

# How Does Social Support Affect Public Service Motivation of Healthcare Workers: the Mediating Effect of Job Stress

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## Research

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# Abstract

**Background:** This study examined relations between social support, job stress, and public service motivation, also assessed how social support and job stress affect public service motivation based on the job demands-resources (JD-R) theory.

**Methods:** The survey investigated a sample of 973 healthcare workers employed in public hospitals in Beijing, Xiamen, and Guangzhou in 2017. Through random sampling according to employee number, age and job title, we selected 5% to 10% of healthcare workers in each target hospital. Finally, we got 973 valid participants, and the response rate was 93.8%. We used correlation analysis, structural equation modeling, Sobel test, and subgroup analysis to test by investigating a sample of 973 healthcare workers from 3 Chinese public hospitals.

**Results:** Challenge stress and hindrance stress were directly inversely associated with public service motivation. Supervisor support was significantly positively associated with public service motivation, and the path from coworker support to public service motivation was significant. Supervisor support was significantly negatively associated with hindrance stress, and coworker support was significantly inversely associated with challenge stress. Hindrance stress and challenge stress significantly mediated the relations between supervisor support and public service motivation, and between coworker support and public service motivation respectively.

**Conclusions:** Public service motivation might be raised by increasing supervisor support and coworker support and by limiting hindrance stress and challenge stress among healthcare workers in China.

## 1. Background

In response to the limits of classical theories of motivation in understanding behavior and staff management in public organizations, e.g., public hospitals [1]. Perry and Wise developed the concept of public service motivation (PSM) [2], which has generated a lively research discourse and considerable interest in recent decades [3, 4]. PSM has been defined as “the idea of commitment to the public service, pursuit of the public interest, and the desire to perform work that is worthwhile to society” [5]. Witteloostuijn et al. described how research on PSM has involved two main perspectives: the definition, composition and measurement of PSM [6], the effect of PSM at the individual and organizational level have been researched [7, 8]. Existing research on PSM is limited by its frequent treatment as an independent variable; few studies have examined PSM as a dependent variable or have investigated the antecedents of PSM [6, 9].

Recent studies have investigated these limitations in the theoretical and practical treatment of PSM [2, 10]. Sex, education level, religious activities, volunteer work, family socialization, leadership style, hierarchical authority, and red tape are widely accepted antecedents of PSM [1, 11]. However, evidence and mediators regarding these antecedents are limited. Social support has a positive effect on individual motivation [12], and therefore affect PSM directly or through other variables, e.g., job stress, a common mediator in studies of social support [13]. Inspired by positive psychology, job stress was divided into challenge stress and hindrance stress, which would have different effect on individuals [14]. Therefore, it's necessary and interesting to investigate how social support and job stress affect PSM.

Additionally, JD-R theory that is proposed to describe how job stress appears and affects employees' psychological outcomes, provides further explains of the relations between social support, job stress and PSM [15] On the one hand, job demands lead to constant overtaxing and job stress, resulting in negative psychological and emotional consequences (e.g., exhaustion) and, ultimately, reduce work motivation among employees [16]. On the other hand, job resources directly and indirectly incentivize individuals. An important job resource—supervisor and coworker support—helps workers overcome job stress and enhances their PSM [15, 17].

In China, public hospitals are an important part of the public sector, providing the vast majority of healthcare services. The job characteristics, responsibilities and requirements of healthcare workers have led to increasing research interest in PSM and job stress among this group [18]. In addition, healthcare workers need sufficient social support in order to deal with complex working environment (e.g., overwork and violence) and provide good healthcare service. Thus, in this study (Fig. 1) we examined the mediating effects of job stress on the association between social support and PSM in a sample of Chinese healthcare workers.

## 2. Methods

### 2.1. Participants

After receiving ethical approval, we conducted a cross-sectional analysis of data from healthcare workers employed in public hospitals in Beijing, Xiamen, and Guangzhou in 2017 (including doctors, nurses, medical technicians, and managers) to investigate the relationship between social support, job stress and PSM. All participants were provided informed consent.

The survey assessed individual characteristics, supervisor support, coworker support, job stress, and PSM. To ensure data integrity and objectivity, participants were selected by using random sampling according to employee number, age and job title. We selected 5–10% of healthcare workers in each target hospital. Besides, to test convergent and divergent validity in our survey, we used similar and opposite questions in the questionnaire to examine whether our respondents provide the expected answers. The participants will be deleted if their answers were not consistent. Finally, we got 973 valid participants, and the response rate was 93.8%.

Table 1 shows the demographic characteristics of the responding healthcare workers. Demographic information was missing for a few participants (range from 1.6–9.3%). Among the 973 participants, 33.5% were men and 63.8% were women; 37.2% were nurses, 32.4% were clinicians, 11.5% were medical technicians, and 11.1% were managers. With respect to age group, 29.4% were aged 25–30 years and only 1.6% were aged 55 years or older. With respect to education level, 42.2% had earned an undergraduate degree, 17.9% had earned a master's degree, 21.4% had graduated from junior college, and 4.0% had earned a doctorate. Most respondents (67.9%) had an early-career position, 11.7% had a mid-career position, and 11.1% were senior employees. Overall, 18.7% of participants had worked less than 3 years, 23.2% had worked 3–5 years, and 23.5% had worked 6–10 years.

Table 1  
Demographic Characteristics of Participating Healthcare  
Workers (N = 973)

Characteristic	N	Percentage (%)
Sex		
Male	326	33.5
Female	621	63.8
Age (y)		
< 25	70	7.2
25 ~ 30	286	29.4
31 ~ 35	243	25.0
36 ~ 40	134	13.8
41 ~ 45	95	9.8
46 ~ 50	69	7.1
51 ~ 55	44	4.5
56 ~ 60	16	1.6
Position		
Clinician	315	32.4
Nurse	362	37.2
Management	108	11.1
Medical technician	112	11.5
Education		
Less than junior college degree	124	12.7
Junior college	208	21.4
Undergraduate	411	42.2
Master	174	17.9
Doctor	39	4.0
Title		
Trainee	394	40.5
Entry-level	267	27.4
Mid-level	114	11.7
Senior	108	11.1
Seniority (y)		
< 3	182	18.7
3-5	226	23.2
6-10	229	23.5
11-20	172	17.7
> 20	98	10.1
Department		
Physician	182	18.7
Surgery	139	14.3
Obstetrics/Gynecology	105	10.8
Abbreviation: Intensive care unit (ICU).		

Characteristic	N	Percentage (%)
Pediatrics	118	12.1
Chinese medicine	65	6.7
Emergency Department/ICU	51	5.2
Oncology	18	1.8
Other clinical departments	56	5.8
Medical technology	73	7.5
Administration and Logistics	22	2.3
Other	71	7.3
Abbreviation: Intensive care unit (ICU).		

## 2.2. Measures

PSM was measured with the reliable five-item scale [19]. The scale was shown to have high reliability in our research ( $\alpha = 0.93$ ). For example, the items “Meaningful public service is very important to me” and “I am often reminded by daily events about how dependent we are on one another” (Table 2) ask respondents to rate their PSM on a scale from 1 (strongly disagree) to 5 (strongly agree). Higher values indicate greater PSM.

Table 2  
Means (SD) for PSM, Challenge Stress (CHS), Hindrance Stress (HS), Supervisor Support (SS) and Coworker Support (CS) Items.

Variable	Item	Mean	SD
PSM (1–5)	PSM1. Meaningful public service is very important to me.	4.05	0.76
	PSM2. I am often reminded by daily events about how dependent we are on one another.	3.91	0.82
	PSM3. Making a difference in society means more to me than personal achievements.	3.75	0.87
	PSM4. I am prepared to make sacrifices for the good of society.	3.40	1.03
	PSM5. I am not afraid to go to bat for the rights of others even if it means I will be ridiculed.	3.46	0.95
Challenge stress (1–6)	CHS1. The number of projects and/or assignments I have	3.59	0.85
	CHS2. The amount of time I spend at work	3.62	0.84
	CHS3. The volume of work that must be accomplished in the allotted time	3.51	0.88
	CHS4. Time pressures I experience	3.57	0.85
	CHS5. The amount of responsibility I have	3.63	0.87
	CHS6. The scope of responsibility my position entails	3.51	0.86
Hindrance stress (1–5)	HS1. The degree to which politics rather than performance affects organizational decisions	2.81	1.13
	HS2. The inability to clearly understand what is expected of me on the job	2.33	1.06
	HS3. The amount of red tape I need to go through to get my job done	3.18	1.06
	HS4. The lack of job security I have	3.15	1.14
	HS5. The degree to which my career seems “stalled”	3.05	1.08
Supervisor support (1–4)	SS1. My supervisor is helpful to me in getting the job done.	3.80	0.90
	SS2. My supervisor is willing to extend himself/herself to help me perform my job.	3.69	0.92
	SS3. My supervisor takes pride in my accomplishments at work.	3.51	0.91
	SS4. My supervisor tries to make my job as interesting as possible.	3.39	0.96
Coworker support (1–3)	CS1. My coworkers listen to me when I need to talk about work-related problems.	3.81	0.77
	CS2. My coworkers help me with difficult tasks.	3.83	0.78
	CS3. My coworkers help me in crisis situations at work.	3.93	0.88
Notes: “R” indicates a negatively phrased and reverse scored item.			

Job stress was measured with the challenge-and hindrance-related self-reported stress (C-HSS) scale of 11 items [14]. For example, the items “The number of projects and/or assignments I have” (Table 2) and “The lack of job security I have” evaluate challenge stress and hindrance stress by using a five-point Likert scale (1 = no stress; 5 = great stress). Higher values indicate greater job stress. The C-HSS scale was shown to have high reliability ( $\alpha = 0.85-0.94$ ) in the present study.

Social support from respondents’ supervisors and coworkers was measured with the four-item “supervisor support scale” (e.g., “My supervisor takes pride in my accomplishments at work”) and the three-item “coworker support scale” (e.g. “My coworkers help me in crisis situations at work”) [20] (Table 2). Each item was rated on a five-point scale (1 = strongly disagree; 5 = strongly agree). Higher values indicate greater support. The Cronbach  $\alpha$  values for these scales were 0.92 for supervisor support and 0.90 for coworker support, in the HRS Psychosocial Working Group, 34 and 0.92 and 0.83, respectively, for our study. Both these instruments have acceptable psychometric properties [21, 22].

The individual characteristics analyzed included age, sex, education, job title, job experience, department, and seniority.

## 2.3. Data Analysis

SPSS 20.0 and AMOS 20.0 were used for the statistical analyses, which comprised descriptive analysis, correlation analysis, and path analysis. Structural equation modelling (SEM) analysis was used to deal with the common-source-bias in 2 steps [23, 24], and examine relationships among supervisor support, coworker support, challenge stress, hindrance stress, and PSM that are classified as direct or indirect [25].

In SEM, five latent variables: PSM, challenge stress, hindrance stress, supervisor support and coworker support were first constructed with the items of the PSM scale, the C-HSS and social support scale. Before imputing these indicators into SEM, correlation analysis was used to determine the significance of correlations between PSM, challenge stress, hindrance stress, supervisor support and coworker support. All these indicators were examined to determine if the model fit the data well using confirmatory factor analysis.

Several recommendations have been made regarding adequate evaluation methods and sample sizes for non-normally distributed data when the normality test does not support the normality assumption for measured variables. Gold et al. insist that expectation-maximization implementation of maximum likelihood is much better than using the Asymptotically Distribution-Free Method on the model when the sample is over 500 [26]. As our study applied expectation-maximization in around 1000 participants, the method applied to evaluate model and sample size fulfilled both of these criteria.

Measures of local and global fit were checked when performing model testing. The local fit of the model was assessed on the basis of the following criteria: factor reliability values of 0.6 or more; indicator reliability value of 0.3 or more for each indicator of an underlying latent variable;  $p < .05$  for all factor loadings and value of average proportions of indicator variance extracted 0.5 or more [27]. The criteria used to evaluate good global fit were chi-square minimal degrees of freedom (CMIN/DF < 5), a root mean square error of approximation (RMSEA) value of less than 0.05, the Goodness of Fit Index (GFI), Normed Fit Index (NFI), Comparative Fit Index (CFI) and Tucker-Lewis index (TLI) values of 0.90 or more [28]. The Sobel test was used to examine the significance of mediated effects [29].

To determine if standardized regression coefficients ( $\beta$ ) differed by subgroup, we conducted subgroup analyses of 3 age groups, two job title groups, two sex groups, 3 post groups and 2 seniority groups. To ensure that the 5 subgroups were of equal size, age was categorized as old (41 years or older), middle (31–40 years) and young (30 years or younger). Job title was classified as early career (trainee or entry-level worker) and mid-/late career (mid-level or senior worker). Sex was categorized as male and female. The post was classified as physician, nurse and other (management and medical technicians). Seniority was classified as less than 5 years (employed for less than 5 years) and greater than 5 years (employed for longer than 5 years).

## 3. Results

### 3.1. Means (SD) of PSM, Challenge Stress, Hindrance stress, Supervisor Support and Coworker Support

As shown in Table 2, the means for the 5 PSM items were very high, but the range was considerable. The means ranged from 3.40 to 4.05. The mean for the challenge stress items was higher than that for hindrance stress items. The means for the seven supervisors support and coworker support items were relatively high. They ranged from 3.39 to 3.93.

### 3.2. Correlations between PSM, Challenge Stress, Hindrance Stress, Supervisor Support and Coworker Support

Correlation coefficients ( $r$ ) showed positive correlations between items within the same construct (Table 3). PSM was significantly positively correlated with coworker support and supervisor support ( $r = 0.41$  to  $0.53$ ) but was significantly inversely correlated with challenge stress and hindrance stress ( $r = -0.39$  to  $-0.45$ ). Supervisor support and coworker support were significantly inversely correlated with challenge stress ( $r = -0.16$  to  $-0.11$ ) and hindrance stress ( $r = -0.32$  to  $-0.26$ ). There was also a significant positive correlation between coworker support and supervisor support ( $r = 0.60$ ).

Table 3  
Intercorrelations between PSM, Challenge Stress (CHS), Hindrance Stress (HS), Supervisor Support (SS) and Coworker Support (CS) Items.

Variables(Mean, SD)	Item				
	PSM	CHS	HS	SS	CS
PSM (2.33, 1.40)	1	-	-	-	-
CHS (3.53, 0.76)	-0.39**	1	-	-	-
HS (2.82, 0.88)	-0.45**	0.53**	1	-	-
SS (3.61, 0.85)	0.53**	-0.16**	-0.32**	1	-
CS (3.87, 0.70)	0.41**	-0.11**	-0.26**	0.60**	1

Note: \*\*\* p < .001, \*\* p < .01, \* p < .05

### 3.3. SEM.

Before SEM, analysis of measurement model showed that our model fits the data well, because the values for the goodness-of-fit index and comparative fit index of each measurement model were all between 0.917 and 0.952.

In the final model (Fig. 2), challenge stress ( $\beta = -0.20$ ;  $p < .001$ ) and hindrance stress ( $\beta = -0.24$ ;  $p < .001$ ) were directly inversely associated with PSM. Supervisor support was significantly positively associated with PSM ( $\beta = 0.41$ ;  $p < .001$ ), and the path from coworker support to PSM was significant ( $\beta = 0.09$ ;  $p < .05$ ). There was a direct positive association between supervisor support and coworker support ( $\beta = 0.70$ ;  $p < .001$ ). Supervisor support was significantly negatively associated with hindrance stress ( $\beta = -0.27$ ;  $p < .001$ ), and coworker support was significantly inversely associated with challenge stress ( $\beta = -0.15$ ;  $p < .001$ ). Supervisor support and coworker support explained 2% and 20% of the variability in challenge stress and hindrance stress. Supervisor support, coworker support, challenge stress and hindrance stress explained 48% of the variability in PSM. We noted significant indirect effects between supervisor support and PSM (Sobel  $z = 5.64$ ;  $p < .001$ ) and between coworker support and PSM (Sobel  $z = 8.39$ ;  $p < .05$ ), which were significantly mediated by hindrance stress and challenge stress, respectively.

Table 4  
Standardized Regression Coefficients ( $\beta$ ) with p-values for the Components of Subgroup Analyses

Paths	Young (n = 356)	Middle (n = 377)	Old (n = 224)	Early career (n = 661)	Mid/late career (n = 222)	Men (n = 326)	Women (n = 621)	< 5 years (n = 408)	> 5 years (n = 499)	Physicians (n = 315)	Nurses (n = 362)	Others (n = 220)
SS to HS	-0.46***	-0.46***	-0.28***	-0.44***	-0.34***	-0.38***	-0.39***	-0.33***	-0.40***	-0.45***	-0.39***	-0.42***
CS to CHS	-0.21***	-0.12***	0.288(p)	-0.20***	-0.11*	-0.14*	-0.16***	-0.13*	-0.15**	-0.22**	-0.14*	-0.14*
SS to PSM	0.39***	0.39***	0.33***	0.42***	0.34***	0.32***	0.48***	0.34***	0.42***	0.051(p)	0.54***	0.50***
CS to PSM	0.572(p)	0.572(p)	0.26**	0.294(p)	0.15*	0.527(p)	0.11*	0.719(p)	0.14**	0.199(p)	0.111(p)	0.442(p)
CHS to PSM	-0.29***	-0.29***	-0.17***	-0.21***	-0.21***	-0.22***	-0.23***	-0.25***	-0.28***	-0.29***	-0.23***	-0.28***
HS to PSM	-0.29***	-0.29***	-0.17***	-0.33***	-0.20***	-0.33***	-0.16***	-0.24***	-0.15***	-0.36***	0.210(p)	-0.25***
CS to HS	0.67***	0.67***	0.76***	0.62***	0.76***	0.74***	0.67***	0.73***	0.68***	0.77***	0.58***	0.73***

Notes: \*\*\* p < .001, \*\* p < .01, \* p < .05

Subgroup analyses showed that the effect of coworker support on challenge stress, the effect of supervisor support on PSM, the effect of coworker support on PSM, and the effect of hindrance stress on PSM were different in the final model (Table 4). Coworker support did not significantly affect challenge stress among old participants and was positively related to PSM among old and mid/late career workers, women, and workers with more than 5 years of seniority. Interestingly, the impact of supervisor support on PSM was not significant in physicians. Besides, hindrance stress was negatively related to PSM expect nurses. The difference between the confirmatory factors analysis of our models of varying levels of measurement invariance is less than 0.01, which suggested that invariance might be tenable across old/young and early/mid-late groups [30].

## 4. Discussion

Using a sample of 973 healthcare workers, we investigated the relationship between social support, job stress and PSM in Chinese public hospitals. Overall, we found comprehensive but mixed support for our initial hypotheses. Supervisor support and coworker support significantly increased PSM among healthcare workers. Challenge stress and hindrance stress were negatively associated with PSM. Supervisor support and coworker support diminished hindrance stress and challenge stress, respectively, among Chinese healthcare workers. Challenge stress and hindrance stress significantly mediated the indirect effects of coworker support and supervisor support, respectively, on PSM. The present findings should prove useful for academic researchers and practitioners.

### 4.1. Theoretical Implications

Our first key finding is that social support and job stress are predictors of PSM of healthcare workers, which adds to the evidence from antecedent research on PSM. Social support, especially supervisor support and coworker support, has been used to explain a wide range of individual values, attitudes and behaviors, such as affective commitment [31] and presenteeism [32]. However, very few studies have investigated the relationship between social support and PSM. Our study provides empirical evidence of the positive effects of supervisor and coworker support on PSM. However, multi-group analysis showed that the impact of coworker support on PSM is weaker than that of supervisor support.

Challenge stress and hindrance stress had a significantly direct negative effect on PSM of healthcare workers, which differs in part from our previous hypothesis and research findings. Previous studies reported that challenge stress has a positive effect on individuals, e.g., by encouraging workers to learn and to overcome obstacles, thus benefiting career development [14, 33]. We assumed that challenge stress was positively related to PSM; however, the present findings show that challenge stress has a significant negative effect on PSM and that the effect is as strong as that of hindrance stress. This interesting finding might be due to the complex working environment for healthcare workers. To our knowledge, the workload of healthcare workers in China is heavy: many are pressured to work 10 or more hours almost every day and always with high efficiency and in a state of tension [34].

Although no studies have examined the relationship between hindrance stress and PSM, the adverse effects of job stress, especially hindrance stress, on the individual and organization have been widely discussed in many studies based on JD-R theory. These effects include burnout [35], increased presenteeism [33], and increased turnover intention [36]. Hindrance stress includes demands that are viewed by managers as unnecessary impediments to personal growth and goal attainment, and by employees as insurmountable [14]. The present analysis of data from 973 healthcare workers employed in Chinese public hospitals provides direct evidence of the negative effect of hindrance stress on PSM.

Our findings show that supervisor support and coworker support had significant negative effects on hindrance stress and challenge stress of healthcare workers, respectively, which supports our previous hypotheses. The relationship between social support and job stress is multipath [37]. Previous studies often investigated social support and job stress in the same research model but failed to explain either how social support affects job stress or the differential effects of supervisor support and coworker support. Consequently, to complement these previous findings, we investigated separately the relationships between supervisor support and hindrance stress, and between coworker support and challenge stress. Our results suggest that supervisor support lessens the hindrance stress of healthcare workers, because they feel they are taken seriously by their supervisors and that the work environment is fair.

Another important finding of this study is that while hindrance stress and challenge stress directly affected PSM, hindrance stress also mediated the effects of supervisor support, and challenge stress mediated the effects of coworker support, on PSM. Because of the limited data on the antecedents of PSM, previous studies did not consider mediators between social support and PSM. Our results shed light on how supervisor and coworker support affect PSM through hindrance stress and challenge stress, as described in JD-R theory. Hindrance stress and challenge stress are the individual's psychological reactions to job demands. Supervisor support and coworker support are important organizational resources provided to workers and help workers to meet their work demands, while reducing job stress and increasing PSM.

### 4.2. Implications for Management

Our findings have a number of important practical implications for managers of public hospitals who hope to reduce job stress and promote PSM among healthcare workers and improve healthcare quality.

Firstly, managers of public hospitals should be mindful of the intense job stress of healthcare workers and undertake interventions targeting challenge stress and hindrance stress. Challenge stress can be managed by ensuring reasonable workloads, rational shift arrangements, and appropriate time pressure and by balancing worker rights and responsibilities. Hindrance stress can be improved by developing a fair organizational climate, scientific performance assessment standards, clear job responsibilities, and a concrete employee growth scheme [38]. In addition, public hospitals should consider interventions that help relieve employee job stress, such as psychological counselling, physical exercise, recreational activities, and lectures on mental health.

Secondly, public hospital managers should encourage and assist supervisors in their leadership functions, e.g., by urging supervisors to (1) care about the work and life of subordinates and assist them whenever possible, (2) identify and acknowledge the strengths and accomplishments of workers and encourage and recognize their efforts, and (3) make workers' jobs as interesting as possible [39]. Public hospitals should develop training courses for supervisors, on topics such as leadership, strategic management, and communication management.

Thirdly, managers of public hospitals should emphasize coworker support and good employee relationships. For instance, a system of group activities in public hospitals could be developed in order to enhance coworker support. Such a system could include training activities and outward-bound activities and might prevent conflicts and improve career development.

### 4.3. Limitations and Future Research

This study is not without limitations. Firstly, the study was cross-sectional. Thus, the relationships between social support, job stress and PSM cannot be assumed to be causal and should be further examined in a cohort in a future longitudinal study. Secondly, we only recruited healthcare workers from Chinese public hospitals and excluded those from private hospitals, which limits the generalizability and robustness of our conclusions. Social support, job stress and PSM differ somewhat between public sector and private sector employees [40]. Therefore, to verify our hypotheses and models, future studies should investigate healthcare workers from private hospitals. Thirdly, our study considered only the effects of work-related dimensions of social support, which were mostly limited to job stress and PSM. Although the scale including supervisor support and coworker support dimensions could be used to adequately test social support, other dimensions of social support might be important in job stress and PSM. Future studies should examine how the support of family, friends and spouses affects job stress and PSM of healthcare workers. Fourthly, our study want to explain the potential psychological process of employees working in public sectors under the combined effect of job demands and job resources. However, JD-R theory proposed that social support and job stress not only affect employees' motivation, but also significantly affect their burnout and job performance. On the basis of the results of the current study, future studies should integrate more psychological outcome variables in our research model. Finally, our sample comprises healthcare workers in a developing East Asian country and does not include healthcare workers from countries with other cultures and different levels of development. Future studies should examine whether the present findings are consistent across cultures and stages of economic development.

## 5. Conclusions

In conclusion, supervisor support and coworker support are significantly negatively associated with hindrance stress and challenge stress, respectively, and positively with PSM. Challenge stress and hindrance stress are directly inversely associated with PSM, and the significant indirect effects between supervisor support and coworker support and PSM are significantly mediated by hindrance stress and challenge stress. Thus, managers of public hospitals should focus on the relationship between social support, job stress and PSM and on interventions targeting increased supervisor and coworker support. In addition, managers should attempt to decrease challenge stress and hindrance stress by improving work conditions and by offering more opportunities for healthcare workers to improve their work relationships and relieve stress.

## Abbreviations

SS: Supervisor Support; CS: Coworker Support; HS: Hindrance Stress; CHS: Challenge Stress; PSM: Public Service Motivation.

## Declarations

### *Ethics approval and consent to participate*

This study was approved by the research ethics committee in the first affiliated hospital of Xiamen university (NO. KYX2016007).

### *Consent for publication*

Not applicable.

### *Availability of data and materials*

The datasets during and/or analyzed during the current study available from the corresponding author on reasonable request.

### *Competing interests*

The authors declare that they have no competing interests.

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### *Authors' contributions*

JD conducted the data analyses and drafted the manuscript. YG (Yuangeng Guo) led the design of the study and contributed to the writing of the manuscript. YG (Yongchuang Gao) participated in the data analyses and manuscript writing. JD, YG (Yongchuang Gao) and ZC coordinated the data collection and participated in the data analyses. TY guided YG (Yuangeng Guo) in the design of the study and contributed the interpretation of the results. All authors have read and approved the final manuscript.

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## Figures

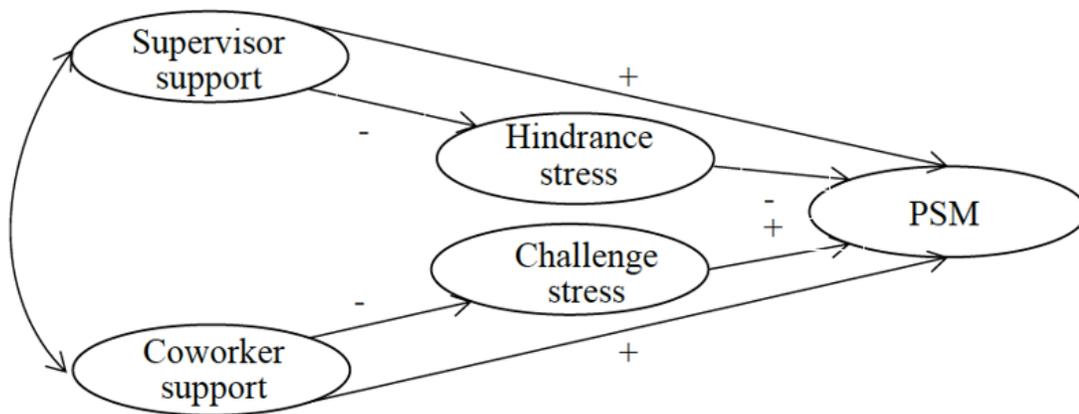
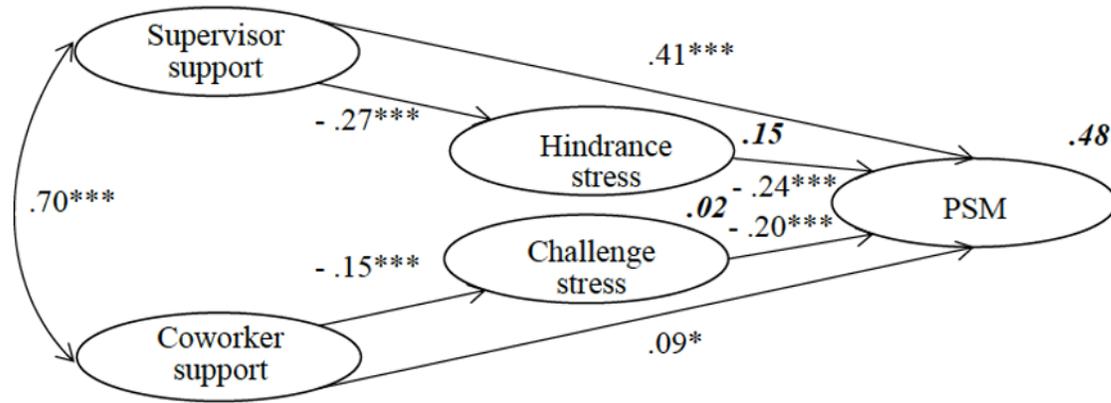


Figure 1

Proposed Model of How Supervisor Support and Coworker Support Influence Challenge Stress, Hindrance Stress and PSM.



Note: Numbers not in bold are standardized regression coefficients and numbers in bold explain variability; Chi-square = 814.315; degrees of freedom = 0.215,  $p < .001$ ; RMSEA = 0.054; NFI = 0.953; CFI = 0.965; \*\*\*  $p < .001$ , \*\*  $0.001 < p < .01$ , \*  $0.01 < p < .05$ .

Figure 2

Final Model Illustrating How Supervisor Support and Coworker Support Influence Challenge Stress, Hindrance Stress and PSM.