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Original research article

Determinants of nurses' distress during organ donation after circulatory death

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Abstract
Background: Organ donation after circulatory death (DCD) poses ethical, emotional, and procedural challenges for nurses at critical junctures of the donation pathway. Despite its growing adoption to address organ shortages, determinants of nurse distress in DCD remain underexplored – especially in Central Europe.
Aim: To quantify associations between nurse distress during key DCD phases and four factors: (1) perceived ethical dilemma, (2) level of personal participation, (3) perceived professional respect, and (4) cumulative DCD experience.
Methods: A cross sectional survey of Czech ICU nurses used a bespoke questionnaire to rate discomfort at twenty critical moments on a five point Likert scale. Associations between dichotomized distress (low vs. moderate-high) and each determinant were tested via Pearson's χ^2 or Fisher's exact test.
Results: Distress varied significantly with the type of ethical dilemma, notably during terminal extubation and agonal breathing. Full pathway participation correlated with lower distress in the no touch interval, whereas perceived respect showed no significant effect in decision making phases. Greater DCD experience was linked to reduced discomfort in technical and emotionally charged stages.
Conclusion: Ethical framing, procedural immersion, and hands on experience chiefly drive nurse distress in DCD; professional respect plays a lesser role. Ethics focused debriefings, immersive simulations, and targeted coping strategies may enhance nurse resilience and care quality.

Keywords: End-of-life care; Ethical dilemmas; Nurse distress; Organ donation after circulatory death; Psychological well-being

Introduction

Organ donation after circulatory death (DCD) has become a cornerstone strategy for mitigating the chronic shortfall of transplantable organs, yet the bedside choreography it demands remains ethically and emotionally intricate; especially for nurses who must reconcile end-of-life care with procurement-driven imperatives. Recent conceptual analyses emphasise how evolving procurement practices challenge long-standing interpretations of the dead-donor rule and intensify moral scrutiny in critical-care units (Clark, 2024; Thiessen et al., 2023).

Quantitative and qualitative evidence now indicates that nurses' moral distress spikes at several junctures of the controlled-DCD pathway, from terminal extubation through the mandated no-touch interval, leading to heightened risks of burnout and secondary traumatic stress (Silva et al., 2024; Victorino et al., 2025). Moral distress – first defined by Jameton as the psychological disequilibrium that arises when clinicians recognise the ethically appropriate action yet are constrained from carrying it out (Jameton, 2017) – differs from burnout or compassion fatigue in that it is rooted in perceived ethical compromise rather than workload alone and tends to accumulate over time as unresolved moral residue, thereby amplifying intent-to-leave and other adverse professional outcomes (Epstein and Hamric, 2009; Sedláček et al., 2025). Converging data further suggest that this distress is modulated by four inter-related determinants: the ethical frame through which clinicians interpret withdrawal of treatment, the depth of personal participation in the donation pathway, the extent to which nursing opinions are respected by physicians and coordinators, and cumulative hands-on experience with DCD cases (Boylan and Goff, 2024; Hossein et al., 2025; Peng et al., 2025; Silva E Silva et al., 2025). Clarifying the relative weight of these determinants is essential – not only for safeguarding staff well-being but also for sustaining programme quality at a time when national transplant authorities are accelerating the rollout of DCD protocols.

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This rapid diffusion of DCD can be viewed as a paradigmatic shift in modern transplantation ethics. It relocates the moment of moral tension from the declaration of death to the preparatory measures taken while life-sustaining treatment is being withdrawn. Contemporary ethical scholarship argues that technologies such as *in-situ* normothermic regional perfusion and ex-situ machine perfusion unsettle traditional notions of bodily integrity and blur the boundary between therapeutic and purely procurement-oriented interventions (Brierley et al., 2024; Domínguez-Gil et al., 2016; Murphy et al., 2025; Wall and Testa, 2024). Competing conceptions of justice – maximising societal benefit versus preserving individual dignity – therefore intersect directly at the bedside, requiring nurses to navigate overlapping professional, relational, and institutional obligations (Clark, 2024; Cooper and Murphy, 2025; Georgiou et al., 2025; Murphy et al., 2025). Because these theoretical debates are operationalised in real time through clinical protocols, they shape not only organisational policy but also the lived moral experience of frontline staff (Andersen Ljungdahl et al., 2024; Le Dorze et al., 2022).

Against this backdrop, the study set four prespecified objectives grounded in prior scholarship and discussions with Czech critical-care nurses. First, we aimed to quantify the association between the ethical frame nurses regarded as most salient and the intensity of discomfort at specific procedural moments, with particular attention to terminal extubation. Second, to assess whether continuous participation in the entire DCD pathway is linked to lower discomfort in emotionally charged phases compared with involvement limited to preparatory steps, especially during the mandated no-touch interval. Third, to examine whether perceived lack of respect for nursing input by the medical team coincides with higher discomfort in decision-centred moments such as donor classification and the first family discussion. Fourth, to evaluate whether greater practical experience, operationalised as prior care of three or more DCD donors, corresponds to lower discomfort in technically demanding phases.

Drawing on a nationwide sample of Czech intensive-care nurses, the study identifies specific organisational and experiential factors that shape discomfort during controlled DCD. It pinpoints where moral distress is most amenable to reduction, offering guidance for targeted educational, organisational, and psychosocial interventions.

Materials and methods

Study population

Registered nurses employed in Czech intensive-care units where organ donation after circulatory death is performed were invited to complete an anonymous online questionnaire. Two screening items verified eligibility by asking whether the respondent's workplace conducts organ donation after circulatory death and whether the nurse has been involved in at least the preparatory phase of care for a potential donor. Nurses who answered "yes" to both items were included. A total of 121 eligible nurses constituted the analytic sample.

Measures

Data were collected with a self-administered questionnaire constructed de novo for this investigation. Perceived discomfort constituted the primary outcome and was quantified for twenty predefined critical moments in the donation pathway – including terminal extubation, the mandated no-touch interval and communication with the donor's family – by means of a five-point Likert scale ranging from 'not at all' to 'extremely discomforting'. Four a priori determinants were examined as predictors of discomfort: (1) the ethical dilemma the respondent regarded as most dominant, selected from ten predefined options subsequently collapsed when cell frequencies were low; (2) the level of personal participation in the donation pathway, dichotomised as involvement in the entire process versus the preparatory phase only; (3) perceived professional respect, captured as a dichotomous response indicating whether physicians respect the nurse's opinion; and (4) practical experience, operationalised as the cumulative number of circulatory-death donors previously nursed and categorised as fewer than two versus three or more cases. Demographic variables – sex, age group, length of nursing practice, highest nursing qualification and hospital type – were also recorded to characterise the sample. Prior to deployment, the questionnaire was pilot tested with five nurses who had direct participation in controlled DCD. The pilot assessed item clarity and feasibility of completion.

Data analysis

Discomfort ratings were dichotomised into "low" (not at all / slightly) and "moderate-high" (the three upper categories) to meet the assumptions of Pearson's χ^2 test. Sparse responses within the ethical-dilemma variable were merged into an "other" category for the same reason. Associations between dichotomised discomfort in the critical moment relevant to each determinant of interest were examined with Pearson's χ^2 test, or Fisher's exact test when expected frequencies were <5. Ordinal predictors such as years of practice (≤5 vs. >5 years), number of DCD donors previously cared for (<2 vs. ≥3), and religious orientation (believer vs. non-believer) were dichotomised due to small cell counts. These predictors were analysed using Pearson's χ^2 or Fisher's exact test where appropriate. No test for linear trend was applied due to binary grouping. Statistical significance level was set at 0.05. All data and statistical analyses were performed using Python (version 3.12) and MS EXCEL.

Ethical aspect of the research

The study adhered to the principles of the Declaration of Helsinki. Administrative authorisation to conduct the anonymous, voluntary survey was obtained from each participating hospital (through the offices of the Deputy Director for Nursing Care or for Medical/Therapeutic Care). Before participation, all respondents reviewed an electronic information sheet and provided informed consent. No personal or patient-identifiable data were collected, and results are reported in aggregate only.

Results

Sample characteristics

The analytic cohort consisted of 121 registered nurses working in critical-care units across the Czech Republic. Women predominated, most respondents were 31–45 years old, and educational attainment ranged from secondary school to master's degree. Roughly one-third of participants had ≤5 years of professional practice, whereas another third reported ≥16 years. The respondents were employed exclusively in centres performing organ DCD across all administrative regions of the Czech Republic. Detailed frequencies are presented in Table 1.

Table 1. Demographic profile of participating nurses (*N* = 121)

Characteristic	Category	Value / *n* (%)
Age groups	≤18–30	30 (24.8%)
	31–45	68 (56.2%)
	46–60	23 (19.0%)
	>60	0
Highest nursing qualification	Secondary	18 (19.0%)
	College	22 (18.2%)
	Master's	18 (66.9%)
Critical-care specialisation	Yes	95 (78.5%)
	No	26 (21.5%)
Length of practice	≤1–5 y	21 (17.4%)
	6–10 y	20 (16.5%)
	11–15 y	24 (19.8%)
	16–20 y	20 (16.5%)
	>20 y	35 (28.9%)
Hospital tier	Faculty	121 (100 %)
Region	Pilsen Region	32 (26.4%)
	Capital City of Prague	51 (42.1%)
	Olomouc Region	27 (22.3%)
	South Moravian Region	11 (9.1%)
Religious practice	Yes	46 (38%)
	No	75 (62%)

Note: The study sample was restricted to regions in which DCD is implemented in clinical practice

Associations between candidate determinants and nurse discomfort

Perceived discomfort was analysed for each pre-specified determinant; full contingency outputs appear in Table 2.

The ethical dilemma judged most salient proved decisive at the moment of terminal extubation. Nurses who framed the situation primarily as a withdrawal-of-treatment problem reported moderate-to-high discomfort far more often than colleagues who viewed communication issues as the central dilemma (χ^2 = 16.14, df = 7, p = 0.0239).

Depth of personal participation in the donation pathway exerted a protective effect during the mandated no-touch interval. Nurses present only for preparatory steps were more than three times as likely to rate their discomfort as moderate-to-high compared with those accompanying the donor throughout the entire process (χ^2 = 7.51, df = 1, p = 0.0061; Fisher p = 0.0058; OR = 3.31). The direction and significance of the effect persisted when the full five-level Likert responses were analysed (χ^2 = 11.33, df = 4, p = 0.0231). By contrast, the same determinant showed only a borderline association with discomfort triggered by gurgling respiratory sounds immediately after extubation (χ^2 = 3.71, df = 1, p = 0.0542; Fisher p = 0.0524).

Feeling respected by physicians did not measurably influence discomfort in the two decision-making phases scrutinised. Whether classifying the donor according to the Maastricht criteria (χ^2 = 0.01, df = 1, p = 0.9053) or conducting the first family conversation (χ^2 = 1.08, df = 1, p = 0.2985), discomfort levels were statistically indistinguishable between nurses who felt acknowledged and those who did not.

Greater practical experience offered selective protection. Caring for three or more circulatory-death donors was strongly associated with lower discomfort during the no-touch interval (χ^2 = 12.35, df = 1, p = 0.0004; Fisher p = 0.0002). The same experience threshold, however, bore no significant relation to discomfort elicited by gurgling respiratory sounds (χ^2 = 1.03, df = 1, p = 0.3101; Fisher p = 0.2423).

Table 2. Associations between candidate determinants and moderate–high discomfort

Determinant	Critical moment analysed	χ^2 (df)	Exact p	Fisher p	OR (95 % CI)	Interpretation
Ethical dilemma considered most salient	Terminal extubation	16.14 (7)	0.0239	–	–	Significant
Personal participation (whole vs preparatory)	No-touch interval	7.51 (1)	0.0061	0.0058	3.31	Significant
Personal participation	Gurgling respiratory sounds	3.71 (1)	0.0542	0.0524	–	Borderline
Perceived respect by physicians	Maastricht classification	0.01 (1)	0.9053	0.8222	–	Not significant
Perceived respect by physicians	Family discussion	1.08 (1)	0.2985	0.2799	–	Not significant
Practical experience (≥3 vs <2 donors)	No-touch interval	12.35 (1)	0.0004	0.0002	–	Significant
Practical experience	Gurgling respiratory sounds	1.03 (1)	0.3101	0.2423	–	Not significant

Ethical framing and procedural immersion emerged as the primary drivers of acute psychological discomfort. Nurses who identified treatment-withdrawal dilemmas as paramount, or who had limited exposure to the full donation pathway, reported the highest levels of distress – particularly during the no-touch interval. In contrast, perceived professional respect showed no discernible influence, and the buffering effect of accumulated experience appeared confined to the interval rather than to earlier respiratory events. These findings point to the value of immersive, ethically focused training to mitigate nurse distress during organ donation after circulatory death.

As shown in Table 3, nurses reported varying levels of subjective discomfort across specific phases of the DCD process. The highest discomfort occurred during family discussions and when hearing gurgling respiratory sounds after terminal extubation.

Table 3. Subjective discomfort levels in DCD process phases

Phase of the DCD process	Mean level of subjective discomfort
Terminal extubation	3.06
Gurgling respiratory sounds	3.76
No-touch interval	2.98
Family discussion	4.10
Donor classification (Maastricht III)	2.55

Determinant-specific findings

The quantitative analyses yielded a mixed but instructive pattern across the pre-specified determinants. Discomfort during terminal extubation was higher when nurses construed the situation primarily as withdrawal of treatment, underscoring the influence of ethical framing. Continuous participation across the entire DCD pathway was associated with lower discomfort during the no-touch interval, while the association with distress triggered by post-extubation gurgling was borderline. Perceived respect from physicians did not measurably alter discomfort in decision-centred moments, including donor classification and the first family conversation. Greater hands-on experience, defined as prior care of three or more DCD donors, attenuated discomfort during the no-touch interval but did not mitigate reactions to gurgling respiratory sounds, suggesting that experiential learning chiefly buffers protocol-driven stages.

Discussion

This study enriches current knowledge on moral distress in DCD by showing that nurses' discomfort is shaped primarily by the way they interpret the ethical dimension of treatment withdrawal, by the depth of their procedural immersion and, to a more limited extent, by cumulative hands-on experience.

Nurses who interpreted terminal extubation primarily as the withdrawal of futile therapy frequently reported greater moral distress than those who emphasised communication concerns. Similar experiences of distress linked to withdrawal decisions have been described in a United Kingdom case-based qualitative investigation of end-of-life care in adult intensive care units (St Ledger et al., 2013). Qualitative work from France likewise highlights the emotional tension clinicians experience when reconciling palliative intent with the procedural demands of controlled DCD (Le Dorze et al., 2022). These converging observations strengthen the rationale for structured ethics debriefings that clarify the distinction between treatment withdrawal and euthanasia.

Continuous presence across the entire DCD pathway – from preparation to retrieval – was associated with lower odds of moderate-to-high discomfort during the five-minute no-touch interval. This observation concurs with a recent Swedish phenomenographic study, which reported that nurses who followed the whole DCD pathway felt better prepared and more secure during time-critical stages such as the interval (Andersen Ljungdahl et al., 2024). Consistent with this protective effect, a systematic review of 35 studies (Labrague et al., 2019) found that high-fidelity simulation – most often paired with guided debriefing – significantly reduces self-reported anxiety and increases self-confidence among nursing learners when compared with lecture-based instruction (Lochmannová, 2025). Taken together, these external data reinforce our dose–response finding that full-pathway exposure confers substantially greater psychological benefit than partial or solely didactic involvement.

Experience with three or more DCD donors conferred an additional but more selective buffer, lowering distress during the no-touch interval without mitigating the visceral unease provoked by gurgling respiratory sounds. Comparable selectivity has been observed in a Swedish phenomenographic study, where repeated participation normalised protocol-driven tasks, yet failed to desensitise nurses to emotionally distressing respiratory signs of dying (Flodén and Forsberg, 2009). Targeted coping strategies – such as peer-led debriefings focused on gurgling respiratory sounds – may therefore be needed to address this residual stressor.

By contrast, perceived professional respect from physicians showed no measurable influence on discomfort in decision-oriented phases. Although disregard for nursing input is a recognised source of moral distress in general end-of-life care (De Brasi et al., 2021), tight protocolisation in DCD may leave little discretionary space for team dynamics to modulate acute emotions, rendering a binary respect measure insufficiently sensitive. Future work should incorporate multidimensional constructs such as psychological safety and shared decision-making.

Ancillary items from our questionnaire reinforce the practical relevance of these findings: most respondents expressed a desire for additional DCD-specific education and on-demand psychological support, mirroring calls in the international literature for scenario-based training and structured debriefing resources within procurement programmes (Bednář et al., 2023; Sadeghi et al., 2023).

Several limitations temper the generalisability of our conclusions. The cross-sectional, self-report design precludes causal inference and may be vulnerable to recall or social-desirability bias. Dichotomising five-point ratings, though necessary for statistical power, reduces granularity, and the sample's restriction to Czech intensive-care units may limit international transferability. Even so, the data show that ethical framing, full-process immersion and accumulated experience – not generic demographic factors – are the main determinants of nurse distress during DCD. Educational strategies (Lizáková et al., 2025; Magerčiaková et al., 2025) that combine ethics-centred reflection with immersive, simulation-enhanced training, alongside targeted coping interventions for persistent stressors such as gurgling respiratory sounds, hold the greatest promise for protecting nurses' psychological well-being and, by extension, safeguarding high-quality donor and family care.

Conclusion

Nurse discomfort during organ donation after circulatory death is driven chiefly by how the withdrawal of life-sustaining treatment is ethically construed and by the depth of nurses' procedural immersion. Distress rises when terminal extubation is interpreted as an act of withdrawing futile therapy, whereas full participation in every step of the donation pathway – and, to a lesser extent, prior experience with several DCD cases – markedly attenuates stress during the no-touch interval. These findings support the routine incorporation of ethics-centred debriefings that clarify the distinction between treatment withdrawal and euthanasia, together with immersive, scenario-based training and mentorship models that provide complete pathway exposure and structured coping

strategies for particularly distressing cues such as gurgling respiratory sounds. By targeting the specific determinants identified here, transplant programmes can bolster nurses' psychological resilience and help maintain high-quality, patient- and family-centred care.

Author contribution statement

Conceptualisation and study design were developed by *JK, JŠ, AL, PL*, and *TK*. Data collection and curation were performed by *JK*. Formal analysis and interpretation of results were conducted by *JK* and *AL*. Statistical analysis was performed by *TK*. The original manuscript draft was written by *JK* and *AL*, and all authors contributed to critical review and editing. Supervision and project administration were overseen by *JŠ*. All authors have read and approved the final version of the manuscript.

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Data availability statement

The dataset generated and analysed during the current study consists of anonymised questionnaire responses from intensive-care nurses and is subject to Czech and EU data-protection legislation. To protect participant confidentiality and honour the conditions approved by the office of the Deputy Director for Nursing Care or the Deputy Director for Medical/Therapeutic Care, raw data cannot be made publicly available. De-identified summary tables that support the main findings are available from the corresponding author on reasonable request for non-commercial, research purposes.

Ethical approval

All procedures conformed to the ethical principles of the Declaration of Helsinki. Administrative authorisation to conduct the anonymous, voluntary survey was obtained from each participating hospital through the office of the Deputy Director for Nursing Care or the Deputy Director for Medical/Therapeutic Care. Participation was voluntary: before completing the survey, each nurse received an electronic information sheet outlining the study's purpose, procedures, risks, and benefits, and subsequently provided informed consent. No personal identifiers were collected, and all data were analysed in aggregate form to ensure participant confidentiality.

Conflict of interest

The authors have no potential conflict of interest to declare with respect to the research, authorship, and/or publication of this article.

References

1. Andersen Ljungdahl K, Nissfolk S, Flodén A (2024). The circulatory death that saves lives – Intensive care nurses' conceptions of participating during donation after circulatory death: A phenomenographic study. Nurs Open 11(3): e2124. DOI: 10.1002/nop2.2124.
2. Bednář M, Dufek P, Lochmannová A, Šimon M, Bureš M (2023). Use of virtual reality for education and training of emergency rescue system for crisis situations. ACM Int Conf Proc Ser 2023: 142–147. DOI: 10.1145/3629296.3629318.
3. Boylan HC, Goff AD (2024). Dual advocates in deceased organ donation: The potential for moral distress in organ procurement organization staff. J Clin Ethics 35(1): 70–75. DOI: 10.1086/728145.
4. Brierley J, Pérez-Blanco A, Stojanovic J, Kessaris N, Scales A, Paessler A, et al. (2024). Normothermic regional perfusion in paediatric donation after circulatory determination of death – the Oxford position statement from ELPAT. Front Transplant 3: 1320783. DOI: 10.3389/frtra.2024.1320783.
5. Clark S (2024). Ethical considerations in controlled donation after circulatory death. Ann Cardiothorac Surg 14(1): 613–663. DOI: 10.21037/acs-2024-dcd-25.
6. Cooper J, Murphy Z (2025). Making organ donation after circulatory death routine: Preserving patienthood and reproducing ways of dying in the intensive care unit. Sociol Health Illn 47(1): e13824. DOI: 10.1111/1467-9566.13824.
7. De Brasi EL, Giannetta N, Ercolani S, Gandini ELM, Moranda D, Villa G, Manara DF (2021). Nurses' moral distress in end-of-life care: A qualitative study. Nurs Ethics 28(5): 614–627. DOI: 10.1177/0969733020964859.
8. Domínguez-Gil B, Duranteau J, Mateos A, Núñez JR, Cheisson G, Corral E, et al. (2016). Uncontrolled donation after circulatory death: European practices and recommendations for the development and optimization of an effective programme. Transpl Int 29(8): 842–859. DOI: 10.1111/tri.12734.
9. Epstein EG, Hamric AB (2009). Moral distress, moral residue, and the crescendo effect. J Clin Ethics 20(4): 330–342. DOI: 10.1086/jce200920406.
10. Flodén A, Forsberg A (2009). A phenomenographic study of ICU nurses' perceptions of and attitudes to organ donation and care of potential donors. Intensive Crit Care Nurs 25(6): 306–313. DOI: 10.1016/j.iccn.2009.06.002.
11. Georgiou A, Tan W, Ionescu MI, Kuhn IL, Fritz Z (2025). Ethical issues in uncontrolled donation after circulatory determination of death: A scoping review to reveal areas of broad consensus, and those for future research. Transpl Int 38: 13992. DOI: 10.3389/ti.2025.13992.
12. Hossein MP, Ansari M, Fekri N, Yazdimoghaddam H (2025). The effects of e-learning vs. gamification-based training on ICU nurses' knowledge and attitudes toward organ donation candidates: A study based on the psychological security and empowerment model. BMC Med Educ 25(1): 760. DOI: 10.1186/s12909-025-07299-0.
13. Jameton A (2017). What moral distress in nursing history could suggest about the future of health care. AMA J Ethics 19(6): 617–628. DOI: 10.1001/journalofethics.2017.19.6.mhst1-1706.
14. Labrague LJ, McEnroe-Petitte DM, Bowling AM, Nwafor CE, Tsaras K (2019). High-fidelity simulation and nursing students' anxiety and self-confidence: A systematic review. Nurs Forum 54(3): 358–368. DOI: 10.1111/nuf.12337.
15. Le Dorze M, Martouzet S, Cassiani-Ingoni E, Roussin F, Mebazaa A, Morin L, et al. (2022). "A delicate balance" – Perceptions and experiences of ICU physicians and nurses regarding controlled donation after circulatory death: A qualitative study. Transpl Int 35: 10648. DOI: 10.3389/ti.2022.10648.
16. Lizáková Ľ, Stupková D, Libešová L, Lamková I, Horanská V, Andráščíková Ľ, Lochmannová A (2025). Quality of the educational environment in Slovakia and the Czech Republic using the DREEM inventory. Nurs 21st Century 24(1): 45–51. DOI: 10.12923/pielxxiw-2025-0006.
17. Lochmannová A (2025). Exploring the role of virtual reality in preparing emergency responders for mass casualty incidents. Isr J Health Policy Res 14(1): 22. DOI: 10.1186/s13584-025-00681-9.
18. Magerčiaková M, Lochmannová A, Mainz D, Debska G (2025). Nursing students' perceptions of health literacy: A cross-country comparative study. Bratisl Med J 126(3): 351–357. DOI: 10.1007/s44411-025-00057-0.
19. Murphy NB, Slessarev M, Basmaji J, Blackstock L, Blaszak M, Brahmania M, et al. (2025). Ethical issues in normothermic regional perfusion in controlled organ donation after determination of death by circulatory criteria: A scoping

review. Transplantation 109(4): 597–609. DOI: 10.1097/TP.0000000000005161.

20. Peng M, Guan Q, Zhu X (2025). Moral distress, attitude toward death, and palliative care core competencies among ICU nurses: A cross-sectional study. BMC Palliat Care 24: 16. DOI: 10.1186/s12904-025-01655-z.
21. Sadeghi M, Nematollahi M, Farokhzadian J, Khoshnood Z, Eghbalian M (2023). The effect of scenario-based training on the core competencies of nursing students: A semi-experimental study. BMC Nurs 22(1): 475. DOI: 10.1186/s12912-023-01442-2.
22. Sedláček D, Lochmannová A, Šín R, Křivková J, Kovalčinová K, Marek P (2025). Frontline ethical burdens: A mixed methods investigation of moral distress in emergency medical services. Bratisl Med J 126(7): 1463–1471. DOI: 10.1007/s44411-025-00221-6.
23. Silva AR, Rochon A, Hornby L, Lotherington K, James L, Webster R, et al. (2024). Resilience among organ donation coordinators: A Canadian mixed-methods study. Front Public Health 12: 1367546. DOI: 10.3389/fpubh.2024.1367546.
24. Silva e Silva V, Minervini A, Dupuis KL, Lotherington K, Dhanani S, Silva A (2025). Understanding the work-related challenges of organ and tissue donation coordinators during the COVID-19 pandemic: A mixed-method study. BMJ Open 15(1): e088626. DOI: 10.1136/bmjopen-2024-088626.
25. St Ledger U, Begley A, Reid J, Prior L, McAuley D, Blackwood B (2013). Moral distress in end-of-life care in the intensive care unit. J Adv Nurs 69(8): 1869–1880. DOI: 10.1111/jan.12053.
26. Thiessen C, Gordon EJ, Kelly B, Wall A (2023). The ethics of donation after circulatory death organ recovery: An overview of new considerations arising from procurement practice and policy changes. Curr Opin Organ Transplant 28(2): 133–138. DOI: 10.1097/mot.0000000000001046.
27. Victorino JP, de Brito ES, Westin UM, Vargas MAO, Mendes KDS, Ventura CAA (2025). Health advocacy and moral distress among nurses in organ transplant units. Nurs Ethics 32(3): 994–1003. DOI: 10.1177/09697330241295368.
28. Wall A, Testa G (2024). The ethics surrounding normothermic regional perfusion in donors following circulatory death. Clin Liver Dis 23(1): e0193. DOI: 10.1097/cld.0000000000000193.