

# Effect of Work Stressors, Personal Strain, and Coping Resources on Burnout in Chinese Medical Professionals: A Structural Equation Model

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**Abstract:** The present study analyzes the effect of work stressors, personal strain and coping resources on burnout among Chinese medical professionals. A total of 2,721 medical professionals were selected using the stratified cluster sampling method. A Chinese version of the Maslach Burnout Inventory-General Survey was used to measure burnout, whereas the Occupation Stress Inventory-Revised Edition was used to evaluate work stressors, personal strain, and coping resources. The structural equation model (SEM) was established to test the effect of work stressors, personal strain, and coping resources on burnout. Among the predictive factors for burnout, work stressors and personal strain were the primary risk factors, whereas coping resources make up the important protective factor. The result from SEM indicated that work stressors had both direct and indirect effects on burnout, with the indirect effect mediated by both personal strain and coping resources. Coping resources only affected burnout indirectly, as mediated by personal strain, whereas personal strain affected burnout independently. The results suggest that work stressors, personal strain, and coping resources play important roles in burnout among medical professionals. To prevent burnout, such countermeasures as controlling the work stressors, reducing personal strain, and strengthening coping resources are recommended.

**Key words:** Burnout, Work stressor, Personal strain, Coping resources, Medical professionals, SEM

## Introduction

Medical professionals comprise a large proportion of China's labor force. By the end of 2009, the number of healthcare workers in China reached approximately 7.7

million<sup>1)</sup>. The number will continue to grow dramatically because of speedy economic development, thus resulting in an improvement in people's living standards and a higher demand for better medical services. Accordingly, health-related issues being encountered by the medical professionals themselves are being increasingly recognized<sup>2)</sup>.

Burnout is described as a feeling of emotional exhaustion, depersonalization, and reduced personal accomplish-

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ment. Epidemiological studies conducted in different countries have shown that medical professionals are at a higher risk of suffering from burnout, which directly or indirectly affects the quality and safety of medical/clinical service<sup>3-5</sup>. An important task for researchers is to determine the variables that might protect medical professionals against burnout.

Burnout is one of the possible consequences of long-term chronic occupational stress. Various studies have reported that medical professionals in numerous countries experience very high levels of occupational stress<sup>6, 7</sup>. The hospital workplace has a variety of work stressors, such as increasing workload, uncertainty concerning treatment, emotional response to suffering and dying patients, organizational problems and conflicts, insufficient skills, and insufficient social support at work<sup>8-10</sup>. These work stressors tap into the vulnerability of medical professionals and result in burnout. Occupational stressors in the absence of adequate coping resources possibly contribute to the development of depression, anxiety, and a decrease in service provision<sup>10-12</sup>. Thus, further understanding work stress and coping variables that may relate most closely to burnout among medical professionals is necessary. Although these variables have been examined previously, few studies have utilized a more comprehensive model to explore the effect of work stressors, personal strain, and coping resources on job burnout among medical professionals in China. Following these considerations, we hypothesized a comprehensive model will promote a better understanding of the relationship among work stressors, personal strain, coping resources, and burnout among medical professionals. Therefore, this study addresses the need for a comprehensive model to explore the relationship among these variables. The information will be useful in developing a strategy to prevent burnout for all medical professionals in China.

## Methods

### *Study subjects*

Study subjects were recruited from 12 hospitals in Fujian Province and Henan Province in China using stratified cluster random sampling. Two hospitals were randomly chosen from three strata (provincial, municipal, and county-level hospitals) in each province. A survey coordinator at each hospital invited medical professionals (including medical doctors, nurses and other clinical occupations) who met certain criteria, namely, an age range of 18 to 60 yr old and a minimum service period of one

year. Questionnaires were distributed between March and July 2008. Of the 3,320 medical professionals who were contacted, 2,721 (82%) returned completed questionnaires (1,376 from Fujian Province and 1,345 from Henan Province). There is no bias (gender, occupation, region, etc.) between completers and non-completers. The respondents were from different settings, including surgery (445), internal medicine (448), oncology (162), pediatrics (314), obstetrics and gynecology (335), emergency department (155), ear-nose-throat department (206), anesthesiology (220), clinical laboratory (231), and medical imaging department (205). All study subjects were fully informed of the purpose of the study prior to enrollment.

### *Data collection*

A Chinese version of the Maslach Burnout Inventory-General Survey (MBI-GS) was used to assess burnout<sup>7, 13</sup>, and a Chinese version of the Occupation Stress Inventory-Revised Edition (OSI-R) was applied for occupational stress, personal strain, and coping resources among medical professionals in China<sup>14</sup>. A structured questionnaire was administered to collect information on demographic characteristics (including gender, age, education level, marital status and per capita family income). Education level was categorized into "associate's degree or below" and "bachelor's degree or higher"; marital status was divided into: single, married and others (Divorced/Widowed); and per capita family income was categorized into three-level degree: <1,500 (yuan)/month, 1,500–2,000 (yuan)/month and  $\geq 2,000$  (yuan)/month.

The research proposal and access to the research data were approved by the Ethics Review Committee of the participating hospital.

### *Measures*

Maslach Burnout Inventory-General Survey (MBI-GS)

Burnout was assessed using the MBI-GS (Schaufeli *et al.* 1996)<sup>15</sup>. The MBI-GS comprises 16 items and three sub-scales, namely, emotional exhaustion (EX, five items, e.g., "Working all day is really a strain for me," 0=never, 6=everyday), cynicism (CY, five items, e.g., "I doubt the significance of my work," 0=never, 6=everyday), and professional efficacy (PE, six items, e.g., "I have accomplished many worthwhile things in this job," 0=everyday, 6=never). Higher MBI-GS scores indicate higher levels of burnout.

The translation-back-translation procedure (Brislin, 1986)<sup>16</sup> was used in this study. Several professors from the nursing and medicine fields translated the MBI-GS,

which was originally developed in English, into Chinese specifically for this study. To test language validity, several other professors translated the Chinese version back into English, and the Chinese version was reviewed. The Chinese version was concluded to have high validity and reliability<sup>7, 13</sup>.

#### Measurement of Occupational Stress Inventory

The Occupational Stress Inventory-Revised Edition (OSI-R)<sup>14</sup> was translated into Chinese. OSI-R contains a concise measure of three dimensions of occupational adjustment, namely, work stressors, personal strain, and coping resources. This measurement has been widely used in China and has been confirmed to have good reliability and validity<sup>17</sup>. OSI-R comprised three questionnaires. The Occupational Role Questionnaire included six scales (role overload, role insufficiency, role ambiguity, role boundary, responsibility, and physical environment) and was used to assess work stressors. The Personal Strain Questionnaire (PSQ) included four scales (vocational strain, psychological strain, interpersonal strain, and physical strain) and was applied to evaluate the level of personal strain. Finally, the Personal Resource Questionnaire (PRQ) included four scales (recreation, self-care, social support, and rational/cognitive coping) and was administered to assess coping resources. Each scale contained 10 items. Scales for the three OSI-R domains are described in our previous study<sup>18</sup>. A higher PSQ score indicates greater stress level, whereas a higher PRQ score indicates better coping resources.

#### Data analysis

Epidata3.02 was used to input data, and SPSS18.0 for Windows and AMOS 7.0 were used for the statistical analyses. Descriptive analysis procedures were used to demonstrate demographic information and evaluate the means and standard deviations among observed variables.

Pearson's correlation analysis was used to examine the simple relationships among work stressors, personal strain, coping resources, and burnout.

Multiple linear regression analysis was applied to determine predictors for burnout while adjusting for demographic variables. Categorical variables were considered dummy variables. Model fitting was accomplished using a stepwise method with criteria for entry at  $p \leq 0.05$  and removal at  $p > 0.10$  to select potential predictors for the three dimensions of burnout.

The structural equation model (SEM) was constructed using AMOS 7.0 to test the effects of work stressors,

coping resources, and personal strain on burnout using the maximum likelihood method. Standardized path coefficients, as well as the significance of the direct and indirect effects, were presented. The following indicators were used to examine the goodness of fit of the models:  $\chi^2$  coupled with the degrees of freedom (df), the incremental fit index (IFI), the Tucker-Lewis coefficient (TLI), the comparative fit index (CFI), as well as the root mean square error of approximation (RMSEA). Satisfactory model fit is indicated by RMSEA values less than or equal to 0.10 and by GFI, IFI, TLI, and CFI values greater than or equal to 0.90<sup>19, 20</sup>. The  $\chi^2$  tests as indicators of overall fit were omitted because of their sensitivity to sample size<sup>21</sup>.

## Results

The demographic information and the mean scores of for EX, CY, and PE are shown in Table 1. Among the 2,721 participants, 62 percent were female. Respondent average age was 33 yr, ranging from 18 to 60 yr. Moreover, 56% of the participants had a bachelor's degree or higher. Approximately 30% of the participants were single.

Significant differences were found in the means of EX, CY, and PE scores among different region, gender, age group, education level, marital status, and family income categories (Table 1). Medical professionals in Henan Province appeared to have slightly higher EX scores but lower PE scores than those in Fujian Province. Female medical staff had slightly lower EX and CY scores but higher PE scores than the male medical staff. The middle-aged group (30 to 45 yr old) was found to have the highest EX score, whereas the youngest age group (<30 yr old) had the highest PE scores. Moreover, EX and CY scores were significantly higher, whereas PE scores were significantly lower in those with a bachelor's degree or higher. Finally, PE scores were lowest in the married group and highest in those with the lowest family income.

The means, standard deviations, and the correlation coefficients of the study variables in relation to burnout are shown in Table 2. The scores for the six sub-scales of work stressors and four sub-scales of personal strain related positively with EX, CY, and PE, whereas the scores for the four sub-scales of coping resources correlated negatively with the same burnout variables.

Potential predictors for the three dimensions of burnout are shown in Table 3. In terms of work stressors, role overload was significantly related to EX and CY, role insufficiency was significantly associated with CY and

**Table 1. Mean scores for the burnout subscales (n=2,721)<sup>§</sup>**

Demographic characteristics	N (%)	Burnout		
		EX	CY	PE
<b>Gender</b>				
Male	1024 (37.6)	10.53 (5.87)	9.92 (5.53)	11.41 (7.40)
Female	1697 (62.4)	9.75 (5.70)*	9.34 (4.95)*	12.50 (7.78)*
<b>Age group, year</b>				
<30	1103 (40.5)	9.76 (5.38)	9.52 (5.19)	13.30 (7.58)
30–45	1077 (39.6)	10.66 (6.04)*	9.84 (5.12)	11.61 (7.47)*
≥45	541 (19.9)	9.54 (6.41)	9.41 (5.28)	8.84 (7.33)*
<b>Education level</b>				
Associate's degree or below	1176 (43.2)	9.21 (5.33)	9.10 (5.02)	13.44 (7.94)
Bachelor's degree or higher	1545 (56.8)	10.68 (6.03)*	9.90 (5.28)*	11.06 (7.27)*
<b>Marital status</b>				
Single	871 (32.0)	10.28 (5.61)	9.72 (5.30)	13.19 (7.16)
Married	1778 (65.3)	9.92 (5.85)	9.56 (5.16)	11.47 (7.70)*
Divorced/Widowed	72 (2.7)	10.08 (5.94)	9.66 (3.84)	14.22 (8.22)
<b>Per capita family income</b>				
<1,500 (yuan)	1224 (45.0)	9.03 (4.92)	9.32 (5.33)	14.06 (7.57)
1,500–2,000	816 (30.0)	9.16 (4.74)	9.61 (5.05)	13.00 (6.81)*
>2,000	681 (25.0)	9.46 (4.90)	9.59 (5.24)	12.50 (8.56)*

EX: emotional exhaustion; CY: cynicism; PE: professional efficacy.

<sup>§</sup>Values are means and standard deviations (in parentheses), unless stated otherwise.

\*  $p < 0.05$  when compared with the first group.

**Table 2. Means, SDs, and correlation coefficients of study variables in relation to burnout (N=2,721)**

Variable	Mean (SD)	Correlation Coefficient		
		EX	CY	PE
<b>Work Stressor</b>	143.41 (21.10)	<b>0.491**</b>	<b>0.470**</b>	<b>0.163**</b>
Role Overload (RO)	26.78 (5.35)	0.487**	0.327**	0.041
Role Insufficiency (RI)	25.36 (4.78)	0.233**	0.395**	0.269**
Role Ambiguity (RA)	19.97 (5.43)	0.214**	0.321**	0.267**
Role Boundary (RB)	21.91 (5.72)	0.251**	0.313**	0.211**
Responsibility (R)	25.16 (6.02)	0.362**	0.257**	-0.059**
Physical Environment (PE1)	24.22 (6.54)	0.292**	0.176**	-0.079**
<b>Personal Strain</b>	88.06 (19.31)	<b>0.463**</b>	<b>0.497**</b>	<b>0.197**</b>
Vocational Strain (VS)	18.37 (5.50)	0.277**	0.443**	0.243**
Psychological strain (PSY)	24.47 (7.09)	0.427**	0.419**	0.187**
Interpersonal Strain (IS)	23.35 (5.15)	0.243**	0.307**	0.123**
Physical Strain (PHS)	21.85 (5.94)	0.497**	0.423**	0.091**
<b>Coping Resources</b>	124.47 (17.60)	<b>-0.363**</b>	<b>-0.319**</b>	<b>-0.323**</b>
Recreation (RE)	24.19 (5.80)	-0.356**	-0.187**	-0.127**
Self-Care (SC)	29.06 (5.52)	-0.302**	-0.226**	-0.189**
Social Support (SS)	38.69 (5.59)	-0.108**	-0.253**	-0.329**
Rational Coping (RC)	32.52 (6.55)	-0.309**	-0.285**	-0.275**

\*\*  $p < 0.01$ ; EX: emotional exhaustion; CY: cynicism; PE: professional efficacy.

**Table 3. Predictors of the three dimensions of burnout in medical staff # (n=2,721)**

Variables	Estimate	Std Error	Beta	t	p value
<b>Emotional Exhaustion*</b>					
Physical Strain	0.241	0.032	0.223	7.463	0.000
Role Overload	0.375	0.029	0.310	12.737	0.000
Psychological Strain	0.225	0.028	0.247	8.085	0.000
Age	-0.063	0.015	-0.092	-4.135	0.000
Recreation	-0.086	0.028	-0.077	-3.135	0.002
Rational Coping	-0.112	0.027	-0.114	-4.223	0.000
Physical Environment	0.080	0.022	0.081	3.572	0.000
<b>Cynicism<sup>‡</sup></b>					
Psychological strain	0.108	0.025	0.149	4.330	0.000
Role Overload	0.162	0.027	0.168	5.941	0.000
Role Insufficiency	0.185	0.029	0.173	6.293	0.000
Physical Strain	0.141	0.028	0.164	5.100	0.000
Vocational Strain	0.097	0.028	0.105	3.476	0.001
Responsibility	0.066	0.024	0.078	2.793	0.005
Age	-0.028	0.014	-0.052	-2.086	0.037
<b>Professional Efficacy<sup>§</sup></b>					
Social Support	-0.195	0.042	-0.148	-4.704	0.000
Age	-0.131	0.021	-0.165	-6.225	0.000
Role Insufficiency	0.134	0.047	0.086	2.873	0.004
Rational Coping	-0.165	0.035	-0.146	-4.713	0.000
Vocational Strain	0.138	0.042	0.103	3.321	0.001
Role Boundary	0.149	0.041	0.114	3.669	0.000
Gender	-0.970	0.409	-0.063	-2.372	0.018
Responsibility	-0.082	0.036	-0.067	-2.254	0.024

# Variables considered in the model include demographic factors (region, gender, age, marital status, and per capita family income), work stressors (including six scales), personal strain (including four scales), and coping resources (including four scales).

\*R Square = 41.9%; Adjusted R Square = 41.5%.

‡ R Square = 39.0%; Adjusted R Square = 38.5%.

§ R Square = 31.4%; Adjusted R Square = 30.8%.

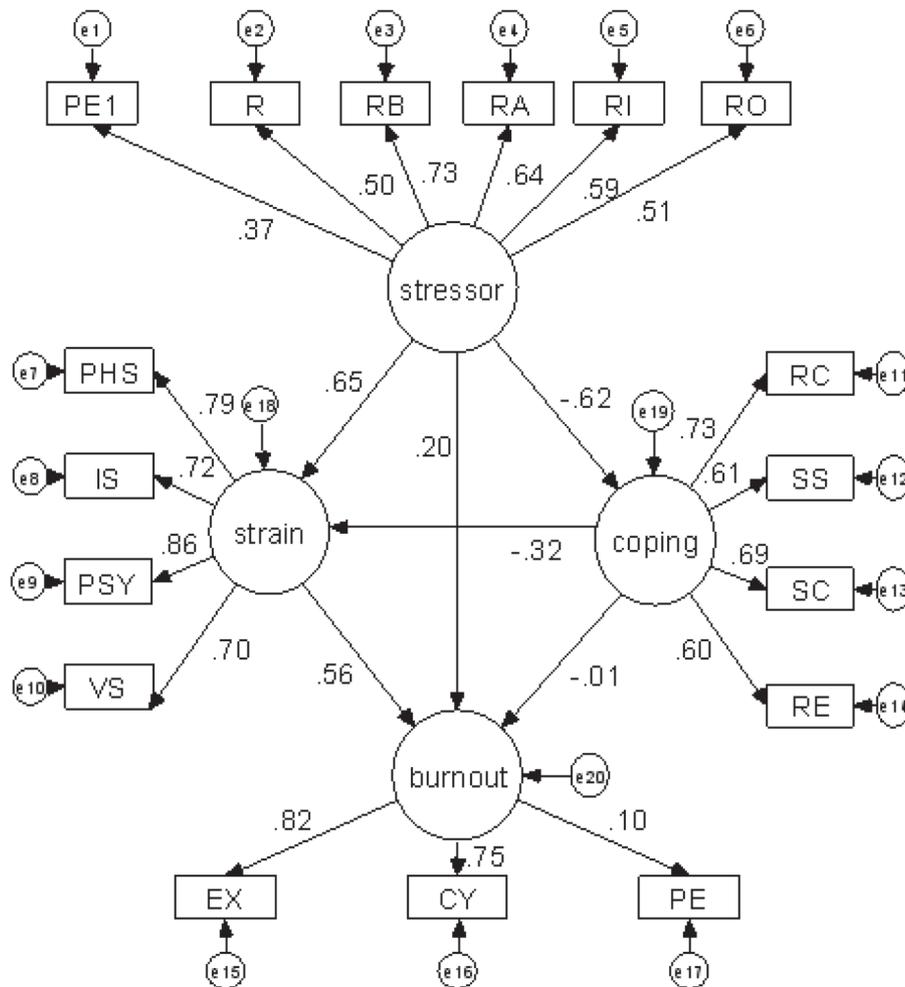
PE, physical environment only contributed to EX, and role boundary was related to PE alone. On the other hand, responsibility was positively related to CY and negatively related to low PE.

In terms of personal strain factors, psychological and physical strain were related to EX and CY, whereas vocational strain was significantly associated with CY and PE. Among the coping variables, rational coping and recreation were the primary protective predictors for EX, and rational coping and social support were the significant predictors for PE. Only age and gender contributed to burnout among the demographic variables. Younger and female medical professionals were more susceptible to burnout. The predictor variables accounted for 41.5%, 38.5%, and 30.8% of the variance (adjusted  $R^2$ ) in the model of EX, CY, and PE, respectively.

The SEM yielded a  $\chi^2$  of 248.4 ( $df=92$ ). The NFI is 0.929, the TLI is 0.915, the CFI is 0.943, and the RMSEA is 0.079. These results indicate a relatively good fit of the SEM of work stressors, personal strain, and coping resources among Chinese medical professionals.

The SEM presented in Fig. 1 indicated that work stressors and personal strain have direct positive effects on burnout, whereas coping resources have minimal direct effects on burnout among Chinese medical professionals in this study. Work stressors affect burnout independently, mediated by both personal strain and coping resources. Coping resources affect burnout indirectly and are mediated by personal strain, whereas personal strain affects burnout independently.

Table 4 shows the estimates of the standardized direct, indirect, and total effects of work stressors, personal strain,



**Fig. 1. SEM for burnout among medical professionals.**  
 RO: role overload; RI: role insufficiency; RA: role ambiguity; RB: role boundary; R: responsibility; PE1: physical environment; PHS: physical strain; IS: interpersonal strain; PSY: psychological strain; VS: vocational strain; RC: rational coping; SS: social support; SC: self-care; RE: recreation; EX: emotional exhaustion; CY: cynicism; PE: professional efficacy.

**Table 4. Standardized effect of influencing factors on burnout**

Variable	Direct	Indirect	Total
Stressor	0.199	0.483	0.682
Coping resources	-0.014	-0.182	-0.196
Strain	0.560	-	0.560

and coping resources on burnout. Work stressors have both direct and indirect positive effects on burnout, whereas personal strain has only direct positive effect on burnout. Coping resources have only an indirect negative effect on burnout. Of all the standardized total effects, the absolute value of work stressors is the greatest (0.676), followed by personal strain (0.617) and coping resources (0.228).

### Discussion

A large number of studies have already explored the relationship between occupational stress and health outcomes<sup>22, 23</sup>. However, few studies have utilized a more comprehensive model to evaluate the relationships among work stressors, personal strain, coping resources, and burnout. The key findings of the present study confirm the relationships among work stressors, personal strain, coping resources and burnout. Work stressors both directly and indirectly affected burnout, and the indirect effect was mediated by both personal strain and coping resources. On another hand, coping resources affected burnout indirectly and negatively, with the effect mediated by personal strain. Finally, personal strain directly affected burnout and

functioned as a central psychosocial experience that mediated the effects of work stressors and coping resources on burnout.

A positive correlation was observed between work stressors and burnout based on the correlation analysis in this study. Multiple linear regression analysis indicated that work stressors (indicated by role overload, role insufficiency, role boundary, physical environment, and responsibility) comprised the main risk factor for the three dimensions of burnout among medical professionals. The result from SEM in our study supported that work stressors had a direct effect on burnout. On the other hand, work stressors also affected burnout indirectly, as mediated by personal strain and coping resources. The direct paths going from work stressors to personal strain supported the latter as a central psychosocial experience associated with high burnout. In other words, work stressors indirectly increase burnout by increasing personal strain. This finding is similar to that of a previous research, which revealed that personal strain mediated the relationship between life-events (or stressors) and quality of life<sup>24</sup>). This result might be attributed to the fact that work stressors yield personal strain, which then generates a high level of burnout, and that work stressors indirectly affect burnout, as mediated by personal strain. The direct path going from work stressors to coping resources indicated that work stressors indirectly increase burnout by reducing the coping resources. This finding is consistent with that of a previous research, which indicated that social support and coping mediated the effect of work stressors on burnout in intellectual disability support staff<sup>25</sup>). The possible mechanism was that work stressors result in insufficient coping resources, thereby increasing personal strain and finally generating a high level of burnout.

A number of studies explored the relationship between coping resources and health outcomes<sup>26, 27</sup>). Coping resources are known to be important protective factors for health status<sup>28</sup>). The results from the multivariate analysis in this study also indicated coping resources (as reflected by rational coping, social support, and recreation) to be the main protective predictor for burnout in medical professionals. However, the direct and indirect effects of coping resources on burnout have rarely been examined. In this study, coping resources were found to have minimal direct effects on burnout and affected burnout indirectly, as mediated by personal strain. The direct path from coping resources to personal strain showed that personal strain served as a central psychosocial experience in the relationship between coping resources and burnout. Moreover,

coping resources indirectly decrease burnout by lessening personal strain.

Similarly, one study suggested that personal strain mediates the effects of coping strategies on the quality of life of HIV-positive women<sup>29</sup>). Full use of coping resources was suggested to lessen the level of personal strain, thereby reducing burnout among medical professionals. The previous study drew our attention to the importance of increasing coping resources among medical professionals. Increasing coping resources was also suggested to be useful in relieving strain and avoiding burnout among medical professionals.

The result from the multivariate analysis revealed psychological, physical, and vocational strain as significant risk predictors for the three dimensions of burnout among medical professionals. The direct path from personal strain to burnout indicated that the former directly and positively affects burnout. More importantly, results from the current study have suggested personal strain as a central psychosocial experience that mediates the effects of work stressors and coping resources on burnout. Personal strain appears to be the main cause for increased burnout among medical professionals in this study. Based on the results, three approaches may be developed to reduce the effect of work stressors on job burnout, namely, decreasing work stressors, increasing coping resources, and promoting individual tolerance for personal strain.

#### *Strengths and limitations of this study*

The strengths of this study lie in the large sample size and the use of a more comprehensive model to explore the relationships among work stressors, personal strain, coping resources, and burnout. This study contributes to the effectiveness of organizational interventions employed to avoid burnout among medical professionals. However, a number of limitations should be considered in interpreting the results. First, the study had a cross-sectional design. Similar all other cross-sectional studies, we cannot draw any causal associations between burnout and the variables of interest. Second, all measures were based on self-reports, which likely yielded recall/report bias. However, no sensitive issues were included in the questionnaire, and no particular motivation existed for the participants to under-report or over-report. The recall/report error might randomly occur in the population, which was unlikely to have affected the direction of the associations between burnout and other factors. Third, regarding the generalizability of the study, the subjects were recruited from three strata, namely, provincial, municipal, and county-level hospitals

in two provinces, which might not be representative of the entire population of medical professionals in China. On the other hand, the age composition of respondents was similar to that of health professionals throughout the country, according to 2005 data<sup>1)</sup>. However, the proportion of respondents with a bachelor's degree or higher was slightly higher than that for the country's entire population of health professionals. The subjects in this study can fairly represent the medical professionals in city- or above-level hospitals, but may not be representative of those working in township health centers or private clinics.

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