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Moral distress and protective work environment for healthcare workers during public health emergencies

K. Bondjers[1*], Alve K. Glad[1], H. Wøien[8], T. Wentzel-Larsen[1], D. Atar[3,4], SK. Reitan[5,6], LA. Rosseland[4,7], JA. Zwart[2,4], G. Dyb[1,4] and SØ. Stensland[1,2]

Abstract

Background Public health emergencies, such as the Covid-19 pandemic, put great pressure on healthcare workers (HCW) across the world, possibly increasing the risk of experiencing ethically challenging situations (ECS). Whereas experiencing ECS as a HCW in such situations is likely unavoidable, mitigation of their adverse effects (e.g., moral distress) is necessary to reduce the risk of long-term negative consequences. One possible route of mitigation of these effects is via work environmental factors.

Objectives The current study aimed to examine: [1] risk factors associated with ECS among HCW [2], intensity of moral distress associated with ECS across various occupational factors (i.e., profession, degree of exposure to patients with Covid-19), and [3] the impact of work environmental factors on this association, in a sample of HCW during the pandemic.

Methods We employed multiple logistic and linear regression to self-report data from 977 HCWs at four Norwegian hospitals responding to a survey at the fourth wave of the pandemic.

Results About half of HCW in this study had experienced ECS during the pandemic, and levels of moral distress associated with such were higher than in previous studies using similar assessment methods. Younger age, female sex, geographical work area (mid-north of Norway), and profession (nurse) were all associated with higher odds (range of OR: 1.30–2.59) of experiencing ECS, as were direct contact with patients with Covid-19. Among those participants who reported that they had experienced ECS during the pandemic, moral distress levels when recalling those situations were moderate (Mean 5.7 on a 0–10 scale). Men reported somewhat lower intensity of moral distress (partial eta squared; $\eta p^2 = 0.02$). Reporting a manageable workload ($\eta p^2 = 0.02$), and greater opportunity to work according to best practice ($\eta p^2 = 0.02$), were associated with lower levels of moral distress.

Conclusions Our findings suggest that moral distress could potentially be mitigated on an organizational level, particularly by focusing on ensuring a manageable workload, and an ability to work according to best practice. To build sustainable healthcare systems robust enough to withstand future public health emergencies, healthcare organizations should implement measures to facilitate these aspects of HCWs' work environment.

*Correspondence:
K. Bondjers
kristina.bondjers@nkvts.no

Full list of author information is available at the end of the article

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Keywords Moral distress, Ethical challenges in healthcare, Healthcare workers, Healthcare organizations

Introduction

Ethically challenging situations (ECS) in healthcare settings include situations where scarce resources (medical or human) or other constraints (e.g., social, practical), prevent or hinder ethical and professional practice. Such situations may elicit moral distress: feelings of stress and discomfort related to not being able to execute actions in adherence with one's moral values, or not being able to preserve all interests and values at stake [1]. Transient discomfort is a normal and healthy reaction to ethical difficulties. It enables us to identify ethical challenges and thus promotes adherence to moral standards [2]. However, lingering moral distress has been shown to increase the risk of mental and physical health problems among healthcare workers (HCW), and is associated with turnover intention, reduced clinician well-being and reduced quality of patient care [2–7]. While elimination of exposure to ECS within the healthcare sector is likely impossible, mitigation of its adverse effects such as persistent moral distress is necessary to reduce the risk of long-term negative consequences on the health and professional quality of life of HCW. One possible route of mitigation might be via work environmental interventions. However, knowledge is sparse on what work environmental factors reduce or increase the risk of lingering moral distress.

The Covid-19 pandemic put great pressure on HCW across the world, giving rise to ECS related to, for example, allocation of resources, priority-setting dilemmas, unpreparedness, and severe challenges in providing optimal care [8–10]. Several studies have indicated that exposure to ECS was high, with up to 80% of HCW in various settings and professions experiencing at least one situation eliciting moral distress [4, 11]. In Scandinavia, a study of HCW in western Norway reported that 67% of HCW had experienced priority-setting dilemmas [8]. In the neighboring country, Sweden, with somewhat higher infection rates, 76% of HCW reported experiencing situations eliciting moral distress [12]. Risk of experiencing ECS appears to be higher among HCW involved in direct care for patients with Covid-19, female sex, and of younger age [8, 12].

A recent meta-analysis examining moral distress among nurses, utilizing data from 19,537 participants, indicated a mean score of moral distress of 2.55 on a 0–10 scale [13]. In a panel study among Norwegian physicians moral distress in relation to time constraint appeared to increase between 2004 and 2021 [14]. Some studies have suggested that the intensity of moral distress varies among professions, with nurses and physicians reporting higher levels of distress compared to other HCW [15, 16]. Further, higher pandemic exposure (e.g., working closer to patients with Covid-19) appears to be associated with higher levels of moral distress [8, 17, 18]. It is possible that the experience of moral distress associated with experiencing ECS may be aggravated or alleviated by factors in the work environment. For example, some studies have shown that lack of support from leadership, lack of access to personal protective equipment (PPE), swiftly changing guidelines, and unpredictability in roles and tasks, lead to increased levels of moral distress [19, 20]. Higher organizational support, resource adequacy, and positive work-life balance, on the other hand, appears to be a protective factors against moral distress [17, 18, 21].

While there are studies such as those described above that have examined experiencing ECS and intensity of moral distress among HCW during the pandemic, most of these studies have used data collected during the pandemic's early phases. It is possible that both risk factors for exposure to ECS, the impact of such events on distress, and the potential protective aspects of work environment differed across the pandemic. In the current study, we aimed to expand the current knowledge on ECS, moral distress, and work environment during long term public health emergencies by examining [1] demographic and occupational risk factors associated with experiencing ECS among HCW [2], intensity of moral distress associated with such situations across various occupational factors (i.e., profession, exposure to patients with Covid-19), and [3] the impact of work environmental factors on lingering moral distress associated with such situations, in a sample of HCW during the pandemic's fourth wave in Norway.

Methods.

Participants and procedure

Participants in the current study were partaking in a longitudinal open-cohort study following HCW at four large university hospitals in Norway throughout the first four waves of the Covid-19 pandemic, described in detail elsewhere [22]. The current paper uses data collected around the pandemics fourth wave (T4) in Norway, and took place in January/February 2022. Eligible participants were hospital frontline workers, working directly or indirectly with diagnosed or suspected patients with Covid-19 at Oslo University Hospital (OUS), Akershus University Hospital (AHUS), St Olavs Hospital (St Olav), and the University Hospital of North Norway (UNN). Invitations to participate in a web-based survey were sent out via the hospitals' typical channels for communicating with their staff (e.g., e-mail, SMS, online bulletin boards). In total, 977 HCWs (75% female, mean age 45 years)

participated at T4. Participants were nurses, physicians, and other regulated and non-regulated hospital personnel (e.g., physiotherapists, nutritionists, assistant nurses, ambulance personnel, psychologists, social workers, priests, medical laboratory scientists or cleaners). Table 1 displays demographic data and background data for the sample. Informed consent was obtained from all participants prior to the study.

Measures

Participants answered a web-based questionnaire consisting of both items developed for the current study, and validated psychometric measures. Below, we describe measures relevant for the current analysis, including demographic data, professional role, pandemic exposure, work environmental factors and moral distress. Psychometric measures (i.e. work environmental factors and moral distress) are also included in supplementary A.

Participants' demographic and professional characteristics

Participants' age and sex were derived from their social security number. Their profession was categorized as 'nurse', 'physician' or 'other frontline worker', with the latter including all other hospital personnel.

Pandemic exposure

Pandemic exposure was measured as workplace (geographical area) and level of contact with patients with Covid-19. Participants' responses regarding their primary workplace (i.e., hospital) were dichotomized based on geographic variation in incidence rates. During the study period, incidence rates and hospital admissions were higher in the South-east (OUS and Ahus) than in Mid-North (UNN and St Olav) in Norway [23]. Level of contact was based on participants' reports on their contact with patients with suspected or diagnosed Covid-19 during the pandemic. Three categories were derived, "Direct contact with severely ill patients"; encompassing personnel working with patients with Covid-19 with severe illness, "Direct contact with patients without severe illness"; encompassing personnel being in contact with patients with diagnosed or suspected covid-19 infection, without severe illness and "Indirect contact"; encompassing personnel working at one of the hospitals during the outbreak, but reporting no direct contact with suspected or diagnosed Covid-19 patients, in line with recommendations by Pollock et al., 2020 [24].

Experiencing ethically challenging situations and levels of moral distress

Participants were given the following definition of moral distress: *"Moral distress is distress or worry you feel when you know what the ethically right thing to do is, but various obstacles (e.g., lack of personnel resources, lack of equipment, procedures, pressure from others) prevent you from doing it" and asked."During the pandemic, have you been in situations where you have experienced moral distress?"*. Participants who confirmed this were asked to rate how much moral distress they experienced when thinking about that situation now, using the moral distress thermometer, where participants rate their moral distress on a 11-point scale, ranging from 0 (no distress) – 10 (worst possible distress) [25]. The Moral distress thermometer has previously shown moderate to strong

Table 1 Demographic data and background factors. *N* = 977

		N	%	Mean (range)
Demographics				
	Sex, women	735	(75)	
	Age (mean / range)			45 (19–81)
Profession				
	Nurse	437	(45)	
	Physician	186	(19)	
	Other	354	(36)	
Pandemic exposure[a]				
Geographical area				
	South/East	706	(73)	
	Mid/North	265	(27)	
Level of care for C-19 patients[b]				
	Indirect contact	191	(20)	
	Direct contact, but not with severely ill	304	(32)	
	Direct contact, with severely ill	451	(48)	
	Experienced ECS[1]	508	(52%)	

[a] 976 participants provided data for this variable

[b] 946 participants provided data for this variable

[1] ECS = Ethically challenging situation

associations with longer measures of moral distress among healthcare workers [25, 26]. In a psychometric validation of the instrument in Sweden, which is culturally and lingually similar to Norway, the mean score among healthcare professionals was 2.26 [26].

Work environment

The participants' perception of their work environment was measured using the 29-item Frontline health workers' Occupational Risk and Characteristics in Emergencies index (FORCE-index) [27]. Satisfaction scores within the following nine facets of the work environment are derived: (i) competency, (ii) stress management, (iii) familiarity, (iv) workload, (v) work performance, (vi) infection safety, (vii) personal protection equipment, (viii) social safety, and (ix) social support. Scale score ranges are 0–10, with higher scores indicating higher satisfaction in that area.

Statistical analysis

The data-analysis included several steps. To achieve our first aim, to examine demographic and occupational risk factors associated with experiencing ECS among HCW, sex, age, profession, geographical area, and level of contact with patients with Covid-19, were entered into a multiple logistic regression, using reporting experiencing ECS as an outcome. For our second aim, to examine the intensity of moral distress associated with such situations across various occupational factors, a multiple linear regression analysis was run, with the same predictors (i.e., sex, age, profession, geographical area, and level of contact with patients with Covid-19) and intensity of moral distress when recalling this event as an outcome (model 1). To achieve the third aim, to examine the impact of work environmental factors on lingering moral distress associated with such situations, additional predictors in the form of participants' rating of nine facets of their work environment were entered as predictors in a multiple linear regression model, while adjusting for the predictor variables in model 1 (model 2). We report on partial eta^2 (ηp^2) as an effect measure for significant predictor variables in the linear regression. All analyses were conducted using R software and the package finalfit, effectsize and car [28–32].

Missing data Participants who did not respond to the question on ECS ($n=5$) were excluded from the current study. For all analysis, we employed complete case analysis. In the logistic regression analysis, 31 individuals lacked information on pandemic exposure, and 1 participant lacked information on geographical area, these were excluded from the analysis. The sample size for the logistic regression thus included 940 out of 977 participants. For the linear regression analysis, we used data from participants who had acknowledged that they had experienced an ECS (508). Out of those, 17 participants did not respond to the outcome measure for the linear regression (i.e. the moral distress thermometer) and were excluded. For the predictor variables in this analysis, there were no missing data on any of the background variables (i.e. age, gender, geographical area, profession, and level of contact with patients with Covid-19). For the calculation of variables assessing work environmental factors, we initially used half-rule to handle missing data when calculating mean scores. The sample size for the linear regression included 461 participants.

Results

Sample characteristics, experiencing ethically challenging situations and moral distress intensity

In total, 977 HCW participated at T4. Table 1 presents demographic data for the remaining sample. The majority (73%) worked in a geographical area with high incidence rates of Covid-19, and 80% had been in direct contact with patients with Covid-19 during the pandemic, whereof 48% had been in contact with patients with severe illness. A little more than half (508, 52%) reported experiencing ECS. Mean score on the moral distress thermometer, aimed at assessing levels of moral distress, was 5.7 (SD=2.1) among participants who had experienced ECS. In line with mean score in previous studies, we have interpreted this as moderate levels.

Predictors of experiencing ethically challenging situations

In a univariable logistic regression younger age, female sex nurse profession, and level of contact to patients with Covid-19 were associated with higher odds of experiencing an ECS. A multivariable logistic regression yielded similar results, with the addition of geographical area (working in Mid-North) also being associated with higher odds of experiencing an ECS (Fig. 1).

Predictors of moral distress intensity

To estimate the associations between pandemic exposure (geographical area, frontline workers), work environment facets, and the outcome moral distress (rated 0–10) among participants reporting experiencing ECS, multiple linear regression analyses were performed (Table 2). Results from model 1 indicated that women ($\eta p^2=0.02$) and nurses ($\eta p^2=0.01$) had higher levels of moral distress in a univariable analysis. In a multivariable analysis, only female sex remained as a significant predictor of higher intensity of moral distress. In model 2, univariable analysis indicated that higher scores on all organizational factors, except for social support, were associated with moral distress. In a multivariable analysis, only two organizational factors remained: reporting a manageable workload ($\eta p^2=0.02$) and greater opportunity to work according to best practice ($\eta p^2=0.01$).

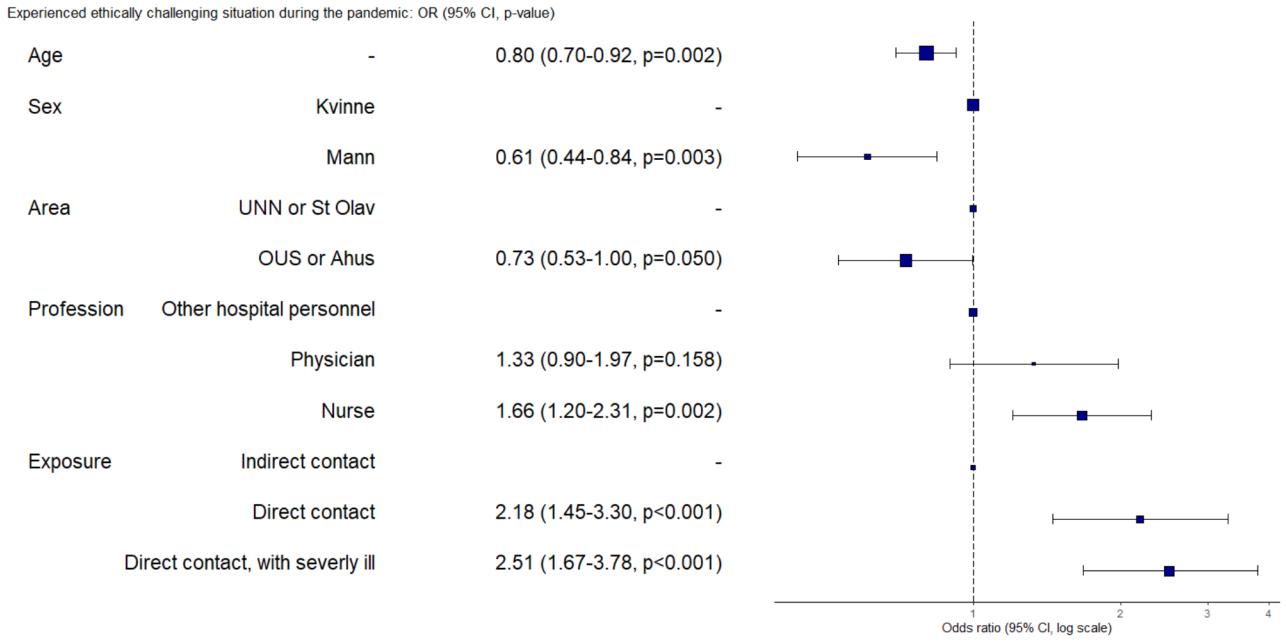

Fig. 1 Odds ratios for experiencing an ethically challenging situation during the pandemic, predicted by background factors and pandemic exposure (*N* = 940). Estimates are based on multiple logistic regression. Age shows odds per 10 year increment

Discussion

The current study aimed to examine [1] risk factors associated with experiencing ECS while working in hospital settings during the Covid-19 pandemic [2], levels of moral distress associated with such exposure at the fourth infection wave, two years into the pandemic, and [3] the impact of work environmental factors on intensity of moral distress. Three key findings were observed. First, pandemic exposure in the form of working with patients with Covid-19 was significantly associated with increased risk of experiencing an ECS. However, when comparing geographical areas, the risk of experiencing ECS was also higher for those working in Mid and North of Norway, areas that overall had lower cumulative rates of Covid-19 across the pandemic [23]. Second, levels of moral distress were higher than in previous studies using equivalent measures during the pandemics early stages [8, 18]. And third, while there were differences between professions, with nurses reporting higher intensity of moral distress, this effect was lower and non-significant when accounting for work environmental factors. Experiencing a manageable workload, a supportive social work environment and being able to provide adequate medical and psychosocial care, were significantly associated with lower intensity of moral distress.

The present results corroborate findings from previous studies in similar settings, and clearly suggest that direct contact with patients with Covid-19 was associated with higher risk of experiencing ECS during the pandemic [8, 12, 33]. Likewise, nurses, women and those of younger age, had higher odds of experiencing an ECS, largely in line with previous studies [8, 12]. A surprising finding was the differences in risk associated with working in different geographical areas. This difference was significant after adjusting for contact with patients with Covid-19, and there are several possible explanations for this. For example, albeit highly speculative, it is possible that differences in organizational challenges between the regions, related to the pandemic or not, could contribute to varying risk. Additionally, with a lower number of Covid-19 patients in the mid/northern regions across the pandemic, there is a possibility that procedures and routines related to the pandemic were less integrated in regular care and perceived as more challenging than in areas with higher number of cases. Finally, it is possible that incidence rates in the surrounding society and Covid-related admission rates at the hospital might have influenced whether some of the constraints imposed in the hospital, such as general visitation restrictions or enforced use of PPE impacting the ability to communicate with patients, were perceived as ethically challenging in low-endemic areas. In line with this hypothesis, in a qualitative study performed on the same sample, visitation restrictions for non-Covid patients were described as provoking moral distress [34]. It should be noted that there are also other differences between these geographical areas, such as overall population density and life expectancy [35]. Thus, these results need to be replicated in independent samples and settings, but tentatively suggest that keeping measures proportional to risk in the

Table 2 Linear regression analysis estimating associations between background factors, pandemic exposure, work environmental facets and moral distress. The current analysis includes participants who reported that they had experienced ECS during the course of the pandemic ($N = 461$)

		Model 1								Model 2							
	MDT score Mean (SD)	Univariable coefficient [95% CI], p				Multivariable coefficient [95% CI], p				Univariable coefficient [95% CI], p				Multivariable coefficient [95% CI], p			
Age^10	5.7 (2.1)	-0.13	[-0.30;	0.04],	0.130	-0.09	[-0.27;	0.08],	0.297	-0.13	[-0.30;	0.04],	0.130	-0.06	[-0.23;	0.12]	0.51
Sex														-			
Women	5.9 (2.2)					-											
Men	5.2 (1.9)	**-0.64**	**[-1.10;**	**-0.18]**,	**0.007**	**-0.66**	**[-1.14;**	**-0.17]**,	**0.008**	**-0.64**	**[-1.10;**	**-0.18]**,	**0.007**	**-0.64**	**[-1.11;**	**-0.18]**	**0.007**
Area						-								-			
Mid & North	5.9 (2.2)																
South-East	5.7 (2.1)	-0.16	[-0.58;	0.25],	0.445	-0.4	[-0.84;	0.03],	0.070	-0.16	[-0.58;	0.25],	0.445	-0.39	[-0.81;	0.03]	0.068
Profession						-								-			
Other hospital personnel	5.6 (2.2)																
Physician	5.2 (2.1)	-0.41	[-0.97;	0.15],	0.150	-0.41	[-0.99;	0.18],	0.169	-0.41	[-0.97;	0.15],	0.150	-0.22	[-0.79;	0.35]	0.446
Nurse	6.0 (2.1)	**0.47**	**[0.03;**	**0.90]**,	**0.035**	0.28	[-0.19;	0.75],	0.237	**0.47**	**[0.03;**	**0.90]**,	**0.035**	0.33	[-0.13;	0.79]	0.157
Level of contact						-								-			
Indirect contact	5.5 (1.8)																
Direct contact, not with severely ill	5.5 (2.0)	0.08	[-0.57;	0.74],	0.809	0.02	[-0.65;	0.69],	0.951	0.08	[-0.57;	0.74],	0.809	-0.10	[-0.77;	0.57]	0.772
Direct contact, with severely ill	5.9 (2.3)	0.42	[-0.20;	1.04],	0.181	0.43	[-0.23;	1.08],	0.200	0.42	[-0.20;	1.04],	0.181	0.19	[-0.49;	0.86]	0.586
Work environment factors																	
Competency										**-0.25**	**[-0.35;**	**-0.14]**,	**<0.001**	-0.09	[-0.21;	0.02]	0.116
Stress management										**-0.09**	**[-0.16;**	**-0.02]**,	**0.008**	0.00	[-0.07;	0.07]	0.988
Familiarity										**-0.18**	**[-0.26;**	**-0.10]**,	**<0.001**	-0.07	[-0.16;	0.02]	0.137
Workload manageability										**-0.27**	**[-0.34;**	**-0.19]**,	**<0.001**	**-0.16**	**[-0.26;**	**-0.06]**	**0.002**
Work performance										**-0.13**	**[-0.21;**	**-0.06]**,	**0.001**	**-0.09**	**[-0.17;**	**-0.01]**	**0.036**
Infection safety										**-0.09**	**[-0.15;**	**-0.02]**,	**0.007**	0.04	[-0.03;	0.11]	0.279
Protection (PPE)*										**-0.25**	**[-0.35;**	**-0.16]**,	**<0.001**	-0.05	[-0.17;	0.07]	0.378
Social safety										**-0.42**	**[-0.62;**	**-0.22]**,	**<0.001**	-0.16	[-0.37;	0.06]	0.154
Social support										-0.16	[-0.22;	0.09],	0.130	-0.07	[-0.14;	0.00]	0.066

Note: MDT score = score on the Moral distress thermometer, SD = standard deviation. Significant associations ($p < .05$) in bold

surrounding society during public health emergencies could protect against unnecessary adverse experiences among frontline workers.

The higher levels of moral distress compared to previous studies using equivalent measures [8, 18] indicate that it may have been more difficult for HCW to cope with ECS as the pandemic furthered on. Regarding demographical and occupational risk factors for lingering moral distress associated with ECS, the pattern was slightly different than for risk factors for experiencing ECS described above. Sex (female) was the only consistent demographic risk factor associated with intensity of moral distress, corroborating previous studies [14, 36]. A study using a qualitative approach to moral distress among HCW during the Covid-19 pandemic has suggested that while exposure to ECS at work is not explicitly gendered (i.e., they could be experienced by both men and women), societal and individual expectations on workers of different gender may be, both at work and at home [37]. In light of this, albeit speculative, it is possible that reactions to ECS (i.e. moral distress) may be stronger and last for longer, for women compared to men, as a result of gender norms. As for occupational factors, we did not find significant differences in intensity of moral distress between participants working in different geographical areas nor for participants with different exposure to patients with Covid-19. In line with established knowledge [13, 38], nurse occupation was significantly associated with both experiencing ECS and higher intensity of moral distress, but when adjusting for work environmental factors, this association was no longer significant. Instead, reporting a manageable workload, being able to perform according to best practice, and social support served as protective factors against higher intensity of moral distress. These results highlight the importance of taking care to address such work environmental factors, particularly among HCW in the nurse profession. These results are partly in line with previous studies. For example, Plouffe et al. (2021) [21] found that positive work life impact (which is partly defined as adequate work hours) predicted lower intensity of moral distress in a sample of Canadian HCW. Zulaihah et al. (2022) [39] proposed that excessive work demands were one of many work environmental risk factors for increased moral distress during the pandemic. Our findings corroborate those, and further shows that a manageable workload and possibility of delivering high quality care appears to be protective, even in the light of exposure to ECS. While some work environmental factors (e.g., access to adequate resources and predictability/familiarity in teams and task), which have been found to be associated with lower levels of moral distress in previous studies [20], did not come out as significant predictors in our multiple linear regression analysis, they did appear as significant in our univariable linear regression analysis. We acknowledge that this might be attributed to methodological differences (e.g., measurement instrument, sample differences), but it is also possible that the effect of some work environmental factors suggested to protect against moral distress in previous studies are better explained by manageable workload and the ability to treat patients according to best medical practice.

Limitations and strengths

Among the strengths of the current study, are the use of a large and geographically diverse sample, including participants with varying levels of pandemic exposure (i.e., contact with patients with Covid-19 and incidence rate areas), enabling us to examine prevalence of ECS and levels of moral distress across various kinds of exposure. Another strength is the collection of data at a later pandemic time-point (fourth wave in Norway). As to our knowledge, most previous studies have examined experiencing ECS and moral distress in the early stages of the pandemic, and this study thus contributes with novel information on the long-term impact of working during a medical disaster. However, the cross-sectional nature of the current self-reported survey study limits our ability to draw any firm causal conclusions from the results. Although we asked participants to consider exposure to ECS during the whole pandemic, it is possible that responses may have been influenced by recall bias. Further, we did not ask participants when they experienced the ECS and were thus not able to examine if time since event might have impacted the moral distress they experienced when recalling that event. We elected to combine several different professions into the category "other hospital personnel", and it is possible that there may have been specific professional categories (e.g., prehospital workers, administrative staff) in this group with higher or lower risk than others, whose experiences we are not able to explore here. Finally, the recruitment strategy for this study was broad, using email, SMS, online bulletin boards, posters, flyers and word of mouth. Unfortunately, this prevents us from calculating an overall response rate, as we do not know how many potential participants that received information about the study. Further, here were hospitals and wards who opted out of participating in the study. Thus, there may have been selection bias both on an organisational and individual level. It is for example possible that HCW accepting to participate may have been more focused on work environmental consequences of Covid-19.

Conclusions and future directions

The current study increases knowledge on the risk of experiencing ECS and consequently moral distress during long-term public health emergencies. Considering that

the reported intensity of moral distress in this study was higher than in previous studies, results might indicate that the intensity of moral distress possibly increases over time. While this is extra pertinent during a pandemic, we believe that the results could also be applied during other public health care emergencies, for example during natural disasters, or climate related challenges, such as heat waves. Our results points to several areas in which healthcare organizations may monitor and target specific work environmental conditions to potentially mitigate the impact of ECS on moral distress. For example, ensuring manageable workloads, access to a supportive work environment, and providing HCW with conditions that enable them to work according to best practice, are potential targets for organisational intervention. Further, future studies should examine how such organisational measures impact the association between moral distress, turnover, and HCW mental health and well-being, to illuminate on the complex association between individual experiences and organisational resilience. For the years to come, the total burden on health services is likely to increase, relating to for example expected demographic developments with a lower ratio of HCW to patients [37]. This may potentially pose a threat to the sustainability of healthcare systems, and based on results from the current study, we highly recommend that healthcare organizations ensure healthy work environments as a basis for robust and sustainable organisations, able to withstand during future public health emergencies.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12910-024-01098-w.

Supplementary Material 1

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Author contributions
Authors KB, KAG, SS, TWL performed data preparation and analysis of this paper. Authors SS, GD, KB, HW, JAZ, LAR, SKR and DA participated in overall study design and data collection. The manuscript was prepared by authors KB and KAG. All authors contributed with critical review of the paper and analysis and read and approved the final manuscript.

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Data availability
Deidentified individual participant data that underlie the results reported in this article will be available upon reasonable request. In addition, syntax and analytic code can be made available. Data will be available for researchers with a methodologically sound proposal whose proposed use of the data has been approved by an independent review committee. Proposals should be directed to synne.stensland@nkvts.no. Data requestors will need to sign a data access agreement.

Declarations

Ethics approval and informed consent
The study received ethical approval from the Regional Committees for Medical Research Ethics South East Norway (#2020/ 130944). The study was performed in accordance with the Declaration of Helsinki. All participants were given written information about the study. Informed consent was obtained from all participants prior to the study. They were informed that they could decline to continue participation at any time, without needing to give any reason.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

Author details
[1]Norwegian Centre for Violence and Traumatic Stress Studies, Oslo, Norway
[2]Department of Research and Innovation, Division of Clinical Neuroscience, Oslo University Hospital, Oslo, Norway
[3]Division of Cardiology, Oslo University Hospital Ullevål, Oslo, Norway
[4]Institute of Clinical Medicine, University of Oslo, Oslo, Norway
[5]Department of mental health, NTNU, Trondheim, Norway
[6]Nidelv DPS, St Olavs hospital, Trondheim, Norway
[7]Department of Research and Development, Division of Emergencies and Critical Care, Oslo University Hospital, Oslo, Norway
[8]Division of Emergencies and Critical Care, Oslo University Hospital, Oslo, Norway

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