

BMJ Open Quality of working life of medical doctors and associated risk factors: a cross-sectional survey in public hospitals in China

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ABSTRACT

Objectives To assess the quality of working life (QWL) of medical doctors and associated risk factors.

Setting and participants A cross-sectional questionnaire survey of 2915 medical doctors from 48 hospitals was conducted in China.

Methods The QWL-7–32 scale was adopted to assess seven domains of QWL: physical health, mental health, job and career satisfaction, work passion and initiative, professional pride, professional competence, and balance between work and family.

Primary and secondary outcome measures Data were analysed using SPSS V.19.0. Analysis of variance tests and multivariate linear regression analyses were performed to identify the sociodemographic characteristics and job factors associated with overall QWL and its seven subdomain scores.

Results On average, the respondents reported an overall QWL score of 92.51 (SD=17.74) of a possible 160. Over 35% of respondents reported more than 60 hours of weekly working time; 59.9% experienced night sleep deprivation frequently; 16.6% encountered workplace violence frequently. The multivariate regression models revealed that the eastern region ($\beta \leq -2.887$ for non-eastern regions, $p < 0.001$), shorter working hours ($\beta \leq -2.638$ for over 40 hours a week, $p < 0.01$), less frequent night sleep deprivation ($\beta \leq -5.366$ for sometimes or frequent, $p < 0.001$), higher income ($\beta \geq 2.795$ for lower income, $p < 0.001$) and less frequent encounters of workplace violence ($\beta \leq -9.267$ for sometimes or frequent, $p < 0.001$) were significant predictors of higher QWL. Night sleep deprivation and workplace violence were common predictors ($p < 0.05$) for all seven domains of QWL.

Conclusion The low QWL of medical doctors working in public hospitals in China is evident, which is associated with high workloads, low rewards and workplace violence. There are also significant regional differences in the QWL of medical doctors, with the eastern developed region featuring better QWL. Public hospitals in China are facing serious challenges in occupational health and safety, which needs to be addressed through a systems approach.

INTRODUCTION

Over the past few decades, quality of working life (QWL) has attracted increasing attention in the healthcare industry.^{1 2} QWL is

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ A large number (n=2915) of medical doctors from 48 public hospitals in China participated in the survey.
- ⇒ The overall quality of working life (QWL) and its seven domains (physical health, mental health, job and career satisfaction, work passion and initiative, professional pride, professional competence, and balance between work and family) were measured using the validated tool QWL-7–32.
- ⇒ Data were collected through field visits and face-to-face interviews, with a high response rate.
- ⇒ The study adopted a cross-sectional design and no causal relationships should be assumed.
- ⇒ Data were subject to recall and self-reporting bias.

a term that has been used to describe the broad job-related experience of an individual. High levels of QWL are important for healthcare organisations to attract and motivate employees that lead to good work performance.^{3–5} Low QWL is not only detrimental to the physical and mental health of employees,⁶ it may also be linked to poor work performance.^{2 7} In the health industry, there have been increasing concerns about the link between low QWL and the poor quality of patient care.⁸

However, our understanding about the QWL of medical doctors is quite limited. Most existing QWL studies in the health industry have been conducted in western countries and seem to have a focus on nurses.^{5 9 10} This is likely to be associated with the high prevalence of private practice of medical doctors in the study countries and their overemphasis on professional autonomy in medicine.¹¹ In a publicly dominated system where medical doctors are hired as employees of hospitals, however, medical doctors are usually working under great pressure due to high compliance requirements from the professional body, the government, the organisation and the

public. Unlike their private counterparts, medical doctors employed by public hospitals have limited entitlement to flexible working time. They are also required to work on the frontline in response to public health emergencies such as the COVID-19 pandemic.^{12 13} This study addresses the gap in the literature by assessing the QWL of medical doctors working in the public hospital system in China. Few QWL studies, if any, have been conducted on medical doctors in developing countries.

The Chinese health system is hospital dominant, with most hospital beds being owned by public hospitals. The rapid economic development in China over the past few decades has been accompanied with a rapid expansion and modernisation of hospitals, employing 56.93% of medical doctors and delivering about 78.64% of inpatient care and 43.81% of outpatient and emergency visits in 2018.¹⁴ Unfortunately, due to the relatively weak primary care system, the workloads of medical doctors in public hospitals have remained high.¹⁵ In China, patients enjoy the freedom to bypass primary care in seeking hospital services.¹⁶ The daily average outpatient visits to a public hospital physician reached 7.5 in 2018.¹⁴ There is evidence that the high stress level has started to result in serious damages to the health and well-being of medical doctors in public hospitals.^{17 18} In recent years, ‘Karoshi’ (overwork death) of young hospital doctors has attracted extensive reporting in China.^{17 19} Even more concerning is the deteriorating patient–doctor relationship. Workplace violence against medical doctors has been widely reported,^{20 21} jeopardising the professional pride and job satisfaction of health workers,^{22 23} as well as the QWL of medical doctors.²⁴ This study aimed to assess the QWL of medical doctors in public hospitals in China and to identify the sociodemographic characteristics and job factors associated with QWL.

METHODS

A cross-sectional survey of medical doctors in public hospitals was conducted.

Participants and sampling

A multistage stratified sampling strategy was adopted to select study participants. Six provinces were purposely identified considering a balance of geographical location and economic development: Shandong and Hebei from the east (most developed), Hubei and Hunan from the central (less developed), Guizhou and Qinghai from the west (least developed). In each selected province, four tertiary hospitals in metropolitan areas and four county hospitals in rural areas were conveniently selected. In total, 48 hospitals participated in this study: 24 urban tertiary and 24 rural county hospitals. All of these were government-owned public hospitals. All medical doctors employed by the participating hospitals were eligible for this study.

Patient and public involvement

Data were collected from medical doctors in public hospitals in China. There was no direct patient involvement.

Measurements

The questionnaire, which contains two sections, was designed by the research team in the Chinese language. The first section collected the sociodemographic characteristics and work experience data of the study participants. The second section measured QWL.

Quality of working life

Complex interactions exist between working and personal lives.²⁵ Several scales have been developed to disentangle working life from personal life.^{25–28} They tend to measure working life from the perspectives of employee engagement, control at work, home–work interface, general well-being, job and career satisfaction, working conditions and stress at work. Arguably, QWL is a highly contextualised concept.²⁹ This study adopted the QWL-7–32 scale, a scale that was developed in reference to the existing scales but was adapted to the specific context of China.^{30 31} It defines quality of working life as ‘the physical and mental effects of occupation on workers and their feelings on occupation’. The QWL-7–32 contains 32 items measuring seven domains of QWL, namely physical health (eight items), mental health (five items), job and career satisfaction (eight items), work passion and initiative (four items), professional pride (three items), professional competence (two items), and balance between work and family (two items). Each item was rated on a 5-point Likert scale, with a higher score indicating higher QWL. A summed score was calculated for the entire QWL scale and its seven domains, respectively. The reliability of the scale was tested in 248 medical doctors conveniently selected from two urban tertiary hospitals and two county hospitals. The Cronbach’s alpha coefficients indicate acceptable internal consistency for the scale and its seven domains (table 1).

Sociodemographic characteristics and work experience

The selection of the variables measuring sociodemographic characteristics and work experience was guided by the existing literature. QWL is associated with both intrinsic and extrinsic factors.^{29 32 33} In this study, the sociodemographic characteristics of the study

Table 1 Cronbach’s alpha coefficients of the QWL-7–32 scale (n=248)

Domain	Number of items	Score range	Cronbach’s alpha
Physical health	8	8–40	0.869
Mental health	5	5–25	0.876
Job and career satisfaction	8	8–40	0.922
Work passion and initiative	4	4–20	0.670
Professional pride	3	3–15	0.780
Professional competence	2	2–10	0.800
Balance between work and family	2	2–10	0.746
Overall QWL	32	32–160	0.950

QWL, quality of working life.

participants (including gender, age and marital status) reflected the intrinsic factors associated with QWL. Work-related extrinsic factors measured in this study included salary, professional title, workload, night sleep deprivation and experience of violence against health workers. Empirical evidence shows that low income is associated with low employee satisfaction.³⁴ A high workload is usually blamed for driving the deterioration of QWL.^{2 31} Professional title is deemed as a proxy indicator of career success. Workplace violence against health workers has become a serious issue of concern in the hospital sector over the past few years in China,^{20 21} which has a profound impact on the QWL of health workers. We also considered regional variations and urban–rural differences in QWL, a common theme studied in health services research.³⁵

Data collection

Data were collected from January to November 2018. Trained investigators visited each participating hospital, inviting the medical doctors who were working at the time to self-complete a paper questionnaire. Participation in the survey was anonymous and voluntary. Respondents provided their implied informed consent prior to commencement of the survey. They were allowed to skip questions with which they felt uncomfortable.

A sample size of 2500 would enable us to detect an effect size of less than 0.01 for a multivariate linear regression analysis containing 20 predictors, with an alpha error being set at 0.05 and a statistical power being set at 0.80.³⁶ Considering that missing data commonly occur in questionnaire surveys, we collected at least 80 questionnaires in each urban tertiary hospital and 60 in each county hospital. A total of 3360 questionnaires were dispatched and 3170 (94.35%) were returned. This resulted in a final sample of 2915 (86.76%) containing no missing data for data analyses. The pilot sample was not included in the final data analysis.

Data analysis

Data were entered into EpiData V.3.0 and analysed using SPSS V.19.0. In all of the analyses, a two-sided *p* value of less than 0.05 was deemed statistically significant.

Frequency distributions in different categories of the sociodemographic characteristics and work experience of the study participants were described and compared between urban and rural and across regions using χ^2 tests.

Means and SDs of the QWL (including its seven domains) scores were calculated. Differences in the QWL scores among the study participants with different characteristics were tested through analysis of variance tests. Multivariate linear regression models were established with an Enter approach involving all of the independent variables with a statistical significance in the univariate analyses to identify the sociodemographic and work-related predictors of QWL after adjustment for variations in other variables.

RESULTS

Sociodemographic characteristics and work experience

The majority of respondents were male (53.2%) and aged between 30 and 45 years (61.0%). Most (76.7%) were married at the time of the survey. Only 17.9% had been awarded a senior professional title, while 46.9% had a junior title or below. About 48% of respondents had a monthly basic salary of less than ¥5000 (US\$785), compared with 40.9% earning ¥5000–¥8000 (US\$785–US\$1255) and 11.2% earning more than ¥8000 (US\$1255).

The vast majority (88.9%) of respondents reported working more than 40 hours a week. The weekly workload of 35.3% of respondents exceeded 60 hours. Night sleep deprivation was frequent in 59.9% of respondents. Over 68% of respondents reported sometimes while 16.6% reported frequent experience of workplace violence from patients and/or their family members (table 2).

There were significant regional and urban–rural differences in the sociodemographic characteristics and work experience of the study participants. The eastern participants were more likely to be female and married, while the central participants were more likely to report higher than 60-hour weekly workload and more frequent night sleep deprivation, and the western participants were more likely to be younger, had a junior professional title, earned a basic salary in the middle range (¥5000–¥8000) and reported experience of workplace violence more frequently. Compared with their urban counterparts, the rural participants were more likely to be married, held a lower professional title, reported workplace violence more frequently, and earned lower salary despite reporting a higher workload and more frequent night sleep deprivation (table 2).

Quality of working life

On average, the respondents reported a QWL score of 92.51 (SD=17.74) of a highest possible 160: 22.68±4.56 for physical health; 13.71±4.09 for mental health; 22.30±6.16 for job and career satisfaction; 13.10±2.74 for work passion and initiative; 9.24±2.32 for professional pride; 6.66±1.42 for professional competence; and 4.82±1.65 for balance between work and family, respectively (table 3).

Overall, the respondents from rural hospitals in the central region and those who were aged between 30 and 45 years and married, held a middle professional title, earned a lower income, worked longer hours, experienced more frequent night sleep deprivation and encountered more frequent workplace violence reported lower QWL than others (*p*<0.05): although urban–rural location was not associated with professional pride (*p*=0.090) and professional competence (*p*=0.345); marital status was not associated with work passion and initiative (*p*=0.388) and professional pride (*p*=0.473); professional title was not associated with job and career satisfaction (*p*=0.139) and work passion and initiative (*p*=0.661); and salary was not associated with work passion and initiative (*p*=0.878). The male respondents had lower job and career

Table 2 Sociodemographic and job-related characteristics of study participants

Characteristics	n (%)	Eastern (n=976)			Central (n=964)			Western (n=975)			P value	Total	P value
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total			
Gender**													
Male	1550 (53.2)	260 (48.8)	215 (48.5)	475 (48.7)	0.939	359 (57.6)	219 (64.2)	578 (60.0)	0.046	314 (52.0)	183 (49.3)	497 (51.0)	0.420
Female	1365 (46.8)	273 (51.2)	228 (51.5)	501 (51.3)		264 (42.4)	122 (35.8)	386 (40.0)		290 (48.0)	188 (50.7)	478 (49.0)	
Age (years)**													
<30	796 (27.3)	121 (22.7)	81 (18.3)	202 (20.7)	0.015	162 (26.0)	97 (28.4)	259 (26.9)	0.579	212 (35.1)	123 (33.2)	335 (34.4)	0.181
30–45	1778 (61.0)	357 (67.0)	291 (65.7)	648 (66.4)		385 (61.8)	199 (58.4)	584 (60.6)		342 (56.6)	204 (55.0)	546 (56.0)	
>45	341 (11.7)	55 (10.3)	71 (16.0)	126 (12.9)		76 (12.2)	45 (13.2)	121 (12.6)		50 (8.3)	44 (11.9)	94 (9.6)	
Marital status*													
Married	2237 (76.7)	410 (76.9)	368 (83.1)	778 (79.7)	0.017	462 (74.2)	271 (79.5)	733 (76.0)	0.065	431 (71.4)	295 (79.5)	726 (74.5)	0.005
Not married	678 (23.3)	123 (23.1)	75 (16.9)	198 (20.3)		161 (25.8)	70 (20.5)	231 (24.0)		173 (28.6)	76 (20.5)	249 (25.5)	
Professional title**													
Junior or below	1368 (46.9)	212 (39.8)	171 (38.6)	383 (39.2)	<0.001	285 (45.7)	167 (49.0)	452 (46.9)	0.310	315 (52.2)	218 (58.8)	533 (54.7)	<0.001
Middle	1024 (35.1)	202 (37.9)	212 (47.9)	414 (42.4)		205 (32.9)	115 (33.7)	320 (33.2)		173 (28.6)	117 (31.5)	290 (29.7)	
Senior	523 (17.9)	119 (22.3)	60 (13.5)	179 (18.3)		133 (21.3)	59 (17.3)	192 (19.9)		116 (19.2)	36 (9.7)	152 (15.6)	
Monthly basic salary** (¥)													
<5000	1395 (47.9)	214 (40.2)	293 (66.1)	507 (51.9)	<0.001	306 (49.1)	177 (51.9)	483 (50.1)	<0.001	247 (40.9)	158 (42.6)	405 (41.5)	0.261
5000–8000	1193 (40.9)	213 (40.0)	141 (31.8)	354 (36.3)		209 (33.5)	144 (42.2)	353 (36.6)		298 (49.3)	188 (50.7)	486 (49.8)	
>8000	327 (11.2)	106 (19.9)	9 (2.0)	115 (11.8)		108 (17.3)	20 (5.9)	128 (13.3)		59 (9.8)	25 (6.7)	84 (8.6)	
Weekly working hours**													
≤40	324 (11.1)	87 (16.3)	36 (8.1)	123 (12.6)	<0.001	68 (10.9)	10 (2.9)	78 (8.1)	<0.001	68 (11.3)	55 (14.8)	123 (12.6)	<0.001
41–60	1562 (53.6)	295 (55.3)	309 (69.8)	604 (61.9)		324 (52.0)	132 (38.7)	456 (47.3)		345 (57.1)	157 (42.3)	502 (51.5)	
>60	1029 (35.3)	151 (28.3)	98 (22.1)	249 (25.5)		231 (37.1)	199 (58.4)	430 (44.6)		191 (31.6)	159 (42.9)	350 (35.9)	
Night sleep deprivation*													
Never	212 (7.3)	46 (8.6)	32 (7.2)	78 (8.0)	0.008	55 (8.8)	18 (5.3)	73 (7.6)	<0.001	41 (6.8)	20 (5.4)	61 (6.3)	0.603
Sometimes	957 (32.8)	206 (38.6)	134 (30.2)	340 (34.8)		223 (35.8)	62 (18.2)	285 (29.6)		208 (34.4)	124 (33.4)	332 (34.1)	
Frequent	1746 (59.9)	281 (52.7)	277 (62.5)	558 (57.2)		345 (55.4)	261 (76.5)	606 (62.9)		355 (58.8)	227 (61.2)	582 (59.7)	
Workplace violence**													
Never	427 (14.6)	108 (20.3)	72 (16.3)	180 (18.4)	0.117	119 (19.1)	25 (7.3)	144 (14.9)	<0.001	70 (11.6)	33 (8.9)	103 (10.6)	<0.001
Sometimes	2003 (68.7)	368 (69.0)	309 (69.8)	677 (69.4)		421 (67.6)	237 (69.5)	658 (68.3)		432 (71.5)	236 (63.6)	668 (68.5)	
Frequent	485 (16.6)	57 (10.7)	62 (14.0)	119 (12.2)		83 (13.3)	79 (23.2)	162 (16.8)		102 (16.9)	102 (27.5)	204 (20.9)	

*P<0.05 and **p<0.001 for regional differences.

Table 3 Sociodemographic and job-related characteristics associated with quality of working life

Characteristics	n (%)	Quality of working life		Physical health		Mental health		Job and career satisfaction		Work passion and initiative		Professional pride		Professional competence		Balance between work and family	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Urban or rural		p<0.001		p<0.001		p=0.003		p=0.002		p=0.003		p=0.090		p=0.345		p<0.001	
Urban	1760 (60.4)	93.39	17.40	23.05	4.51	13.89	4.03	22.58	6.08	12.97	2.68	9.30	2.25	6.68	1.41	4.92	1.64
Rural	1155 (39.6)	91.16	18.16	22.13	4.58	13.43	4.17	21.86	6.26	13.28	2.81	9.15	2.41	6.63	1.45	4.67	1.67
Gender		p=0.058		p=0.998		p=0.073		p=0.005		p<0.001		p=0.339		p<0.001		p=0.251	
Male	1550 (53.2)	91.92	18.47	22.68	4.72	13.58	4.10	21.99	6.35	12.92	2.82	9.20	2.50	6.76	1.49	4.79	1.69
Female	1365 (46.8)	93.17	16.85	22.68	4.37	13.85	4.08	22.64	5.92	13.30	2.62	9.28	2.10	6.56	1.34	4.86	1.60
Age (years)		p<0.001		p<0.001		p<0.001		p=0.001		p=0.001		p<0.001		p<0.001		p<0.001	
<30	796 (27.3)	94.55	17.54	23.36	4.66	14.41	4.04	22.87	5.97	13.21	2.61	9.33	2.20	6.41	1.35	4.97	1.63
30–45	1778 (61.0)	91.16	17.59	22.37	4.42	13.40	4.03	21.94	6.16	12.97	2.76	9.11	2.31	6.67	1.40	4.70	1.65
>45	341 (11.7)	94.76	18.31	22.75	4.87	13.65	4.33	22.79	6.47	13.51	2.85	9.71	2.56	7.21	1.56	5.14	1.67
Marital status		p<0.001		p<0.001		p<0.001		p<0.001		p=0.388		p=0.473		p<0.001		p<0.001	
Married	2237 (76.7)	91.74	17.69	22.41	4.49	13.48	4.06	22.06	6.19	13.07	2.78	9.22	2.37	6.75	1.44	4.76	1.65
Not married	678 (23.3)	95.03	17.68	23.59	4.67	14.46	4.10	23.08	5.99	13.18	2.58	9.30	2.13	6.38	1.34	5.04	1.64
Professional title		p=0.027		p=0.006		p=0.001		p=0.139		p=0.661		p=0.016		p<0.001		p<0.001	
Junior or below	1368 (46.9)	92.96	17.42	22.90	4.61	14.00	4.08	22.50	6.00	13.09	2.59	9.19	2.22	6.42	1.34	4.86	1.64
Middle	1024 (35.1)	91.35	17.77	22.32	4.38	13.35	4.05	22.00	6.18	13.05	2.82	9.17	2.33	6.79	1.41	4.66	1.64
Senior	523 (17.9)	93.60	18.41	22.82	4.74	13.63	4.16	22.35	6.52	13.19	2.93	9.50	2.53	7.05	1.52	5.06	1.67
Monthly basic salary (¥)		p<0.001		p<0.001		p<0.001		p<0.001		p=0.878		p<0.001		p<0.001		p<0.001	
<5000	1395 (47.9)	91.22	18.32	22.37	4.77	13.59	4.25	21.86	6.23	13.07	2.76	9.07	2.34	6.52	1.44	4.74	1.68
5000–8000	1193 (40.9)	92.56	17.19	22.63	4.35	13.60	3.94	22.34	6.15	13.12	2.75	9.30	2.30	6.78	1.39	4.78	1.61
>8000	327 (11.2)	97.82	16.14	24.20	4.06	14.61	3.84	23.99	5.57	13.11	2.58	9.73	2.21	6.84	1.41	5.33	1.61
Region		p<0.001		p<0.001		p<0.001		p<0.001		p<0.001		p<0.001		p<0.001		p<0.001	
Eastern	976 (33.5)	96.21	17.43	23.32	4.40	14.24	4.04	23.52	6.05	13.47	2.82	9.78	2.20	6.83	1.43	5.05	1.60
Central	964 (33.1)	91.47	17.76	22.76	4.57	13.64	4.09	21.68	6.31	13.01	2.65	9.00	2.32	6.66	1.41	4.72	1.64
Western	975 (33.4)	89.82	17.42	21.98	4.60	13.24	4.09	21.68	5.94	12.80	2.69	8.94	2.34	6.50	1.40	4.69	1.69
Weekly working hours		p<0.001		p<0.001		p<0.001		p<0.001		p<0.001		p<0.001		p=0.010		p<0.001	
≤40	324 (11.1)	101.65	16.88	25.06	4.36	15.44	3.90	25.08	5.56	13.60	2.55	9.75	2.34	6.82	1.39	5.90	1.36
41–60	1562 (53.6)	94.81	16.73	23.28	4.21	14.16	3.91	22.95	6.03	13.30	2.68	9.39	2.24	6.70	1.37	5.04	1.56
>60	1029 (35.3)	86.13	17.39	21.03	4.58	12.47	4.09	20.42	6.01	12.63	2.82	8.86	2.38	6.57	1.50	4.16	1.61
Night sleep deprivation		p<0.001		p<0.001		p<0.001		p<0.001		p<0.001		p<0.001		p=0.001		p<0.001	
Never	212 (7.3)	107.63	18.27	26.49	4.80	16.45	4.32	26.67	6.20	14.49	2.79	10.35	2.42	7.07	1.53	6.11	1.62
Sometimes	957 (32.8)	98.65	15.34	24.38	3.77	15.00	3.68	24.14	5.57	13.42	2.54	9.55	2.14	6.71	1.34	5.45	1.45
Frequent	1746 (59.9)	87.30	16.75	21.29	4.34	12.66	3.92	20.75	5.93	12.75	2.76	8.94	2.34	6.59	1.44	4.32	1.55

Continued

Table 3 Continued

Characteristics	n (%)	Quality of working life		Physical health		Mental health		Job and career satisfaction		Work passion and initiative		Professional pride		Professional competence		Balance between work and family	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Workplace violence		p<0.001		p<0.001		p<0.001		p<0.001		p<0.001		p<0.001		p<0.001		p<0.001	
Never	427 (14.6)	105.76	17.46	25.79	4.39	16.27	4.11	26.45	5.97	14.22	2.73	10.21	2.30	6.94	1.50	5.88	1.56
Sometimes	2003 (68.7)	92.74	15.55	22.77	4.06	13.75	3.73	22.31	5.67	13.16	2.57	9.28	2.17	6.67	1.34	4.80	1.53
Frequent	485 (16.6)	79.88	17.64	19.60	4.66	11.26	4.08	18.59	5.91	11.83	2.92	8.23	2.53	6.39	1.61	3.98	1.70
Total	2915 (100)	92.51	17.74	22.68	4.56	13.71	4.09	22.30	6.16	13.10	2.74	9.24	2.32	6.66	1.42	4.82	1.65

satisfaction ($p=0.005$) and work passion and initiative ($p<0.001$), despite reporting higher professional competence ($p<0.001$) than their female counterparts (table 3).

The multivariate regression models confirmed that eastern region, less frequent night sleep deprivation and less frequent encounters of workplace violence were significant predictors of higher QWL across all of the seven domains after adjustment for variations of other variables. Urban location remained a significant predictor of lower work passion and initiative. Male gender was a significant predictor of higher physical health and professional competence, but lower work passion and initiative. A younger age was associated with higher physical health and mental health, and higher professional pride, but lower professional competence. Those who were married had lower physical health but higher professional competency than those who were unmarried. A junior professional title was associated with higher job and career satisfaction, but lower professional competence. Lower income was associated with lower QWL, but the effects were not statistically significant for work passion and initiative, and professional competence. Less working hours was associated with higher QWL, but the effects were not statistically significant for work passion and initiative, professional pride and professional competence (table 4).

DISCUSSION

The study participants reported an overall QWL score of 92.51 ($SD=17.74$) of a highest possible 160. This level of QWL is low in comparison with the findings of studies conducted in some non-health industries such as primary and secondary schoolteachers³⁷ and oil-drilling workers.^{31 38} Although medical practice requires high levels of work commitment, it is usually considered a respectful and highly rewarding job.¹¹ However, medical practice also involves high levels of patient safety risk, especially in under-resourced facilities.³⁹ Patients often hold very high expectations due to the high expense of medical services. The respectful doctor–patient relationship can be jeopardised when things do not go as well as anticipated.⁴⁰

We found that long working hours, frequent night sleep deprivation, frequent encounters of medical violence and low salary are major predictors of low QWL. The respondents from the eastern region also reported higher QWL than their central and western counterparts. These results are consistent with the findings of previous studies.^{41–49} Our study showed that exceedingly long working hours were particularly detrimental to the physical health, mental health, job satisfaction and work–life balance of the study participants. Indeed, long working hours are not uncommon in medical services given the global shortage of a medical workforce, which has been shown to impair the health of medical workers,^{41–43} leading to depressive symptoms,⁴⁴ low job satisfaction⁴⁵ and the increased risk of job stress.⁴⁶ In addition to long working hours, empirical

Table 4 Results (beta coefficients) of multivariate linear regression models on quality of working life

Predictor	Standardised beta coefficients							
	Quality of working life	Physical health	Mental health	Job and career satisfaction	Work passion and initiative	Professional pride	Professional competence	Balance between work and family
Urban or rural								
Urban (ref)								
Rural	0.471 (-0.702 to 1.644)	-0.123 (-0.426 to 0.180)	0.120 (-0.165 to 0.405)	0.070 (-0.356 to 0.496)	0.462*** (0.260 to 0.665)	-0.014 (-0.185 to 0.157)	-0.043 (-0.151 to 0.064)	0.001 (-0.112 to 0.112)
Gender								
Male (ref)								
Female	0.126 (-0.994 to 1.246)	-0.294* (-0.582 to -0.005)	0.024 (-0.248 to 0.296)	0.291 (-0.116 to 0.697)	0.296** (0.103 to 0.489)	0.014 (-0.149 to 0.178)	-0.174** (-0.276 to -0.072)	-0.032 (-0.139 to 0.075)
Age (years)								
<30 (ref)								
30-45	-1.012 (-2.809 to 0.785)	-0.220 (-0.684 to 0.244)	-0.366 (-0.803 to 0.070)	-0.080 (-0.732 to 0.573)	-0.071 (-0.381 to 0.239)	-0.286* (-0.548 to -0.024)	-0.028 (-0.192 to 0.136)	0.039 (-0.133 to 0.210)
>45	-0.404 (-3.118 to 2.311)	-0.757* (-1.457 to -0.056)	-0.671* (-1.331 to -0.012)	0.191 (-0.795 to 1.176)	0.326 (-0.143 to 0.794)	0.095 (-0.301 to 0.491)	0.329** (0.081 to 0.577)	0.084 (-0.175 to 0.343)
Marital status								
Married (ref)								
Not married	1.040 (-0.664 to 2.745)	0.578* (0.138 to 1.018)	0.282 (-0.132 to 0.696)	0.381 (-0.238 to 0.999)	-0.064 (-0.359 to 0.230)	-0.088 (-0.337 to 0.160)	-0.206** (-0.361 to -0.050)	0.158 (-0.005 to 0.321)
Professional title								
Junior or below (ref)								
Middle	-1.240 (-2.758 to 0.278)	-0.362 (-0.753 to 0.030)	-0.391* (-0.760 to -0.022)	-0.534 (-1.085 to 0.017)	-0.028 (-0.290 to 0.234)	-0.053 (-0.274 to 0.169)	0.269*** (0.131 to 0.408)	-0.142 (-0.287 to 0.003)
Senior	-1.288 (-3.403 to 0.828)	-0.333 (-0.879 to 0.213)	-0.402 (-0.916 to 0.113)	-0.961* (-1.729 to -0.193)	0.006 (-0.359 to 0.371)	-0.001 (-0.309 to 0.308)	0.366*** (0.173 to 0.559)	0.037 (-0.165 to 0.239)
Monthly basic salary (¥)								
<5000 (ref)								
8000-12000	2.795*** (1.482 to 4.107)	0.736*** (0.397 to 1.075)	0.459** (0.139 to 0.778)	0.989*** (0.512 to 1.465)	0.108 (-0.118 to 0.335)	0.333** (0.141 to 0.524)	0.081 (-0.038 to 0.201)	0.089 (-0.037 to 0.214)
>8000	4.372*** (2.283 to 6.461)	1.361*** (0.822 to 1.900)	0.842** (0.334 to 1.350)	1.715*** (0.957 to 2.473)	-0.163 (-0.523 to 0.198)	0.462** (0.157 to 0.766)	-0.094 (-0.284 to 0.097)	0.248* (0.049 to 0.448)
Region								
Eastern (ref)								
Central	-2.887*** (-4.270 to -1.503)	-0.149 (-0.506 to 0.208)	-0.249 (-0.585 to 0.088)	-1.285*** (-1.788 to -0.783)	-0.222 (-0.460 to 0.017)	-0.702*** (-0.904 to -0.500)	-0.142* (-0.269 to -0.016)	-0.137* (-0.269 to -0.005)

Continued

Table 4 Continued

Standardised beta coefficients								
Predictor	Quality of working life	Physical health	Mental health	Job and career satisfaction	Work passion and initiative	Professional pride	Professional competence	Balance between work and family
Western	-4.710*** (-6.110 to -3.309)	-1.007*** (-1.369 to -0.646)	-0.730*** (-1.070 to -0.389)	-1.350*** (-1.859 to -0.842)	-0.426** (-0.667 to -0.184)	-0.743*** (-0.948 to -0.539)	-0.245*** (-0.372 to -0.117)	-0.209** (-0.342 to -0.075)
Weekly working hours								
≤40 (ref)								
41-60	-2.638** (-4.507 to -0.770)	-0.748** (-1.230 to -0.266)	-0.516* (-0.971 to -0.062)	-0.841* (-1.519 to -0.162)	0.028 (-0.294 to 0.351)	-0.046 (-0.318 to 0.226)	-0.006 (-0.176 to 0.165)	-0.510*** (-0.688 to -0.332)
>60	-6.478*** (-8.551 to -4.406)	-1.893*** (-2.428 to -1.358)	-1.332*** (-1.836 to -0.828)	-1.849*** (-2.602 to -1.097)	-0.241 (-0.598 to 0.117)	-0.147 (-0.449 to 0.155)	-0.006 (-0.195 to 0.183)	-1.011*** (-1.209 to -0.813)
Night sleep deprivation								
Never (ref)								
Sometimes	-5.366*** (-7.678 to -3.053)	-1.246*** (-1.842 to -0.649)	-0.713* (-1.275 to -0.151)	-1.425** (-2.265 to -0.586)	-0.763*** (-1.162 to -0.364)	-0.570** (-0.907 to -0.233)	-0.343** (-0.554 to -0.132)	-0.306** (-0.527 to -0.085)
Frequent	-12.616*** (-14.956 to -10.276)	-3.319*** (-3.923 to -2.716)	-2.281*** (-2.850 to -1.712)	-3.579*** (-4.429 to -2.730)	-1.130*** (-1.534 to -0.727)	-0.873*** (-1.215 to -0.532)	-0.382*** (-0.596 to -0.169)	-1.050*** (-1.273 to -0.827)
Workplace violence								
Never (ref)								
Sometimes	-9.267*** (-10.907 to -7.627)	-1.908*** (-2.332 to -1.485)	-1.720*** (-2.119 to -1.321)	-3.063*** (-3.659 to -2.468)	-0.880*** (-1.163 to -0.597)	-0.705*** (-0.944 to -0.465)	-0.275*** (-0.425 to -0.125)	-0.716*** (-0.873 to -0.560)
Frequent	-18.975*** (-21.075 to -16.874)	-4.180*** (-4.722 to -3.638)	-3.582*** (-4.092 to -3.071)	-5.828*** (-6.591 to -5.066)	-2.070*** (-2.433 to -1.708)	-1.544*** (-1.851 to -1.238)	-0.535*** (-0.727 to -0.344)	-1.235*** (-1.436 to -1.034)

*P<0.05; **p<0.01; ***p<0.001.

evidence also shows that night sleep deprivation can cause sleep disturbances and fatigue, and increase the risk of serious illness⁴⁷ including depression.⁴⁸ Frequent night sleep deprivation can even negatively influence the performance of medical doctors as indicated in this study and others.⁴⁹ Unfortunately, insufficient sleep is one of the most frequently reported concerns of medical doctors in China.⁵⁰ The problems resulting from high workloads and disruptions to daily routine can be further exacerbated by low financial rewards. Compared with medical practitioners in many other countries, doctors in China earn a much lower level of income.

Unsurprisingly, frequent encounters of workplace violence emerged as a significant predictor of low QWL of medical doctors across all of the seven domains in this study. Over the past few years, China has witnessed increasing reports of incidence of violence against health workers, raising serious questions about the patient–provider relationship.^{51–54} The deteriorating practice environment has led to the increased intention of health workers to leave the industry.⁵⁵ In this study, 16.6% of respondents reported frequent encounters with medical violence, compared with 68.7% reporting sometimes and 14.6% never. In China, most county hospitals are classified as secondary hospitals. They have suffered the most in patient–provider conflicts compared with their tertiary and primary care counterparts.^{53–56} However, rural medical workers seem to have maintained a relatively higher work passion and initiative than their urban counterparts according to the findings of our study. It is likely that both health workers and patients may hold a relatively lower expectation of the medical services delivered in rural settings than those delivered in urban settings.⁵⁷ In recent years, the urban–rural disparities in medical resources⁵⁸ and healthcare services⁵⁹ in China have started to narrow.

The regional differences of QWL revealed in this study are perhaps a reflection of the widespread issue of regional disparity in China. The relatively more developed eastern region has more financial resources and invests more in health than the less developed central and western regions.^{60–62} As a result, medical doctors in the eastern region experience a better working environment, thus reporting higher QWL.

China is facing serious challenges in maintaining a healthy and sustainable health workforce. Healthcare demands have increased dramatically with the rapid economic growth and ageing population over the past few decades.^{63–65} This has imposed a great burden on the healthcare delivery system, further exacerbating the challenge of the health workforce shortage. The long working hours (35.3% reporting >60 hours per week), coupled with frequent night sleep deprivation (60%) and low salary (less than 12% earning >US\$1255 per month), present a significant risk for occupational health and safety as indicated by the findings of this study. Low QWL not only affects the health and well-being of medical workers,⁶⁶ it can also affect their competency and work

performance.⁵ This can become a serious risk of patient safety and quality of care.⁶⁷

It is unlikely that the aforementioned occupational health and safety risks can be addressed without taking a systems approach. China has recently launched a series of health system reforms, aiming at improving health-care accessibility and affordability by containing hospital costs and encouraging patients to seek medical care in primary care.^{16–68} The central government has increased its investment in rural health development, in particular in the least developed western region. Strengthening law enforcement was also proposed to deal with workplace violence. These measures, though necessary, may not be enough to address the low QWL issue experienced by medical doctors. Although the cost containment measures may be welcomed by patients, they may hinder the potential salary growth of health workers. Increasing policy attention needs to be paid to sustainable workload, proper financial and professional rewards, and the work–life balance of medical workers. While growing the health workforce is fundamental for a long-term solution, urgent efforts should be made to foster a safe working environment where health workers and patients can work in partnership.

Strengths and limitations

The sample size of this study is large. Data were collected through field visits, which ensured a high response rate. However, such an approach cannot catch those who were not working at the time of the survey. The data were also subject to recall and self-reporting bias. The study adopted a cross-sectional design and no causal relationships should be assumed.

CONCLUSION

The low QWL of medical doctors working in public hospitals in China is evident, which is associated with long working hours, frequent night sleep deprivations, frequent encounters of workplace violence and low salary. There are also significant regional differences in the QWL of medical doctors, with the eastern developed region featuring better QWL. Adequate resource support and a safe working environment are critical for ensuring a sustainable healthy medical workforce, which requires a systems approach.

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Ethics approval This study involves human participants and ethics approval was granted by the Research Ethics Committee of Tongji Medical College, Huazhong University of Science and Technology (no: IORG0003571). Participants gave informed consent to participate in the study before taking part.

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