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure. *Eur Heart J.* 2023;44(37):3627-3639. doi: https://doi.org/10.1093/eurheartj/ehad195
14. Savarese G, Lund LH, Dahlström U, Strömberg A. Nurse-Led Heart Failure Clinics Are Associated With Reduced Mortality but Not Heart Failure Hospitalization. *J Am Heart Assoc.* 2019;8(10):e011737. doi: https://doi.org/10.1161/JAHA.118.011737
15. Brisco MA, Testani JM, Cook JL. Renal dysfunction and chronic mechanical circulatory support: from patient selection to long-term management and prognosis. *Curr Opin Cardiol.* 2016;31(3):277-286. doi: https://doi.org/10.1097/HCO.0000000000000278
16. Sze S, Pellicori P, Kazmi S, et al. Prevalence and Prognostic Significance of Malnutrition Using 3 Scoring Systems Among Outpatients With Heart Failure: A Comparison With Body Mass Index. *JACC Heart Fail.* 2018;6(6):476-486. doi: https://doi.org/10.1016/j.jchf.2018.02.018
17. Heidenreich PA, Bozkurt B, Aguilar D, et al. 2022 AHA/ACC/HFSA Guideline for the Management of Heart Failure: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. *Circulation*. 2022 May 3;145(18):e1033. doi: doi: https://doi.org/10.1161/CIR.0000000000001063

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Review

The Professional Values of Nursing Students: a Systematic Review

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Abstract

Introduction. Professional values play a crucial role in nursing practice, as they influence nurese' care quality and ethical decisions. In an evolving educational and healthcare context, it is essential for students to develop and integrate the professional values necessary to effectively address future challenges. This systematic review aims to identify the professional values declared by nursing students during their academic journey.

Methods. A comprehensive literature search was carried out for primay quantitative studies published until december 2024 in the databases PubMed/Medline, Embase, CINAHL, Scopus, and yielded 21,071 records. After screening, 29 relevant studies were included in this review. The process of screening, selection and inclusion of articles was reported using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). A systematic review was conducted following the JBI Manual for Evidence Synthesis. Methodological quality assessment and methodological quality of the included articles were evaluated.

Results. The 29 included studies, comprising 3 cohort studies and 26 cross-sectional studies, reported a low methodological quality assessment, ensuring high reliability of the results. The most frequently cited value was Caring, while Activism and Altruism were also important values for students. Additionally, specific studies highlighted values such as the Principle of Work, respect for Human Dignity, Ethical and Moral aspects,

as well as Nursing Professionalism.
Discussion. The review provided insight into the fundamental values that define nursing students. Furthermore, it enabled an understanding of the multiple variables that shape professional values, highlighting key factors such as academic education and cultural context. These findings offer a foundation for further exploration of the elements that directly influence the development of professional values.

Keyword: Nursing Student, Professional Values, Education, Systematic Review, Professional Identity

Introduction

The contemporary era of increasing globalization, diversity, and healthcare disparities, combined with the persistent emergence of ethical dilemmas in health, poses significant challenges to professional values.[1] The evolution of healthcare systems and the necessity to ensure safe and high-quality care have underscored the importance of value-driven decision-making,[1] alongside the effort to maintain a strong professional identity.[2,3] Consequently, defining the values associated with nursing practice has become more essential than ever.[1]

Nurses currently make up the largest proportion of the workforce in healthcare organizations,[4] and the growing complexity of their professional decisions and practices can lead to multifaceted ethical dilemmas and concerns.[1,5] In the healthcare field, professional values act as ethical guidelines and standards of conduct, directing the assessment of nurses' actions and practices.[6] As early as the 19th century, Florence Nightingale argued that nursing should not only be grounded in scientific knowledge and technical expertise but should also be established on personal values.[7] Modern literature reinforces this perspective, emphasizing that values provide essential guidance for action, shaping the sustainability and long-term development of care. These values are the foundation of decision-making in nurses' practical activities.[8]

Professional values are shaped by personal preferences cultivated through growth and experience, strongly influenced by factors such as culture, environment, education, and prior experiences.[9] In essence, they reflect an individual's beliefs and attitudes about a specific purpose, object, or behavior.[10] Before becoming fully-fledged professionals, nursing students are introduced to the field during clinical internships. At this stage, personal values may already align with professional values, influencing students' career choices.[11] The greater the alignment between personal and professional values, the more likely students are to exhibit ethical behaviour and make responsible professional decisions.[12]

The promotion of professional values is a continuous process, beginning when students enter nursing programs and extending throughout their professional careers.[13] Although students enter university with their individual values,[14] they develop a professional identity by adopting and internalizing the values of the groups they become part of.[15] The pre-graduation experiences students encounter, combined with the guidance of educators, play a crucial role in equipping them with the knowledge and skills needed. These experiences are vital for transforming personal values into professional ones, ultimately defining their practice.[16]

Simultaneously, educational contexts and healthcare systems are increasingly shaped by demands for flexibility and efficiency, adhering to cost-effectiveness frameworks designed to maximize outcomes with minimal resource expenditure. Nursing education has been significantly influenced by these trends, with healthcare institutions placing a growing emphasis on selecting students and future professionals with exceptional competencies, often assessed in terms of efficiency rather than efficacy or quality.[17]

Over time, primary studies exploring nursing students' professional values have expanded in literature. Although several primary studies have investigated nursing students' professional

values, no systematic synthesis has yet compared the explicitly declared values during academic education. The recent scoping review by Li et al. (2022) clarified the concept and influencing factors, but did not analyze empirical data on declared values or the tools used for their measurement.[18]

This systematic review aims to synthesize the professional values declared by nursing students during their academic education, as reported in primary quantitative studies. A secondary objective is to identify and describe the measurement instruments used to assess these values.

Methods

Study Design and Protocol Registration

This systematic review was conducted following the guidelines outlined in the JBI Manual for Evidence Synthesis.[19] Consistent with it, the review adhered to the PRISMA ScR Checklist reporting system for its development.[20] The protocol for this systematic review was prospectively registered in the Prospective Register of Systematic Reviews (PROSPERO) (Approval was confirmed on March 16, 2024, under the registration number CRD42024520854.).

Research Question

To identify relevant studies, the research question was structured using the participants (P), concept (C), and context (C) (PCC) framework.[21] In line with this approach, the review includes three main aspects: P= nursing students; C= primarily identifying professional values, and secondarily, the scales used to measure them; C= educational environment.

Search Strategy

The search was conducted in December 2024 across multiple databases: PubMed, Embase, CINAHL, and Scopus. No temporal filters were applied (Table 1). The selection and inclusion process of the articles was carried out using the preferred reporting items for Systematic Reviews and Meta-Analyses. Four review authors (JA and DA) (AV and AV). Independently screened all titles and abstracts identified by electronic database searches and excluded duplicates and irrelevant records using Rayyan software (https://www.rayyan.ai/). The conflicts were resolved by involving a fifth review author (SC). We then obtained full-text articles for the remaining studies, which were independently evaluated for inclusion by four review authors (JA and DA) (AV and AV) using the eligibility criteria described above. Disagreements were resolved by consensus meetings, with arbitration

Table 1. Search strategy

Database	Search strategy
PubMed	((Nursing Students[Title]) OR ("Students, Nursing"[Mesh])) AND ("Professionalism"[Mesh] OR "Ethics, Nursing"[Mesh] OR "Professional values" OR "Professional nursing values" OR "Values" OR "Shared Governance, Nursing"[Mesh] OR "Nursing values")
CINAHL	TI ("Nursing Students") OR (MM "Students, Nursing") AND ((MM "Professionalism") OR (MM "Ethics, Nursing") OR "Professional values" OR "Professional nursing values" OR "Nursing values"))
Embase	Title, Abstract or Author Keywords: ('nursing student') AND ('professionalism' OR 'nursing ethics' OR 'professional values' OR 'professional nursing values' OR 'values' OR 'nursing values')
Scopus	Article title, Abstract, Keywords: ("Nursing students") AND ("Professionalism" OR "Ethics Nursing" OR "Professional Values" OR "Professional Nursing Values" OR "Values" OR "Nursing Values")

provided by a third review author (SC), who had not initially reviewed the article.

Inclusion and exclusion criteria

The selection of studies was carried out based on several inclusion criteria. Studies were required to address the research question, focus on the education setting, and include primary literature. Only quantitative studies with nursing students were included, regardless of the year of the course, gender and age. Documents written in languages other than English were also considered, with no geographical limitations. The exclusion criteria ruled out any studies that did not address the research question, qualitative studies, and validation studies of tools no presenting the survey results.

Methodological quality assessment of studies

The methodological quality of the included studies was independently assessed by four reviewers (JA and DA; AV and AV). For observational studies, the Joanna Briggs Institute (JBI) Critical Appraisal Checklist for Analytical Cross-Sectional Studies was used. Any disagreements were resolved by a third, impartial reviewer (SC).

Each study was rated according to the following thresholds: high quality if more than 70% of items were marked "yes"; moderate quality if between 50% and 70%; and low quality if less than 50% of items were marked "yes".[22]

The quality appraisal was used for descriptive purposes only and did not influence study inclusion or the synthesis of results.

Data extraction and synthesis

The data extracted included key study characteristics including authors, publication year, country, sample size, and tools employed with their validation studies was systematically collected and synthesized (see Table 2), The synthesis was conducted using a narrative approach, complemented by tabular summaries to provide a comprehensive overview of the findings.

Results

Literature Screening

A total of 21,071 records were identified through database searches: 1,588 from PubMed-Medline, 4,201 from Scopus, 158 from Embase, and 15,124 from CINAHL. After the screening process, 1,171 duplicate documents were removed. A total of 42 potentially relevant documents were identified. Following the review of titles and abstracts, 13 documents were excluded as they were either not relevant to the topic or unsuitable for the type of study conducted. Specifically, some studies focused solely on validating the considered scale without providing useful data regarding professional values.[23-26] Others investigated the self-concept of students, explored personal values and sociodemographic aspects.[27,28] Additionally, a study emphasized ethical values rather than professional ones, while further one concentrated exclusively on the value of altruism.[29,30] Finally, some studies included nurses who had already completed their training in the study sample.[5,26,31-33] At the end of the selection process, [29] relevant studies were included in this review (Appendix 1).

Characteristics of the studies

The characteristics of the included studies are summarized in Table 2. Most studies were conducted in Asia (51.7%), with significant contributions from countries such as South Korea,[29,34,35] Taiwan,[23,36] Turkey,[37-39] Jordan,[40,41] and Iran.[42,43] The higher portion of the studies (20.7%) were conducted in North America, particularly in the United States, where some authors conducted important studies,[44-47] followed by Europe (17.2%), with Spain,[39,48] Italy,[10,49] and Ireland50. Finally, 10.4% of the studies were distributed across Africa and South America, with contributions from South Africa,[51] Brazil,[26] and Colombia.[52] Most studies (92%) adopted a cohort study design, such as those by Ibrahimoglu et al. in Turkey and Arries in Canada.[53,54] Only a minority (8%) relied on cross-sectional studies, such as those conducted by Alfred et al. and Green.[55,56] All studies reported a low mentmethodological quality assessment, ensuring high reliability of the results.

The analyzed studies employed a variety of validated scales to assess professional nursing values and related constructs, reflecting the diversity in methodological approaches. Among the most used instruments were the Nursing Professional Values Scale (NPVS) developed by Weis and Schank (2000), its revised versions NPVS-R (2009) and NPVS-3 (2017), and other region-specific tools such as the Ethical Values Scale and the Salford-Scott Nursing Values Questionnaire (1959).[17,31,32.57,58] These tools ensured consistent and reliable measurements across different cultural and professional

Table 2. Characteristics of the studies included.

Author, Year and Context	Study Design	Method. quality assessment	Scale	Original Validation
Martin et al., 2003 in USA	Cohort study	Low	Nursing professional Values Scale (NPVS)	Weis and Schank (2000)
Leners et al., 2006 in USA	Cohort study	Low		
Kaya et al., 2017 in Turkey	Cross sectional study	Low		
Ibrahimoglu et al., 2020 in Turkey	Cohort study	Low		
Lin et al., 2010 in Taiwan	Cohort study	Low	Nursing professional Values Scale Revised (NPVS-R)	Weis and Schank (2009)
Alfred et al., 2013 in Taiwan and USA	Cross sectional study	Low		
Moon et al., 2014 in South Korea	Cohort study	Low		
Lin et al., 2016 in Taiwan and China	Cohort study	Low		
Donmez and Ozsoy, 2016 in Turkey	Cohort study	Low		
Kargar et al., 2017 in Iran	Cohort study	Low		
Posluszny and Hawley, 2017 in USA	Cohort study	Low		
Rose et al., 2018 in USA	Cohort study	Low		
Poorchangizi et al. 2019 in Iran	Cohort study	Low		
Arries, 2020 in Canada	Cohort study	Low		
Bleda et al., 2020 in Spain	Cohort study	Low		
Green, 2020 in Israel	Cross sectional study	Low		
Nocerino et al.,2020 in Italy	Cohort study	Low		
Paşalak et al., 2021 in Turkey; Spain; Tanzania	Cohort study	Low		
Allari et al., 2022 in Jordan	Cohort study	Low		
Bimray et al., 2023 in South Africa and Cape Town	Cohort study	Low		
Dellafiore et al., 2021 in Italy	Cohort study	Low	Nursing Professional Value Scale-3 (NPVS-3)	Weis and Schank (2017)
Subih et al., 2021 in Jordan	Cohort study	Low		
Poreddi et al., 2022 in India	Cohort study	Low		
Rached et al., 2023 in Brasil	Cohort study	Low		
Bang et al., 2011 in South Korea	Cohort study	Low	Nursing Professional Values Scale (NPVS)	Yeun et al. (2005)
Durán, 2014 in Colombia	Cohort study	Low	Los valores éticos en adolescentes mexicanos	Medina and Luis (2003)
Koo, 2016 in South Korea	Cohort study	Low	The ethical values scale	Choi (1990)
Rassin, 2010 in Israel	Cohort study	Low	Professional Values	Michal Rassin (2010)
Timmins et al., 2018 in Republic of Ireland	Cohort study	Low	Salford-Scott Nursing Values Questionnaire (1959)	(Robinson et al. 1991; Johnson, Haigh,Yaters-Bolton (2007)

contexts.

Methodological quality assessment and certainty of the evidence of the included studies

Among the included studies were rated as low quality according to the JBI checklist. All included studies demonstrated acceptable methodological quality. For cohort studies (see Table 2), quality scores ranged from 9.1% to 100%, with all three included studies achieving the maximum score of 100%, indicating a high level of methodological rigor.[37,53,56]

Regarding the cross-sectional studies (Table 3), quality scores ranged from 12.5% to 100%, with classification into three categories: high quality (≥ 62.5%), medium quality (37.5%–50%), and low quality (≤ 37.5%). All selected cross-sectional studies were evaluated as high quality. Among them, six studies achieved a score of 87.5%,[10,26,36,51,56,59] while five studies scored 75%.[23,39,41,53,54] This indicates that, despite some variations in scores, the studies demonstrated a high methodological standard. Other studies included in the review were evaluated as follows: Martin,[44] Johnson,[30] and Koo[29] showed clearly defined sample inclusion criteria, while Donmez[38] and Posluszny[46] achieved similar scores in other quality categories. Studies such as Poorchangizi et al. and Kargar Jahromi et al ensured the validity and reliability of outcome measurements,[42,43] whereas Bleda,[48] and Allari,[40] effectively addressed confounding factors. Moon et al.,[34] Rose,[47] and Nocerino[49] employed appropriate statistical analyses; lastly Michal Rassin[60] and Durán Parra[52] demonstrated accurate outcome measurement.

Professional values

Table 3 summarizes the key professional values identified in studies conducted on nursing students in various countries, organized by the survey instrument used and the sample size. These studies provide an overview of the values that nursing students consider essential for their future profession.

The value of Caring emerges as the most frequently reported by nursing students across the analyzed studies. Caring was highlighted in diverse cultural contexts, including the United States,[45] Turkey[38] and Iran[43]. Trust is the second most recurrent value and was particularly emphasized in studies conducted in the United States and Italy.[46,49] The value of Human Dignity received significant attention in Turkey and Israel.[53,56] The value of Justice, with a specific focus on confidentiality and public safety, was demonstrated in studies from Iran and Jordan.[40,42] Activism and Altruism were highlighted in Italy by Dellafiore and in Canada by Arries, respectively.[10,54] Other studies identified Altruism, Nursing Professionalism, Obedience to Authority, Truth, and the Principle of Duty as key values.[50] A study conducted in Korea analyzed three different cohorts of nursing students (1988, 2007, and 2015), confirming the Principle of Duty as the most frequently stated value, and emphasizing the importance of providing immediate assistance to those in need.[29] Another Korean study emphasized the value of Nursing Professionalism, identifying new domains such as the "Professional Self-Concept" and "Nursing Originality".[35]

Some researchers went beyond analyzing the most frequently declared value by nursing students and delved deeper into the topic by exploring commonalities, differences, and similarities across cultures, comparing samples from different countries. For instance, Alfred et al. identified two distinct values among American and Taiwanese students: Trust and Caring, respectively.[55] Comparisons were also made among nursing students across different academic years. Bleda, Alvarez and Plat investigated students in all four academic years using the Kruskal-Wallis test, revealing a statistically significant relationship between the total scale score and the academic year. Specifically, as students advanced in their academic years, their average scores increased.[48] Another type of in-depth analysis was performed in two studies by evaluating nursing students in their fourth year of training compared to those in their second year.[44,56]

Martin, Yarbrough and Alfred[45] demonstrated that fourth-year nursing students scored higher on 5, out of 11 values on the NPVS scale by Weis & Schank (2000).[31] Green conducted a comparison among three different levels within a Bachelor of Science in Nursing program.[56] The Novice group had received only theoretical preparation, the Advanced group had basic practical training, and the Senior group had advanced practical training. Statistically significant differences emerged for three values—Caring, Activism, and Justice on the NPVS-R scale by Weis and Schank (2009),[32] with the Advanced group achieving the highest scores. Kaya et al. followed the same cohort of students over four years to investigate professional values

Table 3. The professional values that emerged most.

Author(s)/year	Sample Size	Tool used to assess professional values	Emergent value
Bimray et al., 2023	245	NPVS-R	Trust
Rached et al., 2023	337	NPVS-3	Caring
Allari et al., 2022	182	NPVS-R	Justice
Poreddi et al., 2022	273	NPVS-3	Caring
Dellafiore et al., 2021	135	I-NPVS-3	Activism
Pasalak et al., 2021	305	NPVS-R	Caring
Subih et al., 2021	324	NPVS-3	Caring
Arries, 2020	89	NPVS-R	Altruism
Bleda et al., 2020	315	EVPS (NPVS-R)	Ethical dimension (Caring)
Green, (2020)	261	NPVS-R	Human Dignity
Ibrahimoglu et al., 2020	290	NPVS	Human Dignity
Nocerino et al., 2020	115	NPVS-R	Trust
Poorchangizi et al., 2019	100	NPVS-R	Caring
Rose et al., 2018	106	NPVS-R	Justice
Timmins et al., 2018	158	Salford-Scott Nursing Values questionnaire	Altruism
Kargar et al., 2017	120	NPVS-R	Justice
Kaya et al., 2017	123	NPVS	Human Dignity
Posluszny and Hawley, 2017	136	NPVS-R	Trust
Donmez and Ozsoy, 2016	416	NPVS-R	Caring
Koo, 2016	192	The ethical values scale	Principle of Duty
Lin et al., 2016	946	NPVS-R	Caring
Durán, 2014	162	Los valores éticos en adolescentes mexicanos	Etico - Morale
Moon et al., 2014	1024	NPVS-R	Human Dignity
Alfred et al., 2013	Taiwan: 94; USA:168	NPVS-R	Taiwan: Caring; USA: Trust
Bang et al., 2011	526	NPVS	Nursing Professionalism
Lin et al., 2010	94	NPVS-R	Caring
Rassin et al., 2010	180	Professional Values	Human Dignity
Leners et al., 2006	159 (pretest) 28 (postest)	NPVS	Caring
Martin et al., 2003	1450	NPVS	Caring

Legend. Emergent Value: Primary value highlighted; NPVS-R= Nursing Professional Value Scale-Revised; NPVS-3= Nursing Professional Value Scale, I-NPVS-3= Italian Nursing professional Values-3, EPVS= Escala de Valores Profesionales de Enfermería, NPVS=Nursing Professional Values Scale

in relation to their development. Human Dignity consistently ranked first throughout the study, though its percentage varied over time.[37] Lastly, to evaluate the academic impact on students, Lin et al. used the NPVS-R tool and observed a statistically significant increase in the total score from the pre-test to the post-test.[23]

Discussion

This systematic review has investigated the professional values of undergraduate nursing students, encompassing a wide array of cultural contexts. The internalization of a professional identity rooted in nursing's core values is essential for students, as it directly impacts the quality of care and the profession's development. Nursing professional values form the cornerstone of the profession, playing a critical role in shaping attitudes, beliefs, and the interactions between individuals and healthcare professionals. High levels of professional values enhance nursing care quality, improving satisfaction among nurses and patients alike. The educational journey and training process are pivotal in instilling these values in future generations of nurses. While professional values and their adoption in students' lives as future professionals can be considered integral to nursing education,[61] a personal contribution from the student and their environment also remains vital to achieving full professional development. This personal contribution includes not only professional values but also elements such as individual beliefs, past experiences, workplace environments, and worldviews.[62]

To better understand not only the nature of professional values but also their antecedents, it is essential to investigate external correlations. Among these, the role of education emerges as particularly influential. Kantek, Kaya, Gezer[8] emphasize that nursing professional values are significantly shaped by both theoretical education and the clinical environment during internships. The studies by Lin et al.[23] and Rose[47] clearly highlight that the university experience profoundly impacts the development of professional values in students, even though it is not the sole contributing factor. Lin et al.[23] underscored the critical role of nursing educators in fostering the development of students' professional values over the course of their academic training. Their findings indicated an increase in average scores as academic years progressed. Educators are tasked with guiding students in transforming into professionals, enabling them to integrate personal values into their professional framework.

Another significant correlation concerns the sociocultural influence of the environment on professional values. The study by Alfred et al.,[55] comparing contexts such as the United States and Taiwan, revealed that nurse students trained in countries with differing cultural perspectives share fundamental values but differ in the priority they assign to these values. Shaw & Degazon propose using common foundational values as a basis for fostering a more globalized approach to professional values.[63] At the same time, increasing cultural understanding is crucial to bridging differences and fostering growth through mutual learning.[64] Regardless of culture or educational background, in all healthcare settings, nurses operate within relational contexts, embodying values that underpin their moral and ethical responsibilities to patients, communities, their profession, employers, and themselves.

Implications for Practice

Implications for practice can be identified in the areas of nursing research, clinical practice, education, and management. Nurse researchers should focus on the development and testing of a theory of professional nursing values and on understanding common nursing values within a global healthcare context. Professional values should be articulated to unify the profession and demonstrate the value of nursing to society. Value theory should be integrated into both undergraduate and postgraduate education, as well as into nursing practice. A deeper understanding of values is essential to strengthen professional identity and ensure the provision of high-quality services to citizens. The organizational environment should foster discussions on professional values aligned with corporate values, with the aim of strengthening the sense of belonging and achieving high standards of care quality.

Limitations of the study

The strengths of this systematic review lie in the rigorous methodological framework adopted, in accordance with international guidelines for systematic reviews. This approach enabled an in-depth analysis of professional values in nursing students, considering multiple

cultural and educational contexts. The synthesis of data from numerous studies provides a global perspective on the development and integration of professional values in nursing education. Furthermore, all included studies demonstrated a low methodological quality assessment, as assessed through standardized methodological quality appraisal tools. This enhances the reliability and validity of the synthesized findings. The systematic application of transparent and replicable methods strengthens the credibility of the review, supporting its contribution to evidence-based educational strategies in nursing.

Some limitations should be acknowledged. Most of the studies included in this review used a cross-sectional design that does not allow for establishing causal relationships between values and the identified factors. In other words, it is not possible to conclusively determine whether the years of training, context, or instructors directly influence the value identity of students. Moreover, despite data was collected anonymously in all included studies, nursing students are subject to social desirability bias in self-assessment of values, reflecting the possible social expectations placed on students and the nursing profession.[65] Additionally, although the studies show a broad geographical variety, it is not possible to definitively state the uniqueness of professional values in any given setting. Finally, the variety of instruments used in the included studies could be a factor impacting the results.

Conclusion

The systematic review on the professional values of nursing students has provided an overview of the core principles declared by future healthcare professionals, in different cultural contexts. This knowledge is crucial to understand which values should guide their professional approach once they join the healthcare system. As the future leaders of the nursing care process, it is essential that they have a clear understanding of the professional values that must define their practice. These values are closely linked to the quality of care they will provide to patients. Their importance lies in the fact that they determine the ethical and human approach toward patients, influencing the effectiveness of care and patient satisfaction. High professional values can contribute to improving the quality of nursing care, with positive effects on the satisfaction of both nurses and patients.

This review offers a sort of "snapshot" of the nursing profession in its current state, providing a baseline from which to study the evolution and changes that may occur in the future. Monitoring such changes over time can be useful in understanding how professional values adapt to new contexts and challenges in the healthcare field.

A strong need has emerged to continue investing in education, highlighting the importance of educational programs not only transmitting technical knowledge but also promoting the development of ethical and human values, which are essential for the nursing profession. In conclusion, the review suggests that the active involvement of students in their professional preparation, with particular attention to the development of values, can help improve the quality of nursing care by forming more conscious professionals. It is necessary for future professionals, to precisely understand what guides their actions since their student' years, to optimize it in line with the needs of patients, always keeping their centrality in care.

References

1. Weis D, Schank MJ. Development and psychometric evaluation of the nurses professional values scale-3. *J Nurs Meas.* 2017;25(3):400e410. https://doi.org/10.1891/1061-3749.25.3.400.
2. Rocco G, Affonso DD, Mayberry LJ, Stievano A, Alvaro R, Sabatino L. The evolution of professional nursing culture in Italy: Metaphors and paradoxes. *Global Qualitative Nursing Research.* 2014;1:2333393614549372. https://doi.org/10.1177/2333393614549372.
3. Salmond SW, Echevarria M. Healthcare transformation and changing roles for nursing. *Orthopedic Nursing.* 2017;36(1):12–25. https://doi.org/10.1097/NOR.0000000000000308.
4. Sonderegger S, Bennett S, Sriram V, Lalani U, Hariyani S, Roberton T. Visualizing the drivers of an effective health workforce: a detailed, interactive logic model. *Hum Resour.* 2021;19(32). https://doi.org/10.1186/s12960-021-00570-7.
5. Asiandi A, Erlina M, Lin Y-H, Huang M-C. Psychometric evaluation of the nurses professional values scale-3: Indonesian version. *Int J Env Res Public Health.* 2021;18(16):8810e8813. https://doi.org/10.3390/ijerph18168810
6. Alsufyani AM, Aboshaiqah AE, Alshehri FA, Alsufyani YM. Nurses' professional values scale–three: Validation and psychometric appraisal among Saudi undergraduate student nurses. *J Taibah Univ Med Sc.* 2022;17(5):737e746. https://doi.org/10.1016/j.jtumed.2022.04.001
7. Rassin M. Nurses' professional and personal values. *Nurs Ethics.* 2008;15:614–630. https://doi.org/10.1177/0969733008092870
8. Kantek F, Kaya A, Gezer N. The effects of nursing education on professional values: A longitudinal study. *Nurse Education Today.* 2017;58:43–46. https://doi.org/10.1016/j.nedt.2017.08.004.
9. Sibandze BT, Scafide KN. Among nurses, how does education level impact professional values? A systematic review. *International Nursing Review.* 2018;65(1):65–77. https://doi.org/10.1111/inr.12390
10. Dellafiore F, Grugnetti AM, Caruso R, Prinzivalli G, Luca M, Grugnetti G, Belloni S, Magon A, Arrigoni C. "Nurses professional values scale-three": A validation study among Italian nurses and nursing students. Journal of Nursing Measurement. 2020;*Online ahead of print.* https://doi.org/10.1891/JNM-D-20-00030.
11. Ulusoy H, Guler G, Yildirim G, Demir E. Reliability and validity of the Salford Scott Nursing Values Questionnaire in Turkish. *Nurs Ethics.* 2018;25(1):80–91. https://doi.org/10.1177/0969733016642626.
12. Aydın GÖ, Turan N, Irmak AY, Çelikkalp Ü, Aygün A, Çakır Z. Nursing students' individual values, inclination to ethical and professional values. *Perspect Psychiatr Care.* 2022;58:850–860. https://doi.org/10.1111/ppc.12863
13. Bijani M, Tehranineshat B, Torabizadeh C. Nurses', nursing students', and nursing instructors' perceptions of professional values: a comparative study. *Nurs Ethics.* 2019;26(3):870–83. https://doi.org/10.1177/0969733017727153
14. Schmidt BJ, McArthur EC. Professional nursing values: a concept analysis. *Nurs Forum.* 2018;53(1):69–75. https://doi.org/10.1111/nuf.12211.
15. İlaslan E, Geçkil E, Kol E, Erkul M. Examination of the professional values of the nurses and the associated factors. *Perspect Psychiatr Care.* 2021;57:56–65. https://doi.org/10.1111/ppc.12524.
16. Altiok H, Ustun B. Professionalism: Concept analysis. *Dokuz Eylul University School of Nursing Electronic Journal.* 2022;7(2):151–155.
17. Yoder-Wise, P. S. Building the Future of Learning in Nursing. *Journal of Continuing Education in Nursing.* 2021; 52(5), 207. https://doi.org/10.3928/00220124-20210414-01
18. Li J, Chen H, Li X. Professional values of nursing students: A scoping review. *Chin J Nurs Educ.* 2022;19(10):955–960. https://doi.org/10.3761/j.issn.1672-9234.2022.10.017
19. Aromataris E, Munn Z, editors. *JBI Reviewer's Manual.* JBI, 2020. Available from: https://reviewersmanual.joannabriggs.org/. https://doi.org/10.46658/JBIRM-19-01.
20. Maraolo AE. Una bussola per le revisioni sistematiche: la versione italiana della nuova edizione del PRISMA statement. *BMJ.* 2021;372:n71.
21. Aromataris E, Lockwood C, Porritt K, Pilla B, Jordan Z, editors. *JBI Manual for Evidence Synthesis. JBI*; 2024. Available from: https://synthesismanual.jbi.global. https://doi.org/10.46658/JBIMES-24-01.
22. Moola S, Munn Z, Tufanaru C, Aromataris E, Sears K, Sfetcu R, Currie M, Qureshi R, Mattis P, Lisy K, Mu P-F. Chapter 7: Systematic reviews of etiology and risk. In: Aromataris E, Munn Z, editors. *JBI Manual for Evidence Synthesis.* JBI; 2020. Available from: https://synthesismanual.jbi.global.
23. Lin YH, Wang LS, Yarbrough S, Alfred D, Martin P. Changes in Taiwanese nursing student values during the educational experience. *Nurs Ethics.* 2010;17(5):646–54.https://doi.org/10.1177/0969733010373011
24. Podgorica N, Shabani Z, Gjinaj V, Rached CDA, Crescente NY, Vieira GS. Validity and reliability of the Albanian version of the nursing professional values scale (NPVS-3). *Teaching and Learning in Nursing.* 2023;18(1):122–8. https://doi.org/10.1016/j.teln.2022.08.007
25. Alabdulaziz H, Cruz JP, Alasmee NA, Almazan JU. Psychometric analysis of the nurses' professional values scale-3 Arabic version among student nurses. *Int Nurs Rev.* 2021;1–8. https://doi.org/10.1111/inr.12677.
26. Rached CDA, Ferreira VCG, Santos JdN. Brazilian version of the Nursing Professional Values Scale (NPVS-3): Validity and reliability assessment. *J Nurs Meas.* 2022 Jun 3. https://doi.org/10.1891/JNM-2021-0032.

27. Çöplü M, Tekinsoy Kartın P. Professional self-concept and professional values of senior students of the nursing department. *Nurs Ethics.* 2019;26(5):1387–97. https://doi.org/10.1177/0969733018761171.
28. Rivas, R., Rivas, A., & Busos, M. Values expressed in students of nursing. Temuco - Chile, 2009. *Ciencia Y Enfermeria,* 17, 65–75. https://www.researchgate.net/publication/289564624_Values_expressed_in_students_of_nursing_Temuco_-_Chile_2009
29. Koo ONH. A study on the changes in ethical values of new nursing students. *Indian J Sci Technol.* 2016;9(39):1–6. https://doi.org/10.17485/ijst/2016/v9i39/103228.
30. Johnson M, Haigh C, Yates-Bolton N. Valuing of altruism and honesty in nursing students: a two-decade replication study. *J Adv Nurs.* 2007;57(4):366–374. https://doi.org/10.1111/j.1365-2648.2007.04119.x.
31. Weis D, Schank MJ. An instrument to measure professional nursing values. *J Nurs Scholarsh.* 2000;32(2):201–204. https://doi.org/10.1111/j.1547-5069.2000.00201.x.
32. Weis D, Schank MJ. Development and psychometric evaluation of the Nurses Professional Values Scale--Revised. *J Nurs Meas.* 2009;17(3):221–231. https://doi.org/10.1891/1061-3749.17.3.221.
33. Schmidt BJ, Mott J, Thompson AE, Henne T, Patterson M. Professional nursing values in men: An NPVS-R instrument validation study. *J Nurs Meas.* 2019;27(1):E48–E61. https://doi.org/10.1891/1061-3749.27.1.E48.
34. Moon S, Kim DH, Kim EJ, Kim YJ, Lee S. Evaluation of the validity and reliability of the Korean version of the Nursing Professional Values Scale-Revised. *Nurse Educ Today.* 2014;34(3):325–330. https://doi.org/10.1016/j.nedt.2013.06.014.
35. Bang KS, Kang JH, Jun MH, Kim HS, Son HM, Yu SJ, Kwon MK, Kim JS. Professional values in Korean undergraduate nursing student Ibrahimoglu s. *Nurse Educ Today.* 2011;31(1):72–75. https://doi.org/10.1016/j.nedt.2010.03.019.
36. Lin Y, Li J, Shieh S, Kao C, Lee I, Hung S. Comparison of professional values between nursing students in Taiwan and China. *Nurs Ethics.* 2016;23(2):223–230. https://doi.org/10.1177/0969733014561912
37. Kaya H, Işik B, Şenyuva E, Kaya N. Personal and professional values held by baccalaureate nursing students. *Nurs Ethics.* 2017 Sep;24(6):716–731. https://doi.org/10.1177/0969733015624488.
38. Donmez RO, Ozsoy S. Factors influencing development of professional values among nursing students. Pak *J Med Sci.* 2016;32(4):988–993. https://doi.org/10.12669/pjms.324.10616
39. Paşalak Şİ, Subaş F, Kaya N, Seven M. Professional values in a sample of nursing students from different countries. *Florence Nightingale J Nurs.* 2021;29(1):93–102. https://doi.org/10.5152/FNJN.2021.19200.
40. Allari RS, Abu-El-Noor NI, Abu-El-Noor MK. Professional values in nursing students in Jordan: baccalaureate nursing students' perception. *Front Nurs.* 2022;9(3):319–328. https://doi.org/10.2478/fon-2022-0041.
41. Subih M, Al Hadid L, Al Omari D, Albana H, Shahrour LA. Professional values development among Jordanian baccalaureate nursing students. *Nurs Educ Perspect.* 2021;42(6):E26. https://doi.org/10.1097/01.NEP.0000000000000867.
42. Kargar Jahromi M, Manesh E, Hejazi F, Moosavifard Z, Poorgholami F. Professional values of the nursing students' perspective in Jahrom University of Medical Sciences, 2017. *Bangladesh J Med Sci.* 2020;19:427–432. https://doi.org/10.3329/bjms.v19i3.45859.
43. Poorchangizi B, Borhani F, Abbaszadeh A, Mirzaee M, Farokhzadian J. The importance of professional values from nursing students' perspective. *BMC Nurs.* 2019;18:26. https://doi.org/10.1186/s12912-019-0351-1.
44. Martin P, Yarbrough S, Alfred D. Professional values held by baccalaureate and associate degree nursing students. *J Nurs Scholarsh.* 2003;35(3):291–296. https://doi.org/10.1111/j.1547-5069.2003.00291.x.
45. Leners DW, Roehrs C, Piccone AV. Tracking the development of professional values in undergraduate nursing students. *J Nurs Educ.* 2006;45:504–510. https://doi.org/10.3928/01484834-20061201-06
46. Posluszny L, Hawley D. Comparing professional values of sophomore and senior baccalaureate nursing students. *J Nurs Educ.* 2017;56:546–550. https://doi.org/10.3928/01484834-20170817-06.
47. Rose T, Nies MA, Reid J. The internalization of professional nursing values in baccalaureate nursing students. *J Prof Nurs.* 2018;34(1):25–30. https://doi.org/10.1016/j.profnurs.2017.06.004.
48. Bleda S, Alvarez I, Prat M. The perceptions of professional values among students at a Spanish nursing school. *Healthcare (Basel).* 2020 Mar 26;8(2):74. https://doi.org/10.3390/healthcare8020074.
49. Nocerino R, Chiarini M, Marina M. Nurse professional identity: Validation of the Italian version of the questionnaire Nurse Professional Values Scale-Revised. Clin Ter. 2020 Mar-Apr;171(2):e114–e119. https://doi.org/10.7417/CT.2020.2200.
50. Timmins F, King C, de Vries JM, Johnson M, Cullen JG, Haigh C. Altruism, honesty and religiosity in nursing students. J Clin Nurs. 2018;27(19–20):3687–3698. https://doi.org/10.1111/jocn.14374.
51. Bimray P, Chipps J, Ticha V. Professional values of undergraduate students at a nursing school in South Africa. *Nurs Res Pract.* 2023;2023:1. https://doi.org/10.1155/2023/9635033.
52. Durán Parra M. Valores en los estudiantes de enfermería de la Universidad de Santander. *Av Enferm [Internet].* 2014 [cited 2025 Jan]. https://repositorio.udes.edu.co/entities/publication/71363a1e-8383-4815-bc7d-70f76a60dd8e
53. Ibrahimoglu O, Mersin S, Kilic HS, Kahraman BB. Professional values of nursing students in Turkey. Int

J Caring Sci. 2020;13(2):878–884. https://avesis.bilecik.edu.tr/yayin/cdbb58fe-0b65-45ff-a8ce-22b6a193ab59/professional-values-of-nursing-students-in-turkey
54. Arries E. Professional values and ethical ideology: Perceptions of nursing students. *Nurs Ethics.* 2019;27:969–981. https://doi.org/10.1177/0969733019889396.
55. Alfred D, Yarbrough S, Martin P, Mink J, Lin YH, Wang LS. Comparison of professional values of Taiwanese and United States nursing students. *Nurs Ethics.* 2013 Dec;20(8):917–926. https://doi.org/10.1177/0969733013484486.
56. Green G. Examining professional values among nursing students during education: A comparative study. *Nurs Forum.* 2020 Nov;55(4):589–594. https://doi.org/10.1111/nuf.12474.
57. Choi YS. A study of the ethical values of Korean nurses. *J Korean Acad Nurs.* 1990;8(41):249–270.
58. Scott W. Empirical assessment of values and ideologies. *Am Sociol Rev.* 1959;24:299–310. https://doi.org/10.2307/2089378
59. Poreddi V, Reddy S, Birudu R. Comparison of professional values between sophomore and senior nursing students. *Nurs Educ Perspect.* 2022;43(6):E94–E96. https://doi.org/10.1097/01.NEP.0000000000000985.
60. Rassin MR. Values grading among nursing students – Differences between the ethnic groups. *Nurse Educ Today.* 2010;30(5):458–463. https://doi.org/10.1177/0969733008092870
61. Fischer N, Theis D. Extracurricular participation and the development of school attachment and learning goal orientation: The impact of school quality. *Dev Psychol.* 2014;50(6):1788–1793. https://doi.org/10.1037/a0036705.
62. Shafakhah M, Molazem Z, Khademi M, Sharif F. Facilitators and inhibitors in developing professional values in nursing students. *Nurs Ethics.* 2016;1(1–12). http://dx.doi.org/10.1177/0969733016664981.
63. Shaw HK, Degazon C. Integrating the core professional values of nursing: a profession, not just a career. *J Cult Divers.* 2008;15:44–50. https://pubmed.ncbi.nlm.nih.gov/19172979/
64. Snellman I, Gedda KM. The value ground of nursing. *Nurs Ethics.* 2012;19(6):714–726. https://doi.org/10.1177/0969733011420195
65. Gnambs T, Kaspar K. Socially desirable responding in web-based questionnaires: A meta-analytic review of the candor hypothesis. *Assessment.* 2017 Sep;24(6):746–762. https://doi.org/10.1177/1073191115624547.

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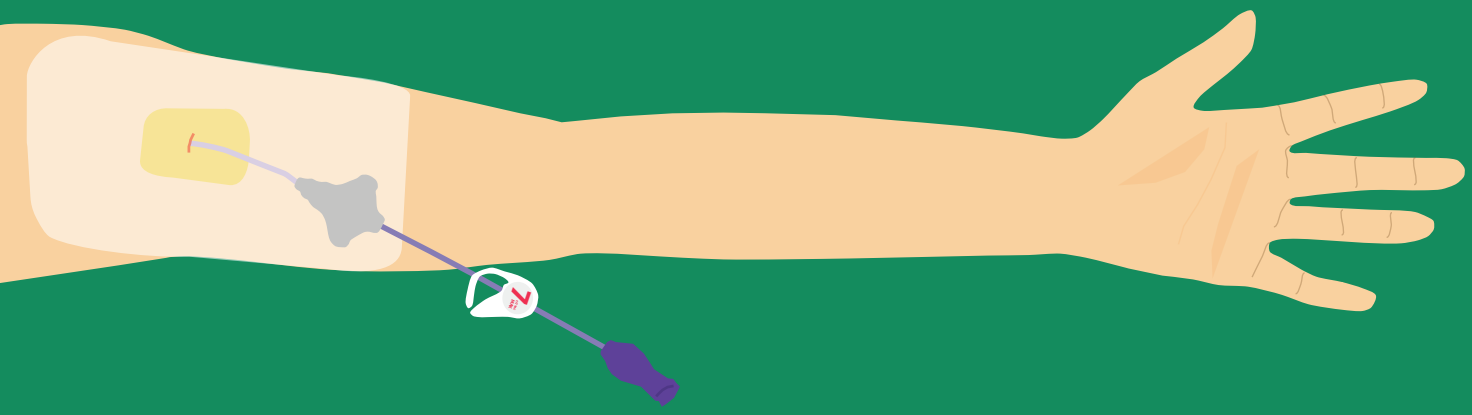

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