Research Article

Understanding Moral Injury and Its Predictors among Chinese Physicians

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Background: Moral injury - the betrayal of one's moral and professional values - is a negative factor affecting physicians' wellbeing, however, few studies have examined moral injury and its predictors in healthcare professionals. This study aimed to determine the prevalence and predictors of moral injury in Chinese physicians.

Methods: This study was a cross-sectional survey conducted from September 14 to October 27, 2023, in mainland China. A total of 549 physicians completed the online self-administered questionnaire through the WeChat app. The 10-item Moral Injury Symptom Scale-Health Professional (MISS-HP) was used to assess the severity of moral injury symptoms, and the Moral Injury Events Scale (MIES) was used to measure exposure to potentially morally injurious events (PMIEs).

Results: The results of the study showed a mean score of 42.07 (SD=13.67) for the ten-item MISS-HP，the prevalence of moral injury among the physicians was 31.6%. The multiple linear regression identified five main predictors of moral injury: exposure to PMIEs, poor job satisfaction, lack of organizational support, witnessing patient suffering or death, and mental health needs.

Conclusions: The findings contribute to the understanding of risk factors for moral injury among physicians and highlight the importance of intervening to help mitigate the risk factors. This is because moral injury can negatively affect the wellbeing of healthcare professionals, which in turn affects the stability of the healthcare team and the quality of care.

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Background

Moral injury (MI), as an emerging concept, has received increasing attention from scholars in recent years. The concept of moral injury can be traced back to the concept of Survivor's Guilt, as used to

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describe symptoms of guilt in survivors of the Holocaust[1]. Shay described the negative impact of war on the moral dimension of individuals and introduced the concept of moral injury: "the betrayal of justice by a person of legitimate authority in a high-stakes situation"[2]. In a medical context, especially for healthcare workers during the COVID-19 pandemic, it could be viewed as presenting a high-risk situation. However, physician burnout and distress have been a concern not only in times of crisis but also before the COVID-19 pandemic[3][4]. Ethical decision-making dilemmas need to be faced in the careers of many physicians when they have to make accurate, prompt clinical decisions in complex situations[5]. The pandemic exacerbated moral distress in clinical practice, and healthcare workers faced higher job demands in the face of strained healthcare resources[6]. This in turn led to increased scholarly focus on the mental health and wellbeing of healthcare professionals. Healthcare professionals not only need to take on the physical and psychological stresses of the workplace while giving care and attention to patients, they are also expected to maintain high levels of professionalism and show empathy. The physical and psychological needs and individual vulnerabilities of physicians are often overlooked[6][7]. The concept of moral injury has led scholars to pay increasing attention to the vulnerability of healthcare workers[8].

The twenty-eighth item in the *International Code of Medical Ethics* refers to "the importance of safeguarding the physical and mental health and wellbeing of healthcare workers and encouraging them to seek professional help, if necessary, to ensure that they can practice safely"[9]. Reframing physician wellbeing as a core value should help facilitate healthcare system responses to new societal challenges and guide decision-making at critical moments[7].

The introduction of the concept of moral injury has prompted scholars to explore the wellbeing of healthcare professionals from a new perspective. Unlike burnout, moral injury emphasizes the fact that healthcare professionals' suffering is rooted in healthcare system vulnerabilities rather than just in vulnerable individuals [4]. It also describes an ethical dilemma faced by doctors in clinical practice, namely the conflict between the ideal healthcare service and the reality of objective constraints. Objective constraints, such as the shortage of healthcare resources, can impede healthcare professionals from providing optimal treatment and care, resulting in moral distress for individuals. The accumulation of this distress can result in moral injury[6]. Potentially morally injurious events (PMIEs) that occur in high-stakes situations, such as committing "morally wrong" actions and inactions or witnessing others' acts of omission and commission may violate long-standing, deeply

ingrained moral values, behaviors, and expectations[10]. Experiencing PMIEs may cause individuals to have deep emotional wounds[11]. Negative moral emotions such as guilt, shame, self-condemnation, unforgiveness, loss of interpersonal trust, and moral injury-induced changes in beliefs can have a long-term impact on the health and wellbeing of practicing healthcare professionals[12]. Furthermore, PMIEs highlight the detrimental impact of situational characteristics in the workplace on individuals. Research has demonstrated that clinical experiences such as witnessing the death of a patient or colleague, and incidents of workplace violence, can influence the professional values of healthcare workers and precipitate emotional distress[13].

PMIEs significantly and negatively impact the mental health and wellbeing of healthcare workers[14] [15]. Recent evidence suggests that moral injury can result in consequences at personal, interpersonal, and systemic levels[16], and moral injury is significantly associated with clinical symptoms such as depression, anxiety, burnout, compassion fatigue, suicidal ideation, substance use, sleep disturbance, and posttraumatic stress disorder[14][17][18][19][20]. In addition to the detrimental effects on the individual wellbeing of healthcare professionals, another crucial aspect to consider is the potential impact of moral injury on patient care and healthcare outcomes[16]. Moral injury can impede a physician's capacity to provide high-quality care, maintain trust with patients and colleagues, and make ethical decisions[16]. Although there has been a gradual increase in the number of empirical studies of moral injury in medical personnel in recent years, most of them focus on the symptoms and consequences of moral injury [17], and few studies specifically explore the influencing factors of moral injury on healthcare professionals. Previous studies have shown that gender, age, department, years of practice, religious affiliation, psychiatric history, job satisfaction, organizational support, self-criticism, moral resilience, and existing symptoms of burnout can be regarded as influencing factors of moral injury [14][21][22][23][24][25][26]. It is crucial to investigate the factors associated with moral injury and develop early intervention and prevention strategies to help clinicians cope with moral dilemmas in clinical practice and reduce the prevalence of moral injury.

The lack of scientific and objective measurement tools is an important reason for the slow progress of empirical research. In existing empirical studies, the operationalized definition of moral injury is vague and lacks a gold standard for assessing or diagnosing moral injury [27]. The Moral Injury Symptoms Scale–Health Professional (MISS-HP), developed by Mantri et al., is the most widely used

scale to assess and diagnose moral injury in healthcare workers[28], and it has been applied in different countries[19][25][29][30][31][32][33].

In the theoretical model described by Litz, individuals' moral judgments are moderated by cultural and individual differences, which are closely related to sociocultural factors[27]. However, most existing empirical studies have been conducted in Western countries, and research needs to be expanded to explore the applicability of the concept of moral injury in different cultural contexts. For instance, few empirical studies have been conducted in China. Unlike in the West, China has a small percentage of people with religious beliefs.

Wang et al. conducted a survey of moral injury among more than 3,000 healthcare workers in mainland China, which showed that 89.2% of respondents had no religious beliefs and the prevalence of moral injury was 41.3%[18]. China has a large base of healthcare workers, and moral injury prevalence and influencing factors need to be explored further. Therefore, to help fill gaps in this area of research, the present study aims to explore the prevalence of moral injury and associated factors among Chinese physicians, with the expectation of sparking a dialog that will drive future research on moral injury in the medical workforce. Based on the main predictors of moral injury, rationalized recommendations for the prevention of moral injury in medical personnel are proposed to provide an objective basis for safeguarding the physical and mental health and wellbeing of medical personnel worldwide. In turn, this could both improve the quality of medical care and stabilize the medical workforce.

Methods

Sample and data collection

The survey was conducted between 14 September and 27 October 2023 via the online survey platform called WenJuanXing(https://www.wjx.cn/). A link to the online questionnaire was sent to potential participants via China's most popular social media platform, WeChat. Respondents were encouraged to forward the questionnaire link to their colleagues and post it on social media. The questionnaire was completed anonymously. The inclusion criteria were as follows: 1) practicing physicians or interns, or regulated physicians; 2) practical experience $\geq$ 3 months; and 3) informed consent and voluntary signing of the informed consent form. The exclusion criteria were as follows: 1) medical

students without clinical practice experience; and 2) inability to use the internet or other mobile devices due to vision loss or other disabilities preventing completion of an online questionnaire.

The study included healthcare institutions of various sizes, including primary healthcare facilities, regional hospitals, and large medical centers situated at the provincial and municipal levels in China. Respondents came from various provinces in mainland China, including Heilongjiang, Xinjiang, Guangdong, and Beijing. 549 physicians gave informed consent and completed the questionnaire. Of those, 128 invalid questionnaires were excluded during the data cleaning process, leaving a final sample of 421 physicians to be included in the analysis. The sample efficiency rate was 76.68%.

Ethics approval

This study was conducted with the consent of the Ethics Committee of Harbin Medical University Health System Hospital (No. HMUIRB2023036). All participants signed an electronic consent form before the start of the questionnaire.

Measures

Explanatory variables

Explanatory variables considered in this study were gender(Male/Female), age (categorized as ≤25, 26-35, 36-45 and ≥46), marital status (Unmarried/Married), educational attainment(Technical secondary school/Undergraduate/Master's degree/PhD), whether expected revenues are being met (No/Yes), length of practice(categorized as ≤5, 6-15, 16-25 and ≥26), job title(to be assessed Internship and training/Primary/Intermediate/Deputy senior/Advanced), department (Internal Medicine/Surgical/Obstetrics and Gynecology/Pediatrics/ICU/Emergency Department/Other Departments), whether in a managerial position (No/Yes), frequent overtime work (No/Yes), feeling overworked (No/Yes), and receiving any support from family or friends (No/Yes).

Job satisfaction was measured on a 3-point Likert scale ranging from 1 (dissatisfied) to 3 (extremely satisfied).

The questionnaire lists several PMIEs in clinical work. Workplace violence was assessed by asking: "Have you ever been attacked by your patients or their close relatives, either physically or verbally?" Medical errors and disputes were assessed by asking: "Have you experienced medical errors or medical disputes?" Witnessing significant patient suffering or death was assessed by asking: "Have

you ever witnessed a patient suffer or die?" Media pressure and public opinion were assessed by asking: "Do you feel that public opinion is pressurized and leads to tensions between doctors and patients?" Response categories were no or yes.

Mental health needs were assessed by asking: "Do you need professional help to relieve psychological stress?". Response categories were no or yes.

Organizational support was related to physicians' moral injury[34], and physicians' perceived level of organizational support was assessed by asking: "Do you think your organization is reasonably safeguarding your safety and wellbeing, especially when dealing with medical disputes?". Response categories were no or yes. When respondents answered "No", this indicates a lack of organizational support.

Exposure to PMIEs was measured with the Moral Injury Events Scale (MIES), which was developed by Nash et al. and applied in a military context[35]. MIES consists of three factors: transgressions by others, transgressions by self, and betrayal[36]. Responses are measured on a 6-point Likert scale of 1 (strongly disagree) to 6 (strongly agree). Total scores range from 9 to 54. Higher scores indicate greater exposure to and/or impact of morally injurious events. The item wording was modified to reflect the healthcare population based on the existing military version of the MIES adjustments. Specifically, on item 7 'leaders' was changed to 'superiors', item 8 'fellow service members', was adapted to 'fellow colleagues', and on item 9 'others outside the US military' was adapted to 'others outside the healthcare system' (defined as patients, their families and society at large). In this study, the Cronbach's alpha for the scale was 0.82.

Outcome measure

The severity of moral injury symptoms was the primary outcome, measured by using the ten-item Moral Injury Symptom Scale-Health Professional (MISS-HP), developed and validated by Mantri et al. for use among USA healthcare professionals[28]. This scale was translated into Chinese by Wang et al. and applied to Chinese medical personnel[33]. Response options for each of the 10 items range from 1 to 10 to signify agreement or disagreement with each statement, with a total score ranging from 10 to 100. Higher scores indicate a greater number and severity of moral injury symptoms, and item 10 was used to assess the loss of religious or spiritual beliefs. Previous studies have shown that only a small percentage of healthcare workers in China have religious beliefs[18], and we expected to assess the impact of moral injury on physicians' professional beliefs, and as a result, item 10 "religious/spiritual

faith" was changed to "professional beliefs/spiritual faith". Reliability or the internal consistency of the scale among the physicians was acceptable (Cronbach's α =0.73). Moderate to severe distress associated with moral injury and impaired functioning at work, in relationships, and in other areas of life indicate clinical significance and are assessed on a five-point Likert scale[28]: not at all, mild, moderate, very much, and extremely. "Moderate", "Very much" and "Extremely" indicate clinically significant distress and impairment in functioning.

Statistical analysis

All data were entered and analyzed using the IBM Statistical Package for the Social Sciences version 26 (IBM SPSS 26). We conducted descriptive analyses of the participants based on their demographics, work-related information, and PMIEs. The MISS-HP of samples with different characteristics are described by mean and standard deviations. Mann–Whitney-U-test and Kruskal–Wallis-test evaluated the mean differences in the MISS-HP score by participants' characteristics. The prevalence of moral injury among physicians was calculated. MISS-HP scores were used as the dependent variable, and demographic variables, work-related factors, etc., were used as independent variables. To explore the effect of the independent variables on moral injury symptoms, we performed multiple linear regression analysis using stepwise selection of predictor variables and multicollinearity was checked using variance inflation factor (VIF). Potential correlates at $p < 0.05$ in the bivariate analysis were included in the multiple linear regression model. The trend level was set at $0.05 < \alpha < 0.10$. We also examined the residuals of the regression analyses for the outcome variables (MISS-HP scores) to test for the assumptions of linearity, homoscedasticity, independence, and normality. All regression analyses were consistent with assumptions regarding variable distribution, and there was no evidence for collinearity (VIF values ranged from 1.05 to 1.19).

Results

Descriptive statistics

The mean score of the MISS-HP was 42.1(SD=13.67) among the participants, and 26.6% (N = 112) of respondents had MI-related clinically significant distress and impaired functioning. As shown in Table 1, a total of 421 physicians completed the survey. The majority were female (57.0%), aged 26-35 years (29.5%), married (57.7%), undergraduate (45.6%), and did not meet expected income (84.1%). A

total of 33.7% of physicians self-reported a need for professional counseling to relieve psychological stress. The majority of the respondents had a job title of intermediate or below (74.8%). Most of the respondents were those with ≤5 years of practice (45.4%), in an internal medicine department (45.8%), and did not hold managerial positions (86.9%).

Characteristics	n	%	MISS-HP score		P
			Mean	SD	
Total	421	100	42.07	13.67	
Moral injury severity level					
Clinically insignificant distress	309	73.4	39.64	13.13	
Clinically significant distress	112	26.6	48.78	12.91	
Gender					
Male	181	43.0	44.85	13.39	**< 0.001**
Female	240	57.0	39.97	13.53	
Age (years)					
≤25	111	26.4	39.7928	12.74086	0.138
26-35	124	29.5	42.3065	13.39347	
36-45	95	22.6	43.5684	15.45319	
≥46	91	21.6	42.956	13.00761	
Marital status					
Unmarried	178	42.3	41.78	13.19	0.583
Married	243	57.7	42.28	14.03	
Educational attainment					
Technical secondary school	41	9.7	44.20	12.21	0.582
Undergraduate	192	45.6	41.41	13.88	
Master's degree	152	36.1	41.87	13.64	
PhD	36	8.6	44.00	14.30	
Whether expected revenues are being met					
No	354	84.1	42.79	13.05	**0.027**
Yes	67	15.9	38.27	16.13	
Length of practice					

Characteristics	n	%	MISS-HP score		P
			Mean	SD	
≤5	191	45.4	40.85	12.90	0.376
6-15	97	23.0	42.77	14.88	
16-25	63	15.0	43.79	14.39	
≥26	70	16.6	42.86	13.30	
Job title					
Internship and training	144	34.2	40.92	12.69	0.445
Primary	93	22.1	43.42	13.53	
Intermediate	78	18.5	41.26	13.36	
Deputy senior	56	13.3	41.66	16.08	
Advanced	50	11.9	44.60	14.19	
Department					
Internal Medicine	193	45.8	42.53	13.28	0.085
Surgical	67	15.9	41.15	13.93	
Obstetrics and Gynecology	23	5.5	36.48	13.12	
Pediatrics	21	5.0	49.71	10.37	
ICU	21	5.0	43.76	14.32	
Emergency Department	15	3.6	41.00	15.83	
Other Departments	81	19.2	41.09	14.17	
Whether in a managerial position					
No	366	86.9	41.86	13.54	0.433
Yes	55	13.1	43.49	14.56	
Frequent overtime work					
No	154	36.6	38.07	13.86	**< 0.001**
Yes	267	63.4	44.37	13.03	

Characteristics	n	%	MISS-HP score		P
			Mean	SD	
Feeling overworked					
No	147	34.9	37.87	13.42	**< 0.001**
Yes	274	65.1	44.32	13.29	
Receiving any support from family or friends					
No	60	14.3	45.67	14.99	0.110
Yes	361	85.7	41.47	13.36	
Job satisfaction					
Dissatisfied	75	17.8	50.44	12.79	**< 0.001**
Satisfied	294	69.8	41.70	12.23	
Extremely satisfied	52	12.4	32.10	15.40	
Workplace violence					
No	97	23.0	37.03	13.28	**< 0.001**
Yes	324	77.0	43.58	13.44	
Medical error or dispute					
No	229	54.4	39.7	13.04	**< 0.001**
Yes	192	45.6	44.89	13.90	
Witnessing patient suffering or death					
No	71	16.9	35.63	14.52	**< 0.001**
Yes	350	83.1	43.37	13.13	
Self-perception of whether public opinion is pressurized					
No	42	10.0	34.17	15.55	**< 0.001**
Yes	379	90.0	42.94	13.18	
Mental health needs					
No	279	66.3	40.03	13.29	**< 0.001**

Characteristics	n	%	MISS-HP score		P
			Mean	SD	
Yes	142	33.7	46.08	13.55	
Lack of organizational support					
No	109	25.9	34.66	13.45	**< 0.001**
Yes	312	74.1	44.66	12.79	

Table 1. Participant characteristics and bivariate analysis (N= 421)

Moral injury severity level: "not at all" and "seldom" indicate insignificant distress; "moderate," "very much" and "extremely" indicate clinically significant distress and impairment in functioning.

Bivariate Analyses

In bivariate analyses, male sex, not meeting income expectations, lack of organizational support, frequent overtime, feeling overloaded with work, and lower job satisfaction were significantly associated with moral injury (all *p* values < 0.05; Table 1). MISS-HP scores were significantly higher among physicians who needed professional help in relieving psychological stress, had experienced workplace violence, medical errors or medical disputes, witnessed the suffering or death of patients, and felt pressured by public opinion and tensions in the doctor-patient relationship (all p values < 0.05; Table 1).

Regression analyses

A multiple linear regression model was computed to investigate predictor variables that had a significant influence on the MISS-HP. Sociodemographic and work-related characteristics of the participants who were deemed to be associated with moral injury symptoms (Table 1) ($p < 0.05$) were included in the multiple linear stepwise regression models. In addition, the MIES scores were included as independent variables in the multiple linear regression model predicting moral injury (Table 2).

In the final regression model, MIES scores, job satisfaction, lack of organizational support, witnessing patient suffering or death, and mental health needs were significantly associated with moral injury symptom scores (MISS-HP).

Each point increase in the MIES score increased the MISS-HP score by 0.81 points ($p < 0.001$). Physicians rated subjectively perceived job satisfaction between 1 (dissatisfied) and 3 (extremely satisfied). There was a 4.2-point decrease in the MISS-HP for each positive step on the job satisfaction scale ($p < 0.001$). Witnessing patient suffering or death increased the MISS-HP score by 3.23 points ($p = 0.019$). Lack of organizational support (delta 3.33 points, $p = 0.007$) or mental health needs (delta 2.37 points, $p = 0.030$) also resulted in more severe moral injury symptoms. Details of the multiple linear regression model can be found in Table 2. On the other hand, the other independent variables included in the model did not achieve statistical significance in the stepwise integration of the predictor variables, so these variables had to be removed from the linear regression model due to their low significance.

	Unstandardized Coefficients	**Std. Error**	**Standardized Coefficients**	**Sig.**	**95.0% Confidence Interval for B**	
	B		**Beta**		**Lower Bound**	**Upper Bound**
Constant	23.354	3.107		0.000	17.248	29.461
MIES score	0.806	0.065	0.501	0.000	0.679	0.933
Job satisfaction	-4.244	0.985	-0.170	0.000	-6.180	-2.308
Lack of organizational support	3.331	1.237	0.107	0.007	0.900	5.762
Witnessing patient suffering or death	3.234	1.379	0.089	0.019	0.524	5.944
Mental health needs	2.370	1.089	0.082	0.030	0.229	4.512

Table 2. Results of the stepwise multiple linear regression model

This table reports the results of our main statistical analysis (N= 421). Unstandardized coefficients explain how much the MISS-HP value increases for one step on the scale of the variable that is shown in the first row. ($F= 64.662$; $p < 0.01$; $R=66.2\%$; $R^2=43.8\%$; adjusted $R^2 = 43.1\%$)

Discussion

The present study assessed the prevalence and predictors of moral injury among Chinese physicians. The results of the study showed a mean score of 42.07 (SD=13.67) for the ten-item MISS-HP. The mean MISS-HP score for this sample was higher than that previously reported for samples from the United States (36.8)[21], Pakistan (37.7)[23], Europe (32.31)[31], Honduras (34.80)[29], and Iran (35.76)[37], but lower than that reported during the first wave of the pandemic in China(46.9)[33]. In China, a MISS-HP cutoff score of 50 or higher is considered for respondents who had moral injury, indicating clinically significant distress and impaired functioning[18], therefore, the prevalence of moral injury among the physicians in this study was 31.6%. However, differences in sample sources may lead to variability in cutoff scores[18][19][28][31][32]. There is no clear gold standard for the diagnosis of moral injury, so the cutoff point should be treated with caution.

Bivariate and regression analyses showed that moral injury among Chinese physicians is influenced by a variety of factors. The multiple linear regression identified five main predictors of moral injury: exposure to PMIEs, job satisfaction, lack of organizational support, witnessing patient suffering or death, and mental health needs. In the regression analysis, we found that MIES scores were predictors of moral injury symptoms. As expected, the greater the exposure to PMIEs, the more severe were physicians' moral injury symptoms. Due to the special characteristics of the medical profession, physicians need to face moral distress that may arise at any time in their clinical work, such as how to distribute limited medical resources fairly and equitably, and how to balance their busy work and private lives. Moral distress is inevitable in medical work[38], and because physicians often need to make prompt and accurate clinical decisions in high-risk situations, each decision is challenging, and the COVID-19 pandemic amplified these issues.

Specific situations and individual experiences in medical practice are closely related to moral injury, and these experiences may involve behaviors that violate individual healthcare professionals' values and codes of ethics or cause harm to patients and others. It has been shown that healthcare resource constraints, witnessing patient suffering or death, institutional betrayal, being treated unfairly, medical errors, excessive workloads, and administrative stress can all be viewed as PMIEs[6][13][39]. The nature of medical work means that when doctors are exposed to the death of a patient, this can lead to moral injury. A focus on the situational characteristics of medical practice enables a more nuanced understanding of the experiences of physicians in distress. The results of this study show

that workplace violence, medical errors, and physicians witnessing patient suffering or death tended to result in higher levels of moral injury, which is consistent with previous findings[6][18][21][40]. It is recommended that hospital administrators provide additional support to physicians who have recently experienced these negative events, to assist them in managing any negative emotions that may arise.

In addition, the results of the present study showed that moral injury is related to gender, with men having more severe symptoms of moral injury than women; however, our findings do not support evidence from previous studies. Factors that contribute to the differences in gender and moral injury symptoms may be influenced by many factors, including the sociocultural environment[27]. Previous studies have shown that women have higher levels of moral injury [18][23], and differences in moral injury by gender needs to be verified by more empirical studies in the future.

Symptoms of moral injury are associated with lower levels of resilience and social support[24][26][41], and more severe moral injury symptoms can harm the mental health of physicians[20]. The results of this study showed that 33.7% of physicians have mental health needs, which means that this population may have greater psychological distress and a desire to seek professional help to relieve psychological stress. In addition, physicians with mental health needs had significantly more severe moral injury symptoms, consistent with previous findings that moral injury is associated with poor mental health symptoms, which can negatively impact physician wellbeing[14][15]. Therefore, physicians themselves, as well as healthcare organizations, should accord greater attention to the psychological needs of physicians. These individuals should cultivate an understanding of self-care strategies and proactively seek assistance from their organizations[42].

Our study also found that lack of organizational support and low job satisfaction significantly predicted higher levels of moral injury symptoms. This is consistent with previous findings that moral injury symptoms are associated with organizational support, workload, and job satisfaction[8][21][43]. The wellbeing of healthcare workers is strongly associated with the level of organizational support, both during and before the COVID-19 pandemic[4][13]. Healthcare professionals are vulnerable in the face of high-risk work and are particularly susceptible to moral injury at special times, such as during the pandemic. Shortages of healthcare resources, urgent medical work, and a perfectionist healthcare culture can mean that superiors and hospital administrators are relatively oblivious to the physical and mental wellbeing of their staff, and oblivious to their needs as human beings[43][44]. The results

of this study showed that 63.4% of physicians reported frequent overtime and 65.1% felt overloaded, indicating that physicians generally face heavy workloads. PMIEs in medical work include transgressions by superiors or organizations that betray personal moral/ethical beliefs or expectations; superiors who do not take responsibility for events and generally do not support their employees, and institutional betrayal[6][39]. Previous studies have shown that moral injury is likely to occur when the relationship between physicians and the healthcare system breaks down, for example, when physicians no longer trust the healthcare organization[34]. A supportive workplace environment is related to lower moral injury[24].

Lower organizational support leads to lower job satisfaction, which in turn negatively impacts physician motivation[4]. It is now widely recognized by scholars that the occurrence of moral distress and moral injury is rooted in larger, systemic healthcare system issues and that we should not focus only on individual physicians, but on the broken healthcare system[4][6]. Healthcare organizations and systems should promote systemic change and actively create a good work environment or culture for healthcare workers[6][7]. As mentioned in the latest edition of *the International Code of Medical Ethics*[9], to ensure that they can practice safely, physicians should actively seek help from their superiors and healthcare organizations, in addition to raising awareness of self-care. Hospital administrators and healthcare systems should pay more attention to the physical and mental wellbeing of their staff and propose policy recommendations to guide healthcare leaders and health systems in this endeavor[40]. We also found that as many as 90% (N=379) of the respondents perceived that public opinion was stressful and led to tensions in the doctor-patient relationship. Studies have shown that stigmatization is one of the stressors for healthcare workers and that misinformation on social media is an obstacle for healthcare workers to safeguard their wellbeing[45][46]. Therefore, the media should be encouraged to guide positive social opinion and promote the harmonious development of doctor-patient relationships, especially in times of crisis. This is important to enhance trust between doctors and patients, which is a matter of great significance to the prevention of moral injury.

The following recommendations may prove beneficial in alleviating moral injury and ensuring the wellbeing of physicians: Firstly, healthcare professionals must be made aware of the possibility of PMIEs occurring and be psychologically prepared. Furthermore, they should be aware of the concept of moral injury and the negative emotional reactions that occur when facing PMIEs. This can be

achieved by strengthening medical education and ethics training, and by teaching doctors how to cope with moral dilemmas and moral injuries. Additionally, doctors must be encouraged to take the initiative to seek help in the face of dilemmas, and to try and improve levels of self-care. Secondly, to establish a supportive working environment, hospital administrators and healthcare organizations should strive to create a good ethical climate, improve various management systems, such as the monitoring and handling mechanism of medical adverse events, and help healthcare workers deal with medical incidents promptly. This will help to minimize the harm that they cause to patients and doctors. Finally, Healthcare organizations should provide professional support for healthcare workers, such as setting up a special counseling department within the organization, or teaching healthcare workers self-care strategies to safeguard their mental health [45][46]. There is an urgent need for a special role for the "doctor's doctor" to help healthcare professionals better cope with high-risk, high-stress events that they encounter in the course of their work.

Limitations

Several aspects of the present study limit the generalizability and interpretation of the findings. First, it should be noted that the study employed a non-random sampling method, which may limit the generalizability of the findings to the entire mainland China population, and the variability of different cultural and social factors needs to be taken into account. Second, in this study, a translated and adapted MIES was used. The reliability and validity of the scale need to be further generalized and validated. Third, the cross-sectional nature of these findings prevents causal inferences from being made, in that prospective studies will be needed to determine whether moral injury symptoms cause lower job satisfaction, higher psychological stress, or vice versa, or whether the effects are bidirectional. Fourth, due to limited space, this study did not specifically list the scores and correlations for each item of each scale, and it is anticipated that more detailed analyses will be presented through further articles.

Conclusions

In conclusion, this study examined the prevalence and predictors of moral injury among Chinese physicians. The prevalence of moral injury among the physicians in this study was 31.6%, and physicians reported commonly experiencing PMIEs and suffering from moral injury-related symptoms in their clinical practice. Exposure to PMIEs, job satisfaction, lack of organizational

support, witnessing patient suffering or death, and mental health needs have been identified as predictors of physician moral injury. These factors should be considered when developing interventions to address moral injury among physicians. Our aim is not to exempt physicians from the risk of experiencing PMIEs in their clinical practice, but rather to focus on protecting the health of physicians after they experience PMIEs through a series of measures to minimize the negative impact of these adverse events on the individual physician and spark a dialog that motivates future research. The findings contribute to the understanding of risk factors for moral injury among physicians and highlight the importance of intervening in risk factors. This is because moral injury can negatively affect the wellbeing of healthcare professionals, which in turn affects the stability of the healthcare team and the quality of care.

Abbreviations

- ANOVA: One-way analysis of variance
- COVID-19: Coronavirus Disease 2019
- M: mean
- MI: Moral injury
- MIES: Moral Injury Events Scale
- MISS-HP: Moral Injury Symptoms Scale–Health Professional
- PMIEs: Potentially morally injurious events
- SD: Standard deviation
- SPSS: IBM Statistical Package for Social Science
- VIF: Variance inflation factor

Statements and Declarations

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Authors' contributions

RS and YW designed the study. RS and YW managed and analyzed the data. RS prepared the first draft. RS and YW reviewed and edited the manuscript, with feedback and comments from RW. All authors were involved in revising the paper, and RS had full access to the data and gave final approval of the submitted versions. All authors have read and agreed to the published version of the manuscript.

Competing interests

The authors declare no conflict of interest.

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Availability of data and materials

Data in request to Shao RQ at qing093011@163.com. This paper does not include any information about patients, and the data reported in this paper has not included in any other reports.

Ethics approval and consent to participate

Approved in decision HMUIRB2023036 by the institutional review board of Harbin Medical University. Informed consent was obtained from all subjects involved in the study.

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Declarations

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