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Relationship between occupational stress and burnout among Chinese teachers: a cross-sectional survey in Liaoning, China

Yang Wang · Aaron Ramos · Hui Wu · Li Liu · Xiaoshi Yang · Jiana Wang · Lie Wang

Abstract

Objectives Teaching has been reported to be one of the most stressful occupations in the world. Few studies have been conducted to explore the effects of occupational stress on burnout among teachers in developing countries. This study aimed to explore the relationship between occupational stress and burnout among teachers in primary and secondary schools in the Liaoning Province of China.

Methods A questionnaire that assessed occupational stress comprised of Karasek's job content questionnaire (JCQ), Siegrist's effort–reward imbalance questionnaire (ERI), and burnout assessed by the Maslach Burnout Inventory-General Survey was distributed to 681 teachers in primary and secondary schools. A total of 559 effective respondents became our final study subjects. Hierarchical linear regression and logistic regression analyses were performed through the use of SPSS 17.0 to explore the association between occupational stress and burnout.

Results A high level of emotional exhaustion was significantly associated with high extrinsic effort, high overcommitment, low skill discretion, and high job demand. A high level of cynicism was associated with low reward, low skill discretion, high overcommitment, and low supervisor support. The low level of professional efficacy was associated with low coworker support, low reward, low skill discretion, and high job demand. Compared to the JCQ, the ERI was more likely to explain the burnout of teachers in our study.

Conclusions Occupational stress proved to be associated with dimensions of burnout among Chinese teachers. It is important for administrators of primary and middle schools to note that strategies to decrease teachers' occupational stress seem to be crucial to enhance physical and mental health of teachers in China.

Keywords Occupational stress · Burnout · Teachers

Y. Wang · A. Ramos · H. Wu · L. Liu · X. Yang · J. Wang · L. Wang (✉)
Department of Social Medicine, School of Public Health, China Medical University, 92 Bei'er Road, Heping District, Shenyang 110001, Liaoning, People's Republic of China
e-mail: liewang@mail.cmu.edu.cn

Y. Wang
e-mail: allylove666@aliyun.com

A. Ramos
e-mail: aaronaramos@yahoo.com

H. Wu
e-mail: wuhui@mail.cmu.edu.cn

L. Liu
e-mail: liul@mail.cmu.edu.cn

X. Yang
e-mail: yangxiaoshi@mail.cmu.edu.cn

J. Wang
e-mail: jiana0818@163.com

Introduction

Burnout is a term used to describe a state of physical, emotional, and mental exhaustion, which occurs after long-term exposure to situations that are emotionally demanding (Montgomery et al. 2006). It is characterized by emotional exhaustion, cynicism, and reduced professional accomplishment and has been recognized as an occupational hazard for various people-oriented professions, such as health care or education (Maslach and Goldberg 1998). Burnout is associated with physical illness and mental problems such as cardiovascular diseases, musculoskeletal pain (Honkonen et al. 2006), depression, and anxiety (Maslach

et al. 2001). At the organizational level, burnout is associated with absenteeism, intention to leave the job, turnover, lower productivity, job dissatisfaction, and decreased commitment (Maslach and Goldberg 1998; Maslach et al. 2001).

Occupational stress has been found to be strongly associated with burnout in previous research studies (Wu et al. 2007; Escribà-Agüir et al. 2006). Two theoretical models are extensively applied to examine the relationship between psychosocial stress at work and the outcomes of health: the job–demand–control–support (DCS) model and the effort–reward imbalance (ERI) model. The DCS model emphasizes the effects of job demands and job control on job strain as well as a "buffering" factor, social support, and postulates that the combination of high job strain and lack of social support are related with many adverse health conditions (Karasek et al. 1998). The latter model, the ERI model, measures the balance of efforts and rewards at work (Siegrist 1996; Siegrist et al. 2004). The imbalance of high efforts and low rewards, where rewards concern money, esteem, career opportunities, and job security, leads to long-term activation of the autonomic nervous system, eventually contributing to illness. Overcommitment is another measurement in ERI model. It is defined as personal coping style characterized by a high motivation to keep control and to spent efforts to reach this aim. Overcommitted people are at increased risk of reduced health.

There are two important differences between the two models of occupational stress. First, personal component is included in ERI model, but not in DCS model. In the ERI model, people with overcommitment exaggerate their efforts beyond levels normally considered appropriate. However, no intrinsic component is defined in the DCS model. Second, the ERI model emphasizes reward, particularly the social exchange process in which efforts spent at work are compensated by adequate rewards. If the adequate exchange is violated, employees are considered to be under high levels of stress as a sense of reciprocity and fairness is undermined. Task-level control is the key component of DCS model, whereas it is excluded in the ERI model. Control over the task indicates the influence of environmental conditions at work.

Teaching has been reported to be one of the most stressful occupations in the world (Tsutsumi et al. 2002; Johnson et al. 2005). Teachers, especially those in the primary and secondary schools, are facing complex and mentally stressful work conditions with heavy responsibilities, insufficient personnel, and high expectations from society and parents (Wu et al. 2006). Teachers were reported to have a higher prevalence of hypertension, anxiety, headaches, psychosomatic disorders, and cardiovascular diseases in a German study, when compared to other occupations (Unterbrink et al. 2008). Currently, research on occupational stress and burnout has mainly focused on developed countries, and few studies have been conducted to explore these effects on teachers in developing countries.

In China, primary school education requires 6 years (grade 1–6). Secondary school education is comprised of 3 years of middle school education (grade 7–9) and 3 years of high school education (grade 10–12). The Chinese government provides 9 years of free and compulsory education to all school-aged children. Children normally enter primary school at age of 6–7 years old. The average class size is around 45–55 students per class. Teachers in primary and secondary schools are generally required to obtain a college degree or higher. Due to one-child policy and intense academic competition in China, Chinese parents pay much attention to their children's education and regard it as essential to their children's future. Teachers are given very high expectations from parents and society as a whole. A teacher's job performance in primary and secondary schools is assessed by students' exam scores and the number of students able to enter into prestigious schools. This puts the teachers under great pressure to produce quality students despite having to work with limited resources provided by the schools and government. Teachers are facing increasingly stressful work conditions with large classes and relatively little rewards for their work. Consequently, they are suffering from high levels of occupational stress and job strain, which can lead to burnout, psychological distress, absenteeism, physical illnesses, and poor work performance (Wu et al. 2006).

There are three specific aims in the present study: first, to assess the relation of demographic and work characteristics to burnout among teachers in primary and secondary schools in China; second, to assess the association between occupational stress and burnout. Both DCS model and ERI model are used to assess the occupational stress of teachers; and finally, we aim to examine which model (DCS or ERI) would better explain the burnout of teachers.

Methods

Study design and sample

A cross-sectional study was conducted in Liaoning Province during the months of November and December in 2011. Liaoning is composed of three metropolitan cities ($\geq$1,000,000 population), seven medium-size cities (500,000–1,000,000 population), and four small cities (200,000–500,000 population). First, we randomly selected one metropolitan city, one medium-size city, and one small city from all fourteen cities. Then, one urban area and one county were randomly selected in the metropolitan city and the medium-size city. Because the number of

public schools in the counties of the small city was few, only one urban area was randomly chosen in the selected small city. Two public schools were randomly chosen from each selected area, including one primary school (grades 1–6) and one secondary school (grades 7–12). The mean number of teachers per school in our study was 153. Seventy teachers in each school were randomly selected; thus, the mean proportion of selected teachers was about 50 %. A written informed consent was obtained from those who agreed to participate voluntarily; then, a self-administered questionnaire was distributed to these participants. Nineteen teachers refused to participate, of which 4 (21.1 %) were males and 15 (78.9 %) females. The questionnaire was sent to 681 teachers, with 133 males (19.5 %) and 548 females (80.5 %). Effective responses were obtained from 559 teachers (effective response rate: 82.09 %), with 114 (20.4 %) males [mean age = 33.58 years, standard deviation (SD) = 8.45 years] and 445 (79.6 %) females [mean age = 33.46 years, standard deviation (SD) = 6.47 years). This study received ethics approval from the Ethics Committee on Human Experimentation of China Medical University.

Demographic and work characteristics

Demographic factors including age (<30, 30–40, >40), gender (male, female), marital status (single, married/cohabitation, divorced/widow/separated), and education (junior college or under; undergraduate, graduate, or above) were measured. Three work characteristics were also measured: years of experience, monthly income, and weekly working hours. "Monthly income" was categorized as "<2,000 RMB (≈$320)," "2,000–3,000 RMB," and ">3,000 RMB (≈$480)" groups. "Years of experience" was divided into "<10 years," "10–20 years," and ">20 years" groups. "Weekly work hours" was divided into "≤40" group and ">40" group according to Chinese legal work time: 8 h per day.

Measurement of burnout

Maslach Burnout Inventory–General Survey (MBI-GS) was used to measure burnout (Maslach and Jackson 1981; Schaufeli et al. 1996). MBI-GS consists of three dimensions: emotional exhaustion (EE), cynicism (CY), and professional efficacy (PE). The total scale consists of 15 items: 5 items for EE dimension, 4 items for CY dimension, and 6 items for PE dimension. Each of the items is scored on a Likert scale from 0 to 6. Score is defined according to how often the statement is experienced, from "never" (0) to "every day" (6). Higher scores on the EE and CY dimensions and lower scores on the PE dimension indicate higher level of burnout.

The Chinese version of the MBI-GS was revised and validated by Li and Shi in 2003 and has been demonstrated good reliability and validity in the Chinese population (Wu et al. 2007; Li et al. 2003; Xie et al. 2011). In the present study, the Cronbach's alpha coefficients of EE, CY, and PE were 0.942, 0.850, and 0.935, respectively. In each dimension, we divided subjects into tertiles to indicate low EE/CY/PE (the lower tertile), moderate EE/CY/PE (the middle tertile), and high EE/CY/PE (the upper tertile) groups. The following were the cutoff points for the MBI-GS subscales: EE: low <8, moderate 9.13, high >13; CY: low <3, moderate 3.6, high >6; and SE: low >33, moderate 33.24, high <24. Subjects in the high group of EE, the high group of CY, and the low group of PE were defined as suffering burnout.

Measurement of occupational stress

Two standardized questionnaires, Karasek's job content questionnaire (JCQ) and Siegrist's ERI questionnaire, were used to obtain information on occupational stress. Chinese versions of these two questionnaires have both demonstrated good reliability and validity (Li et al. 2004, 2005).

The Chinese version of JCQ consists of three dimensions: job demand (5 items, particularly psychological job demand), job control (9 items), and social support (8 items). Job control includes skill discretion (6 items) and decision authority (3 items), and social support includes supervisor support (4 items) and coworker support (4 items). Each of the items is scored on a Likert scale from 1 (strongly disagree) to 4 (strongly agrees). Cronbach's alpha coefficients of job demand, job control, and social support were 0.715, 0.796, and 0.860, respectively. The ratio between job demand and job control (weighted by item numbers) has been calculated in this study (Peter et al. 2002). Subjects were divided into tertiles based on the job demand–control ratio. People in the upper tertile of job–demand ratio were defined as high job strain group, while the middle tertile as moderate job strain group and the lower tertile as low job strain group.

The Chinese version of ERI questionnaire consists of three dimensions: extrinsic effort (6 items), reward (11 items), and overcommitment (6 items). The items of extrinsic effort and reward are scored on a 5-point scale in which 1 indicates no respective stressful experience and 5 indicates very high stressful experience. Higher scores on extrinsic effort and reward indicated higher demands of efforts and higher rewards. The items of overcommitment are scored on a 4-point scale in which 1 indicates complete disagreement and 4 indicates complete agreement with statement. Higher scores suggest higher demands characterized by excessive work-related commitment. The Cronbach's coefficients of extrinsic effort, reward,

and overcommitment scales were 0.826, 0.871, and 0.776, respectively. The ratio between extrinsic effort scale and reward scale (weighted by item numbers) was calculated to quantify the degree of effort–reward imbalance (Siegrist et al. 2004). Subjects were grouped by tertiles of effort–reward ratio. People in the upper tertile of effort–reward ratio were defined as high effort–reward imbalance group, while the middle tertile as moderate imbalance group and the lower tertile as low imbalance group.

Statistical analysis

All analyses were performed using the SPSS 17.0 for Windows, and all statistical tests were two-sided ($\alpha = 0.05$). Distributions of MBI-GS scores in demographic and working characteristics were tested by Student's t test or one-way analysis of variance (ANOVA). The Pearson correlation analysis was conducted to examine the correlations among variables of MBI-GS, JCQ, and ERI. Hierarchical linear regression analyses were performed to examine the association between occupational stress and MBI-GS scores. In step 1 of the hierarchical linear regression analyses, the control variables were put in the model. In the present study, we kept age, gender, marital status, educational level, monthly income, and weekly working hours in the model as potential confounders. Because marital status and educational level are categorical variables without a linear trend, dummy variables were set for these two variables, respectively. For marital status, "Married" was set as the reference group. For educational level, "junior college or under" was set as the reference group. In step 2, dimensions of JCQ and ERI were added. Variances of MBI-GS scores explained by occupational stress were examined by ΔR^2. To estimate the degree of relation between the occupational stress (measured by job demand–control ratio and effort–reward ratio) and MBI-GS, a logistic regression model was fitted for each of the three dimensions.

Results

The information on demographic and work characteristics of the subjects is shown in Table 1. Of the 559 respondents in this study, the average age was 33.47 ± 7.11 years. About three quarters (75.2 %) of teachers were married/cohabitation, and 75.9 % of respondents had at least undergraduate education. Among all respondents, 47.0 % worked as teachers between 10 and 20 years, 56.5 % had monthly incomes between 2,000 and 3,000 RMB (≈$320–$480), and 56.1 % worked >40 h per week.

Table 2 gives the mean occupational stress and MBI-GS scores among the Chinese teachers. The mean MBI-GS scores (SD) were 11.98 (7.40) for EE, 5.50 (4.37) for

Table 1 Demographic and working characteristics of study subjects

Variables	N (%)
Gender	
Male	114 (20.4 %)
Female	445 (74.6 %)
Age (years)	
<30	184 (33.0 %)
30–40	269 (48.1 %)
>40	106 (18.8 %)
Marital status	
Single	125 (22.3 %)
Married/cohabitation	420 (75.2 %)
Divorced/widow/separated	14 (2.6 %)
Education	
Junior college or under	135 (24.1 %)
Undergraduate	383 (68.5 %)
Graduate or above	41 (7.4 %)
Years of experience	
<10	204 (36.6 %)
10–20	263 (47.0 %)
>20	92 (16.4 %)
Monthly income	
<2,000 RMB (≈$320)	196 (35.1 %)
2,000–3,000 RMB	316 (56.5 %)
>3,000 (≈$480)	47 (8.4 %)
Weekly working hours	
≤40	245 (43.9 %)
>40	314 (56.1 %)

CY, and 26.85 (8.35) for PE in our study. The correlations among variables of MBI-GS, JCQ, and ERI are shown in Table 3. Univariate analysis results of MBI-GS scores in relation to demographic and work characteristics are shown in Table 4. Age, gender, marital status, educational level, years of experience, and weekly working hours were all associated with emotional exhaustion score. Teachers aged between 30 and 40 had higher emotional exhaustion scores, compared to teachers in other age groups ($P < 0.05$). Female teachers had higher emotional exhaustion scores than male teachers ($P < 0.05$). Teachers who were married/cohabited had lower emotional exhaustion scores than teachers who were single or divorced/widow/separated in this study ($P < 0.05$). Teachers with an "undergraduate" education and who had been teaching for 10–20 years had higher emotional exhaustion scores than the other respondents ($P < 0.05$). Teachers who worked >40 h per week had higher emotional exhaustion scores than teachers who worked ≤40 h per week. Mean cynicism scores and mean professional efficacy scores were not significantly different across demographic and working groups.

Table 2 Mean scores of work stress and job burnout among Chinese teachers

Variables	Mean	SD
Job burnout		
Emotional exhaustion (EE)	11.98	7.40
Cynicism (CY)	5.50	4.37
Professional efficacy (PE)	26.85	8.35
Job content questionnaire (JCQ)		
Job demand	33.92	4.46
Job control	63.94	8.31
Skill discretion	33.18	3.92
Decision authority	30.76	5.93
Social support	24.53	3.15
Supervisor support	11.94	2.03
Coworker support	12.59	1.68
Effort–reward imbalance (ERI)		
Extrinsic effort	16.98	5.39
Reward	41.68	8.21
Overcommitment	16.50	3.18

that demographic and work variables explained 6.9, 1.7, and 0.9 % of variance in emotional exhaustion, cynicism, and professional efficacy, respectively. Occupational stress was responsible for 36.6, 17.1, and 13.6 % of variance in emotional exhaustion, cynicism, and professional efficacy, respectively.

Results of logistic regression are shown in Table 6. No association was observed between demand–control ratio and EE/CY/PE. Exposure to high effort–reward imbalance increased the risk of high EE, high CY, and low PE. Teachers with moderate effort–reward ratio and high effort–reward ratio had 2.21 (95 % CI 1.09, 4.48) times and 5.65 (95 % CI 2.68, 11.91) times the risk of presenting emotional exhaustion, respectively, compared to teachers with low effort–reward ratio. Respondents with high effort–reward ratio had 2.01 (95 % CI 1.07, 3.80) times the risk of presenting cynicism, compared to teachers with low effort–reward ratio. Additionally, teachers with high effort–reward ratio had 2.43 (95 % CI 1.27, 4.63) times the risk of presenting low professional efficacy, compared to teachers with low effort–reward ratio.

Results of hierarchical linear regression analyses are presented in Table 5. After adjusting for age, gender, marital status, educational level, years of experience, and weekly working hours, a high level of emotional exhaustion was significantly associated with high extrinsic effort, high overcommitment, low skill discretion, and high job demand (in descending order of standardized estimate). A high level of cynicism was associated with low reward, low skill discretion, high overcommitment, and low supervisor support (in descending order of standardized estimate). A low level of professional efficacy was associated with low coworker support, low reward, low skill discretion, and high job demand (in descending order of standardized estimate). Results of hierarchical linear regression analyses showed

Discussion

This study adds to knowledge about the relationship between burnout and occupational stress among teachers in primary and secondary schools in China. Results showed that burnout was associated with occupational stress among teachers in primary and secondary schools. Reducing teachers' occupational stress might be an important intervention measure to attenuate the burnout of teachers.

Demographic characteristics including gender, age, marital status, and educational level all had significant effects on emotional exhaustion of teachers. Female teachers had higher emotional exhaustion than male teachers. This is

Table 3 Correlations among dimensions of MBI-GS scores, JCQ and ERI

	1	2	3	4	5	6	7	8	9	10
1. Emotional exhaustion	1									
2. Cynicism	0.339**									
3. Professional efficacy	−0.007	−0.212**								
4. Job demand	0.396**	0.120**	0.103*							
5. Skill discretion	−0.156**	−0.205**	0.239**	0.099*						
6. Decision authority	−0.254**	−0.219**	0.110**	−0.226**	0.400**					
7. Supervisor support	−0.174**	−0.253**	0.177**	−0.105*	0.395**	0.430**				
8. Coworker support	−0.055	−0.092*	0.233**	0.037	0.327**	0.121**	0.436**			
9. Extrinsic effort	0.604**	0.239**	−0.031	0.495**	−0.118**	−0.312**	−0.218**	−0.056		
10. Reward	−0.294**	−0.310**	0.170**	−0.239**	0.150**	0.340**	0.300**	0.096*	−0.507**	
11. Overcommitment	0.542**	0.154**	0.086*	0.486**	0.078	−0.200**	0.029	0.156**	0.573**	−0.238**

* *P* < 0.05, ** *P* < 0.01

Table 4 Univariate analysis of MBI-GS scores in relation to demographics and working variables

Variables	Mean ± SD		
	EE	CY	PE
Age (years)			
<30	10.97 ± 7.43[a]	5.61 ± 4.83	26.62 ± 8.68
30–40	13.11 ± 7.42[a,b]	5.59 ± 4.29	27.62 ± 7.95
>40	11.04 ± 7.25[b]	5.59 ± 3.56	25.57 ± 9.15
Gender			
Male	10.70 ± 6.98[a]	5.29 ± 4.11	26.61 ± 8.82
Female	12.30 ± 7.48[a]	6.30 ± 5.18	26.92 ± 8.23
Marital status			
Single	10.39 ± 6.72[a]	5.47 ± 4.15	26.05 ± 8.70
Married/cohabitation	8.34 ± 5.40[b]	4.60 ± 2.67	28.62 ± 7.78
Divorced/widow/ separated	12.58 ± 7.55[a,b]	5.75 ± 5.18	27.05 ± 8.20
Education			
Junior college or under	12.65 ± 7.52[a]	5.27 ± 3.91	27.56 ± 8.00
Undergraduate	11.67 ± 7.25[a,b]	5.46 ± 4.38	26.75 ± 8.38
Graduate or above	12.31 ± 7.67[b]	5.93 ± 5.62	26.49 ± 8.92
Teaching years			
<10	11.28 ± 7.61[a]	5.85 ± 5.07	26.66 ± 8.73
10–20	13.00 ± 7.33[a]	5.46 ± 4.01	27.38 ± 7.85
>20	11.34 ± 7.30	5.10 ± 4.36	26.17 ± 8.97
Monthly income			
≤2,000 RMB (≈$320)	12.17 ± 7.80	5.84 ± 4.92	26.20 ± 8.91
2,001–3,000 RMB	11.95 ± 7.22	5.18 ± 3.94	27.38 ± 7.95
>3,000 (≈$480)	12.43 ± 6.88	5.33 ± 3.73	26.09 ± 8.31
Weekly working hours			
≤40	10.43 ± 6.60[a]	5.20 ± 4.01	26.26 ± 8.63
>40	13.88 ± 7.76[a]	5.82 ± 4.59	27.21 ± 7.97

MBI-GS Maslach Burnout Inventory–General Survey

[a,b] Mean scores were significantly different within the two groups using the same letter

probably because, in China, although dual-career families are common, women still take on substantially more household responsibilities and tasks than their husbands. Bu and McKeen (2000) reported that Chinese female employees spent an average of 3.7 h per day on housework compared to 2.2 h per day for male employees. The conflict between work life and family life may make women more vulnerable to emotional exhaustion. Teachers aged between 30 and 40 years old experienced a higher level of emotional exhaustion. Teachers in this age group are the core task force. They had more working experiences than younger teachers and were more likely to be assigned as home room class teachers, who were responsible for both teaching tasks and student's management. Being a homeroom

teacher needs one to deal with different situations beyond the normal classroom experience and may lead to a considerable number of negative or threatening experiences (i.e., complaints from students and/or parents). The greater strain and burden from these additional demands can leave the teachers feeling emotionally exhausted. Because of younger teachers' lack of experience and older teachers' holding positions of authority, these teachers are burdened with the greatest amount of responsibilities between the age groups.

Divorced/widowed/separated teachers suffered more emotional exhaustion than married/cohabitation and single teachers, which were in accordance with previous studies (Bauer et al. 2006). Social support from a partner may play an important role with regard to coping with demands; thus, married/cohabitated teachers tended to exhibit a sense of security and are less susceptible to physical and psychological strains.

Occupational stress measured by JCQ and ERI also played a significant role in teachers: burnout. Our study indicated that teachers who experienced high job demand, low skill discretion, low supervisor support, and low cow-orker support had higher risk of developing high emotional exhaustion, cynicism, and low professional efficacy, which were in accordance with previous studies (Tsai and Chan 2010; Naring et al. 2006). Teaching is a profession that requires high psychological job demands. Teachers spend a large amount of time preparing for lessons, grading test, and assignments, participating in conferences and organizing extracurricular events, and undertaking administrative duties. As they cope with the strain of completing these task, they must always appear be enthusiastic and lively in order to catch and hold their students' attention. Teachers may adopt extreme passion when praising a student or give an impression of calm confidence when confronted with a disruptive student (Unterbrink et al. 2007). The need to wear a facade due to the professionalism expected of a teacher contributes to this additional emotional strain. The high work load coupled with the high emotional demands of this profession may increase the risk of burnout. Additionally, receiving positive feedback from colleges and supervisors along with a chance to share any workplace frustrations is helpful in any profession. Poor relationships with supervisors and colleges may lead to loneliness and exclusion among teachers. This feeling of loneliness and exclusion may result in burnout after a long period of time. The present study indicated that effort–reward imbalance was another predictor of job burnout. High extrinsic effort, low reward, and high overcommitment are significantly associated with dimensions of burnout. As we mentioned, Chinese parents and society as a whole are very concerned with children's education because of the extremely intense academic competition to gain admission into prestigious

Table 5 Hierarchical linear regression analyses of the factors associated with MBI-GS scores

Variables	Emotional exhaustion		Cynicism		Professional efficacy	
	Step 1 (β)	Step 2 (β)	Step 1 (β)	Step 2 (β)	Step 1 (β)	Step 2 (β)
Age	−0.140	−0.093	−0.076	−0.059	0.036	0.027
Gender	0.082	0.043	−0.083	−0.080	0.001	−0.014
Dummy_m1	−0.141*	−0.017	−0.027	0.009	−0.048	−0.062
Dummy_m2	−0.095*	−0.044	−0.028	−0.027	0.033	0.044
Dummy_e1	0.036	−0.002	0.022	0.000	0.059	0.062
Dummy_e2	0.019	0.069	0.013	0.029	−0.003	−0.011
Teaching years	0.075	0.042	0.001	−0.061	−0.051	0.026
Weekly working hours	0.190**	0.045	0.065	0.040	0.038	0.023
Job demand		0.096*		−0.001		−0.132*
Skill discretion		−0.151**		−0.158**		0.170**
Decision authority		0.001		−0.016		0.023
Supervisor support		−0.020		−0.109*		−0.006
Coworker support		−0.054		0.005		0.172**
Extrinsic effort		0.328**		0.043		−0.012
Reward		−0.004		−0.221**		0.170**
Overcommitment		0.297**		0.123*		0.020
R^2	0.069**	0.434**	0.017**	0.188**	0.009**	0.145**
ΔR^2	0.069**	0.366**	0.017**	0.171**	0.009**	0.136**

MBI-GS Maslach Burnout Inventory–General Survey, Dummy_m1 means "single" versus "married/cohabitation," Dummy_m2 means "divorced/widow/separated" versus "married/cohabitation," Dummy_e1 means "junior college or under" versus "undergraduate," Dummy_e2 means "graduate or above" versus "undergraduate"

* $P < 0.05$, ** $P < 0.01$

Table 6 ORs of job burnout by job strain and effort–reward imbalance

	Emotional exhaustion[a] OR (95 % CI)	Cynicism[a] OR (95 % CI)	Professional efficacy[a] OR (95 % CI)
Job strain			
Low	1	1	1
Moderate	1.28 (0.70, 2.36)	0.99 (0.58, 1.71)	1.15 (0.68, 1.96)
High	1.51 (0.80, 2.87)	1.14 (0.63, 2.05)	1.29 (0.71, 2.32)
Effort–reward imbalance			
Low	1	1	1
Moderate	2.21 (1.09, 4.48)*	1.29 (0.72, 2.32)	1.76 (0.99, 3.14)
High	5.65 (2.68, 11.91)**	2.01 (1.07, 3.80)*	2.43 (1.27, 4.63)**

* $P < 0.05$, ** $P < 0.01$

[a] Odds ratio adjusted by age, gender, marital status, educational level, years of experience, weekly working hours, supervisor support, coworker support, and overcommitment

schools. Teachers' job evaluation and even incomes are closely related with their students' test scores. Therefore, it is very common for teachers, especially teachers in secondary schools to hold extra classes after normal school hours, nonschool weekdays, or weekends. Additionally, due to the limited teaching resources and the huge population base in China, the class size is quite large with 45–55 students per class. This also increases teachers' workload as they have to focus on every student's academic and psychological demands. Moreover, personal expectations and aims also had a strong influence in the stress experience. Teachers with high intrinsic effort may be more able to experience negative emotions (Bakker et al. 2000). When the extrinsic effort and intrinsic effort exceed the reward, the impact on both physical and mental health can easily lead to burnout.

Our study showed that compared to DCS, ERI was more likely to explain burnout of teachers. With the development of economic globalization and the accelerated pace of life, short-term contracts with high flexibility and mobility are increasing, resulting in the growth of high job insecurity; thus, reward seems to play an important role in current job content. In this point of view, ERI is more consistent with the trend of today's job market. However, ERI model cannot cover all aspects of psychological work characteristics. DCS continues to be a critical dimension of occupational stress. They are complementary with regard to health rather than competitive (Peter et al. 2002).

Several limitations of the present study need to be mentioned. First, this study had a cross-sectional design, so we cannot derive any conclusions on the causality of the associations observed between occupational stress and

dimensions of burnout. Second, this study was based on self-report measures, so there is potential for inflated relations because of common method bias. We followed the recommendations of Podsakoff et al. (2003) to minimize this potential problem by allowing the respondents' answers to be anonymous and to assure respondents that there are no right or wrong answers and they should answer questions as honestly as possible. Additionally, subjects were all from primary and secondary schools in the Liaoning province in our study, and all teachers were currently employed. These might bring possible bias to results of our study. Teachers in other provinces and teachers who were not currently employed should also be included in future studies to increase the generalization. Intervention strategies such as teaching teachers about the symptoms of stress and the coping skills to deal with it, redesigning the task, establishing flexible work schedules, and redesigning the work environment might be helpful to modify or control occupational stress and to prevent job burnout of teachers (Wu et al. 2006; Zhong et al. 2009). However, due to the cross-sectional design of the present study, we were unable to draw any causal conclusions between occupational stress and burnout. All findings obtained in the present study need to be confirmed in future prospective studies.

Conclusions

To summarize, our findings revealed that occupational stress was associated with the dimensions of burnout among Chinese teachers. JCQ and ERI both played important roles in teachers' burnout. However, ERI would better explain teachers' burnout than JCQ in our study. Strategies to decrease teachers' occupational stress may be crucial to prevent the job burnout of teachers in China.

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