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Moral resilience of oncology nurses and its influencing factors: a cross-sectional study

Xu Tian¹, Zhuomei Chen², Xiuni Gan³, Maria F. Jimenez-Herrera⁴, Yi Ren^{5*} and Fangrong Liu^{6*}

Abstract

Background Oncology nurses are more likely to experience intrinsic distress than non-oncology nurses because they must constantly consider the implications of multiple intensive cancer-directed therapies, which can result in a variety of moral sufferings. Moral resilience recently emerges as a viable resource for relieving nurses' moral sufferings. However, limited knowledge exists regarding the moral resilience of oncology nurses.

Objectives This study aimed to investigate the moral resilience of Chinese oncology nurses and to learn more about the factors that influence moral resilience among oncology nurses.

Methods A cross-sectional survey study was employed. A convenience sample of 466 Chinese oncology nurses was recruited through an online platform from February to December 2023. Measures were the demographic data, the Chinese version of Rushton Moral Resilience Scale (Chi-RMRS) and Maslach Burnout Inventory Human Services Survey. Data were analyzed using descriptive statistics, independent-sample t-test, one-way analysis of variance (ANOVA), Pearson correlation coefficient, and linear regression.

Results The mean score of moral resilience and professional burnout of Chinese oncology nurses is (2.79 ± 0.42) and (43.65 ± 17.79), respectively. Chinese oncology nurses' moral resilience was highly negatively correlated to their professional burnout ($r = -0.654$). Gender, educational level, and professional burnout were factors influencing oncology nurses' moral resilience.

Conclusion Our study highlights the necessity of targeted interventions to enhance oncology nurses' moral resilience, particularly considering the influence of gender, educational level, and professional burnout. By addressing these factors, healthcare systems and nursing administrators can improve the well-being of oncology nurses and ensure the delivery of high-quality patient care.

Keywords Oncology nursing, Nurses, Professional burnout, Moral distress, Moral resilience

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Introduction

Nurses always encounter various complex and challenging ethical conflicts in daily nursing practice [1]. Persistent and unresolved ethical conflicts in the clinical settings will trigger various moral sufferings, such as moral distress, injury, and residue [1–3], thus increasing the risk of professional burnout [4, 5] and turnover [1, 6]. Compared to non-oncology nurses, oncology nurses are more likely to experience intrinsic distress, which may result in moral sufferings [7]. Moral resilience is recently proposed as a promising resource for combating nurses' moral sufferings [8, 9], and the Rushton moral resilience scale (RMRS) has also been developed to accurately measure the level of moral resilience [10]. Our team has conducted the cross-cultural validation of the RMRS, resulting in its Chinese version (Chi-RMRS) [11]. Currently, limited knowledge exists regarding moral resilience of oncology nurses. There is an urgent need to explore the moral resilience of Chinese oncology nurses and to learn more about the factors that may influence their moral resilience so that researchers and administrators can take specific strategies to precisely cultivate moral resilience, thus reducing the risk of professional burnout and turnover.

Background

Nursing is an “ethical laden practice” [12]. The International Council of Nurses (ICN) published the nurses' code of ethics in 2021, emphasizing the importance of ethical and moral nursing practice to ensure the safety of caring and preserve the moral integrity of nurses [13]. Morality involves correct behavior or distinction between right and wrong, good and bad, and ethical principles [14]. Nurses frequently face various complex and challenging ethical conflicts when providing care to patients in the clinical settings [1]. If ethical conflicts are difficult to resolve or even remain unresolved for a long time, nurses will experience various moral sufferings, such as moral distress, injury, and residue [1, 3, 15, 16].

Persistent unresolved moral sufferings, particularly moral distress and subsequent moral injury, are associated with a range of adverse consequences, such as professional burnout [17], which may adversely impair nurses' capacity to deliver quality patient care [13] and the ability of healthcare system to maintain good nursing workforce [6]. A meta-analysis of 123,019 Chinese registered nurses reported a cumulative detection rate of positive professional burnout of 64.5% [18], which is much higher than the global prevalence of nursing burnout (30.0%) [19]. Although the number of registered nurses in China has exceeded 5.2 million by the end of 2022; however, the shortage of registered nurses is still a major problem due to higher nurse turnover rate [20]. Accordingly, revealing the reasons why ethical conflicts lead to

moral sufferings will help to explore how to effectively reduce the adverse impact of moral sufferings on registered nurses' well-being [4, 21] and the maintenance of the nursing workforce [6, 22].

It is worth noting that oncology nurses are continuously exposed to the sufferings of patients undergoing nonbeneficial treatments such as cancer-directed therapy over time [23, 24]. Oncology nurses often provide intensive cancer-directed to patients with poor prognosis, which can lead to a variety of life-threatening consequences [7, 25]. In addition, there is evidence to suggest that oncology nurses have higher moral sufferings compared to non-oncology nurses and other healthcare providers in clinical settings [7]. Due to extensive exposure to ethically distressing events and associated work-related stressors, oncology nurses assume the risk of substandard patient quality and safety of cancer care while losing nurse clinicians [26, 27]. Therefore, it is critical to explore how oncology nurses can decrease their moral sufferings in the clinical settings [28].

Nurse resilience is critical for nurses to achieve professional success and manage workplace stressors as it plays an important role as a protective factor that mitigates the effects of adversities [29]. Unlike nurse resilience, as a specific individual trait, moral resilience refers to an individual's capacity to preserve or restore their integrity in response to moral adversity [8]. Recently, moral resilience has been recognized as a promising resource for nurses that can mitigate the effects of moral sufferings and thereby improving nurses' well-being [10]. Now, Rushton CH et al. has developed the Rushton Moral Resilience Scale (RMRS) to characterize the moral resilience of interprofessional and to evaluate interventions designed to foster moral resilience [10], and the Chinese version of the RMRS (Chi-RMRS) has also been cross-culturally validated in our previous study [11].

Since the publication of the RMRS, several empirical studies have used it as a tool to evaluate moral resilience and also explored the association between moral resilience and various types of moral sufferings [6, 30–32]. Furthermore, spare studies have directly investigated the relationship between moral resilience and professional burnout in healthcare professionals, suggesting that moral resilience is negatively associated with professional burnout [10, 32, 33]. However, limited knowledge exists regarding the moral resilience of Chinese oncology nurses and the factors that may influence oncology nurses' moral resilience. Therefore, our study aims fill these gaps by: (a) revealing the level of moral resilience among Chinese oncology nurses, and (b) identifying the possible factors that influence their moral resilience. This study is critical as it seeks to provide insights that can inform intervention strategies to cultivate or enhance moral resilience, thereby improving the well-being of

oncology nurses and ensuring high standards of patient care. Addressing these objectives will contribute to the development of targeted intervention strategies to mitigate moral sufferings and reduce professional burnout, ultimately supporting the sustainability of the oncology nursing workforce and remaining high quality nursing care.

Methods

Study design and participants

We presented all results according to the Strengthening the Reporting of Observational Studies in Epidemiology guidelines [34]. In this study, we recruited oncology nurses clinically working in hospitals to reveal the level of moral resilience, to investigate the association between moral resilience and professional burnout, and to explore the possible influencing factors of moral resilience. The inclusion criterion was oncology nurses who had been clinically working in hospitals to provide independent care during data collection. Administrative staff and nursing staff in auxiliary departments were not included. As a rule of thumb, in regression analyses, the sample size estimation formula $N = [\text{Max (number of variables)}] * 20$, plus an additional 20% to account for potential invalid samples [35]. Hence, for 6 potential independent variables, a sample size of 20 times the number of variables was initially chosen, resulting in 120 samples. To mitigate potential inaccuracies and inefficiencies, the sample size was increased by 20% to reach a total of 144 samples. In fact, the present study included 466 oncology nurses in the final data analysis to support a more robust and reliable analysis [36].

Measurements

Demographic data

Based on our previous validation study [11] and the methodological study conducted by Heinze et al. [10], we collected the following five sociodemographic characteristics: age, gender, marital status, education level, and working years.

The Chi-RMRS

The RMRS was developed by Heinze et al., consisting of 17 items assigned to four subscales, including response to moral adversity, personal integrity, relational integrity, and moral efficacy [10]. Each item is asked by participants on a 4-Likert scale, with 1 indicating disagreement and 4 indicating agreement. Overall moral resilience is expressed as the average score of all 17 items, with a higher total score indicating higher moral resilience. The original RMRS has a Cronbach's α of 0.84, indicating a satisfactory reliability. In this study, moral resilience was measured with the Chi-RMRS, in which the same 17 items were assigned to three subscales, including the

ability to flexibly cope with adversity, relational moral soundness, and moral efficacy [11]. The Chi-RMRS also got a satisfactory reliability, with a Cronbach's α being 0.811 and composite reliability coefficient being 0.920.

Maslach Burnout Inventory (MBI)

The 22-item Maslach Burnout Inventory Human Services Survey (MBI-HSS) is the most commonly used instrument to measure burnout in human services [37]. The 22 items are divided into 3 subscales, including emotional exhaustion (9 items), depersonalization (5 items), and personal accomplishment (8 items). Respondents were asked each item using a 7-Likert scale, with 0 indicating never and 6 indicating every day. The cut-off value for high risk was > 26 for emotional exhaustion, > 9 for depersonalization, and > 32 for personal accomplishment (reversely coded), respectively. If the scores on any subscale exceed the cut-off value, significant burnout is confirmed [38]. The Chinese version of the MBI-HSS had good reliability and validity [39] and was employed to measure participants' burnout in this study.

Data collection

We created a link to the questionnaire based on the online platform WenJuanXing (available at: <https://www.wjx.cn>), which is the most popular online survey platform in mainland China. The principal investigator of this study first reached collaboration with the chief nurses of two hospitals in Chongqing municipal of China. After sharing the link to the questionnaire with these chief nurses, the principal investigator introduced the purpose and procedure of the study in detail to these chief nurses. Next, the chief nurses described the specifics of this study to oncology nurses working clinically in their hospitals, and encouraged all to participant in this survey and share the link to their respective WeChat working groups. Participants were required to sign an electronic informed consent form before entering the survey page. Participation in the survey is completely voluntary and has no adverse consequences. Notably, we conducted a pilot study with 10 oncology nurses to determine the time required to complete all questionnaires, and the results showed that the time to complete all questionnaires ranged from 5 to 30 min. Therefore, when the time taken to complete this survey was < 5 min or > 30 min, the data case was excluded because filling out the questionnaire was too hasty or confusing.

Statistical analysis

Descriptive statistics, including frequency and composition ratio, were used to describe the demographic characteristics of the participants. The Kolmogorov-Smirnov test showed that the scores of moral resilience and professional burnout did not follow the normal distribution;

however, we still used parametric tests to conduct data analysis for the following two reasons: (1) the results of the Kolmogorov-Smirnov test flux and are not always reliable as the sample size varies, especially with a big sample size [40]; and (2) if large samples were recruited, the distribution of the data can be ignored [41], as the violation of the normality assumption should not cause major problems [42]. Therefore, we expressed the scores of moral resilience and professional burnout using mean and standard deviation (SD). Meanwhile, we used independent-sample t-test and one-way analysis of variance (ANOVA) to test the differences of moral resilience scores between demographics. The correlation between moral resilience and professional burnout was examined using chi-square test. Multivariate linear regression analysis with enter strategy was performed was performed by incorporating all potential variables to determine the influencing factors of moral resilience among oncology nurses. The adjusted R-squared and F-statistic were used to evaluate the fit and significance of the regression equation, respectively. All statistical analyses were conducted by using IBM Statistical Package for Social Sciences (SPSS) version 22.0 (SPSS Inc., Chicago, United States). Statistical significance was defined as $p < 0.05$.

Results

Participant characteristics

After excluding the records of 96 oncology nurses who finished the questionnaires less than 5 min or more than 30 min, a total of 466 oncology nurses were valid for the final data analysis, with a valid response rate of 82.9%. The average age of the 466 participants were (35.07 ± 8.76) years, including 172 participants aged < 30 years (36.91%), 164 participants aged 30 to 39 years (35.19%), and 130 participants aged above 39 years (27.90%). Most participants were female (444/466, 95.30%), married (346/466, 74.25%), and had a bachelor's degree (352/466, 75.54%). The number of participants who had worked for < 5 years, 5 to 10 years, 11 to 20 years, and > 20 years were 136 (29.18%), 94 (20.17%), 134 (28.76%), and 102 (21.89%), respectively. Detailed characteristics of the 466 participants are presented in Table 1.

Scores of moral resilience and professional burnout

The mean score of the moral resilience of 466 oncology nurses was (2.79 ± 0.42), with (2.53 ± 0.74), (2.45 ± 0.63), and (3.34 ± 0.45) for the 3 subscales including ability to respond flexibly to moral adversity, relational moral soundness, and moral efficacy, respectively. The mean score of professional burnout of 466 oncology nurses was (43.65 ± 17.79), with (17.45 ± 8.27), (6.20 ± 4.63), and (20.00 ± 8.98) for emotional exhaustion (EE), depersonalization (DP), and personal accomplishment (PA), respectively. Table 1 shows the detailed distribution of the mean

score of moral resilience and professional burnout of 466 oncology nurses according to different demographics.

Correlation between moral resilience and professional burnout

As presented in Table 2, oncology nurses' moral resilience had a significantly negative correlation with their overall professional burnout, emotional exhaustion, depersonalization, and personal accomplishment, with a corresponding Pearson correlation coefficient of -0.654, -0.587, -0.544, and -0.473, respectively. Furthermore, three subscales of the Chi-RMRS were also significantly negatively correlated with overall professional burnout, emotional exhaustion, depersonalization, and personal accomplishment, respectively, and the Pearson correlation coefficient ranging from -0.231 to 0.513.

Multiple linear regression analysis of influencing factors

After performing normality test based on histogram and plots (as shown in Fig. 1), all demographical variables and the professional burnout score were included in the multiple linear regression analysis of influencing factors of moral resilience. Table 3 shows the results of the multiple linear regression analysis. The final model included three variables: gender, educational level and professional burnout ($F = 52.636$, $p < 0.001$). The Durbin-Watson value of 1.221 was between 0 and 4, indicating the absence of autocorrelation. Furthermore, the variance inflation factors (VIF) ranged from 1.028 to 4.500, indicating the absence of the multi-collinearity. As shown in Table 3, these 3 variables explained 43.7% of the total variance in moral resilience. All these results indicated that the final three variables were the influencing factors of moral resilience among Chinese oncology nurses.

Discussion

To our best knowledge, this is the first study to reveal the level of moral resilience among Chinese oncology nurses, to investigate the association between oncology nurses' moral resilience and professional burnout, and to explore the possible influencing factors of oncology nurses' moral resilience. Our findings showed that the moral resilience of Chinese oncology nurses was at moderate level, oncology nurses' moral resilience is negatively correlated to their professional burnout, and oncology nurses' moral resilience will be influenced by gender, educational level, and professional burnout.

Moral resilience among Chinese oncology nurses

Moral resilience has increasingly viewed as a promising resource for effectively coping with moral sufferings [43], but previous studies [44–47] have used the Connor-Davison Scale, an instrument designed to measure general resilience, to quantify moral resilience, which

Table 1 Distribution of moral resilience and burnout of participants involved in this survey study according to different sociodemographic information

Sociodemographic information		Moral resilience, mean $\pm$ SD				Burnout, mean $\pm$ SD			
Variables	Frequency (%)	Ability	Relational	Efficacy	Total score	EE	DP	PA	Total score
Age range, years									
< 30	172 (36.91%)	2.78 $\pm$ 0.74	2.52 $\pm$ 0.65	3.22 $\pm$ 0.52	2.84 $\pm$ 0.44	16.79 $\pm$ 8.87	6.40 $\pm$ 5.25	19.93 $\pm$ 9.57	43.12 $\pm$ 20.08
30–39	164 (35.19%)	2.42 $\pm$ 0.72	2.42 $\pm$ 0.63	3.34 $\pm$ 0.38	2.75 $\pm$ 0.43	17.85 $\pm$ 8.67	6.16 $\pm$ 4.27	20.99 $\pm$ 8.89	45.00 $\pm$ 17.42
> 39	130 (27.90%)	2.32 $\pm$ 0.66	2.39 $\pm$ 0.59	3.49 $\pm$ 0.38	2.76 $\pm$ 0.38	17.82 $\pm$ 6.81	6.00 $\pm$ 4.21	18.85 $\pm$ 8.17	42.66 $\pm$ 14.79
		F = 17.682, p < 0.001	F = 1.745, p = 0.176	F = 13.768, p < 0.001	F = 2.629, p = 0.073	F = 0.868, p = 0.420	F = 0.280, p = 0.756	F = 2.079, p = 0.126	F = 0.750, p = 0.473
Gender, n (%)									
Males	22 (4.70%)	2.13 $\pm$ 0.52	2.33 $\pm$ 0.54	3.26 $\pm$ 0.57	2.60 $\pm$ 0.39	21.00 $\pm$ 11.74	8.73 $\pm$ 6.76	19.45 $\pm$ 8.17	49.18 $\pm$ 24.02
Females	444 (95.30%)	2.55 $\pm$ 0.74	2.46 $\pm$ 0.63	3.34 $\pm$ 0.44	2.79 $\pm$ 0.42	17.27 $\pm$ 8.04	6.08 $\pm$ 4.48	20.03 $\pm$ 9.03	43.34 $\pm$ 17.41
		t = -2.622, p = 0.009	t = -0.908, p = 0.364	t = -0.835, p = 0.404	t = -2.145, p = 0.032	t = 1.471, p = 0.155	t = 1.819, p = 0.083	t = -0.292, p = 0.771	t = 1.119, p = 0.275
Marital status, n (%)									
Married	346 (74.25%)	2.50 $\pm$ 0.76	2.47 $\pm$ 0.65	3.37 $\pm$ 0.45	2.80 $\pm$ 0.43	17.15 $\pm$ 8.02	6.01 $\pm$ 4.49	19.36 $\pm$ 9.14	42.52 $\pm$ 17.77
Unmarried	120 (25.75%)	2.61 $\pm$ 0.52	2.40 $\pm$ 0.56	3.23 $\pm$ 0.42	2.75 $\pm$ 0.38	18.32 $\pm$ 8.94	6.75 $\pm$ 5.00	21.85 $\pm$ 8.27	46.92 $\pm$ 17.51
		t = -1.499, p = 0.135	t = 1.054, p = 0.292	t = 3.000, p = 0.003	t = 0.961, p = 0.337	t = -1.264, p = 0.208	t = -1.506, p = 0.133	t = -2.635, p = 0.009	t = -2.344, p = 0.019
Educational level, n (%)									
Associate degree or below	88 (18.88%)	2.45 $\pm$ 0.75	2.30 $\pm$ 0.67	3.36 $\pm$ 0.54	2.72 $\pm$ 0.40	15.84 $\pm$ 8.22	5.48 $\pm$ 4.56	21.36 $\pm$ 9.06	42.68 $\pm$ 17.80
Bachelor's degree	352 (75.54%)	2.55 $\pm$ 0.74	2.50 $\pm$ 0.62	3.34 $\pm$ 0.43	2.81 $\pm$ 0.43	17.59 $\pm$ 8.17	6.22 $\pm$ 4.67	19.63 $\pm$ 9.06	43.44 $\pm$ 18.06
Master's degree or above	26 (5.58%)	2.42 $\pm$ 0.62	2.28 $\pm$ 0.54	3.17 $\pm$ 0.33	2.63 $\pm$ 0.33	21.00 $\pm$ 8.83	8.38 $\pm$ 3.66	20.46 $\pm$ 7.34	49.85 $\pm$ 12.58
		F = 0.933, p = 0.394	F = 4.965, p = 0.007	F = 2.051, p = 0.130	F = 3.623, p = 0.027	F = 4.168, p = 0.016	F = 40.16, p = 0.019	F = 1.357, p = 0.258	F = 1.738, p = 0.177
Working years									
< 5	136 (29.18%)	2.77 $\pm$ 0.73	2.47 $\pm$ 0.66	3.18 $\pm$ 0.54	2.81 $\pm$ 0.44	17.21 $\pm$ 8.91	6.38 $\pm$ 5.17	21.50 $\pm$ 9.05	45.09 $\pm$ 19.15
5 to 10	94 (20.17%)	2.56 $\pm$ 0.75	2.47 $\pm$ 0.62	3.35 $\pm$ 0.39	2.81 $\pm$ 0.46	17.17 $\pm$ 8.34	6.51 $\pm$ 4.68	18.87 $\pm$ 8.50	42.55 $\pm$ 18.85
11 to 20	134 (28.76%)	2.47 $\pm$ 0.75	2.46 $\pm$ 0.63	3.39 $\pm$ 0.39	2.79 $\pm$ 0.41	17.13 $\pm$ 8.90	6.00 $\pm$ 4.70	19.21 $\pm$ 9.98	42.34 $\pm$ 18.77
> 20	102 (21.89%)	2.25 $\pm$ 0.60	2.40 $\pm$ 0.60	3.46 $\pm$ 0.38	2.73 $\pm$ 0.35	18.45 $\pm$ 6.26	5.94 $\pm$ 3.69	20.08 $\pm$ 7.71	44.47 $\pm$ 13.00
		F = 10.467, p < 0.001	F = 0.280, p = 0.840	F = 9.485, p < 0.001	F = 0.762, p = 0.516	F = 0.637, p = 0.591	F = 0.399, p = 0.754	F = 2.122, p = 0.097	F = 0.728, p = 0.536

EE, emotional exhaustion; DP, depersonalization; PA, personal accomplishment; SD, standard deviation

Table 2 Pearson correlations between moral resilience and general professional burnout among Chinese oncology nurses

Variable	Mean score	1	2	3	4	5	6	7	8
1. The ability flexibly respond to adversity	2.53 $\pm$ 0.74	1							
2. Relational moral soundness	2.45 $\pm$ 0.63	0.548**	1						
3. Moral efficacy	3.34 $\pm$ 0.45	0.028	0.011	1					
4. Moral resilience	2.79 $\pm$ 0.42	0.815**	0.814**	0.397**	1				
5. Emotional exhaustion	17.45 $\pm$ 8.27	-0.508**	-0.448**	-0.236**	-0.587**	1			
6. Depersonalization	6.20 $\pm$ 4.63	-0.399**	-0.476**	-0.231**	-0.544**	0.742**	1		
7. Personal accomplishment	20.00 $\pm$ 8.98	-0.342**	-0.269**	-0.410**	-0.473**	0.400**	0.355**	1	
8. General job burnout	43.65 $\pm$ 17.79	-0.513**	-0.468**	-0.377**	-0.654**	0.860**	0.785**	0.784**	1

**indicates a statistical significance at 0.01. r of ranging from 0.0 to 0.2, from 0.2 to 0.4, from 0.4 to 0.6, from 0.6 to 0.8, and from 0.8 to 1.0 indicates very weak, weak, moderate, high, and very high correlation, respectively

will undoubtedly lead to inaccuracy in the measurement of moral resilience. The development of the RMRS has made it possible to more accurately measure moral resilience [10], and some studies had used it to assess moral resilience of interprofessional [31, 33, 48, 49]. Moreover,

recent studies have utilized the RMRS to assess nurses' moral resilience levels, with reported mean scores ranging from 2.48 to 2.87 [50, 51]. The present study reported a mean moral resilience score (i.e., 2.53 $\pm$ 0.74) that was comparable to some of previous studies [31, 48, 50],

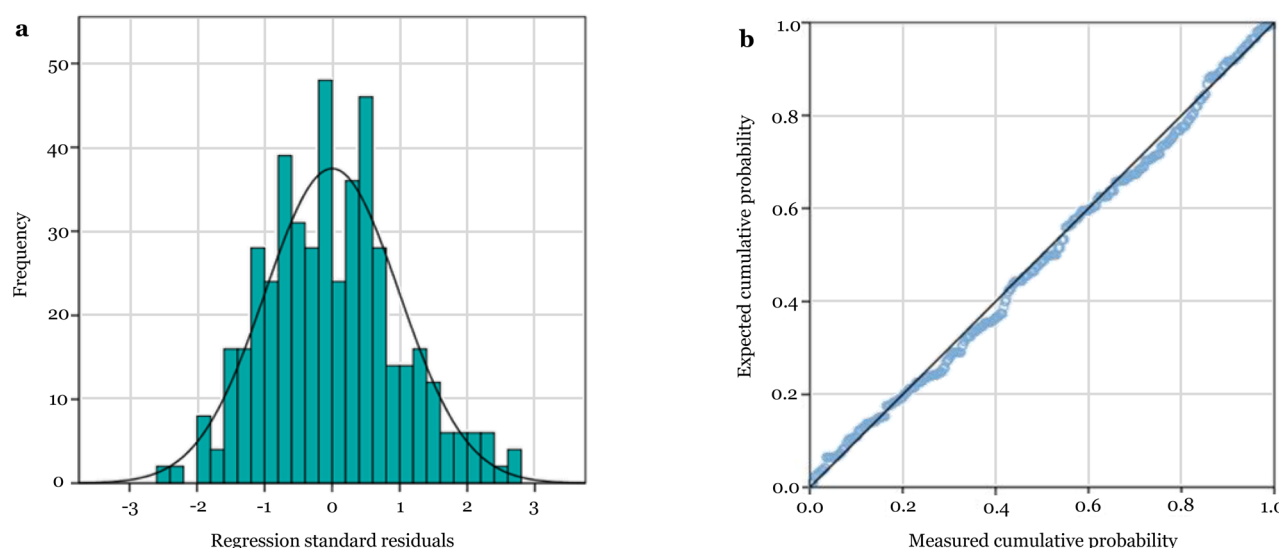


Fig. 1 Normality examination for score of moral resilience based on histogram and P-P plot of standard residuals

Table 3 Multivariate linear regression analysis of moral resilience of Chinese oncology nurses ($n=466$)

Variables	B	SE	β	t	p-value
Constant term	3.176	0.203	n.a.	15.625	<0.001
Gender	0.150	0.070	0.076	2.126	0.034
Participant's age, years	-0.035	0.038	-0.067	-0.924	0.356
Marital status	-0.015	0.038	-0.015	-0.381	0.704
Educational level	0.072	0.031	0.082	2.306	0.022
Working years	-0.015	0.025	-0.044	-0.590	0.555
Job burnout	-0.015	0.001	-0.654	-18.541	<0.001

Adjusted $R^2=0.437$; $F=52.636$, p -value < 0.001

although some studies [32, 51, 52] also reported a higher mean moral resilience score than our study. Actually, these differences in the average moral resilience score only inform us about the importance of separately measuring moral resilience in different professionals because resilience is a dynamic and complex individual trait [53]. Meanwhile, this study revealed that moral efficacy of oncology nurses had the highest score, which was consistent with previous studies [10, 32], while relational moral soundness had the lowest score, followed by the score on the ability of flexibly respond to adversity. As we explained in a previous study [11], healthcare professionals in China particularly focused on interpersonal relationship, which may explain why the score on relational moral soundness was lowest. Certainly, as more and more ethical challenges arise, the importance of the ability of flexibly respond to adversity in nursing deserves special emphasis [10]. Notably, a recent study showed that increased levels of response to moral adversity were associated with lower probability of turnover intention [51]. Therefore, the low score for the ability of flexibly respond to adversity inform us that barrier to the ability of flexibly respond to adversity must be accurately

identified, and effective training programs should be developed or taken to improve oncology nurses' respond to moral adversity, thereby effectively improving adverse occupational consequences.

Correlation between moral resilience and professional burnout

Nurses are subject to high rates of professional burnout, and resilience recently emerged as an important factor in mitigating this condition [54]. While studies have confirmed a negative correlation between general resilience (i.e., psychological resilience) and professional burnout in registered nurses [55]; studies examining the relationship between moral resilience and professional burnout in healthcare professionals remain scarce [10, 32, 33]. Nevertheless, these limited studies suggest a negative association between moral resilience and professional burnout. Notably, one study focusing on nurses reported a weakened relationship between moral resilience and professional burnout [32]. Our study, focusing specifically on oncology nurses, corroborates previous findings by revealing a significant negative relationship between moral resilience and professional burnout. Furthermore, as shown in Fig. 2, the disparity in the prevalence of participants with a low moral resilience levels and those experiencing positive professional burnout suggest that a decrease in the level of moral resilience may contribute to professional burnout. However, a recent study investigating the impact of moral resilience on quiet quitting, job burnout, and turnover intention among nurses only found a negative relationship between response to moral adversity and job burnout, but this study did not observe similar effects for other three aspects of moral resilience [51]. Therefore, future studies need to demonstrate the relationship between moral resilience and professional

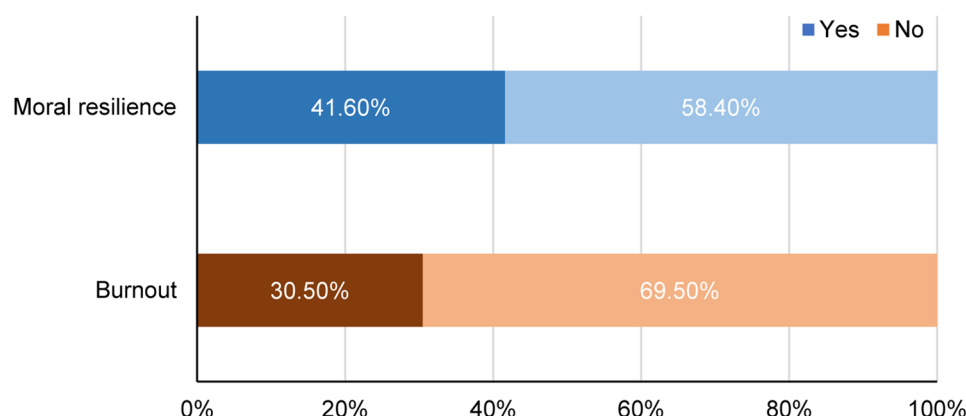


Fig. 2 The prevalence of participants with relatively low levels of and those with positive professional burnout

burnout and further elucidate the mechanisms of moral resilience against professional burnout among oncology nurses, thereby facilitating the development of precise and effective programs to cultivate oncology nurses' moral resilience in a non-punitive way by referring the Rushton's MEPPRA work [56]. These initiatives hold promise for reducing their susceptibility to professional burnout. Additionally, there is a need for studies to evaluate the role of the effectiveness of existing evidence-based programs in fostering moral resilience [57] because previous studies have suggested that moral resilience can be cultivated, created, fostered, or acquired [58].

Influencing factors of Chinese oncology nurses' moral resilience

This study showed that, except for professional burnout, both gender and educational level were also the influencing factors of Chinese oncology nurses' moral resilience. According to the results of linear regression analysis, we can know that male oncology nurses had lower level of moral resilience than female oncology nurses. In China, male nurses are mainly assigned to departments with high caring pressure where various decisions regarding ethical issues arose [59] due to their advantages in physical strength, strong response capability and strong rational judgement ability [60, 61]. This actually exposes male nurses to unethical conditions more frequently and intensively, thereby reducing their ability to respond effectively to ethical adversity. Moreover, in mainland China, nursing has always been considered a profession more suitable for women [62], which also explained why male oncology nurses working in hospitals are often affected by traditional concepts and gender role stereotypes [63]. Therefore, registered male nurses in mainland China actually experience more ethical sufferings than registered female nurses, which also explains why resignation rate of male nurses is higher than that of female nurses [64].

Moreover, the results of the linear regression analysis also showed that the level of moral resilience of oncology nurses with a bachelor's degree was higher than that of nurses with low educational levels. A recent study consistently found that nurses with bachelor's degrees were more likely to exhibit moderate to high levels of moral resilience compared to those with lower educational attainments [65]. One possible explanation for this result is that nurses with higher educational qualifications may receive more comprehensive ethics education, leading to a deeper understanding and knowledge of relevant principles [66]. Additionally, while fewer studies have specifically investigated the influence of educational level on moral resilience, many studies have examined its impact on moral distress, revealing a negative correlation with nurses' moral resilience [30–68]. Previous studies have shown that, compared with nurses with low educational levels, those with high educational levels may have rich professional knowledge and skills and be able to make good judgments on treatment and nursing measures, which means that when nurses take incorrect or unreasonable treatment or care measures they believe, they will be painful and will undergo moral distress [69, 70]. These findings indirectly elucidate why registered nurses with master's degrees exhibit lower moral resilience compared to those with bachelor's and associate degrees.

Previous evidence suggested that working experience could influence moral resilience [10]. However, in our study, linear regression analysis did not reveal a significant association between years of working and the level of moral resilience. This discrepancy might be attributed to contextual differences, cultural factors, or variations in sample size and composition. Additionally, a recent study found that nurses who were divorced or separated were more likely to have lower levels of moral resilience [65]. This might be attributed to the lack of personal support systems, which are crucial during morally distressing situations. While previous evidence highlighted the supportive role of marriage relationships in helping nurses

cope with ethical challenges [71], our study did not detect a significant influence of marital status on moral resilience among oncology nurses in the present study. This discrepancy could be due to the specific stressors faced by oncology nurses, and the impact of marital status may be mediated by other factors such as personal coping mechanisms or institutional support systems [72]. Furthermore, previous research also explored the impact of work satisfaction and ethics training on nurses' moral resilience [65]. However, these variables were not included in the present study. This omission represents a limitation and suggests a direction for future research. Therefore, we recommend that future studies considering recruit larger sample size and include additional variables such as job satisfaction, specific type of ethics training received, and personal support systems to comprehensively investigate the factors influencing moral resilience among Chinese oncology nurses.

Limitations

This study has not without limitations. First, the nature of the online survey applied in this study inevitably introduces bias due to inability to increase valid response to questionnaires, although this survey strategy has been extensively used in cross-sectional study. Secondly, this study speculates on the causal relationship between moral resilience and professional burnout based on the results of Pearson correlation analysis and the difference in prevalence between clinically significant low moral resilience and burnout; however, due to the nature of cross-sectional study, it is impossible to directly determine the causal relationship between moral resilience and professional burnout. Therefore, specific association between moral resilience and professional burnout should be elucidated in future longitudinal studies. Thirdly, this study also explored the possible influencing factors of Chinese oncology nurses' moral resilience; however, the results should be interpreted with caution because only limited factors were considered in this study.

Conclusions

In conclusion, our study sheds light on the moral resilience of Chinese oncology nurses, revealing a mean score indicative of their capacity to navigate moral adversity. Importantly, we observed a significant negative correlation between moral resilience and job burnout, underlining the critical interplay between these factors in the nursing profession. Additionally, our findings highlight the influence of gender, educational level, and professional burnout on oncology nurses' moral resilience, underscoring the multifaceted nature of this construct. These insights contribute to a deeper understanding of the challenges faced by oncology nurses and underscore

the importance of fostering moral resilience to mitigate burnout, sustain a resilient nursing workforce, and deliver quality nursing care.

Relevance to clinical practice

Understanding the moral resilience levels of Chinese oncology nurses and the factors influencing them is paramount for clinical practice. Our findings underscore the importance of incorporating interventions aimed at enhancing moral resilience into nursing education and professional development programs. By addressing factors such as gender, educational level, and job burnout, healthcare institutions can tailor support systems to bolster nurses' moral resilience, ultimately improving their well-being and patient care quality. Moreover, recognizing the negative correlation between moral resilience and job burnout emphasizes the need for proactive measures to mitigate burnout among oncology nurses, thereby safeguarding both their mental health and the integrity of patient care delivery.

Relevance to future research

Our study lays a foundation for future research endeavors aimed at further elucidating the intricate relationship between moral resilience, job burnout, and other socio-demographic factors among oncology nurses. Longitudinal studies could explore how interventions targeting moral resilience impact job burnout rates and overall job satisfaction over time. Additionally, comparative studies across different healthcare settings and cultural contexts could provide valuable insights into the generalizability of our findings and the effectiveness of interventions. Furthermore, qualitative research approaches could delve deeper into the subjective experiences of oncology nurses, shedding light on the nuanced factors influencing moral resilience and burnout within this specific population. Such multifaceted investigations are essential for the development of comprehensive strategies to promote nurses' well-being and ensure the delivery of high-quality patient care in oncology settings.

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Author contributions

X.T. and Z.M.C.: Investigation, Data curation, Formal analysis, Writing - Original Draft; X.T., X.N.G. and Y.R.: Data curation, Formal analysis, Writing - Review & Editing. Y.R. and M.F.J.H.: Investigation, Data curation, Y.R. and F.R.L.: Methodology, Review & Editing; Project administration, Supervision.

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Data availability

The data are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

This research followed the ethical guidelines of the 1975 Declaration of Helsinki and was approved by the Institutional Ethical Review Committee. Informed consent was obtained from all research participants prior to the online survey, who could withdraw at any time or from any item of their own desire.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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