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Burnout among obstetricians and pediatricians: A cross-sectional study from China

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Abstract: Objectives: Hospitals devoted to maternal and child health represent unique health care institutions in China. Health care professionals in these hospitals not only attend to health services for women and children, but also provide technical services and support for district maternal and children's healthcare as well as family planning. However, few studies have examined occupational burnout among doctors employed in these hospitals. This research addresses the gap in the literature. **Methods:** A cross-sectional survey of obstetricians and pediatricians from 11 maternal and child health hospitals across China was conducted from May through June, 2017. A total of 678 people completed a self-administered questionnaire. The survey included questions about demographics, doctor–patient relationships, and networks of support as well as characteristics designed to capture the occurrence of burnout, such as emotional exhaustion (EE), depersonalization (CY), and professional efficacy (PE). T test, variance, and multiple regression analyses were used to examine the data. **Results:** The research revealed that 56.6% of maternal and child care obstetric pediatricians exhibited signs of occupational burnout. Poor doctor–patient relationships and high average number of weekly hours worked contributed to burnout. Additionally, low family support corresponded to physicians' low sense of professional efficacy. **Conclusions:** Several factors have contributed to occupational burnout among pediatricians and obstetricians at maternal and child health hospitals in China, including a lack of family support, poor doctor–patient relationships, and heavy workloads.

Key words: Chinese healthcare system, maternity hospitals, obstetricians and pediatricians, occupational burnout, work-life balance

Article summary

What is already known on this subject?
➢ Obstetricians and pediatricians in China evidenced prevalent occupational burnout,demonstrating very high average scores on emotional exhaustion and moderate scores on depersonalization.
➢ Poor doctor－patient relationships and high average number of weekly hours worked contributed to burnout;low family support corresponded to physicians' low sense of professional efficacy.

Strengths and limitations of this study
➢ Reporting the occupational burnout among the obstetricians and pediatricians in maternity hospitals who represent a key part of China's continued success in efforts toward maternal and child health.
➢ Paying attention to the job burnout of the relevant doctors after the implementation of the second child policy in China.Researching on the influence of doctor-patient relationship and family support on Job Burnout of doctors
➢ Limited by the ability of coordination, the proportion of the selected samples in the central and western regions is too large, which may cause certain limitations and more reflect the general situation of pediatrics and obstetricians in this area.

1 Introduction

China has made great progress with respect to women and child health in the past two decades. From 1990 to 2015, the country lowered infant mortality by nearly 70% and maternal mortality by nearly 75%[1)]. Much of this success was possible due to a multi-pronged strategy that emphasized investments in antenatal and delivery care, effective referral systems for women at high risk, and a commitment to the professionalization of maternity care[2)]. Hospitals devoted to maternal and child health represent unique health care institutions in China. Health care professionals in these hospitals not only attend to health services for women and children, but also provide technical services and support for both district maternal and children's healthcare as well as family planning.

With the recent implementation of China's two-child policy, there was much speculation about the impact the change would have on the services provided to mothers and infants. In particular, there existed concerns about the shortage of health care professionals in hospitals devoted to maternal and child health; more women would require services, many of them would be older women who possibly would require assisted reproductive services due to their age, and the same doctors who provide services might go on maternity leave to have their second child[3)]. Given the fairly rapid changes in this sector of China's healthcare system, the situation of the professionals who attend to mothers and children merits greater attention.

Previous research has shown that, in comparison to other professions, doctors have been more likely to suffer from burnout. Researchers have attributed this likelihood to the fact that doctors often are held to high standards, are less likely to seek support when they need help, and perform work that is often emotionally intense[4)]. Research on occupational burnout among hospital doctors emerged later in China, and never reached the same level of interest that it enjoyed in other countries. To date, the research has focused on the identification of burnout among general hospital doctors, the factors that contribute to occupational burnout[5)],

and the impact of burnout on medical service delivery[6]. Yet, there has been no research on occupational burnout among the obstetricians and pediatricians in maternity hospitals who represent a key part of China's continued success in efforts toward maternal and child health. This study addresses the gap in the literature.

Interest in occupational burnout among health care professionals began nearly half a century ago[7]. Freudenberger's early work in clinics devoted to people struggling with drug addiction noted that staff frequently suffered from the gradual onset of a lack of motivation and commitment, which was accompanied by both mental and physical symptoms[8]. The identification of burnout symptoms typically involved 3 dimensions: emotional exhaustion, depersonalization, and a low sense of professional achievement[9]. Occupational burnout was shown to trigger a variety of personal problems for the medical professional, such as physical illnesses, work absenteeism and/or domestic conflict, and also negatively impacts medical decisions and doctor–patient relationships[10].

Doctor occupation burnout is caused by a variety of factors. A 2011 study from the United States separated these factors into several aspects: external, job-related, and personal life factors[11]. Currently, there is a growing interest in the factors that contribute to burnout among doctors and possible strategies to mitigate their impact.

China has suffered from a shortage of obstetricians in recent years. The number of babies born in 2016 represented an increase of 8.7 million from the previous year. Despite the fact that 53 percent of 2016 newborn babies come from two-child families, the population of obstetricians and pediatricians has not increased at the same rate[12]. Moreover, as a result of the two-child policy, more older women have decided to have another child. Consequently, doctors have been treating a greater number of high-risk births, and their workloads have increased. Furthermore, the expectations of patient's family members have intensified, creating greater pressure on obstetricians and pediatricians in doctor–patient relationships.

Despite the country's sustained commitment to the creation of a strong Maternal and Child Health Initiative over the past twenty years, there has not been research on the possible existence of burnout among the medical professionals who work in facilities that attend to this patient population. Our research was designed to address this gap in the literature and to further an understanding of the challenges China faces in its effort to provide quality health care services to mothers and children. A cross-sectional survey was developed that focused on the personal character traits of doctors, doctor–patient relationships, and the levels of support doctors received from their families. Finally, a means to measure burnout and strategies to mitigate its impacts are proposed.

2 Subjects and Methods

A cross-sectional survey was administered to obstetricians and pediatricians across the country from May through June of 2017.

2.1 Subjects

A sample was obtained through simple random sampling from 11 maternal and child health hospitals located in Jiangsu, Guangdong, Hubei, Shanxi, Gansu, Xinjiang, Chongqing, Yunnan, Sichuan, Guizhou, and Liaoning. More obstetricians and pediatricians are employed in maternity hospitals than in general hospitals. Therefore, the recruitment process assured a good national representation of obstetricians and pediatricians.

The criteria for inclusion were the following: the doctor was employed in a provincial maternal and child health hospital; participation was limited to obstetricians and pediatricians; and, participation was voluntary. A total of 750 questionnaires, along with a consent form, were distributed by mail to 750 pediatricians and obstetricians from the selected hospitals. By the end of June, 710 doctors had returned and 678 had completed the questionnaire—an effective response rate of 90.4%. A total of 131 male (19.3%) and 547 female doctors (80.7%)

responded. Approximately half (49.9%) of the respondents were pediatricians.

The Institutional Review Board of Southwest Hospital, China, approved the study proposal as well as the manner in which informed consent was obtained from all participants.

2.2 Questionnaire

The questionnaire captured participant's demographics and employment, information about doctor–patient relationships, details about the family support enjoyed by doctors, and indicators of occupational burnout.

Demographic and employment information was captured through questions that addressed sex, age, marital status, education level, region, professional title, department, and average number of hours worked.

The question about age permitted one of four possible responses: 29 years of age or younger, 30–39 years of age, 40–49 years of age, and 50 years old of age or older. Due to the different means by which certification to practice medicine in China may be obtained, questions regarding education permitted one of four responses: Junior college, undergraduate degree, master's degree and doctorate. Participants also could choose one of four occupational titles: resident, attending physician, associate chief physician and chief physician. Possible responses to marital status were unmarried, married, divorced or widowed. Place of employment was limited to regions: Eastern, Central, Western, and Northeastern China. Finally, participants indicated the number of average hours worked weekly; 40 hours or less, 41–50 hours, 51–60 hours, and 61 hours or more.

A Chinese adaptation of the Difficult Doctor–Patient Relationship Questionnaire-10 (DDPRQ-10), originally developed by Steven Hahn and colleagues[13], was used to measure doctor's perceptions of doctor–patient relationships[14]. There were ten questions that focused on the following areas: physicians' subjective experiences, patients' behaviors, and symptoms. Responses were scored on a six-point Likert scale. The higher the scores, the more difficult

the doctor–patient relationship was determined to be. The Cronbach's Alpha of the doctor–patient Relationship scale was 0.803.

Family support was measured by the Perceived Social Support Scale-Family[15], adapted for research in China by Xiangdong Wang in 1999[16]. This was a questionnaire that consisted of questions in two categories: My family can help me concretely; I am able to obtain emotional help and support from my family when I need it and I can talk to my family about my problems. Responses were scored on a seven-point scale from completely disagree to completely agree. Higher scores indicated greater levels of perceived support. The Cronbach's Alpha was 0.869.

The Chinese version of the Maslach Burnout Inventory-General Survey (MBI-GS) was chosen to identify occupational burnout[17]. The MBI-GS has been translated and revised to ensure that the questions could be administered to Chinese subjects in a culturally- and linguistically-appropriate fashion[18]. Previous studies on Chinese nurses and doctors that utilized the revised survey found it to be an effective tool[19,20]. The research consisted of three subscales: emotional exhaustion (EE, five items), depersonalization (CY, four items), and low sense of achievement (PE, seven items).

Each question was ranked on a six-point scale from never to always. The possible minimum and maximum scores were 0 to 30 for EE, 0 to 24 for CY, and 0 to 42 for PE. In accordance with the Chinese adaptation of the MBI-GS, the cut-off points were as follows: A low score for EE was less than 9, average was 9 to 13 and high was greater than 13; a low score for CY was less than 3, average was 3–9, and high was greater than 9; and, a low score for PE was greater than 30, an average score was 18–30, and a high score was less than 18[21]. Individuals with a high score in one or more of these three domains were considered to exhibit burnout symptoms. Those with high EE and CY scores combined with a low PE score, were identified as having a high degree of occupational burnout[18]. Cronbach alpha

coefficients for EE, CY, and PE were 0.95, 0.92, and 0.88, respectively.

2.3 Statistical analysis

Data were analyzed using SPSS 17 software. T-tests and variance analysis were employed to test and compare the scores among doctors with different demographics. Additionally, an analysis was conducted to identify any existing correlation between occupational burnout and demographic variables, family support, and doctor–patient relationships. Finally, a multiple regression analysis was performed to examine the factors related to occupational burnout.

Harman single-factor analysis was utilized to test for homology[22]. A factor analysis of all items in the scale was created to determine the principal component in the non-rotation and identify the amount of homologous variance. An amount of less than 50 percent of the key value indicated that common method variance was not problematic. Bartlett's and KMO tests were used to examine scores from the family support, doctor–patient relationships, and occupational burnout scales. The Bartlett's test approached 0, indicating suitability for factor analysis. KMO values were: 0.823, 0.847, and 0.913, respectively. SPSS was utilized to test common variance; the cumulative percentage of the first principal component was 31.98% (less than 50%), which proved that the common method variance was not severe.

2.4 Patient and Public Involvement statement

This study is just for doctors，no patient and public involved.

3 Results

The subjects' distribution by demographics and employment situations is illustrated in Table 1. Among the 678 samples included, women accounted for the vast majority (80.7%); men accounted for only 19.3% of the sample. The majority of the doctors came from the western region, accounting for 63.7% of the sample; only 8.0% came from the eastern region.

Pediatric and obstetricians each accounted for half of the sample. Only 2.9% of the doctors worked less than 40 hours per week, and 39.7 percent worked more than 60 hours a week. The overall burnout rate was 56.6%.

Univariate analysis of the MBI-GS scores in relation to demographics and employment situation variables are shown in Table 2. Obstetricians and pediatricians evidenced prevalent occupational burnout, demonstrating very high average scores on emotional exhaustion and moderate scores on depersonalization. The data indicated that age, department, title, weekly working hours, and region correlated with greater emotional exhaustion, whereas education, sex and marital status did not. Doctors 40 years of age or younger, with lower levels of education, longer working hours, or who came from eastern China exhibited a higher level of emotional exhaustion. Obstetricians evidenced a higher level of emotional exhaustion than pediatricians.

Factors such as age, profession, employment position, number of hours worked and place of residence corresponded with higher levels of depersonalization (CY), whereas sex and marital status did not. As doctors' ages increased, they showed higher levels of depersonalization. Moreover, longer working hours, lower status professional titles and location in eastern or central China also corresponded to higher levels of depersonalization. Obstetricians demonstrated higher levels of depersonalization than pediatricians.

Interestingly, sex and region did not impact PE, yet age, marital status education, professional title, work hours and profession all did. Doctors who were younger, had lower professional titles, were unmarried, worked more than 60 hours a week, and exhibited lower levels of PE, demonstrated a lower sense of achievement on the scales. Interestingly, obstetricians seemed to enjoy a greater sense of achievement. The analyses of family support, doctor–patient relationships and occupational burnout (Table 3), revealed that emotional exhaustion was negatively correlated with family support (r=−0.141), yet positively correlated

with difficult doctor–patient relationships (r=0.459). Depersonalization was negatively correlated with family support (r=−0.188), yet positively correlated with difficult doctor–patient relationships (r=0.570). Moreover, a low sense of achievement proved negatively correlated with family support (r=−0.167), yet positively correlated with difficult doctor–patient relationships (r=0.338).

A regression analysis of factors that shaped occupational burnout showed that the DW value was 1.74; collinearity was not evident. Table 4 illustrates the relationship between hours of work, family support, doctor–patient relationships, and occupational burnout. Emotional exhaustion was negatively correlated with difficult doctor–patient relationships; the correlation coefficients β were 0.396 and 0.219. There was a significant positive correlation between depersonalization and difficult doctor–patient relationships (p<0.01), with a correlation coefficient β of 0.517. Family support was negatively correlated with a low sense of achievement (p<0.01), with a correlation coefficient β of −0.098. Yet, a significant positive correlation was apparent between family support and doctor–patient relationships (p<0.01), with a correlation coefficient β of 0.298.

Multiple regression analysis provided an indication of the factors that helped to predict occupational burnout, as shown in Table 5. Difficult doctor–patient relationships evidenced a greater ability to predict EE, CY, and PE (13%, 20%, and 7%, respectively). Work hours also served as a predictor of EE and CY (9% and 5%, respectively). However, family support proved to be a less reliable predictor.

4 Discussion

The rate of occupational burnout among obstetricians and pediatricians reached 56.6%. This percentage surpasses the rate of 44% identified in Iran, a country with high levels of burnout[23] and parallels the estimated 40–70% of burnout among U.S. obstetricians[24]. Recent

research on occupational burnout among physicians in China had indicated much lower rates than those found here among obstetricians and pediatricians. Moreover, the levels of EE, CY, and PE of these doctors were higher than those of other medical professionals[21].

There could be several explanations for these high rates of burnout among pediatricians and obstetricians. The majority of obstetricians and pediatricians in China are women, as they were in the sample we collected. A study conducted in the United States observed that the burnout rate of female doctors was 1.6 times higher than that of males[25]. Yet, the research conducted here did not identify significant differences in burnout rates between men and women doctors. Interestingly, the researchers who conducted the U.S. study noted that women often face additional pressures both at home and on the job. That is, the factor that impacted the level of burnout was not explained by the sex of the professional, but rather by the totality of the work for which they were responsible.

The findings also suggested that occupational burnout is greater among doctors with longer working hours. Among the pediatricians and obstetricians sampled, 73% worked more than 50 hours per week.

Another possible explanation for the high incidence of burnout could be directly related to doctor–patient relationships. The greater number of patients in the hospitals devoted to maternal and child health in recent years, without a corresponding increase in the number of doctors, suggests that these professionals have had a much greater workload than they previously did. The amount of time and the energy that may be devoted to each patient would either have to be reduced or maintained through an increase of hours worked. Moreover, there seemed to be a dialectical relationship between poor doctor–patient relationships and burnout, each contributing to the greater likelihood of the other.

There were several limitations to the present study. First, as a cross-sectional study, the research captured the situation of burnout at a single time point. An understanding of the

changes over time would have been helpful to identify any direct impacts of the two-child policy and a rapid increase of births in China on doctor burnout in facilities specifically devoted to mothers and children. It would have been interesting to know whether or not the differences in burnout rates among these doctors compared to others throughout the country already existed prior to these changes. That would have helped to further focus on any particularities in these specializations that could merit further attention in future research devoted to addressing burnout.

Second, the inclusion of all medical professionals working in these facilities, such as nurses, could provide greater insight into the systemic and/or dynamic nature of burnout. An understanding of the prevalence or absence of burnout among all the professions that form part of a medical team could reveal some of the interpersonal dynamics on the job that could contribute to or alleviate the symptoms of burnout.

Third, a larger sample of hospitals throughout the country would strengthen the research. Because geographic region did appear to play a role in the presence of burnout, a larger sample from each of the regions would be imperative to better understand those differences.

Finally, the study utilized data collected from the Perceived Social Support Scale and doctor–reported information about doctor–patient relationships, both of which rely on self-reporting. To better grasp the entirety of the support potentially available to or enjoyed by doctors, surveys that capture the experiences of other members of their support networks or research methods that promote direct observation would be recommended.

5 Conclusions

Doctors' occupational health concerns not only themselves, but also the quality of the services that they are able to provide. Consequently, the high rate of burnout among China's obstetricians and pediatricians is cause for concern. There is an urgent need to better

understand the mitigating factors that have contributed to this situation and develop feasible solutions in light of China's current baby boom. The findings from this research have helped to identify several possible areas on which to focus efforts in the coming years.

The shift to a two-child policy by the national government resulted in much higher numbers of births per year. The hospitals devoted to maternal and child health services have experienced a significantly increased demand for their services. Yet, there has not been a corresponding increase in the number of medical professionals available to provide those services. There is an urgent need to fill this gap. The national government could devote the resources necessary to train greater numbers of pediatricians and obstetricians as a means to alleviate the workload currently placed on these doctors.

Regional differences impact burnout in the medical professions. Any efforts to address burnout should remain attentive to the factors underlying these regional differences, especially with regard to the resident population's needs and resources devoted to address those needs.

Administrators in medical institutions are uniquely positioned to identify and reduce burnout among doctors in their facilities. In addition to their ability to adjust workloads, they could develop greater opportunities for doctors of all levels to achieve a greater sense of accomplishment in their profession. Such opportunities could include training, research, enhanced career mobility, and/or pay incentives for any increase of assigned responsibilities.

Finally, greater public awareness of the challenges that the maternal and child health care system currently faces could help alleviate some of the factors that contribute to medical doctor burnout. The government, hospital administrators, researchers, and media outlets could all promote an understanding of the current situation. This could remove some of the burden of responsibility that doctors and patients shoulder as they navigate their relationships with one another.

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*data sharing statement:*We are willing to share the main research data, including the demographic characteristics of the subjects, the doctor-patient relationship score, the job burnout score and the family support score. The data can be obtained by mail within a year after the publication of the article. The data of this issue may be helpful for studying the occupational health and mental health status of Chinese doctors. It is important to note that this shared data is provided only to relevant researchers of universities and public research institutions, and the relevant research documents will be shared after the whole subject finished.

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Table 1. Subject distribution by demographics

Variables	n	%
Sex		
Female	547	80.7%
Male	131	19.3%
Age in years		
≤ 29	165	24.3%
30–39	298	44.0%
40–49	158	23.3%
≥50	57	8.4%
Profession		
Pediatricians	338	49.9%
Obstetricians	339	50.0%
Professional title		
Resident Doctor	282	41.6%
Attending Physician	196	28.9%
Associate Senior	123	18.1%
Chief Physician	77	11.4%
Education		
Junior College	7	1.0%
Undergraduate	356	52.5%
Master's Degree	295	43.5%
Doctorate	20	2.9%
Marriage		
Unmarried	141	20.8%

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Married	522	77.0%
Divorced	15	2.2%
Widowed	0	0
Hours work/week		
≤40	20	2.9%
40–50	164	24.2%
50–60	225	33.2%
≥60 H	269	39.7%
Area		
East	54	8.0%
Central	91	13.4%
West	432	63.7%
Northeast	101	14.9%

Table 2. Univariate analysis of MBI-GS scores, FS, and PPR in relation to demographics

Variables	Burnout (M±SD)		
	EE	CY	PE
Sex			
female	15.56±7.682	8.26±6.037	10.59±8.109
male	14.84±8.314	7.23±5.626	10.21±8.100
p	0.104	0.357	0.717
Age (y)			
≤29	15.98±8.067	8.21±6.141	12.79±7.511
30–39	16.21±7.642	8.75±6.006	10.39±8.030
40–49	13.85±7.586	7.24±5.435	9.35±8.229
≥50	14.05±7.879	6.30±6.216	7.81±8.361
p	0.007**	0.000**	0.007**
Profession			
pediatricians	14.64±7.364	7.38±5.423	9.54±7.605
obstetricians	16.21±8.170	8.74±6.413	11.49±8.481
p	0.009**	0.000**	0.011*
Professional Title			
Resident Doctor	16.51±7.745	8.71±6.209	12.56±7.999
Attending physician	15.49±7.194	8.37±5.672	10.09±7.341
Associate Senior doctor	14.44±8.501	7.68±5.813	8.79±8.375
Chief physician	12.84±7.722	5.52±5.435	6.86±7.933
p	0.001**	0.000**	0.000**
Education			
Junior college	15.00±7.234	6.57±5.094	16.29±9.878

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Undergraduate	15.01±7.914	7.87±6.106	9.79±7.879
Master	15.86±7.687	8.51±5.800	11.35±8.280
Doctor	16.50±7.944	5.40±5.688	9.00±7.233
p	0.515	0.091	0.016*
Marriage			
Unmarried	16.20±7.881	8.33±6.170	12.59±7.540
Married	15.22±7.799	7.98±5.948	9.97±8.166
Divorced	15.40±7.424	8.53±4.969	10.13±8.348
p	0.416	0.781	0.003**
Hours worked/week			
≤40	10.55±6.362	5.90±3.986	11.40±8.075
40–50	12.48±6.753	6.29±4.741	9.80±8.047
50–60	13.59±7.243	7.21±5.615	9.04±7.937
≥60	19.12±7.476	10.01±6.496	12.12±8.027
p	0.000**	0.000**	0.000**
Area			
East	17.76±7.578	7.98±5.389	11.30±8.009
Central Region	16.71±7.766	10.05±6.997	11.81±9.219
West	15.98±7.831	8.01±5.896	10.25±8.037
Northeast	10.63±5.880	6.52±5.094	10.05±7.293
p	0.000**	0.001**	0.305

407 *p-value<0.05; **p-value<0.01.

1

Table 3. Correlations for MBI-GS scores and Family Support and Doctor–Patient Relationships

Variables	Burnout (*r*)		
	EE	CY	PE
Family support	−0.141**	−0.188**	−0.167**
Doctor–patient relationships	0.459**	0.570**	0.338**

*p-value<0.05; **p-value<0.01.

2

Table 4. General linear model analysis of the factors associated with MBI-GS scores

Variables	Burnout					
	EE		CY		PE	
	B	Beta	B	Beta	B	Beta
Family support	0	0	−0.064	−0.052	−0.163**	−0.098**
Doctor–patient relationship	0.423**	0.396**	0.422**	0.517**	0.330**	0.298**
Hours worked (per week)	3.494**	0.219**	0.766	0.063	−1.814	−0.110

*p-value<0.05; **p-value<0.01.

3

Table 5. Factors that impact the variance in MBI-GS subscale scores

Variables		EE	CY	PE
Demographics	R^2	0.107	0.076	0.106
	ΔR^2	0.088	0.056	0.087
	F	5.677**	3.89**	5.628**
Hours worked/week	R^2	0.199	0.123	0.115
	ΔR^2	0.178	0.100	0.092
	F	9.630**	5.423**	5.036**
Family Support	R^2	0.204	0.144	0.137
	ΔR^2	0.182	0.12	0.114
	F	9.388**	6.15**	5.820**
Doctor–patient Relationships	R^2	0.336	0.369	0.212
	ΔR^2	0.317	0.351	0.189
	F	17.562**	20.282**	9.321**

*p-value<0.05; **p-value<0.01.

STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

	Item No	Recommendation
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract√
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found√
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported√
Objectives	3	State specific objectives, including any prespecified hypotheses√
Methods		
Study design	4	Present key elements of study design early in the paper√
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection√
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants√
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable√
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group√
Bias	9	Describe any efforts to address potential sources of bias√
Study size	10	Explain how the study size was arrived at√
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why√
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding√
		(*b*) Describe any methods used to examine subgroups and interactions√
		(*c*) Explain how missing data were addressed√
		(*d*) If applicable, describe analytical methods taking account of sampling strategy√
		(*e*) Describe any sensitivity analyses×
Results		
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed√
		(b) Give reasons for non-participation at each stage√
		(c) Consider use of a flow diagram×
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders√
		(b) Indicate number of participants with missing data for each variable of interest×
Outcome data	15*	Report numbers of outcome events or summary measures√
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included√
		(*b*) Report category boundaries when continuous variables were categorized√
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period√
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and

		sensitivity analyses×
Discussion		
Key results	18	Summarise key results with reference to study objectives√
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias√
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence√
Generalisability	21	Discuss the generalisability (external validity) of the study results√
Other information		
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based√

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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Burnout among obstetricians and pediatricians: A cross-sectional study from China

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Burnout among obstetricians and pediatricians: A cross-sectional study from China

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[a]Junying Ye and Huan Wang contributed equally to this work.

Abstract: Objectives: Hospitals devoted to maternal and child health represent unique health care institutions in China. Health care professionals in these hospitals not only attend to health services for women and children, but also provide technical services and support for district maternal and children's healthcare as well as family planning. However, few studies have examined occupational burnout among doctors employed in these hospitals. This research addresses the gap in the literature. **Methods:** A cross-sectional survey of obstetricians and pediatricians from 11 maternal and child health hospitals across China was conducted May through June, 2017. A total of 678 people completed a self-administered questionnaire. The survey included questions about demographics, doctor–patient relationships, and networks of support as well as characteristics designed to capture the occurrence of burnout, such as emotional exhaustion (EE), cynicism (CY), and professional efficacy (PE). T-test, variance, and multiple regression analyses were used to examine the data. **Results:** The research revealed that 56.6% of obstetricians and pediatricians exhibited signs of occupational burnout. Poor doctor–patient relationships and high average number of weekly hours worked contributed to burnout. Additionally, low family support corresponded to physicians' low sense of professional efficacy. **Conclusions:** Several factors have contributed to occupational burnout among pediatricians and obstetricians at maternal and child health hospitals in China, including lack of family support, poor doctor–patient relationships and heavy workloads.

Key words: Burnout; Chinese Doctors; Maternal and child health care hospital; Maslach Burnout Inventory-General Survey

Article summary

Strengths and limitations of this study

- The research topic is relatively new: the job burnout of doctors in provincial maternal and child health care hospitals in China has scarcely been the key focus; the influences of China's comprehensive two-child policy on the burnout among obstetricians and pediatricians also opens up a new area of research.
- The result shows, for the first time , that 56.6% of obstetricians and pediatricians in Chinese provincial maternal and child health care hospitals exhibited signs of occupational burnout. Poor doctor-patient relationships and high average number of weekly hours worked contributed to burnout.
- This information may raise concerns about the occupational health of Obstetricians and pediatricians in China , and Inspire the government to increase the training of relevant professionals
- A major limitation is that, due to lack of research in this field, this paper only made a preliminary study of the status quo, wanting a more in-depth study, such as interviews, questionnaire surveys, and consultation from professionals.

1 Introduction

China has made great progress on maternal and child health in the past two decades. From 1990 to 2015, the country lowered infant mortality by nearly 70% and maternal mortality 75%[1)]. Much of this success was possible due to a multi-pronged strategy that emphasized investments in antenatal and delivery care, effective referral systems for women at high risk, and a commitment to the professionalization of maternity care[2)]. Hospitals devoted to maternal and child health represent unique health care institutions in China. The professionals in these hospitals not only attend to health services for women and children, but also provide technical services and support for district maternal and children's healthcare as well as family planning. These hospitals are now playing an increasingly significant role in Chinese women and children's health care. For example, our previous survey showed that the number of deliveries in Chongqing Health Center for Women and Children was about 13,000 in 2017, ranking the first among all health institutions in Chonqing, and it was 44.5% higher than that of the second place.

However, the increasing workload, to some extent, limits the development of these hospitals. It is generally known that China has suffered from a shortage of obstetricians in recent years. With the implementation of China's two-child policy, there was much speculation about the impact the change would have on the services provided to mothers and infants. The number of babies born in 2016 represented an increase of 8.7 million from the previous year. Despite the fact that 53 percent of 2016 newborn babies come from two-child families, the population of obstetricians and pediatricians has not increased at the same rate[3)]. In addition, as a result of the new policy, more older women have decided to have another child. Many of them would require assisted reproductive services due to their age, and the same doctors who provide services might go on maternity leave to have their second child[4)] Consequently, doctors have been treating a greater number of high-risk births, and their workloads have increased. Furthermore, the

expectations of patient's family members have intensified, creating greater pressure on them in doctor–patient relationships. All the factors mentioned above may increase the risk of serious job burnout among doctors.

As a previous research showed, in comparison to other professions, doctors are more likely to suffer from burnout. The researchers have attributed this likelihood to the fact that doctors are often held to high standards, are less likely to seek support when they need help, and perform work that is often emotionally intense[5]. As a matter of fact, interest in occupational burnout among health care professionals began nearly half a century ago[6]. Freudenberger's early work in clinics devoted to people struggling with drug addiction noted that staff frequently suffered from the gradual onset of a lack of motivation and commitment, which was accompanied by both mental and physical symptoms[7]. The identification of burnout symptoms typically involved 3 dimensions: emotional exhaustion, cynicism, and a low sense of professional achievement[8]. The burnout was shown to trigger a variety of personal problems for the medical professional, such as physical illnesses, work absenteeism and/or domestic conflict, and also negatively impact medical decisions and doctor–patient relationships[9]. Currently, there is a growing interest in the factors that contribute to burnout and possible strategies to mitigate the impact. For instance, a 2011 study from the U.S. separated the factors into several aspects: external, job-related, and personal life factors[10].

Research on job burnout among hospital doctors emerged later in China, and never reached the same level of interest it enjoyed in other countries. To date, the research has focused on the identification of burnout among general hospital doctors, the factors contributing to job burnout[11], and its impact on medical service delivery[12]. Despite the country's sustained commitment to create a strong Maternal and Child Health Initiative over the past twenty years, there has not been research on the occupational burnout among the medical professionals

working in maternal and child health care hospitals. Our research was designed to address this gap in the literature and to further an understanding of the challenges China faces in its efforts to provide quality health care services to mothers and children. A cross-sectional survey was developed, focusing on the personal character traits of doctors, doctor–patient relationships, and the levels of support doctors received from their families. Finally, a means to measure burnout and strategies to mitigate its impacts are proposed.

2 Subjects and Methods

A cross-sectional survey was administered to obstetricians and pediatricians across the country from May until June, 2017.

2.1 Subjects

We launched a research project on the job burnout among doctors in maternal and child health care hospitals, and invited some provincial hospitals of this kind to participate in the survey. The reason for choosing provincial maternal and child health hospitals is that they have more perfect systems in pediatric and obstetric departments compared with those of the general hospitals, and also they undertake more delivery workload, both of which may better reflect the current situation of job burnout among pediatricians and obstetricians in China. To ensure the consistency of the samples, we formulated the following inclusion criteria: 1. The maternal and child health care hospitals chosen must be at provincial level; 2. According to the evaluation criteria of the third-class maternal and child health care hospitals, the number of beds in use should be no less than 300, and the beds in departments of obstetrics and pediatrics should account for not less than 90% of the total number. Besides, hospitals with imperfect systems were excluded as some maternal and child health care hospitals could only provide outpatient services, but not hospitalization services because of the decisions made by the administrative departments

of higher levels.

A sample was then obtained from 11 maternal and child health hospitals located in Jiangsu, Guangdong, Hubei, Shanxi, Gansu, Xinjiang, Chongqing, Yunnan, Sichuan, Guizhou, and Liaoning. A total of 750 questionnaires, along with a consent form, were distributed by mail to 750 pediatricians and obstetricians from the selected hospitals. By the end of June, 710 doctors had returned and 678 had completed the questionnaire—an effective response rate of 90.4%. A total of 131 male (19.3%) and 547 female doctors (80.7%) responded. Approximately half (49.9%) of the respondents were pediatricians.

The Institutional Review Board of Southwest Hospital, China, approved the study proposal as well as the manner in which the informed consent was obtained from all the participants.

2.2 Questionnaire

The questionnaire captured the participants' demographics and employment, information about doctor–patient relationships, details about the family support enjoyed by doctors, and indicators of occupational burnout.

Demographic and employment information was captured through questions addressing sex, age, marital status, education level, region, professional title, department, and average number of hours worked weekly.

The question about age permitted one of four possible responses: 29 years of age or younger, 30–39 years of age, 40–49 years of age, and 50 years old of age or older. Departments are divided into obstetrics and pediatrics, because these two departments are the most important ones in maternal and child health care hospitals, with the beds accounting for more than 90% of the total number. Due to the different means by which certification to practice medicine in China may be obtained, questions regarding education permitted one of four responses: junior college degree, undergraduate degree, master's degree and doctorate. Participants also could choose one of four

occupational titles: resident, attending physician, associate chief physician and chief physician. Possible responses to marital status were unmarried, married, divorced or widowed. Place of employment was limited to regions: Eastern, Central, Western, and Northeastern China. Finally, the normal working hours of Chinese doctors are 40 hours a week (8 hours a day, 5 days a week), so we take 10 hours as a grade to indicate the number of average hours worked weekly: 40 hours or less, 41 – 50 hours, 51 – 60 hours, and 61 hours or more.

A Chinese adaptation of the Difficult Doctor–Patient Relationship Questionnaire-10 (DDPRQ-10), originally developed by Steven Hahn and his colleagues[13], was used to measure doctor's perceptions of doctor–patient relationships[14]. There were ten questions that focused on the following areas: physicians' subjective experiences, patients' behaviors, and symptoms. Responses were scored on a six-point Likert scale. The higher the scores, the more difficult the doctor–patient relationship was determined to be. The Cronbach's Alpha of the doctor–patient relationship scale was 0.803.

Family support was measured by the Perceived Social Support Scale-Family[15], adapted for research in China by Xiangdong Wang in 1999[16]. This was a questionnaire that consisted of questions in two categories: My family can help me concretely; I am able to obtain emotional help and support from my family when I need it and I can talk to my family about my problems. Responses were scored on a seven-point scale from completely disagree to completely agree. Higher scores indicated greater levels of perceived support. The Cronbach's Alpha was 0.869.

The Chinese version of the Maslach Burnout Inventory-General Survey (MBI-GS) was chosen to identify occupational burnout[17]. The MBI-GS has been translated and revised to ensure that the questions could be administered to Chinese subjects in a culturally- and linguistically-appropriate fashion[18]. Previous studies on Chinese nurses and doctors that utilized

the revised survey found it to be an effective tool[19,20]. The research consisted of three subscales: emotional exhaustion (EE, five items), cynicism (CY, four items), and sense of achievement by professional efficacy (PE, seven items). Emotional exhaustion was defined as feeling emotionally overwhelmed and exhausted by work; CY was defined as doubting the value of one's work or its contribution to anything; PE described a feeling of reduced competence and lack of success/achievement in one' s work with other people. Each question was ranked on a six-point scale from never to always. The possible minimum and maximum scores were 0 to 30 for EE, 0 to 24 for CY, and 0 to 42 for PE. In accordance with the Chinese adaptation of the MBI-GS, the cut-off points were as follows: a low score for EE was less than 9, average was 9 to 13 and high was greater than 13; a low score for CY was less than 3, average was 3–9, and high was greater than 9; and, a low score for PE was greater than 30, an average score was 18–30, and a high score was less than 18[21]. Individuals with a high score in one or more of these three domains were considered to exhibit burnout symptoms. Those with high EE and CY scores combined with a low PE score, were identified as having a high degree of occupational burnout[18]. Cronbach alpha coefficients for EE, CY, and PE were 0.95, 0.92, and 0.88, respectively.

2.3 Statistical analysis

Data were analyzed using SPSS 17 software. T-tests and variance analyses were employed to test and compare the scores among doctors with different demographics. Additionally, an analysis was conducted to identify any existing correlation between occupational burnout and demographic variables, family support, and doctor–patient relationships. Finally, a multiple regression analysis was performed to examine the factors related to occupational burnout.

Harman single-factor analysis was utilized to test for homology[22]. A factor analysis of all items in the scale was created to determine the principal component in the non-rotation and identify the amount of homologous variance. An amount of less than 50 percent of the key value

indicated that common method variance was not problematic. Bartlett's and KMO tests were used to examine scores from the family support, doctor–patient relationships, and occupational burnout scales. The Bartlett's test approached 0, indicating suitability for factor analysis. KMO values were: 0.823, 0.847, and 0.913, respectively. SPSS was utilized to test common variance; the cumulative percentage of the first principal component was 31.98% (less than 50%), which proved that the common method variance was not severe.

2.4 Patient and Public Involvement statement

This study is just for doctors，no patient and public involved.

3 Results

The subjects' distribution by demographics and employment situations is illustrated in Table 1. Among the 678 samples included, women accounted for the vast majority (80.7%); men accounted for only 19.3%. The majority of the doctors came from the western region, accounting for 63.7%; only 8.0% came from the eastern region. Pediatricians and obstetricians each accounted for half of the sample. Only 2.9% of the doctors worked less than 40 hours per week, and 39.7 percent worked more than 60 hours a week. The overall burnout rate was 56.6%.

Univariate analysis of the MBI-GS scores in relation to demographics and employment situation variables are shown in Table 2. Obstetricians and pediatricians evidenced prevalent occupational burnout, demonstrating very high average scores on emotional exhaustion and moderate scores on cynicism. The data indicated that age, department, title, weekly working hours, and region correlated with greater emotional exhaustion, whereas education, sex and marital status did not. Doctors aged 40 or younger, with lower levels of education, longer working hours, or who came from eastern China exhibited a higher level of emotional exhaustion.

Obstetricians evidenced a higher level of emotional exhaustion than pediatricians.

Factors such as age, profession, employment position, number of hours worked and place of residence corresponded with higher levels of cynicism (CY), whereas sex and marital status did not. As doctors' age increased, they showed higher levels of cynicism. Moreover, longer working hours, lower professional titles and location in eastern or central China also corresponded to higher levels of cynicism. Obstetricians demonstrated higher levels of cynicism than pediatricians.

Interestingly, sex and region did not impact PE, yet age, marital status, education, professional title, work hours and profession all did. Doctors who were younger and unmarried, had lower professional titles, worked more than 60 hours a week, and exhibited lower levels of PE, demonstrated a lower sense of achievement on the scales. Interestingly, obstetricians seemed to enjoy a greater sense of achievement. The analyses of family support, doctor–patient relationships and occupational burnout (Table 3), revealed that emotional exhaustion was negatively correlated with family support (r=−0.141), yet positively with difficult doctor–patient relationships (r=0.459). cynicism was negatively correlated with family support (r=−0.188), yet positively with difficult doctor–patient relationships (r=0.570). Moreover, a sense of achievement by professional efficacy proved negatively correlated with family support (r=−0.167), yet positively with difficult doctor–patient relationships (r=0.338).

A regression analysis of factors that shaped occupational burnout showed that the DW value was 1.74; collinearity was not evident. Table 4 illustrates the relationship between hours of work, family support, doctor–patient relationships, and occupational burnout. Emotional exhaustion was negatively correlated with difficult doctor–patient relationships; the correlation coefficients β were 0.396 and 0.219. There was a significant positive correlation between cynicism and difficult doctor–patient relationships (p<0.01), with a correlation coefficient β of 0.517. Family support

was negatively correlated with a sense of achievement by professional efficacy (p<0.01), with a correlation coefficient β of −0.098. Yet, a significant positive correlation was apparent between family support and doctor–patient relationships (p<0.01), with a correlation coefficient β of 0.298.

Multiple regression analysis provided an indication of the factors that helped to predict occupational burnout, as shown in Table 5. Difficult doctor–patient relationships evidenced a greater ability to predict EE, CY, and PE (13%, 20%, and 7%, respectively). Work hours also served as a predictor of EE and CY (9% and 5%, respectively). However, family support proved to be a less reliable predictor.

4 Discussion

The rate of occupational burnout among obstetricians and pediatricians reached 56.6%. This percentage surpasses the rate of 44% identified in Iran, a country with high levels of burnout[23] and parallels the estimated 40–70% of burnout among U.S. obstetricians[24]. Recent research on occupational burnout among physicians in China had indicated much lower rates than those found here among obstetricians and pediatricians. Moreover, the levels of EE, CY, and PE of these doctors were higher than those of other medical professionals[21].

There could be several explanations for these high rates of burnout among pediatricians and obstetricians, the majority of whom in China are women, as they were in the sample we collected. A study conducted in the United States observed that the burnout rate of female doctors was 1.6 times higher than that of males[25]. Yet, the research conducted here did not identify significant differences in burnout rates between men and women doctors. Interestingly, the researchers who conducted the U.S. study noted that women often face additional pressures both at home and on the job. That is, the factor that impacted the level of burnout was not explained by the sex of the

professional, but rather by the totality of the work for which they were responsible.

The findings also suggested that occupational burnout is greater among doctors with longer working hours. Among the pediatricians and obstetricians sampled, 73% worked more than 50 hours per week.

Another possible explanation for the high incidence of burnout could be directly related to doctor–patient relationships. The greater number of patients in the hospitals devoted to maternal and child health in recent years, without a corresponding increase in the number of doctors, suggests that these professionals have had a much greater workload than they previously did. The amount of time and the energy that may be devoted to each patient would have to be either reduced or maintained through an increase of hours worked. Moreover, there seemed to be a dialectical relationship between poor doctor–patient relationships and burnout, each contributing to the greater likelihood of the other.

There were several limitations to the present study. First, as a cross-sectional study, the research captured the situation of burnout at a single time point. An understanding of the changes over time would have been helpful to identify any direct impacts of the two-child policy and a rapid increase of births in China on doctor burnout in facilities specifically devoted to mothers and children. It would have been interesting to know whether or not the differences in burnout rates among these doctors compared to others throughout the country already existed prior to these changes. That would have helped to further focus on any particularities in these specializations that could merit further attention in future research devoted to addressing burnout.

Second, the inclusion of all medical professionals working in these facilities, such as nurses, could provide greater insight into the systemic and/or dynamic nature of burnout. An understanding of the prevalence or absence of burnout among all the professions that form part of a medical team could reveal some of the interpersonal dynamics on the job that could contribute

to or alleviate the symptoms of burnout.

Third, a larger sample of hospitals throughout the country would strengthen the research. As geographic region did appear to play a role in the presence of burnout, a larger sample from each of the regions would be imperative to better understand those differences.

Finally, the study utilized the data collected from the Perceived Social Support Scale and doctor–reported information about doctor–patient relationships, both of which rely on self-reporting. To better grasp the entirety of the support potentially available to or enjoyed by doctors, surveys that capture the experiences of other members of their support networks or research methods that promote direct observation would be recommended.

5 Conclusions

Doctors' occupational health concerns not only themselves, but also the quality of the services that they are able to provide. Consequently, the high rate of burnout among China's obstetricians and pediatricians gives cause for concern. There is an urgent need to better understand the mitigating factors that have contributed to this situation and develop feasible solutions in light of China's current baby boom. The findings from this research have helped to identify several possible areas on which to focus efforts in the coming years.

The shift to a two-child policy by the national government resulted in much higher numbers of births per year. The hospitals devoted to maternal and child health services have experienced a significantly increased demand for their services. Yet, there has not been a corresponding increase in the number of medical professionals available to provide those services. There is an urgent need to fill this gap. The national government could devote the resources necessary to train greater numbers of pediatricians and obstetricians as a means to alleviate the workload currently placed on these doctors.

Regional differences impact burnout in the medical professions. Any efforts to address burnout should remain attentive to the factors underlying these regional differences, especially with regard to the resident population's needs and the resources devoted to address those needs.

Administrators in medical institutions are uniquely positioned to identify and reduce burnout among doctors in their facilities. In addition to their ability to adjust workloads, they could develop greater opportunities for doctors of all levels to achieve a greater sense of accomplishment in their profession. Such opportunities could include training, research, enhanced career mobility, and/or pay incentives for any increase of assigned responsibilities.

Finally, greater public awareness of the challenges that the maternal and child health care system currently faces could help alleviate some of the factors that contribute to medical doctor burnout. The government, hospital administrators, researchers, and media outlets could all promote an understanding of the current situation. This could remove some of the burden of responsibility that doctors and patients shoulder as they navigate their relationships with one another.

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Contributorship statement： Junying Ye and Huan Wang contributed to data collection and analysis, writing and revision; Hao Wu contributed to the design and the writing of the article; Liaosha Ye contributed to data collection; Qi Li contributed to the writing of the article, Xiangyu Ma contributed to data analysis; Xiaodong Yu contributed to data collection; Hua Zhang contributed to data collection and the writing of the article; Xu Luo contributed to data collection.

Data sharing statement: We are willing to share the main research data, including the demographic characteristics of the subjects, the doctor-patient relationship score, the job burnout score and the family support score. The data can be obtained by mail within a year after the publication of the article. The data of this issue may be helpful for studying the occupational health and mental health status of Chinese doctors. It is important to note that this shared data is provided only to relevant researchers of universities and public research institutions, and the relevant research documents will be shared after the whole subject finished.

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1

Table 1. Subject distribution by demographics

Variables	n	%
Sex		
Female	547	80.7%
Male	131	19.3%
Age in years		
≤ 29	165	24.3%
30–39	298	44.0%
40–49	158	23.3%
≥50	57	8.4%
Profession		
Pediatricians	338	49.9%
Obstetricians	339	50.0%
Professional title		
Resident Doctor	282	41.6%
Attending Physician	196	28.9%
Associate Senior	123	18.1%
Chief Physician	77	11.4%
Education		
Junior College	7	1.0%
Undergraduate	356	52.5%
Master's Degree	295	43.5%
Doctorate	20	2.9%

2

Marriage		
Unmarried	141	20.8%
Married	522	77.0%
Divorced	15	2.2%
Widowed	0	0
Hours work/week		
≤40	20	2.9%
40–50	164	24.2%
50–60	225	33.2%
≥60 H	269	39.7%
Area		
East	54	8.0%
Central	91	13.4%
West	432	63.7%
Northeast	101	14.9%

1

Table 2. Univariate analysis of MBI-GS scores, FS, and PPR in relation to demographics

Variables	Burnout (M±SD)		
	EE	CY	PE
Sex			
female	15.56±7.682	8.26±6.037	10.59±8.109
male	14.84±8.314	7.23±5.626	10.21±8.100
p	0.104	0.357	0.717
Age (y)			
≤29	15.98±8.067	8.21±6.141	12.79±7.511
30–39	16.21±7.642	8.75±6.006	10.39±8.030
40–49	13.85±7.586	7.24±5.435	9.35±8.229
≥50	14.05±7.879	6.30±6.216	7.81±8.361
p	0.007**	0.000**	0.007**
Profession			
pediatricians	14.64±7.364	7.38±5.423	9.54±7.605
obstetricians	16.21±8.170	8.74±6.413	11.49±8.481
p	0.009**	0.000**	0.011*
Professional Title			
Resident Doctor	16.51±7.745	8.71±6.209	12.56±7.999
Attending physician	15.49±7.194	8.37±5.672	10.09±7.341
Associate Senior doctor	14.44±8.501	7.68±5.813	8.79±8.375
Chief physician	12.84±7.722	5.52±5.435	6.86±7.933
p	0.001**	0.000**	0.000**

2

Education			
Junior college	15.00±7.234	6.57±5.094	16.29±9.878
Undergraduate	15.01±7.914	7.87±6.106	9.79±7.879
Master	15.86±7.687	8.51±5.800	11.35±8.280
Doctor	16.50±7.944	5.40±5.688	9.00±7.233
p	0.515	0.091	0.016*
Marriage			
Unmarried	16.20±7.881	8.33±6.170	12.59±7.540
Married	15.22±7.799	7.98±5.948	9.97±8.166
Divorced	15.40±7.424	8.53±4.969	10.13±8.348
p	0.416	0.781	0.003**
Hours worked/week			
≤40	10.55±6.362	5.90±3.986	11.40±8.075
40–50	12.48±6.753	6.29±4.741	9.80±8.047
50–60	13.59±7.243	7.21±5.615	9.04±7.937
≥60	19.12±7.476	10.01±6.496	12.12±8.027
p	0.000**	0.000**	0.000**
Area			
East	17.76±7.578	7.98±5.389	11.30±8.009
Central Region	16.71±7.766	10.05±6.997	11.81±9.219
West	15.98±7.831	8.01±5.896	10.25±8.037
Northeast	10.63±5.880	6.52±5.094	10.05±7.293
p	0.000**	0.001**	0.305

404 *p-value<0.05; **p-value<0.01.

1

Table 3. Correlations for MBI-GS scores and Family Support and Doctor–Patient Relationships

Variables	Burnout (*r*)		
	EE	CY	PE
Family support	−0.141**	−0.188**	−0.167**
Doctor–patient relationships	0.459**	0.570**	0.338**

*p-value<0.05; **p-value<0.01.

2

Table 4. General linear model analysis of the factors associated with MBI-GS scores

Variables	Burnout					
	EE		CY		PE	
	B	Beta	B	Beta	B	Beta
Family support	0	0	−0.064	−0.052	−0.163**	−0.098**
Doctor–patient relationship	0.423**	0.396**	0.422**	0.517**	0.330**	0.298**
Hours worked (per week)	3.494**	0.219**	0.766	0.063	−1.814	−0.110

*p-value<0.05; **p-value<0.01.

3

Table 5. Factors that impact the variance in MBI-GS subscale scores

Variables		EE	CY	PE
Demographics	R^2	0.107	0.076	0.106
	ΔR^2	0.088	0.056	0.087
	F	5.677**	3.89**	5.628**
Hours worked/week	R^2	0.199	0.123	0.115
	ΔR^2	0.178	0.100	0.092
	F	9.630**	5.423**	5.036**
Family Support	R^2	0.204	0.144	0.137
	ΔR^2	0.182	0.12	0.114
	F	9.388**	6.15**	5.820**
Doctor–patient Relationships	R^2	0.336	0.369	0.212
	ΔR^2	0.317	0.351	0.189
	F	17.562**	20.282**	9.321**

*p-value<0.05; **p-value<0.01.

STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

	Item No	Recommendation
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract√(line 25-31,page1)
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found√(line 32-37,page1)
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported√(line 49-93,page3-4)
Objectives	3	State specific objectives, including any prespecified hypotheses√(line94-102,page4-5)
Methods		
Study design	4	Present key elements of study design early in the paper√(line 107、132、187、203,page5-8)
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection√(line108-131,page5-6)
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants√(line 108-121,page5)
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable√(line133-186,page6-8)
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group√（(line 139-151,page6-7)）
Bias	9	Describe any efforts to address potential sources of bias√(line194-202,page8-9)
Study size	10	Explain how the study size was arrived at√(line 124-128,page6)
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why√(line 153-182,page7-8)
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding√(line 188-202,page8-9)
		(*b*) Describe any methods used to examine subgroups and interactions√(line 188-202,page8-9)
		(*c*) Explain how missing data were addressed√(line 126,page6)
		(*d*) If applicable, describe analytical methods taking account of sampling strategy√(line 188-202,page8-9)
		(*e*) Describe any sensitivity analyses×
Results		
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed√(line 124-128,page6)
		(b) Give reasons for non-participation at each stage√(line 124-128,page6)
		(c) Consider use of a flow diagram×
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders√(line 207-213,page9)

		(b) Indicate number of participants with missing data for each variable of interest×
Outcome data	15*	Report numbers of outcome events or summary measures√(line214-2221,page9)
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included√(line228-253,page10-11)
		(*b*) Report category boundaries when continuous variables were categorized√(line228-253,page10-11)
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period√(line228-253,page10-11)
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses√(line228-253,page10-11)
Discussion		
Key results	18	Summarise key results with reference to study objectives√(line256-281,page11-12)
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias√(line282-303,page12-13)
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence√(line256-281,page11-12)
Generalisability	21	Discuss the generalisability (external validity) of the study results√(line306-333,page13-14)
Other information		
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based√(line335-336,page15)

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.