-∿- **Signa Vitae**

META-ANALYSIS

Moral distress among health care workers in the intensive care unit; a systematic review and meta-analysis

Rakan M. AlQahtani[1],*(iD), Abdalrhman Al Saadon[1], Mohammed Ibrahim Alarifi[1], Ruaim Muaygil[2], Yasmeen Khalaf Maan Altaymani[1], Mohamed Abdelwahab Mohamed Elsaid[1], Fahad Alsohime[3], Mohamad-Hani Temsah[3], Khaldoon Aljerian[4]

[1] Department of Critical Care Medicine, College of Medicine, King Saud University, 12372 Riyadh, Saudi Arabia
[2] Department of Medical Education, College of Medicine, King Saud University, 12372 Riyadh, Saudi Arabia
[3] Pediatric Intensive Care Unit, Pediatric Department, College of Medicine, King Saud University, 12372 Riyadh, Saudi Arabia
[4] Forensic Medicine Unit, Department of Pathology, College of Medicine, King Saud University, 12372 Riyadh, Saudi Arabia

*Correspondence
arakan@ksu.edu.sa
(Rakan M. AlQahtani)

Abstract

Background: The effect of moral distress among healthcare providers is significant on disease morbidity, especially within the intensive care unit (ICU). In this systematic review and meta-analysis, we aimed to gather all evidence regarding moral distress frequency and severity/intensity among ICU health care providers.
Methods: We conducted a systematic search to gather all relevant studies from six databases, followed by a manual search of references. Fourteen studies consisting of 5905 participants were included in the final moral distress scale analyses.
Results: Overall, there was moderate moral distress severity/intensity among all participants (Mean = 27.79; 95% confidence interval (CI) = 7.40–64.18). On further stratification of the results according to countries, Canada (Mean = 91.99; 95% CI = 80.10–105.65) and USA (Mean = 52.54; 95% CI = 44.78–61.64) showed the highest distress scores, followed by Iran (Mean = 21.20; 95% CI = 7.21–62.30) and Italy (Mean = 3.42; 95% CI = 3.15–3.72). Studies conducted in high income-earning countries reported more severity/intensity (Mean = 22.65; 95% CI = 6.58–78.02) compared to those in the upper-middle income-earning ones (Mean = 18.89; 95% CI = 2.80–127.34). There was significant heterogeneity among the included studies, which could not be explained by the difference in scales, country of the participants, or the female proportion. Moreover, there was a moderate frequency of moral distress (Mean = 46.83; 95% CI = 8.34–262.87), which was found to be much higher (Mean = 87.94; 95% CI = 83.55–92.57), in performing analysis.
Conclusion: Moral distress is a major problem in the ICU setting, in terms of both severity/intensity and frequency. Future large-scale studies are required, through a unified framework, to develop appropriate interventions to address ICU-related moral distress.

Keywords

Moral distress; Intensive care unit; Health care worker; Meta-analysis

1. Introduction

With advances in diagnostic and therapeutic approaches, ethical problems constitute one of the major challenges in clinical society, especially those related to moral distress. The latter was defined as the critical decision made by the health care providers against their practices despite being informed due to several constraints [1]. Evidence shows that the definition of moral distress was previously confined to nurses only, however, recent literature suggests that it includes other healthcare personnel and events where moral distress is suspected or confirmed [2]. Fourie *et al.* [3] even suggested that moral distress develops as a psychological event attributed to the

exposure to moral conflicts. Factors such as inconsistent care plans, a conflict between intensive care unit (ICU) staff among themselves or with their families, lack of resources, and too much care from the family, are known etiologies that trigger moral distress among health care providers [4]. Moreover, working under pressure in developing countries can contribute to moral distress among the clinical team due to poor salaries or staff shortage [5].

Ethical approaches and self-restraint should be considered when differentiating between normal and moral distress events [6]. Moral distress affects health care providers and may lead to serious consequences regarding disease morbidity. Anger,

stress, fatigue, sense of guilt, feeling overwhelmed, headaches, and powerlessness were reported as consequences of exposure to moral distress actions [7]. Moreover, leaving the medical profession is the most notable consequence related to moral distress [8]. The frequency of moral distress was different according to the socioeconomic status of the country, health facilities, the type of medical profession (nurse, physician, and other health care provider), and the sex of the health care providers [9–11].

With the high mortality rates in the ICU department compared to other departments, the ICU team faces the most significant risk factor that drives moral distress, which is the end-of-life decision. This may be due to shortage of therapeutic facilities, prevention of prolonging the patient's suffering, or the choice to save patients who have a higher probability of survival compared to other patients with low survival probability due to bed occupancy shortage [12, 13]. An Iranian cross-sectional study indicated that ICU nurses are exposed to high levels of moral distress frequency and intensity [9]. Moreover, a nationwide cross-section study among European countries indicated a lower frequency and higher intensity of moral distress compared to other developing countries [9, 11, 14].

The likelihood to develop moral distress may be promoted by several factors, including some aspects of patient care, perception of inappropriate care, and different constraints (internal and external) [15]. The concept of "inappropriate care" may include—but not limited to—providing futile or "ineffectual" treatment, inefficient pain relief, and unreal hopeful expectations to patients or their families; expediting the dying process; ignoring patients' desires; working with incompetent caregivers who may not be up to their job responsibilities [15]. Inability to preserve mental and emotional health during difficult experiences may give rise to internal turmoil, which may include lack of self-confidence, unjustified fear, lack of coping with perceived suffering, and contradictions with own religion or cultural beliefs [15]. External constraints may arise from established policies and specific aspects of the ICU work environment [16]. Frequent external constraints include a lack of companionship and cooperation between colleagues, the hierarchical structure present in different healthcare institutions, and deficient communication [17]. To date, there is no comprehensive systematic review that summarizes the literature regarding moral distress among ICU staff. Consequently, in this systematic review and meta-analysis, we aimed to gather all evidence regarding moral distress frequency and severity/intensity among ICU health care providers.

2. Methods

2.1 Search strategy and study selection

This systematic review and meta-analysis were conducted according to the Preferred Reporting Items for Systematic Review and Meta-analyses statement (PRISMA) recommendations [18]. "(moral distress OR moral responsibility OR moral dilemma OR conscience) AND (intensive care unit OR ICU)" were used to gather all relevant studies from six databases: The System for Information on Grey Literature in Europe (SIGLE), Virtual health library (VHL), Web of Science, PubMed, Sco-

pus, and Google Scholar. The search was conducted on 10 November 2020 and, subsequently, followed by a manual search of the listed references of each included article for any missed potentially relevant publication.

We included all studies reporting moral distress among ICUs. We excluded studies with unreliable data for extraction and duplicate studies. Title and abstract screening and full-text screening were initially performed by four reviewers and a fifth reviewer was incorporated to resolve conflicts raised by future reviewers.

2.2 Data extraction

An extraction sheet of the relevant studies was developed and reviewed to avoid possible errors that might be biased.

2.3 Risk of bias

Two authors evaluated the risk of bias through an adapted form of the Newcastle Ottawa cohort scale for cross-sectional studies [19]. The studies were sorted according to their scores: "very good quality" for 9–10 points, "good quality" for 7–8 points, "satisfactory quality" for 5–6 points, and "unsatisfactory quality" for <5 points. A senior author performed a risk of bias assessment to ensure that the integrity of the reported judgment was upheld.

2.4 Statistical analysis

R software and the package "meta" were used to run the statistical analysis. We used the reported moral distress scale (MDS) means and standard deviations to calculate the pooled mean and the corresponding 95% confidence interval (CI); this was performed for both moral distress intensity/severity and frequency [20]. Moreover, correlations between different risk factors and MDS, that were reported in two or more studies, were also pooled to get summary effect sizes (pooled correlations and the corresponding 95% CI). We used a random model due to the presence of significant heterogeneity (p-value < 0.05 or $I^2 > 50\%$) [21]. For any outcome reported in ≥ 10 studies, Egger's regression test (publication bias) and meta-regression were performed [22, 23]. The risk of bias was significant with p-value < 0.1 [24].

3. Results

3.1 Search results

The net result of the database search yielded 834 records. We excluded 794 records after the title and abstract screening, and a further 26 records after the full-text screening. We found three additional papers after conducting a manual search. Finally, we used 15 papers for this meta-analysis [9–11, 14, 25–37] (Fig. 1).

3.2 Study characteristics and risk of bias

Three studies were conducted in Iran, three in Italy, three in Canada, three in the USA, one in Europe, one in the Netherlands, and one in Israel. All studies were cross-sectional studies with a total sample size of 5998 participants, across all studies. Ten studies were conducted for nurses only while the
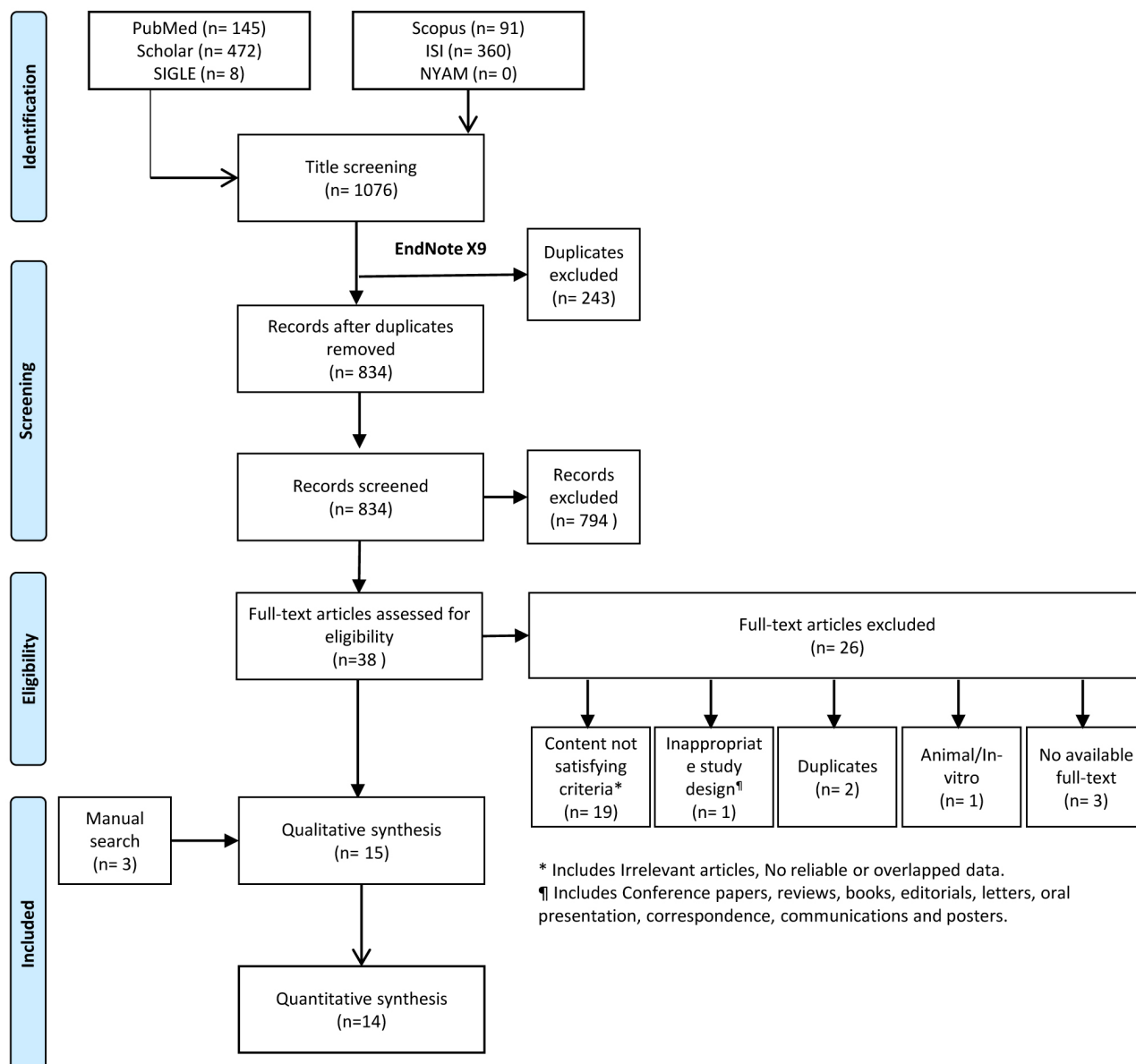
F I G U R E 1. The PRISMA flowchart of the search and screening process.

remaining five studies included nurses and other health care professionals. Seven studies used Corley's MDS while four studies used the modified MDS; however, the used scale was not reported in four studies (Table 1) (Ref. [9–11, 25–31, 33–37]).

Regarding the quality of the included studies, most of them scored "good quality" in most assessment aspects and none of them were classified as being of "unsatisfactory quality". Two of the included studies were "very good quality", seven studies were "good quality", and six were "satisfactory quality". The problems detected were in the "selection" parameter of the assessment scale, specifically, with respect to the "representativeness of the sample", and "ascertainment of the exposure (risk factor)" (Table 2) (Ref. [9–11, 24–31, 33–37]).

3.3 Moral distress

Following the exclusion of one study [28] due to the heterogeneity in the data presentation, fourteen studies consisting of 5905 participants were included in the final MDS analyses. Overall, there was a moderate moral distress severity/intensity among all participants (Mean = 27.79; 95% CI = 7.40–64.18). The distress severity/intensity measured by both MDS-revised (Mean = 15.87; 95% CI = 3.48–72.39) and Corley's MDS (Mean = 33.31; 95% CI = 21.85–50.79) was comparable with no significant difference between the two scales, on testing for subgroup differences (p-value = 0.356) (Fig. 2).

On further stratification of the results according to countries, Canada (Mean = 91.99; 95% CI = 80.10–105.65) and USA (Mean = 52.54; 95% CI = 44.78–61.64) showed the highest distress scores, followed by Iran (Mean = 21.20; 95% CI = 7.21–62.30), and Italy (Mean = 3.42; 95% CI = 3.15–3.72). The differences among the single countries were statistically significant (p-value < 0.001). Studies conducted in high income-earning countries reported more severity/intensity (Mean = 22.65; 95% CI = 6.58–78.02) compared to those in the upper-middle income-earning ones (Mean = 18.89; 95% CI = 2.80–127.34); however, the difference was not statistic-

T A B L E 1. Characteristics of the included studies.

Reference ID	Country	Study design	Participants	Sample size	Female (prevalence)	Moral distress measure	Age (Mean (SD))
Dodek/2019 [30]	Canada	Cross-sectional	428 nurses, 30 physician and 211 other health professionals	669	522	NR	40 (0.3)
Palmer/2019 [31]	Canada	Cross-sectional	1844 nurses, 459 Registered respiratory therapist, 306 physician, 211 other, 32 not specified	2852	2484	Corley's MDS	25–60*
Sannino/2019 [35]	Italy	Cross-sectional	136 Nurses	136	NR	Corley's MDS	NR
Alborzi/2018 [9]	Iran	Cross-sectional	100 Nurses	100	79	Corley's MDS	29.93 (4.5)
Altaker/2018 [27]	USA	Cross-sectional	238 Nurses	238	214	The Moral Distress Scale—Revised	38 (11)
Borhani/2018 [25]	Iran	Cross-sectional	153 Nurses	153	118	Corley's MDS	NR
Lamiani/2018 [33]	Italy	Cross-sectional	45 physician, 77 nurses	122	64	The Moral Distress Scale—Revised	41.7 (2.2)
Saleh/2018 [37]	Iran	Cross-sectional	172 Nurses	172	NR	NR	NR
Larson/2017 [34]	Canada	Cross-sectional	20 physicians, 159 nurses, 25 RTs, and 2 physiotherapists	206	176	The Moral Distress Scale—Revised	20–50*
Boer/2015 [29]	Netherlands	Cross-sectional	87 nurses and 30 physician	117	105	The Moral Distress Scale—Revised	38.3 (1.7)
Gans/2012 [36]	Israel	Cross-sectional	291 Nurses	291	210	NR	22–65*
Papathanassoglou/2012 [11]	Europe	Cross-sectional	255 Nurses	255	NR	NR	NR
Cavaliere/2010 [28]	USA	Cross-sectional	93 Nurses	93	93	Corley's MDS	21–60*
Karanikola/2010 [10]	Italy	Cross-sectional	566 Nurses	566	401	Corley's MDS	38.2 (8.2)
Elpern/2005 [26]	USA	Cross-sectional	28 Nurses	28	NR	Corley's MDS	NR

*NR, not reported; *, range.*

T A B L E 2. NOS for the risk of bias and quality assessment of NRSs (Cross-sectional studies).

Author/Year	Selection				Comparability	Outcome		Total score	Quality assessment
	Representativeness of the sample	Sample size	Non-respondents	Ascertainment of the exposure (risk factor)	Confounding factors controlled	Assessment of outcome	Statistical test		
Saleh/2018 [37]	★	★	★	★★	*	★	★	8	Good
Elpern/2005 [26]	★	★	★	★★	★	★★	★	9	Very Good
Alborzi/2018 [9]	★	★	★		★	★★	★	7	Aſgood
Borhani/2018 [25]	★	★	★	★	★	★	★	7	Bɾgood
Boer/2015 [29]	★	★	★	★	★	★★	★	8	Boer
Gans/2012 [36]	★	★	★	★	★	★	★	7	Good
Karanikola/2010 [10]		★	★	★	★	★	★	6	Satisfactory
Papathanassoglou/2012 [11]		★	★	★	★	★	★	6	Satisfactory
Sannino/2019 [35]	★	★	★		★	★	★	6	Satisfactory
Altaker/2018 [27]	★	★	★		★★	★	★	7	Aſgood
Dodek/2019 [30]	★	★	★	★	★	★★	★	8	Dodek
Palmer/2019 [31]	★	★	★	★	★★	★★	★	9	Very Good
Lamiani/2018 [33]		★	★	★	★	★	★	6	Satisfactory
Larson/2017 [34]		★	★	★	★	★	★	6	Satisfactory
Cavaliere/2010 [28]	★	★	★	★	★	★	★	6	Satisfactory

NOS, Newcastle-Ottawa Scale; NRSs, Numeric Rating Scales.

Study	Mean	Mean	95% CI
MDS-R			
Boer/2015		2.21	[2.09; 2.34]
Saleh/2018		3.11	[3.01; 3.21]
Lamiani/2018		3.50	[3.48; 3.52]
Gans/2012		3.70	[3.53; 3.88]
Papathanassoglou/2012		56.99	[54.74; 59.33]
Dodek/2019		82.50	[82.17; 82.83]
Altaker/2018		96.50	[88.51; 105.21]
Larson/2017		99.50	[90.56; 109.32]
Random effects model		**15.87**	**[3.48; 72.39]**

Heterogeneity: $I^2 = 100\%$, $\tau^2 = 4.798$, $p = 0$

Corley's MDS			
Elpern/2005		3.66	[3.36; 3.99]
Sannino/2019		36.20	[35.52; 36.89]
Borhani/2018		44.80	[42.92; 46.76]
Alborzi/2018		48.42	[46.40; 50.52]
Karanikola/2010		57.90	[56.63; 59.20]
Palmer/2019		81.30	[75.94; 87.04]
Random effects model		**33.31**	**[21.85; 50.79]**

Heterogeneity: $I^2 = 100\%$, $\tau^2 = 0.277$, $p = 0$

Random effects model		**21.79**	**[7.40; 64.18]**

Heterogeneity: $I^2 = 100\%$, $\tau^2 = 4.252$, $p = 0$
Residual heterogeneity: $I^2 = 100\%$, $p = 0$
Test for subgroup differences: $\chi_1^2 = 0.8515$, df = 1 ($p = 0.356$) **Moral Distress Severity/Intensity**

FIGURE 2. Moral distress severity/intensity (scales used). MDS, the moral distress scale; MDS-R, the moral distress scale-revised.

-ally significant (*p*-value = 0.876) (Fig. 3). There was a significant heterogeneity among the included studies ($I^2 = 100\%$; *p*-value < 0.001), which could not be explained by the difference in scales and income levels of the participants' countries as mentioned earlier. Moreover, the meta-regression of females' proportion in the included studies showed no significant influence on the MDS and could not account for the heterogeneity (*p*-value = 0.109) (**Supplementary Fig. 1**).

For moral distress frequency, five studies consisting of 4087 participants were included in the analysis. Overall, there was a moderate frequency of moral distress (Mean = 46.83; 95% CI = 8.34–262.87); however, the confidence interval was very wide. Therefore, we performed a leave-one-out sensitivity analysis by removing the most heterogeneous study just so the results were much higher (Mean = 87.94; 95% CI = 83.55–92.57). The heterogeneity was significant both before ($I^2 = 100\%$; *p*-value < 0.001) and after ($I^2 = 94\%$; *p*-value < 0.001) the sensitivity analysis was performed (Fig. 4).

In the same context, there were only three factors that were tested for a possible correlation to MDS in two or more studies. No significant correlations were found among all tested correlations; including work experience (*r* = -0.04; 95% CI = -0.17–0.09; *p*-value = 0.572), work satisfaction (*r* = 0.08; 95% CI = -0.30–0.45; *p*-value = 0.678), or compassion toward patient (*r* = -0.04; 95% CI = -0.77–0.74; *p*-value = 0.941) (Fig. 5).

4. Discussion

The current study used 14 studies to synthesize a summary of all available evidence regarding measures of moral distress in the ICU setting. Our results showed a considerable moral distress severity/intensity and frequency among health care workers. No significant predictors of the distress level were identified due to the heterogeneity of the tested factors. There were statistically significant distress levels among different countries; higher values seemed to be prevalent in the more developed countries.

Moral distress is often a result of problems within organizations such as staffing shortages, ineffective team communication, procedures performed with insufficient guidance, or policies [38]. Additionally, Dodek *et al.* [30] suggested that both moral distress and general workplace distress have a mutual cause-and-effect relationship, and both can cause burnout among ICU workers [30, 39]. Hence, levels of moral distress are expected to be higher among organizations with poor ethical climates [38]. Moreover, causes of moral distress among ICU workers include some concerns about the life-support provided, the care provided by other health care professionals, poor communication, end-of-life decision-making, and inconsistent care plans [40].

Over the past few years, moral distress has attracted attention in healthcare practice. A review by Lamiani *et al.* [41] has found that numerous studies, both quantitative and qualitative, have been published, and these publications mainly focused on nurses working in ICUs. It may be due to the
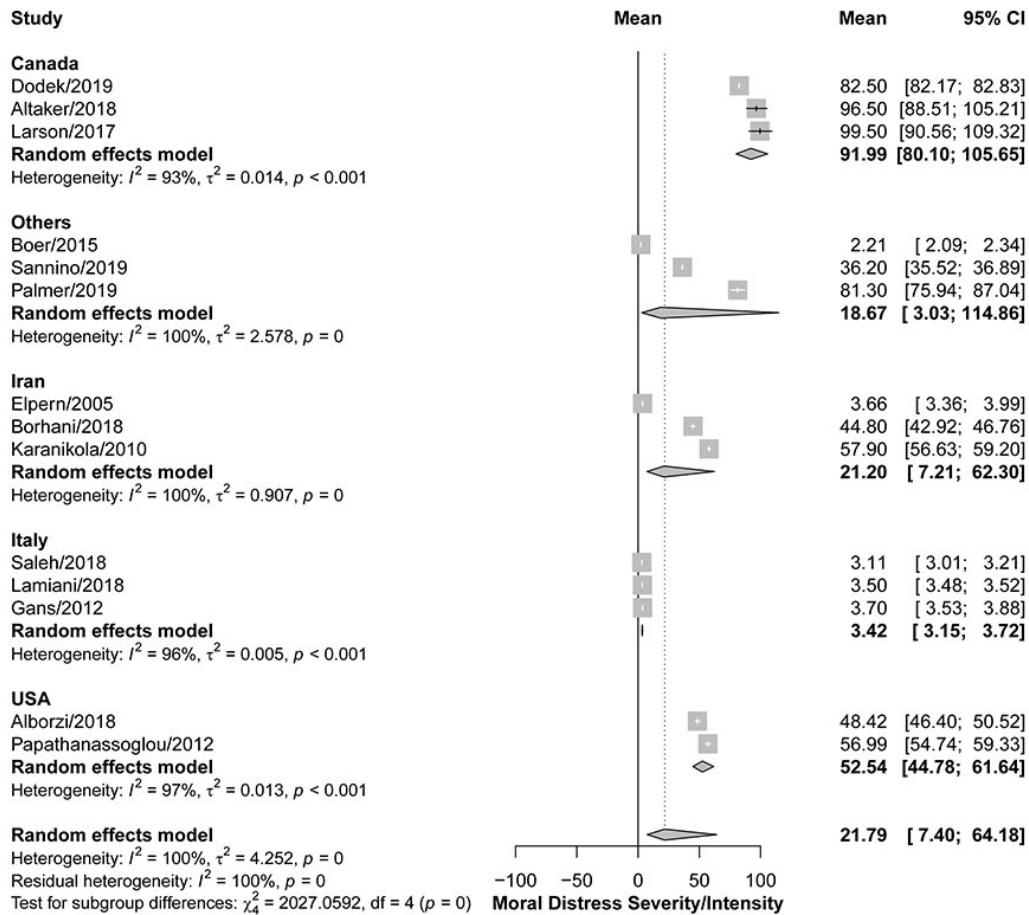
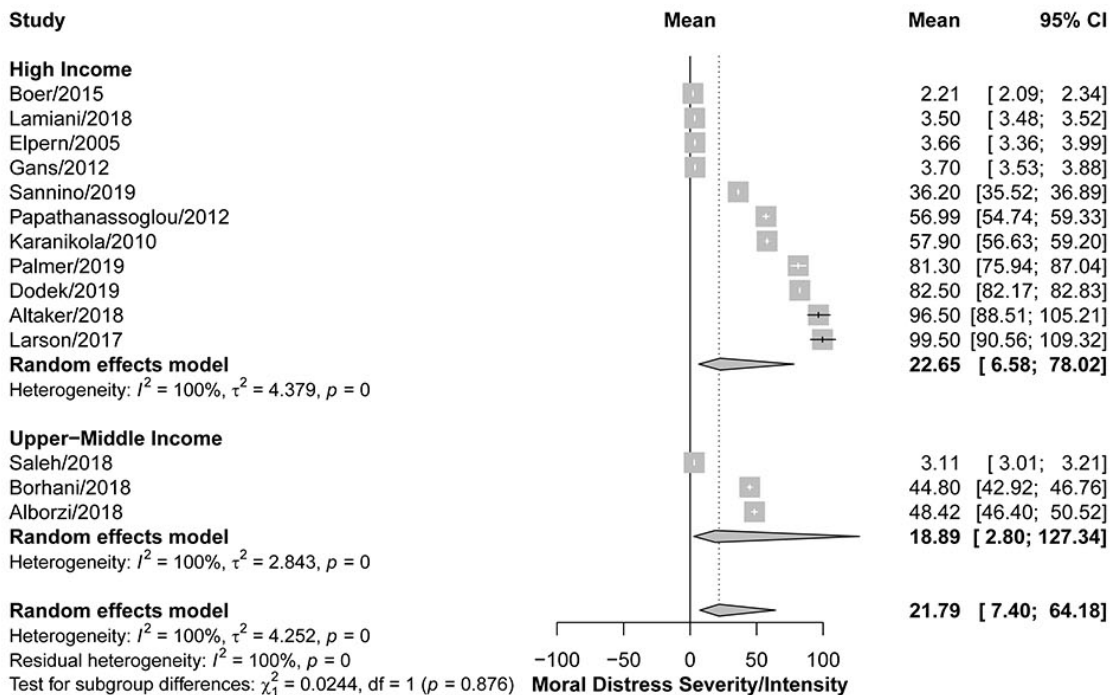**FIGURE 3. Differences among countries in moral distress severity/intensity.** (A) Country-specific scores. (B) World Bank income classification.

deep-rooted proximity of the nurse-patient relationship and the relevant ethical aspects embedded in their involvement in end-of-life care, which made moral distress a relevant experience for healthcare professionals [34, 41–45]. Another study by

Nuttgens and Chang showed that moral distress may result from substandard supervision, supervisee vulnerability, supervisee non-disclosure, and organizational pressures [46].

The mean distress scores for ICU health care workers ranged
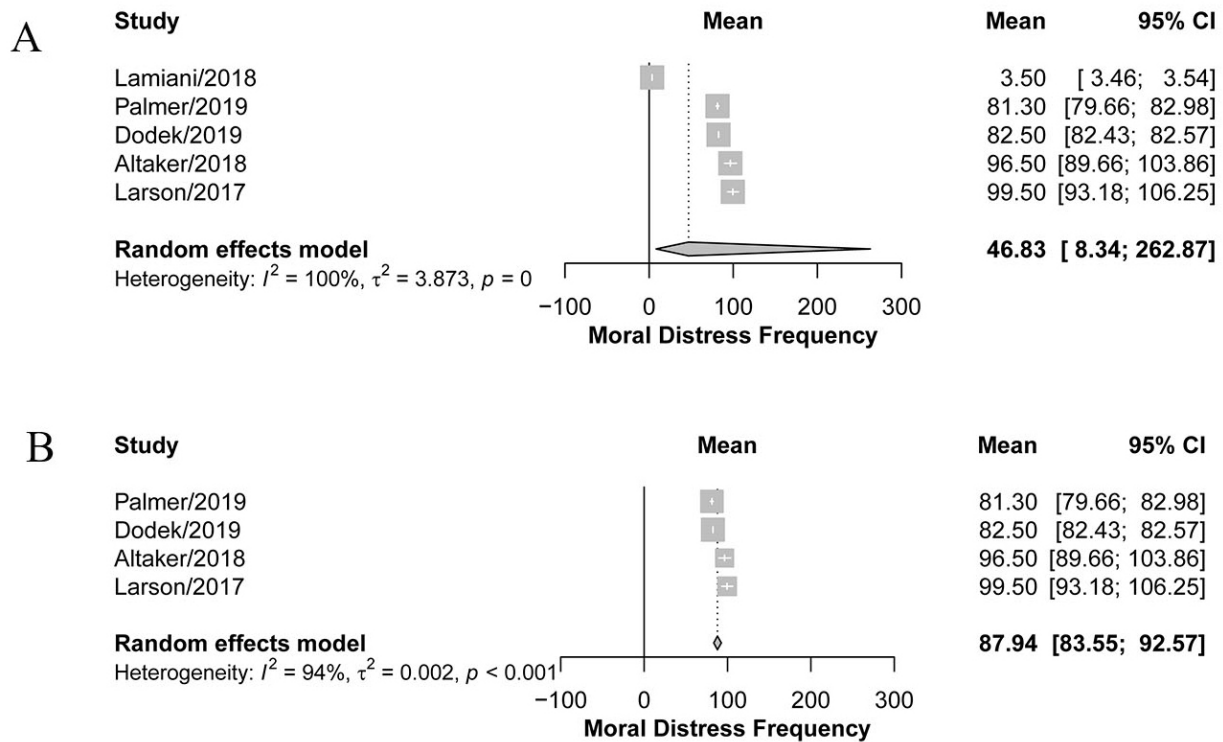
FIGURE 4. Moral distress frequency. (A) All studies. (B) Leave-one-out sensitivity analysis.
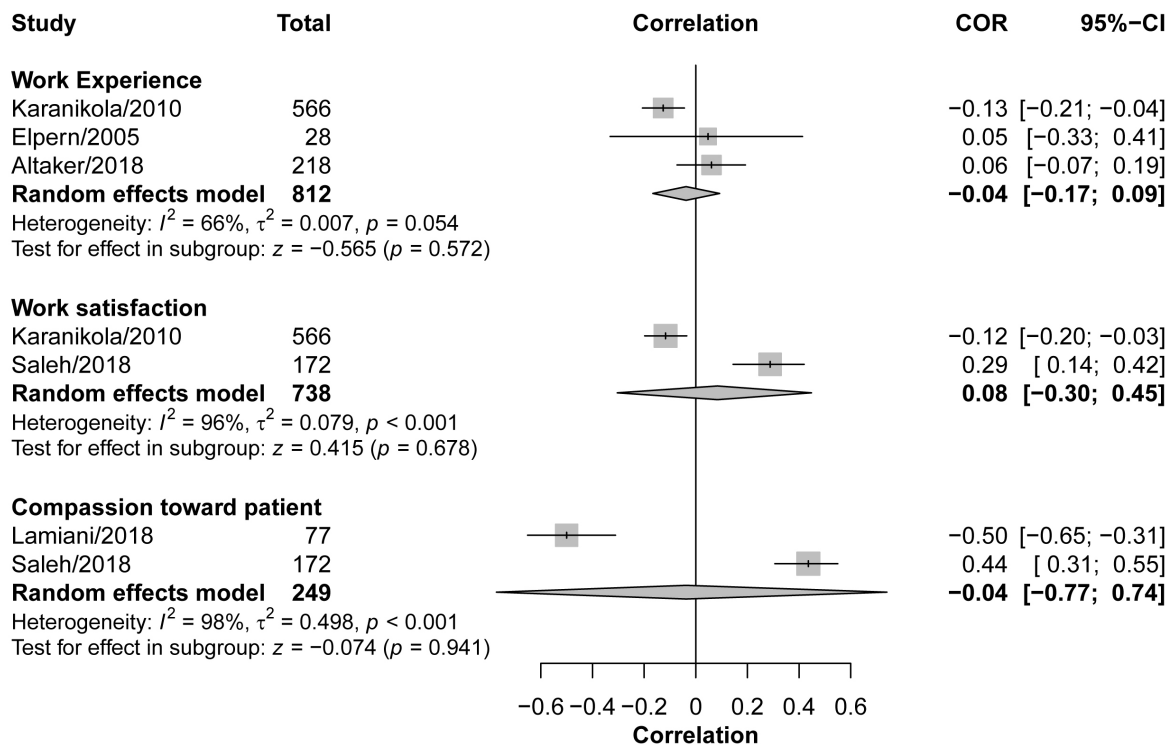
FIGURE 5. Correlation between different factors and moral distress severity/intensity score.

from 57 to 92 in most of the studies, which reached up to 102 in some cases [10, 34, 42, 47–49]. These reported distress levels are higher than those reported in the previous literature, which may be due to the high heterogeneity. Our results further indicated that the factors of being female and work experience were not significant predictors of moral distress levels, which is consistent with a previous study consisting of

171 British participants [49]. However, other studies reported higher moral distress among female workers, which may be a reflection of women being more able to report symptoms [50–52]. Additionally, some other studies found an inverse relationship between work experience and moral distress levels [53].

Depression and moral distress were identified as results and

precursors of each other, and moral distress was described as a significant predictor of burnout among health care workers [54–56]. However, the means to reduce moral distress among health care workers are still limited in the literature [56, 57]. Improving the communication between the health care workers, patients, and patient's loved ones is a common feature in successful interventions [53]. In one study of a pediatric ICU setting, communication was associated with a successful reduction in MDS during the patients' stay [58]. Additionally, the dissociation between the ideas about the medical practice and the reality was suggested as a cause of moral distress in this field [59]. Furthermore, adopting effective mentoring and suitable consultation services proved to be significant assets for health care workers at different career levels [60, 61].

5. Limitations of study

To our knowledge, this is the first meta-analysis to summarize moral distress among health care workers in the context of the ICU setting; however, it has some limitations that should be noted. The included studies were heterogeneous in the tested distress predictors, measured values, composition of their participants, and reporting methods. We could not account for this heterogeneity with subgroup analysis or meta-regression, whenever possible, which is an indicator for the presence of other possible sources that were not tested in the current literature.

6. Conclusions

Moral distress is a major problem in the ICU setting, in terms of both severity/intensity and frequency. The heterogeneity among the current literature is very prominent making it hard to provide solid evidence in this context. Moreover, the most reported factors/predictors could not account for this heterogeneity, which means there is an obvious knowledge gap, and other factors need to be tested. Therefore, future research is required through a unified framework to develop appropriate interventions to address ICU-related moral distress.

AUTHOR CONTRIBUTIONS

RMA: Conceptualization, methodology, writing and editing, adjudication, and supervision. AAS, MIA: Data curation, methodology, writing —original draft preparation. RM, YKA, MME, FA: Investigation, validation, writing —review and editing. MHT, KA: Formal analysis, writing —review and editing.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

SUPPLEMENTARY MATERIAL

Supplementary material associated with this article can be found, in the online version, at https://oss.signavitae.com/mre-signavitae/article/1402535582511316992/attachment/SV2021032101_Supplementary_Figure_1.tif.

REFERENCES

[1] Nejadsarvari N, Abbasi M, Borhani F, Ebrahimi A, Rasooli H, Kalantar Motamedi MH, *et al*. Relationship of moral sensitivity and distress among physicians. Trauma Monthly. 2015; 20: e26075.

[2] Fourie C. Who Is Experiencing What Kind of Moral Distress? Distinctions for Moving from a Narrow to a Broad Definition of Moral Distress. AMA Journal of Ethics. 2017; 19: 578–584.

[3] Fourie C. Moral Distress and Moral Conflict in Clinical Ethics. Bioethics. 2015; 29: 91–97.

[4] Henrich NJ, Dodek PM, Alden L, Keenan SP, Reynolds S, Rodney P. Causes of moral distress in the intensive care unit: a qualitative study. Journal of Critical Care. 2016; 35: 57–62.

[5] Atashzadeh Shorideh F, Ashktorab T, Yaghmaei F. Iranian intensive care unit nurses' moral distress: a content analysis. Nursing Ethics. 2012; 19: 464–478.

[6] Dudzinski DM. Navigating moral distress using the moral distress map. Journal of Medical Ethics. 2016; 42: 321–324.

[7] Wiegand DL, Funk M. Consequences of clinical situations that cause critical care nurses to experience moral distress. Nursing Ethics. 2012; 19: 479–487.

[8] Hamric AB, Blackhall LJ. Nurse-physician perspectives on the care of dying patients in intensive care units: collaboration, moral distress, and ethical climate. Critical Care Medicine. 2007; 35: 422–429.

[9] Alborzi J, Sabeti F, Baraz S, Miladinia M, Saidkhani V, Sharhani A. Investigating of moral distress and attitude to euthanasia in the intensive care unit nurses. International Journal of Pediatrics. 2018; 6: 8475–8482.

[10] Karanikola MNK, Albarran JW, Drigo E, Giannakopoulou M, Kalafati M, Mpouzika M, *et al*. Moral distress, autonomy and nurse-physician collaboration among intensive care unit nurses in Italy. Journal of Nursing Management. 2014; 22: 472–484.

[11] Papathanassoglou EDE, Karanikola MNK, Kalafati M, Giannakopoulou M, Lemonidou C, Albarran JW. Professional autonomy, collaboration with physicians, and moral distress among European intensive care nurses. American Journal of Critical Care. 2012; 21: e41–e52.

[12] Mohammadi S, Talebi F, Borhani F, Roshanzadeh M. Moral distress and attitude to euthanasia: A correlation study in nurses. Medical Ethics Journal. 2014; 8: 28.

[13] Van Wijmen MPS, Rurup ML, Pasman HRW, Kaspers PJ, Onwuteaka-Philipsen BD. Advance directives in the Netherlands: an empirical contribution to the exploration of a cross-cultural perspective on advance directives. Bioethics. 2010; 24: 118–126.

[14] Borhani F, Abbaszadeh A, Mohamadi E, Ghasemi E, Hoseinabad-Farahani MJ. Moral sensitivity and moral distress in Iranian critical care nurses. Nursing Ethics. 2017; 24: 474–482.

[15] Mealer M, Moss M. Moral distress in ICU nurses. Intensive Care Medicine. 2016; 42: 1615–1617.

[16] McCarthy J, Gastmans C. Moral distress: a review of the argument-based nursing ethics literature. Nursing Ethics. 2015; 22: 131–152.

[17] Bruce CR, Miller SM, Zimmerman JL. A qualitative study exploring moral distress in the ICU team: the importance of unit functionality and intrateam dynamics. Critical Care Medicine. 2015; 43: 823–831.

[18] Liberati A, Altman DG, Tetzlaff J, et al. The PRISMA Statement for Reporting Systematic Reviews and Meta-Analyses of Studies that Evaluate Health Care Interventions: Explanation and Elaboration. Annals of Internal Medicine. 2009; 6: e1000100.

[19] Herzog R, Álvarez-Pasquin MJ, Díaz C, Del Barrio JL, Estrada JM, Gil Á. Are healthcare workers' intentions to vaccinate related to their knowledge, beliefs and attitudes? A systematic review. BMC Public Health. 2013; 13: 154.

[20] Ghozy S, Dung NM, Morra ME, Morsy S, Elsayed GG, Tran L, et al. Efficacy of kinesio taping in treatment of shoulder pain and disability: a systematic review and meta-analysis of randomised controlled trials. Physiotherapy. 2020; 107: 176–188.

[21] Higgins JP, Thompson SG, Deeks JJ, Altman DG. Measuring inconsistency in meta-analyses. BMJ. 2003;327(7414):557-560. doi:10.1136/bmj.327.7414.557

[22] Peters JL, Sutton AJ, Jones DR, Abrams KR, Rushton L. Comparison of two methods to detect publication bias in meta-analysis. The Journal of the American Medical Association. 2006; 295: 676–680.

[23] Egger M, Davey Smith G, Schneider M, Minder C. Bias in meta-analysis detected by a simple, graphical test. British Medical Journal. 1997; 315: 629–634.

[24] El-Qushayri AE, Ghozy S, Abbas AS, Dibas M, Dahy A, Mahmoud AR, et al. Hyperimmunoglobulin therapy for the prevention and treatment of congenital cytomegalovirus: a systematic review and meta-analysis. Expert Review of Anti-Infective Therapy. 2020; 19: 661–669.

[25] Borhani F, Saleh ZN, Loghmani L, Rasouli M, Nasiri M. Moral distress and compassion fatigue in nurses of neonatal intensive care unit. Electronic Journal of General Medicine. 2019; 16: 4.

[26] Elpern EH, Covert B, Kleinpell R. Moral distress of staff nurses in a medical intensive care unit. American Journal of Critical Care. 2005; 14: 523–530.

[27] Altaker KW, Howie-Esquivel J, Cataldo JK. Relationships among Palliative Care, Ethical Climate, Empowerment, and Moral Distress in Intensive Care Unit Nurses. American Journal of Critical Care. 2018; 27: 295–302.

[28] Cavaliere TA, Daly B, Dowling D, Montgomery K. Moral distress in neonatal intensive care unit RNs. Advances in Neonatal Care. 2010; 10: 145–156.

[29] De Boer JC, Van Rosmalen J, Bakker AB, Van Dijk M. Appropriateness of care and moral distress among neonatal intensive care unit staff: repeated measurements. Nursing in Critical Care. 2016; 21: 19–27.

[30] Dodek PM, Norena M, Ayas N, Wong H. Moral distress is associated with general workplace distress in intensive care unit personnel. Journal of Critical Care. 2019; 50: 122–125.

[31] Dryden-Palmer K, Moore G, McNeil C, Larson CP, Tomlinson G, Roumeliotis N, et al. Moral Distress of Clinicians in Canadian Pediatric and Neonatal ICUs. Pediatric Critical Care Medicine. 2020; 21: 314–323.

[32] Ganz FD, Raanan O, Khalaila R, Bennaroch K, Scherman S, Bruttin M, et al. Moral distress and structural empowerment among a national sample of Israeli intensive care nurses. Journal of Advanced Nursing. 2013; 69: 415–424.

[33] Lamiani G, Ciconali M, Argentero P, Vegni E. Clinicians' moral distress and family satisfaction in the intensive care unit. Journal of Health Psychology. 2020; 25: 1894–1904.

[34] Larson CP, Dryden-Palmer KD, Gibbons C, Parshuram CS. Moral Distress in PICU and Neonatal ICU Practitioners: a cross-sectional evaluation. Pediatric Critical Care Medicine. 2017; 18: e318–e326.

[35] Sannino P, Giannì ML, Carini M, Madeo M, Lusignani M, Bezze E, et al. Moral Distress in the Pediatric Intensive Care Unit: an Italian Study. Frontiers in Pediatrics. 2019; 7: 338.

[36] DeKeyser Ganz F, Berkovitz K. Surgical nurses' perceptions of ethical dilemmas, moral distress and quality of care. Journal of Advanced Nursing. 2012; 68: 1516–1525.

[37] Saleh ZN, Loghmani L, Rasouli M, Nasiri M, Borhani F. Moral distress and compassion fatigue in nurses of neonatal intensive care unit. Electronic Journal of General Medicine. 2019; 16: em116.

[38] Epstein EG, Whitehead PB, Prompahakul C, Thacker LR, Hamric AB. Enhancing Understanding of Moral Distress: the Measure of Moral Distress for Health Care Professionals. AJOB Empirical Bioethics. 2019; 10: 113–124.

[39] Lin T, Lin H, Cheng S, Wu L, Ou-Yang M. Work stress, occupational burnout and depression levels: a clinical study of paediatric intensive care unit nurses in Taiwan. Journal of Clinical Nursing. 2016; 25: 1120–1130.

[40] Henrich NJ, Dodek PM, Alden L, Keenan SP, Reynolds S, Rodney P. Causes of moral distress in the intensive care unit: a qualitative study. Journal of Critical Care. 2016; 35: 57–62.

[41] Lamiani G, Borghi L, Argentero P. When healthcare professionals cannot do the right thing: a systematic review of moral distress and its correlates. Journal of Health Psychology. 2017; 22: 51–67.

[42] Dodek PM, Wong H, Norena M, Ayas N, Reynolds SC, Keenan SP, et al. Moral distress in intensive care unit professionals is associated with profession, age, and years of experience. Journal of Critical Care. 2016; 31: 178–182.

[43] Neumann JL, Davis L, Jernigan C. Methods to Address Moral Distress Experienced by Stem Cell Transplantation Nurses and Build Resiliency. Biology of Blood and Marrow Transplantation. 2018; 24: S117–S118.

[44] Whitehead PB, Herbertson RK, Hamric AB, Epstein EG, Fisher JM. Moral Distress among Healthcare Professionals: Report of an Institution-Wide Survey. Journal of Nursing Scholarship. 2015; 47: 117–125.

[45] Wiegand DL, Funk M. Consequences of clinical situations that cause critical care nurses to experience moral distress. Nursing Ethics. 2012; 19: 479–487.

[46] Nuttgens S, Chang J. Moral Distress within the Supervisory Relationship: Implications for Practice and Research. Counselor Education and Supervision. 2013; 52: 284–296.

[47] Carroll KW, Mollen CJ, Aldridge S, Hexem KR, Feudtner C. Influences on Decision Making Identified by Parents of Children Receiving Pediatric Palliative Care. AJOB Primary Research. 2012; 3: 1–7.

[48] Whitehead PB, Herbertson RK, Hamric AB, Epstein EG, Fisher JM. Moral distress among healthcare professionals: report of an institution-wide survey. Journal of Nursing Scholarship. 2015; 47: 117–125.

[49] Colville GA, Dawson D, Rabinthiran S, Chaudry-Daley Z, Perkins-Porras L. A survey of moral distress in staff working in intensive care in the UK. Journal of the Intensive Care Society. 2019; 20: 196–203.

[50] O'Connell CB. Gender and the experience of moral distress in critical care nurses. Nursing Ethics. 2015; 22: 32–42.

[51] Førde R, Aasland OG. Moral distress among Norwegian doctors. Journal of Medical Ethics. 2008; 34: 521–525.

[52] Green CA, Pope CR. Gender, psychosocial factors and the use of medical services: a longitudinal analysis. Social Science & Medicine. 1999; 48: 1363–1372.

[53] Abbasi M, Nejadsarvari N, Kiani M, Borhani F, Bazmi S, Nazari Tavaokkoli S, et al. Moral distress in physicians practicing in hospitals affiliated to medical sciences universities. Iranian Red Crescent Medical Journal. 2014; 16: e18797.

[54] Hlubocky FJ, Rose M, Epstein RM. Mastering Resilience in Oncology: Learn to Thrive in the Face of Burnout. American Society of Clinical Oncology Educational Book. American Society of Clinical Oncology Annual Meeting. 2017; 37: 771–781.

[55] Shanafelt T, Dyrbye L. Oncologist burnout: causes, consequences, and responses. Journal of Clinical Oncology. 2012; 30: 1235–1241.

[56] Hlubocky FJ, Taylor LP, Marron JM, Spence RA, McGinnis MM, Brown RF, et al. A Call to Action: Ethics Committee Roundtable Recommendations for Addressing Burnout and Moral Distress in Oncology. JCO Oncology Practice. 2020; 16: 191–199.

[57] Musto LC, Rodney PA, Vanderheide R. Toward interventions to address moral distress: navigating structure and agency. Nursing Ethics. 2015; 22: 91–102.

[58] Wocial L, Ackerman V, Leland B, Benneyworth B, Patel V, Tong Y, et al. Pediatric Ethics and Communication Excellence (PEACE) Rounds: Decreasing Moral Distress and Patient Length of Stay in the PICU. HEC Forum. 2017; 29: 75–91.

[59] Perni S. Moral distress: A call to action. AMA Journal of Ethics. 2017;

19: 533–536.

[60] Disch J. Rethinking Mentoring. Critical Care Medicine. 2018; 46: 437–441.

[61] Hamric AB, Epstein EG. A Health System-wide Moral Distress Consultation Service: Development and Evaluation. HEC Forum. 2017; 29: 127–143.