Table 3. Specific interventions concerning ICU working conditions

Systematic review	Publication and study population	Intervention	Findings
Imbulana, 2021	Abassi, 2019 60 ICU nurses, Iran	Type of intervention: moral empowerment program. The intervention addressed constrained action as a component of moral distress. • Intervention group: 2-day workshop (6hrs/day) employing Alvita K. Nathaniel's Theory of Moral Reckoning in Nursing (Nathaniel, 2006) which helped clinicians develop personal action plans to address the constraints. • Control group: received a pamphlet explaining moral distress symptoms and complications during a 2-hr session The invention group: N = 30 The control group: N = 30 Measurements took place before, 2 weeks and one month after the intervention. Used Corley's Moral Distress Scale or Hamric's Moral Distress Scale-Revised (MDS-R) to quantify the intensity and frequency of moral distress levels in participants.	• Measured distress at three-time points, pre-intervention, 2 weeks post and 1 month post intervention. • Moral distress scores significantly decreased after 1 month post-intervention compared with moral distress scores before the intervention in the experimental group.
	Molazem, 2013	Type of intervention: moral empowerment (focused on constrained action). A total of 60 Cardiac Care Unit Nurses in Iran were included. Intervention group: N = 30	• Moral distress scores in the intervention group reduced at 1 and 2 months post-intervention compared with pre-intervention. • Control group had increased moral distress score post-intervention at 1 and 2 months compared with pre-intervention.

		Control group: N = 30 Intervention: Educational workshop about moral distress and the use of ‘‘4A model” (framework developed by the American Association of Critical-Care Nursing in 2004). • Two 4-hour sessions during two consecutive weeks • 1st session involved discussion about the concept, causes, symptoms of moral distress • 2nd session involved discussion of strategies to reduce moral distress, role play to demonstrate the use of ‘‘4A model” Primary outcome measure was the MDS-R. Used Corley’s Moral Distress Scale or Hamric’s Moral Distress Scale-Revised (MDS-R) to quantify the intensity and frequency of moral distress levels in participants. Measurements to measure moral distress took place pre-intervention and then again at two or more weeks post intervention.	
	Saeedi, 2019 120 ICU nurses, Iran	Type of intervention was categorized as reflective exercises through narrative writing. The intervention addressed a component of moral distress: moral judgement. A total of 106 nurses completed the study: Intervention group: N = 55 Control group: N = 51	• Narrative writing had no significant effect on mean or frequency of moral distress, including on subgroup analysis • Themes such as the lack of respectful working relations, pressures imposed by physicians and managers, financial problems, and the workload were all expressed by the participants.

		Description of the intervention: Narrative writing, asked to write about: • Their thoughts and emotions at least once a week for 8 weeks • Best/worst moral experience Primary outcome measure was the Corley's Moral Distress questionnaire completed by all participants at baseline and at the end of 8 weeks. Measurements to measure moral distress took place pre-intervention and then again at two or more weeks post intervention.	
	Beumer, 2008 34 ICU nurses, USA	5 workshops on moral distress were given to regularly scheduled nurses over the course of 4 weeks: Intervention group: N = 21 Control group: N = 13 Attendees completed a pre- workshop survey and post-workshop survey 7 to 10 weeks later. Primary outcome measure: unvalidated moral distress survey consisting of 8 questions using a 5-point Likert scale and 4 true/false statements.	• 23% strongly agreed with having adequate resources to cope with morally distressing situations postworkshop compared with 12% preworkshop. • Results from moral distress survey suggests decrease in moral distress. • Nurses did not feel more empowered to express opinions of perceived 'futile' treatment. • Feedback suggests importance of recognition and validation of moral distress for nurses.
	Legett, 2013 13 Burns ICU nurses, USA	Phase 1: Seven key informants across four burn centres were interviewed Phase 2: Implementation of intervention at single, burns ICU: Group A: N = 6 Group B: N = 7 Primary outcome measure (used in phase two): Corley's Moral Distress Scale-Revised (MDS-R) and Self-efficacy Scale completed preintervention (Group A), immediately post-intervention (Group	Phase 1: • Expressed need for organized debriefing. • Highlighted existing Employee Assistance Program for stress management. • Suggestions of different approaches eg. annual retreats for staff and burn survivors, regular debriefing sessions on the unit, and a mentoring program. Phase 2: • Higher median MDS-R scores observed in Group B than Group A post-intervention.

		B) and 6 weeks post- intervention (both Group A&B).	• No significant difference for Group A or B MDS-R scores at 6 weeks post-intervention.
	Browning, 2018 36 ICU nurses, USA	Questionnaire completed at the beginning and end of a 6-month period. Intervention group: N = 6 Control group: N = 30 Primary outcome measure: MDS-R	• Levels of moral distress in the experimental group were lower (but not significant) than in the control group. • Improved constructive confrontation and voicing opinion about a patient's care. • 85% respondents reported most benefit from case discussions with colleagues, recognition of nursing concerns (76%), and the opportunity to discuss emotions (70%).
	Meziane, 2018 19 ICU nurses with palliative care experience, Canada	Moral distress measured pre- and post-intervention, and again 2 weeks after. Primary outcome measure: MDS-R	• No significant difference in level of moral distress pre- and postintervention. • 3 nurses who intended to leave their- position at pre-intervention changed their minds at post-intervention.
	Reiley, 2017 49 Cardiac ICU nurses, USA	Focus groups- all sessions audiotaped	• Participants report intervention: decreased moral distress, allowed opportunity to identify emotions and debrief thus improving the ethical practice environment. • Structured ethical group discussion allowed for new perspective of colleagues, patients and families viewpoints. • Highlighted importance of ethical facilitator role and nursing leadership presence.
Alkhawaldeh, 2020	Gholizadeh, 2017 Nurses working in intensive care units of Imam Hussein (SA) hospital in Kermanshah	A total of 60 participants were included. The intervention consisted of mindfulness meditation (eight 90-min sessions once per week for 8 weeks). The evaluation occurred immediately after the intervention. Occupational stress measured using an Expanded Nursing Stress Scale (ENSS).	• Findings supported aforementioned results in terms of the effect of mindfulness meditation on reducing occupational stress among nurses working in ICUs. • The mean ENSS score in the intervention group before intervention was 165.28 (SD = 21.35), which immediately decreased to 118.20 (SD = 17.52) after intervention.

	Nazari, 2015 Nurses working in intensive care units (dialysis, ICU, and CCU) in the treatment centers of Alzahra, Chamran, Kashani, and Noor hospitals affiliated to Isfahan University of Medical Sciences, Iran	A total of 66 participants were included. The intervention consisted of a general Swedish massage (twice a week for 4 wk) each session lasted 25 minutes. The evaluation occurred immediately and after 2 wk of the intervention. Outcome measurement was OSI (Occupational Stress Inventory).	• Found that using a general Swedish massage twice a week for 4 weeks is effective in reducing occupational stress immediately and 2 weeks after intervention among ICU nurses.
	Bernstein, 2015 Employees of the Cleveland Clinic's ICUs	A total of 13 participants were included. The intervention consisted of Hatha Yoga which includes breathing exercises (pranayama), physical movements (asana), and deep relaxation (shavasana) (six sessions a week for 6 wk) each session lasted 15 min. The evaluation occurred immediately after the intervention. Outcome measurement was PSS (Perceived Stress Scale).	• Hatha yoga is effective at reducing the stress level among nurses working in ICUs. • The stress scores were not statistically different between pre-intervention and post-intervention, • the stress scores tended to be lower after yoga than before yoga.
	Lan, 2014 Critical care nurses	A total of 37 participants were included. The intervention consisted of Mindfulness-based cognitive therapy (2 h per week for 5 wk) using lectures, inter-group sessions educational booklets, and audio compact disc	• Findings showed that mindfulness-based cognitive therapy (MBCT) program, which included 5 to 10 minutes of independent daily practice, also resulted in a significant reduction in stress level after 1 week of the intervention when measured using the PSS.

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		The evaluation occurred 1 wk after the intervention. Outcome measurement was PSS (Perceived Stress Scale) and DASS (Depression Anxiety Stress Scale).	
	Hemmati Maslakpak, 2016 Nurses working in the critical care units of Urmia Imam Khomeini and Motahari educational–therapeutic centers	A total of 60 participants were included. The intervention consisted of neuro-Linguistic Programming (18 sessions for 6 mo) each session lasted 3 h). The evaluation occurred 1 month after the intervention. Outcome measurement was the ENSS (Expanding Nursing Stress Scale).	• The use of neuro-linguistic programming can increase coping with stressful situations, and it can reduce occupational stress. • The mean ENSS (Expanding Nursing Stress Scale) score before the program was 120.88 and 121.36 for the intervention and control • groups, respectively. After 1 month of the intervention, the score means of occupational stress decreased to 64.53 in the intervention group, while that of control remained relatively unchanged (120.96).
	Saedpanah, 2016 Nurses working in the Intensive Care Unit (ICU) and Critical Care Unit (CCU) in two teaching hospitals in Sanandaj, Iran	A total of 60 participants were included. The intervention consisted of Emotion regulation training (eight sessions of 2 h) . The evaluation occurred immediately after the intervention. Outcome measurement was the ENSS (Expanding Nursing Stress Scale).	• Findings support the aforementioned results in terms of the effect of education on reducing occupational stress using emotional intelligence components. • The mean ENSS score in the intervention group before intervention was 136.6 (SD = 24.6), which immediately decreased to 113.02 (SD = 16.2) after intervention.
	Nooryan, 2011 Nurses working in the intensive care unit in Armenia	A total of 76 participants were included. (70 participants were male nurses) The intervention consisted of Emotional intelligence items education (four sessions of general conference program, six inter-group	• Teaching emotional intelligence items, which consisted of five major elements and 15 subscales, is effective in reducing occupational stress and anxiety after 1 month of the intervention. • Nurses experiencing a high level of stress, and the ability to deal with emotion intelligence helps them in coping with occupational stress and should be developed in stress management trainings.

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		sessions and educational booklets) each session lasted 2 h. The evaluation occurred 1 month after the intervention. Outcome measurement was Anxiety, stress (Bar-on emotional intelligence questionnaire).	
	Babanataj, 2018 30 ICU nurses, Iran	Effect of the resilience training on occupational stress.	The mean score of the occupational stress of the participants decreased significantly after the intervention, and the mean score of resilience increased significantly after the intervention.
	Eren, 2017 45 ICU nurses, Turkey	Aromatherapy (Lavender oil inhalation for 10 or 15 min)	Nurses' stress scores were not significantly different between control and aromatherapy groups, but stress scores tended to be lower in the intervention group immediately after lavender oil inhalation for 10 or 15 minutes than the control group.