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Health system reforms, violence against doctors and job satisfaction in the medical profession: a cross-sectional survey in Zhejiang Province, Eastern China

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Abstract

Objective: To explore the factors influencing doctors' job satisfaction and morale in China, in the context of the ongoing health system reforms and the deteriorating doctor-patient relationship

Design: Cross-sectional survey using self-completion questionnaires.

Study setting: The survey was conducted from March to May 2012 among doctors at provincial, county and primary care levels, in Zhejiang Province, China.

Results: The questionnaire was completed by 202 doctors. Factors which contributed most to low job satisfaction were low income and long working hours. Provincial level doctors were most dissatisfied while primary care doctors were the least dissatisfied. Three percent of doctors at high-level hospitals and 27% of those in primary care were satisfied with the salary. Only 7% at high-level hospitals were satisfied with work hours, compared to 43% in primary care. Less than 10% at high levels were satisfied with amount of paid vacation time (3%) and paid sick leave (5%), compared with 38% and 41% respectively in primary care.

Overall, 87% reported that patients were more likely to sue and that patient violence against doctors was increasing. Only 4.5% wanted their children to be doctors. Of those 125 who provided a reason, 34% said poor pay, 17% said it was a high-risk profession, and 9% expressed concerns about personal insecurity or patient violence.

Conclusions: Doctors have low job satisfaction overall. Recruitment and retention of doctors have become major challenges for the Chinese health system. Measures must be taken to address this in order to prevent a serious human resource crisis in the

profession. These measures must include reduction of doctors' workload especially at provincial hospitals, increase in doctors' salary and more effective measures tackling patient violence against doctors.

Strengths and limitations of this study

- Our study is one of the first studies investigating doctors' job satisfaction in China since the instigation of the health reforms in 2009.
- We compared doctors' job satisfaction across three levels of health facility and explored associated systemic factors.
- Our study documented for the first time that the increasing patient violence is a major contributor to doctors' low morale
- The generalizability of the study is constrained by the limited number of participating health facilities and the small sample size.

INTRODUCTION

The Chinese medical profession is facing a human resource crisis. Evidence from a number of sources illustrates low levels of morale in the profession. In a study of 933 doctors in 29 public hospitals in Shandong province, 49% said they intended to leave the profession.[1] Other studies have shown that only 24% of doctors would choose the profession if they had a second chance[2]and78% would not want their own children to be doctors.[3] At Shanghai Jiao Tong University, which is among the top five in the country, 10% of the second year medical students transferred to other majors in 2013.[4] These worrying manifestations of discontent come at a time when more doctors are needed, given the pressures of an ageing population[5] and a growing non-communicable diseases burden.[6] Recruitment and retention of doctors have become major challenges for the health system in China.[7]

There is evidence that this situation is worsening[8], so urgent measures are needed to reverse this trend. Clearly, such measures need to include addressing the underlying causes of this discontent. The aim of this study was to explore these underlying causes through surveying the views of doctors working at three levels of the health system: tertiary, secondary and primary care. Primary level facilities are supposed to provide preventive and basic medical services, while secondary and tertiary hospitals provide specialized care. The study was conducted in 2012, three years after the inception of major health system reforms, aiming to provide universal healthcare by 2020 with a focus on strengthening primary care. The reforms have also had impacts on doctors' working conditions: changes to health insurance have made healthcare more affordable at all levels, resulting in increased workload for doctors, especially at

secondary and tertiary level hospitals, even for minor illness. The introduction of an essential drug list for primary care, which aims to reduce perverse incentives for overprescribing to forbid profit on drugs, has reduced doctors' autonomy and reduced their income.[9] This loss of income from the mark-up in primary care has been replaced with a fixed salary and in some places a performance-based bonus, which in most cases is lower than previous earnings.[10]

Another important contributor to morale is a recent deterioration in the doctor-patient relationship.[11] The most extreme manifestation of this is a rise in levels of violence against health workers, along with damage and disturbance to health facilities. In China, this phenomenon is known as Yi Nao, which translates as (medical or hospital disturbance). This is usually caused by patients or their relatives as a reaction to what may be perceived, rightly or wrongly, as failures or mistakes by hospital staff. Sometimes the situation escalates with aggrieved patients and relatives hiring criminal gangs, prepared to go to extreme lengths, to threaten the hospital to provide compensation.[12] Yi Nao events are not rare. The Ministry of Health reported that the number of "major disturbances" involving physical violence nearly doubled from 9,831 in 2006 to 17,243 in 2010.[13] In a 2006 study of 270 hospitals, over 70% reported that they had experienced Yi Nao incidents.[14] A study of 12 hospitals in 2009 revealed that, of 2,464 medical professionals, 50% experienced workplace violence over the last 12 months, with 20% encountering physical abuse at least once.[15] A 2012 survey conducted by the Chinese Hospital Association in 316 public hospitals in 30 provinces revealed that the proportion of hospitals, which reported incidents of physical violence causing harm, had increased from 48% in 2008 to 64% in 2012. Of these, 8% of hospitals reported six or more incidents of physical violence every

year.[16] Violence against health personnel is not unique to China. It has been reported from many other countries, including countries as diverse as the UK, US, Italy, Saudi Arabia, Pakistan and Japan.[17-25] And many other countries are facing challenges with the recruitment and retention of doctors.[26] Therefore, lessons from the Chinese experience are relevant for other countries.

The overall objectives of this study were: 1) to explore the factors influencing doctors' job satisfaction and morale, with a special focus on the impacts of health system reforms and the deteriorating doctor-patient relationship, and 2) to compare doctors working at the three levels in the Chinese health system.

METHODS

Sampling and data collection

This study was conducted from March to May 2012 in health facilities in Zhejiang province, Eastern China. Zhejiang has a population of 55million and is ranked fourth in terms of GDP per capita among China's 33 provinces.

A multi-stage stratified purposive sampling method was adopted (Table 1). We first selected four cities or counties which represented high (Hangzhou and Yiwu), middle (Anji) and low-level (Xianju) economic development in Zhejiang province. In the second stage 10 health facilities were purposively sampled in the four cities/counties to represent a range of health facilities: in urban areas a multi-specialism provincial hospital (tertiary level) in Hangzhou, the main county hospitals (secondary level) in Anji and Xianju respectively, and two community health centres/township health centres (providers of primary care in urban and rural areas) in each city/county were

invited to participate (one in Xianju county refused). In total, four community health centres (CHCs) in urban cities and three township health centres (THCs) in rural counties were selected based on their general representativeness in the city/county.

Table 1 Sampling strategy and achieved sample size by area

Cities	Income level	Participating hospitals	Sample size	Total sample size
Hangzhou	High-income	1 provincial hospital	48	60
		2 CHCs[a]	12	
Yiwu	High-income	2 CHCs	54	54
Anji	Middle-income	1 county hospital	24	41
		2 THCs[b]	17	
Xianju	Low-income	1 county hospital	19	47
		1 THC	28	
Total		10		202

[a]CHCs: Community Health Centres

[b]THCs: Township Health Centres

At provincial level hospitals and county hospitals participants were internal medical doctors and surgeons, who were present in inpatient wards at the time of the survey. At CHCs and THCs, primary care physicians present in clinics at the time of the survey were recruited.

Prospective participants were told that the questionnaire was about job satisfaction, that completion was voluntary, and that respondent anonymity and confidentiality would be strictly protected. Ethical approval was obtained from University College London. Local approvals were obtained from Zhejiang Health Bureau and local health authorities.

Measurement methods

We developed the questionnaire based partly on existing questionnaires[27-30] with some items added and modified to specifically reflect the Chinese setting. Most questions used a five-point Likert scale ranging from 1 (not satisfied at all or strongly disagree) to 5 (extremely satisfied or strongly agree). The questionnaire included items about job satisfaction in general, perceptions about patients' health seeking behaviours and experience of patient aggression. Reverse scoring was used for questions phrased in the negative. The questionnaire was piloted, and modifications were made according to feedback.

Statistical analysis

The data were analysed using IBM SPSS version 21.Comparisons between three levels of facility were conducted using Chi-square tests. We generated an overall job satisfaction score by computing the mean of 19 satisfaction items. The satisfaction score ranges from 1 (the lowest satisfaction) to 5 (the highest satisfaction). A higher score means higher satisfaction level. Analysis of Covariance (ANCOVA) was performed to compare satisfaction scores by level of response of associated factors controlling for gender, age and education.

RESULTS

Sample characteristics

Characteristics of the study sample are shown in Table 2. Two hundred and two doctors completed questionnaires with a response rate of 81%. Forty-eight were from the provincial hospital, 43 from county hospitals, and 111 from primary care facilities. The mean age was 35.2 (SD=7.6), and 105 doctors were male, with 85 female. Only

29% of primary care doctors had an undergraduate degree compared with 93% and 96% at county and provincial level respectively.

Table 2 Characteristics of the sample and basic working conditions by level of hospital n (%)

	Total	Level of hospital			p value
		CHCs	County	Provincial	
	N=202	N=111	N=43	N=48	(χ^2 tests)
Age (mean and SD)	35.2(7.6)	36.1(8.6)	34.2(7.4)	34.0(4.1)	0.196
Gender					0.001
Male	105(52.0)	45(40.5)	33(76.7)	27(56.3)	
Female	85(42.1)	59(53.2)	10(23.3)	16(33.3)	
Missing	12(5.9)	7(6.3)	0	5(10.4)	
Education level					0.000
Post-secondary level or less	78(38.6)	75(67.6)	3(7.0)	0(0)	
Undergraduate or higher	118(58.4)	32(28.8)	40(93.0)	46(95.8)	
Missing	6(3.0)	4(3.6)	0	2(4.2)	
Position rank					0.001
Low	81(40.1)	51(45.9)	21(48.8)	9(18.8)	
Middle	81(40.1)	36(32.4)	16(37.2)	29(60.4)	
High	18(8.9)	4(3.6)	6(14.0)	8(16.7)	
Missing	22(10.9)	20(18.0)	0	2(4.2)	
Work hours/week					0.000
< 40	16(8.2)	15(13.5)	0	1(2.1)	
40 to 50	60(30.6)	42(37.8)	13(30.2)	5(10.4)	
50 to 60	48(24.5)	27(24.3)	10(23.3)	11(22.9)	
≥ 60	72(36.7)	23(20.7)	20(46.5)	29(60.4)	
Missing	6(3.0)	4(3.6)	0	2(4.2)	
Outpatient visits per doctor per day					0.000
< 50	67(33.2)	45(40.5)	17(39.5)	5(10.4)	
50 to 100	58(28.7)	34(30.6)	13(30.2)	11(22.9)	
≥100	27(13.4)	3(2.7)	2(4.7)	22(45.8)	
Not applicable	40(20.8)	24(21.6)	9(20.9)	7(14.6)	
Missing	10(5.0)	5(4.5)	2(4.7)	3(6.3)	
Average visit time/patient (minutes)					0.001
≤ 4	32(15.8)	8(7.2)	6(14.0)	18(37.5)	
5-9	83(41.1)	46(41.4)	21(48.8)	16(33.3)	
10-14	31(15.3)	18(16.2)	8(18.6)	5(10.4)	

15-20	10(5.0)	7(6.3)	1(2.3)	2(4.2)	
≥20	5(2.5)	4(3.6)	1(2.3)	0(0)	
Not applicable	33(16.3)	24(21.6)	4 (9.3)	5(10.4)	
Missing	8(4.0)	4(3.6)	2(4.7)	2(4.2)	
Overtime hours per week					0.000
< 10	103(51.0)	69(62.2)	23(53.5)	11(22.9)	
10 to 30	74(36.6)	35(31.5)	15(34.9)	24(50.0)	
≥ 30	17(8.4)	2(1.8)	4(9.3)	11(22.9)	
Missing	8(4.0)	5(4.5)	1(2.3)	2(4.2)	
On-call duties					0.000
Yes	131(64.9)	53(47.7)	35(81.4)	43(89.6)	
No	61(30.2)	52(46.8)	7(16.3)	2(4.2)	
Missing	10(5.0)	6(5.4)	1(2.3)	3(6.2)	
Monthly salary					0.000
< 1,000 RMB	20(10.2)	2(1.8)	16(37.2)	2(4.2)	
1,000 – 3,000 RMB	146(74.1)	84(75.7)	27(62.8)	35(72.9)	
3,000 – 5,000 RMB	29(14.7)	21(18.9)	0	8(16.7)	
≥ 5,000 RMB	2(1.0)	1(0.9)	0	1(2.1)	
Missing	5(2.5)	3(2.7)	0	2(4.2)	
Total bonus last year (RMB)					0.000
< 10,000	34(17.4)	27(24.3)	4(9.3)	3(6.2)	
10,000 – 30,000	106(54.4)	57(51.4)	35(81.4)	14(29.1)	
30,000 – 50,000	43(22.1)	16(14.4)	4(9.3)	23(47.9)	
50,000 – 100,000	9(4.6)	7(6.3)	0	2(4.2)	
100,000 or higher	3(1.5)	0	0	3(6.3)	
Missing	7(3.5)	4(3.6)	0	3(6.3)	
The need to do research					0.000
Yes	88(44.9)	30(27.0)	18(41.9)	40(83.3)	
No	108(55.1)	77(69.3)	25(58.2)	6(6.3)	
Missing	6(3.0)	4(3.6)	0	2(4.2)	

Workload and pay (Table 2)

Workload varied considerably with level of hospital. Provincial hospital doctors worked the longest hours, 60% routinely worked more than 60 hours per week with 23% working more than 30 hours per week in overtime (additional work hours and on a "forced voluntary" basis largely due to heavy workload). For county level doctors these figures were 47% and 9%, and primary level doctors reported 21% and 2%.

Sixty-nine percent of provincial hospital doctors saw over 50 patients in clinic per day with 46% seeing over 100 patients a day. Thirty-five per cent of doctors at secondary level facilities saw over 50 outpatients per day and 33% at the primary level. Not surprisingly, consultation times were reported to be very short. Nearly 38% of provincial hospital doctors spent 4 minutes or less on average for each outpatient. These compared to 14% in county hospitals, and 7% in primary care. Ninety per cent of doctors at the provincial hospital reported that they did on-call duties (which usually involved being available on site overnight to deal with referrals and problems), followed by the county level (81%) and primary level (48%). Eighty-seven percent of provincial hospital doctors were required to do research in order to be eligible for promotion. This compared to 42% and 28% in county level and primary care respectively.

Remuneration consists of two parts: a basic salary and a bonus. For most doctors (74%) their monthly salary was between1, 000 and 3,000 RMB (1 USD = 6.16RMB in 2012), with only 1% paid more than 5,000 RMB per month and 29% paid between 3,000 and 5,000 RMB. Interestingly, 37% of county hospital doctors were paid less than 1,000 RMB monthly and none of them earned over 3,000 RMB. But 19% and 17%respectively in primary care and tertiary hospitals were paid between 3,000 RMB and 5,000 RMB. Up to 94% of junior doctors were paid 3,000 RMB or less, compared to 77% middle ranked doctors and 65% of senior doctors. Annual bonuses, varied mainly by the level of the hospital, 79% in primary care, 91% in secondary hospitals and 38% in the tertiary hospital reported 30,000 RMB or less. Half (51%) in the tertiary hospital received a bonus between 30,000 and 50,000, while only 15% and 9% respectively in primary and secondary hospitals earned this amount. Overall only

12 doctors (6%) reported 50,000 RMB or more; seven of these were primary care doctors, five tertiary care doctors with none being county hospital doctors. Of those who did overtime, more than 80% were not paid for it.

Job satisfaction

Doctors' satisfaction with various aspects of work and conditions is shown in Table 3. Most striking are the differences between primary care practitioners and doctors in higher-level hospitals (county and provincial hospitals). Very low proportions of high-level hospital doctors were satisfied with their working conditions: only 7% at high-level hospitals were satisfied with work hours, compared to 43% in primary care. Percentages for satisfaction with basic salary were 3% and 27% respectively for higher level and primary care. Similar variations in bonuses were reported (6% at higher level versus 20% in primary care). Less than 10% at high levels were satisfied with the amount of paid vacation time (3%), amount of paid sick leave (5%) and opportunities for promotion (9%), with 38%, 41% and 25% respectively in primary care. Interestingly, primary care doctors were most likely to feel they had high social recognition (58%), compared with 29% at the provincial hospital and 23% at the county hospitals. Work relationships showed high levels of satisfaction across all health facilities. Levels of satisfaction with utilization of expertise, opportunity to update expertise and support for training showed only small differences by level.

Table 3 Doctors' job satisfaction by level of hospital (% of completely satisfied or satisfied)

Items	Satisfied No (%)	95% CIs of percentages	Satisfied (%) By level of hospital			p value (χ^2 tests)
			CHCs (N=111)	County (N=43)	Provincial (N=48)	
Work schedule and job reward						
Hours of work	52(25.7)	20.2 - 32.2	46(42.6)	2(4.7)	4(8.30)	0.000
Flexibility in scheduling	47(23.3)	18.0 - 29.6	38(35.5)	5(11.6)	4(8.30)	0.000
Geographical location of work	118(58.4)	51.5 - 65.0	68(63.0)	24(57.1)	26(54.2)	0.439
Basic salary	32(15.8)	11.5 - 21.5	29(27.4)	0(0.0)	3(6.3)	0.000
Bonus	26(12.9)	8.9 - 18.2	21(20.0)	3(7.0)	2(4.2)	0.000
Benefits (insurances, travelling etc.)	41(20.3)	15.3 - 26.4	32(30.2)	6(14.0)	3(6.3)	0.000
Amount of paid vacation time offered	43(21.3)	16.2 - 27.4	40(37.7)	1(2.3)	2(4.2)	0.000
Amount of paid sick leave offered	48(23.8)	18.4 - 30.1	43(41.0)	3(7.0)	2(4.2)	0.000
Opportunities for Promotion	34(16.8)	12.3 - 22.6	26(24.5)	4(9.8)	4(8.7)	0.004
Job security	94(46.5)	39.8 - 53.4	55(50.9)	15(36.6)	24(51.1)	0.536
Recognition for work by supervisors/senior staff	113(55.9)	49.1 - 62.6	65(60.2)	22(52.4)	26(55.3)	0.742
Recognition in society	87(43.1)	36.4 - 50.0	63(58.3)	10(23.3)	14(29.2)	0.000
Work relationships						
Relationships with co workers	168(83.2)	77.4 - 87.7	96(88.1)	37(86.0)	35(72.9)	0.116
Relationship(s) with supervisor(s)	142(70.3)	63.7 - 76.2	79(75.2)	35(81.4)	28(59.6)	0.032
Relationships with subordinates	150(74.3)	67.8 - 79.8	85(86.7)	32(80.0)	33(73.3)	0.247

Relationships with nurses	168(83.2)	77.4 - 87.7	94(86.2)	38(88.4)	36(75.0)	0.271
Use and update of professional knowledge						
Opportunity to utilize your professional skills and talents	105(52.0)	45.1 - 58.8	60(56.1)	21(48.8)	24(51.1)	0.938
Opportunity to learn new skills and new knowledge	83(41.1)	34.5 - 48.0	42(38.9)	16(37.2)	25(52.1)	0.573
Support for training and education	87(43.1)	36.4 - 50.0	49(47.6)	19(44.2)	19(39.6)	0.914

Patients' help seeking behaviours, demands and aggression (Table 4)

Across all levels of facilities doctors felt patients were becoming more demanding: 84% reported that patients often went to higher level hospitals for simple medical problems which could be solved at primary care facilities, 80% said that patients just want to get drugs or tests rather than medical advice. Across all levels of facilities doctors reported that patients were becoming more aggressive in their demands, with perceptions of high and increasing levels of complaints from patients, who are much more likely to sue than previously, with 87%reporting that there was an increasing trend of violence against doctors. County level doctors consistently reported higher levels for all these items.

Table 4 Patients' help seeking behaviours, demands and aggression by level of hospital (% of strongly agree or agree)

Items	Agree No (%)	95% CIs of percentage	Agree(percent) CHCs (N=111)	County (N=43)	Provincial (N=48)	p value (χ^2 tests)
Patients often go to higher level hospitals (e.g. tertiary hospitals) with simple complaints which could be dealt with at a lower level hospital	169(83.7)	78.0 - 88.1	95(87.2)	35(81.4)	39(83.0)	0.790
Sometimes patients just want to get drugs and tests rather than really seeking medical advice from doctors	162(80.2)	74.2 - 85.1	84(79.2)	38(88.4)	40(85.1)	0.631
Nowadays patients are better informed about their own medical conditions so that sometimes they demand specific treatments from doctors	168(83.2)	77.4 - 87.7	93(86.9)	36(85.7)	39(83.0)	0.949
Patients are becoming more aggressive in their demands	144(71.3)	64.7 - 77.1	66(60.6)	40(93.0)	38(80.9)	0.001
The number of complaints by patients has increased in recent years	153(75.7)	69.4 - 81.1	77(72.6)	41(95.3)	35(72.9)	0.006
Patients are becoming more likely to sue them even when doctors are trying to do their best	176(87.1)	81.8 - 91.1	93(87.7)	43(100.0)	40(83.3)	0.107
Violence against doctors by their own patients is increasing	176(87.1)	81.8 - 91.1	92(86.8)	43(100.0)	41(85.4)	0.126

Influencing factors of job satisfaction

Analysis of Covariance (ANCOVA) comparing job satisfaction scores among sub-groups, adjusted by gender, age and education, are presented in Table 5. Doctors in the provincial hospital appeared to be the most dissatisfied group, and primary care physicians were most satisfied with their work ($p < 0.001$). Those who had worked longer hours ($p < 0.001$), did longer overtime hours ($p < 0.05$), took on-call duties ($p < 0.01$) were more likely to be dissatisfied. Doctors who reported average consultation times of 10-20 minutes per patient and higher monthly salary showed higher satisfaction ($p < 0.01$). Doctors who had more negative perceptions of the doctor-patient relationship (thought patients were more demanding and aggressive) also had lower satisfaction scores.

Table 5 Influencing factors of doctors' job satisfaction controlling for gender, age and education

	Overall job satisfaction		
Variables	Mean	SD	p value*
Level of hospital			0.000
Primary	3.23	0.06	
Secondary	2.83	0.08	
Tertiary	2.82	0.09	
Position rank			0.064
Low	3.12	0.06	
Middle	2.91	0.06	
High	2.97	0.15	
Work hours per week			0.000
＜50	3.23	0.06	
50 or more	2.92	0.05	
Outpatient visits per doctor per day			0.102
＜50	3.14	0.07	
50to 100	2.99	0.07	
≥100	2.85	0.11	

Not applicable	3.12	0.08	
Average visit time per patient (minutes)			0.004
＜10	2.92	0.05	
10-20	3.23	0.08	
≥20	2.97	0.25	
Not applicable	3.22	0.09	
Overtime hours per week			0.020
＜10	3.15	0.05	
10 to 30	2.95	0.06	
≥ 30	2.83	0.13	
On-call duties			0.001
Yes	2.94	0.05	
No	3.26	0.08	
Monthly salary			0.004
＜1,000 RMB	2.72	0.12	
1,000-3,000 RMB	3.05	0.04	
≥ 3,000 RMB	3.24	0.10	
Patients' help seeking behaviours and aggression			
Patients often go to higher level hospitals (e.g. tertiary hospitals) with simple complaints which could be dealt with at a lower level hospital			0.718
Disagree	3.07	0.10	
Agree	3.04	0.04	
Sometimes patients just want to get drugs and tests rather than really seeking medical advice from doctors			0.040
Disagree	3.22	0.09	
Agree	3.01	0.04	
Nowadays patients are better informed about their own medical conditions so that sometimes they demand specific treatments from doctors			0.586
Disagree	2.99	0.11	
Agree	3.05	0.04	
Patients are becoming more aggressive in their demands			0.008
Disagree	3.22	0.08	
Agree	2.98	0.04	
Patients are becoming more likely to sue them even when doctors are trying to do their best			0.532
Disagree	3.12	0.13	
Agree	3.04	0.04	
The number of complaints by patients has increased in recent years			0.052
Disagree	3.19	0.09	
Agree	3.00	0.04	
Violence against doctors by their own patients is increasing			0.063

Disagree	3.27	0.13
Agree	3.02	0.04

*p values for Analysis of Covariance (ANCOVA) controlling gender, age and education

Finally, 88% (177) of the doctors said they would not want their children to be doctors. Of those 125who provided a reason, 42 (34%) said poor pay, 22 (18%) said high pressure from work, and21 (17%) said it was a high-risk profession. Eleven (9%) expressed concerns about personal insecurity or patient violence and conflicts, 11 (9%) cited the poor doctor patient relationship, and 17 (14%) stated low status and social recognition.

DISCUSSION

This study provides some insights into the reasons for the low morale in the medical profession in China. Given perceived low status, high perceived risk of violence and increasing litigation, it is perhaps not surprising that job satisfaction is low and that the overwhelming majority of our sample (88%) do not want their children to be doctors. Concerns for the future of the medical profession, and threats to the health system are being voiced quite openly even by senior Chinese authorities.[31]

Our findings highlight the causes of low job satisfaction among doctors. They also show that despite being the best qualified, and having the highest status and the highest income, doctors at the provincial hospital were the most dissatisfied group, followed by county hospital doctors with primary care doctors the most satisfied. The causes of dissatisfaction fall into three main areas: low income, heavy workload and patient aggression. We will discuss these three factors and their policy implications.

Income

Low income is a major grievance, mirroring findings in previous studies.[28 32] Even at provincial level, 80% earned an annual salary of 36,000 RMB or less. Among senior doctors 35% earned more than this. .This compared to the average annual income of 34,550 RMB in urban Zhejiang in 2012.[33] While bonuses increase this considerably for some doctors, the overall income is still not regarded by most as sufficient compensation for the long hours, and the risks incurred.

To better remunerate doctors of course demands more resources, but government investment in health remains insufficient. Total health expenditure remained under 5% of GDP before the health reforms in 2009 and saw a slight increase to 5.36% in 2012, compared to a GDP growth of 9.3% in 2011 and 7.8% in 2012.[34 35] This compares with total health spending of around 10% of GDP in UK, Germany, France, Norway, Canada, and Japan.[36] Government subsidy into these so-called public health facilities, accounts for less than 10% of higher-level hospital revenue and 40% of community health centre revenue.[37 38]

Fees for basic medical services, including doctors' consultation, nursing services and surgical procedures, have been kept low ostensibly in order to ensure access to basic care for all.[39] For example in Beijing[40], a doctor consultation fee in an outpatient department is 2.5 RMB at a community health centre and 4 RMB at a tertiary hospital. The staff costs (surgeons, nurses, anaesthetists) for an appendectomy are 150 RMB. These low costs are blamed in medical circles for the undervaluing medical expertise.[41] Because these charges are kept low, facilities operate a market system, making profits from prescribing drugs and tests. The health reforms were meant to

address the problem of perverse incentives, partly through the introduction of the zero mark-up essential drug policy in 2009. The government started the policy in primary care level and it is now being rolled-out in higher-level hospitals. With no mark-up from drugs now possible, the basic salary for the majority of doctors remains low.[10] A series of experimental initiatives aiming to augment doctors' income are being launched, such as pay-for-performance and raising prices of services, including consultation fees and procedures. But this may not fill the gap and doctors' income remains low. Some doctors are finding other ways to complement income. For example a shift is being seen towards prescribing more Traditional Chinese Medicine.

Appropriate measures to address effort-reward imbalance must be taken. First, increasing government funding to increase doctors' salary can help to attract and retain good doctors. Second, increasing charges for healthcare may be useful to increase hospital revenue, to reflect the value of doctors' expertise and to improve their self-value and morale. This increase should be covered by governmental insurance schemes. Third, involving doctors in proper evaluation and modifications of essential drug list policy is necessary, especially in deciding which drugs are on the list. There are known to be grievances about the content of the list and doctors want more autonomy in this regard.[9] Also, it is important to note the socioeconomic disparities across China. It is extremely difficult to prescribe a national strategy, and exploration of local policies tailored to local social-economic conditions is warranted.

Workload

Long working hours appear to be a major contributor to dissatisfaction especially at provincial and county hospitals. Here the huge volume of outpatients makes it

difficult to spend sufficient time with patients, affecting quality of care and the doctor-patient relationship. With no gatekeeping systems in primary care, many patients bypass lower levels to go to where they think they will get the best care, that is, provincial level hospitals. Inappropriate use of higher level care was commented on by 84% of our respondents. The health reform measures taken to strengthen primary care were partly to address this problem of massive overutilization of secondary and tertiary facilities for mostly minor conditions. But the reforms have probably made no difference.[9] This is because improvements in health insurance re-imbursement have improved access, especially to higher-level facilities. Around 96% of the population now have health insurance.[42] The outpatient throughput from 2009 to 2012 increased by 50% from 303 million to 455 million.[43]

With 46% of all out-patient consultations occurring at county level and above in 2012[44], the sheer volume of out-patient visits necessitates a very short consultation, inevitably jeopardising the quality of care. The health reforms have failed to discourage patients from inappropriately using higher-level care for minor conditions and this was a major goal of the reforms.

To tackle this, the primary care system needs to be further strengthened with the addition of a gate-keeping role. As we found in our study, primary care doctors have much lower educational attainment, and this may contribute to the long standing mistrust among the public. It has been 15 years since the introduction of community health services as a new primary health care model in urban areas. Despite the increasing government support, the general public still lack trust in these urban primary care physicians.[45] The medical education curriculum needs to include more

primary care and thus attract more well-qualified doctors into primary care. This would help to reduce patient flow to high level hospitals, and be far more cost-effective.

Patient aggression

Patients' aggressive demands and violence are having a serious impact on doctors' job satisfaction.[11 46] The situation is compounded by the fact that many of these violent events take place not only with impunity of the legal authorities, but also with the tolerance of the general public. In addition, while many receive scant media publicity, the internet spreads news of these events rapidly and widely. This has bred fears and insecurity, contributing to low morale in the profession.[12]

The causes of this patient aggression are complex. First, perverse incentives and doctors' profit seeking behaviours have compromised quality of care, and led to erosion of professional ethics and higher medical costs.[47] Certain areas of the media have taken to criticising doctors for their "irresponsible and wrong" advice, and occasional cases of extremely high medical expenses, which make patients feel exploited.[48] In addition, patients are better informed about medical problems due to increasingly accessible health information, leading them to be more demanding.

Second, in a commoditized health care system, despite high coverage of medical insurance, patients are still paying a large portion of their medical expenses out-of-pocket.[37] Together with long waiting times and short consultation times, poor communication between doctors and patients can easily trigger tension between the two parties when doctors fail to meet patients' high expectations. Third, as doctors are

the ones who dictate patient care, they are an easy target for patients' complaints and frustration.

Measures to prevent patient aggression against doctors are necessary. t. National measures to strengthen hospital security and criminalize any acts causing hospital disturbance were taken[49] soon after a doctor was killed by a 17 year-old patient in 2012. But these have been poorly enforced and critics argue that this does not solve the underlying systemic issues. More radical solutions are needed to prevent violence in health facilities. Policies of 'zero tolerance' towards violence in healthcare sectors are recommended by the most influential medical associations in China.[50] Education programs assisting doctors to prevent and manage patient violence may also be beneficial.[51] An emphasis on doctor-patient communication skills in medical school syllabus may help improve the doctor-patient relationship, and reduce patient aggression.[52]

Limitations

The study has some limitations. First, we sampled only four cities and counties in the province and only one provincial hospital. So the generalizability of the results is questionable. The sample size was relatively small. However, we did sample across three levels of health institutions in four places with different economic levels. Second, as there are almost no studies on this topic, comparisons could not be made. But as a very first study comparing job satisfaction at three levels of facility and exploring associated systemic factors, we have provided a starting point for further research into exploring related issues in China.

CONCLUSION

Doctors in Zhejiang province, China have low job satisfaction overall. Measures must be taken to address this in order to prevent a serious human resource crisis in the profession. Urgent measures must include reduction of doctors' workload, especially at provincial hospitals, increase in doctors' salary, and more punitive measures against individuals who commit violent acts against doctors.

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Authors' contributions

TH and DW designed the study and the questionnaire. DW carried out the survey. KFL and YW performed the statistical analysis. DW, TH and YW interpreted the analysis. DW and TH drafted the manuscript. All authors read and approved the final manuscript.

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Competing interests

The authors declare that they have no competing interests.

Ethical approvals

The study is a student research project that has received ethical approval from the UCL Research Ethics Committee.

Data sharing statement

No additional data are available.

REFERENCES

1. Li D, Yin W, Zhang X, et al. Investigation on turnover intention of medical staff in public hospitals and research of early-warning system's construction. *Chinese Journal of Hospital Administration* 2010;**26**(03):218-21.

2. National Health and Family Planning Commission PRC. *Research on relationship between Yi and Huan in China, 2008*: Center for Health Statistics and Information 2008:P106.

3. Wang ZG. *Worrying conditions of doctors' practising environment: 78% of the doctors do not want their children to be doctors 2013.* http://news.china.com.cn/2013-10/27/content_30414901.htm (accessed 3 Mar 2014).

4. Shanghai Jiao Tong University. *Announcement of results of changing majors for students admitted in 2013.* http://www.jwc.sjtu.edu.cn/web/sjtu/198015-1980000004584.htm (accessed 27 May 2014).

5. Flaherty JH, Liu ML, Ding L, et al. China: the aging giant. *J Am Geriatr Soc* 2007;**55**(8):1295-300.

6. CDC US. *U.S. CDC IN CHINA: 2010-2011 Annual Report Healthy People in a Health China*, 2013.

7. Song K, Scott A, Sivey P, et al. Improving Chinese primary care providers' recruitment and retention: a discrete choice experiment. *Health Policy Plan* 2013.

8. China Daily. *WeChat poll revealed "90% of participants do not want children to be doctors: high pressure and intense doctor-patient conflicts are main reasons"*. http://www.chinadaily.com.cn/micro-reading/dzh/2014-04-23/content_11627822.html (accessed 23 May 2014).

9. Zhou XD, Li L, Hesketh T. Health system reform in rural China: Voices of healthworkers and service-users. *Soc Sci Med* 2014;**117**:134-41.

10. Guan XD, Liang HG, Xue YJ, et al. An analysis of China's national essential medicines policy. *J Public Health Policy* 2011;**32**(3):305-19.

11. Zhang X, Sleeboom-Faulkner M. Tensions between medical professionals and patients in mainland China. *Camb Q Healthc Ethics* 2011;**20**(3):458.

12. Hesketh T, Wu D, Mao LN, et al. Violence against doctors in China. *Br Med J* 2012;**345**.

13. Wang ZG. *Yi Nao incidents increased by 7000 over last five years: illegal gangs made huge profits 2012.* http://www.china.com.cn/news/2012-05/03/content_25287333_2.htm (accessed 23 Jul 2014).

14. Xiong C. *Medical malpractice and medical disputes.* Chinese Hospital Association Guide 2006.

15. Wu SY, Zhu W, Li HY, et al. Workplace violence and influencing factors among medical professionals in China. *Am J Ind Med* 2012;**55**(11):1000-08.

16. Ding Xiang Yuan. *Chinese Hospital Association: violence against doctors gets worse*. http://vote.dxy.cn/report/dxy/id/57914 (accessed 28 Feb 2014).

17. BMA. *Violence at work: the experience of UK doctors*: Health Policy and Economic Research Unit, British Medical Association, 2003.

18. Algwaiz WM, Alghanim SA. Violence exposure among health care professionals in Saudi public hospitals. A preliminary investigation. *Saudi Med J* 2012;**33**(1):76-82.

19. Behnam M, Tillotson RD, Davis SM, et al. Violence in the emergency department: a national survey of emergency medicine residents and attending physicians. *J Emerg Med* 2011;**40**(5):565-79.

20. Forrest LE, Herath PM, McRae IS, et al. A national survey of general practitioners' experiences of patient-initiated aggression in Australia. *Med J Aus* 2011;**194**(11):605-08.

21. Joa TS, Morken T. Violence towards personnel in out-of-hours primary care: a cross-sectional study. *Scand J Prim Health Care* 2012;**30**(1):55-60.

22. Kowalenko T, Walters BL, Khare RK, et al. Workplace violence: a survey of emergency physicians in the state of Michigan. *Ann Emerg Med* 2005;**46**(2):142-47.

23. Magnavita N, Heponiemi T. Violence towards health care workers in a Public Health Care Facility in Italy: a repeated cross-sectional study. *BMC Health Serv Res* 2012;**12**(1):108.

24. Mirza NM, Amjad AI, Bhatti ABH, et al. Violence and abuse faced by junior physicians in the emergency department from patients and their caretakers: a nationwide study from Pakistan. *J Emerg Med* 2012;**42**(6):727-33.

25. Saeki K, Okamoto N, Tomioka K, et al. Work-related aggression and violence committed by patients and its psychological influence on doctors. *J Occup Health* 2011;**53**(5):356-64.

26. Sibbald B, Bojke C, Gravelle H. National survey of job satisfaction and retirement intentions among general practitioners in England. *Br Med J* 2003;**326**(7379):22.

27. Liu JA, Wang Q, Lu ZX. Job satisfaction and its modeling among township health center employees: a quantitative study in poor rural China. *BMC Health Serv Res* 2010;**10**(1):115.

28. Shi L, Song K, Rane S, et al. Factors associated with job satisfaction by Chinese primary care providers. *Prim Health Care Res Dev* 2014;**15**(01):46-57.

29. Thakur M. Job satisfaction in banking: A study of private and public sector banks. *The IUP Journal of Bank Management* 2007;**6**(4):60-68.

30. Buciuniene I, Blazeviciene A, Bliudziute E. Health care reform and job satisfaction of primary health care physicians in Lithuania. *BMC Fam Pract* 2005;**6**(1):10.

31. Ren Min Wang PRC. *Liao Xin Bo: Improve doctors' dignity. Secondary Liao Xin Bo: Improve doctors' dignity.* http://www.people.com.cn/n/2014/0213/c347759-24348138.html (accessed 23 May 2014).

32. Lim M-K, Yang H, Zhang T, et al. China's evolving health care market: how doctors feel and what they think. *Health Policy* 2004;**69**(3):329-37.

33. Zhejiang Provincial Bureau of Statistics. *Statistical report on national economy and social development in Zhejiang Province, 2012.* http://tjj.zj.gov.cn/tjgb/gmjjshfzgb/201302/t20130208_122162.html (accessed 21 Feb 2014).

34. The World Bank. *World Development Indicators: GDP growth (annual %).* http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG (accessed 7 Apr 2014).

35. National Health and Family Planning Commission PRC. *Health statistics in China, 2012.* http://www.moh.gov.cn/zwgkzt/ptjty/201206/55044/files/3ca7756121334b7a870a25ac79988f23.pdf (accessed 7 Apr 2014).

36. The World Bank. *Health expenditure, total (% of GDP) 2012.* http://data.worldbank.org/indicator/SH.XPD.TOTL.ZS (accessed 24 May 2014).

37. National Health and Family Planning Commission PRC. *China Health Statistics Yearbook 2013.* http://www.nhfpc.gov.cn/htmlfiles/zwgkzt/ptjnj/year2013/index2013.html (accessed 23 May 2014).

38. Ren YJ, Ji QY. Analysis of salary distribution system in public hospitals. *Journal of Shanghai Jiaotong University (Medical Science)* 2013;**33**(6).

39. Yip W, Hsiao WC. The Chinese health system at a crossroads. *Health Aff* 2008;**27**(2):460-68.

40. Beijing Municipal Commission of Development and Reform. *Prices of medical services in Beijing*. http://service2.bjpc.gov.cn/bjpc/mediprice/MedicalService1.jsp (accessed 28 Apr 2014).

41. Wang XH. *Zhong Nan Shan: Chinese doctors survive by selling drugs and the value of their expertise is not being reflected*. http://news.xinhuanet.com/health/2014-03/06/c_126226620.htm (accessed 24 May 2014).

42. Meng Q, Xu L, Zhang Y, et al. Trends in access to health services and financial protection in China between 2003 and 2011: a cross-sectional study. *Lancet* 2012;**379**(9818):805-14.

43. Health Bureau of Zhejiang Province. *Health statistics in Zhejiang Province*. http://www.zjwst.gov.cn/col/col320/index.html### (accessed 31 Mar 2014).

44. Health Bureau of Zhejiang Province. *Outpatient services in health facilities in Zhejiang Province, 2012*. http://www.zjwst.gov.cn/art/2013/4/15/art_320_227356.html (accessed 31 Mar 2014).

45. Du J, Lu X, Wang Y, et al. Mutual referral: a survey of GPs in Beijing. *Fam Pract* 2012;**29**(4):441-7.

46. Yao Y, Wang W, Wang F, et al. General self-efficacy and the effect of hospital workplace violence on doctors' stress and job satisfaction in China. *Int J Occup Med Environ Health* 2014;**27**(3):1-11.

47. Yip WC-M, Hsiao W, Meng Q, et al. Realignment of incentives for health-care providers in China. *Lancet* 2010;**375**(9720):1120-30.

48. Jie YX. *10 doctors calls for apologies from mass media about fasified reports.* http://www.yxj.org.cn/news/yijieyaowen/shehuijiaodian/20140521095829366651.htm (accessed 23 May 2014).

49. National Health and Family Planning Commission PRC. *The directive of maintaining order at medical institutions by Police Department, Ministry of Health.* http://wsb.moh.gov.cn/zwgkzt/ptg/201204/54578.shtml (accessed 11 Feb 2014).

50. CMA. *United call for "Zero tolerance to medical violence" by Chinese Medical Association, Chinese Medical Doctor Association, Chinese Hospital Association and*

Chinese Health Law Society. http://www.cma.org.cn/index/xhdt/20131029/1383026180011_1.html (accessed 11 Feb 2014).

51. Zernike W, Sharpe P. Patient aggression in a general hospital setting: do nurses perceive it to be a problem? *Int J Nurs Pract* 1998;**4**(2):126-33.

52. Ong LM, De Haes JC, Hoos AM, et al. Doctor-patient communication: a review of the literature. *Soc Sci Med* 1995;**40**(7):903-18.

STROBE 2007 (v4) checklist of items to be included in reports of observational studies in epidemiology*

Checklist for cohort, case-control, and cross-sectional studies (combined)

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4–5
Objectives	3	State specific objectives, including any pre-specified hypotheses	6
Methods			
Study design	4	Present key elements of study design early in the paper	6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6-7
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants	6-7
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case	N/A
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7-8
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	*8*
Bias	9	Describe any efforts to address potential sources of bias	N/A
Study size	10	Explain how the study size was arrived at	6-7
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	8
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	8
		(*b*) Describe any methods used to examine subgroups and interactions	8
		(*c*) Explain how missing data were addressed	N/A
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed	N/A

		Cross-sectional study—If applicable, describe analytical methods taking account of sampling strategy	
		(*e*) Describe any sensitivity analyses	N/A
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	8
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	8-11
		(b) Indicate number of participants with missing data for each variable of interest	9-10
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)	N/A
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time	N/A
		Case-control study—Report numbers in each exposure category, or summary measures of exposure	N/A
		Cross-sectional study—Report numbers of outcome events or summary measures	13-14
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	8-19
		(*b*) Report category boundaries when continuous variables were categorized	N/A
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	17-18
Discussion			
Key results	18	Summarise key results with reference to study objectives	19
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	24
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	N/A
Generalisability	21	Discuss the generalisability (external validity) of the study results	24
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	N/A

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.
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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Health system reforms, violence against doctors and job satisfaction in the medical profession: a cross-sectional survey in Zhejiang Province, Eastern China

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Health system reforms, violence against doctors and job satisfaction in the medical profession: a cross-sectional survey in Zhejiang Province, Eastern China

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Abstract

Objective: To explore the factors influencing doctors' job satisfaction and morale in China, in the context of the ongoing health system reforms and the deteriorating doctor-patient relationship

Design: Cross-sectional survey using self-completion questionnaires.

Study setting: The survey was conducted from March to May 2012 among doctors at provincial, county and primary care levels, in Zhejiang Province, China.

Results: The questionnaire was completed by 202 doctors. Factors which contributed most to low job satisfaction were low income and long working hours. Provincial level doctors were most dissatisfied while primary care doctors were the least dissatisfied. Three percent of doctors at high-level hospitals and 27% of those in primary care were satisfied with the salary. Only 7% at high-level hospitals were satisfied with work hours, compared to 43% in primary care. Less than 10% at high levels were satisfied with amount of paid vacation time (3%) and paid sick leave (5%), compared with 38% and 41% respectively in primary care.

Overall, 87% reported that patients were more likely to sue and that patient violence against doctors was increasing. Only 4.5% wanted their children to be doctors. Of those 125 who provided a reason, 34% said poor pay, 17% said it was a high-risk profession, and 9% expressed concerns about personal insecurity or patient violence.

Conclusions: Doctors have low job satisfaction overall. Recruitment and retention of doctors have become major challenges for the Chinese health system. Measures must be taken to address this, in order to ensure recruitment and retention of doctors in the

future. These measures must include reduction of doctors' workload especially at provincial hospitals, increase in doctors' salary and more effective measures to tackle patient violence against doctors.

Strengths and limitations of this study

- Our study is one of the first to investigate doctors' job satisfaction in China, since the instigation of the health reforms in 2009.
- We compared doctors' job satisfaction across three levels of health facility and explored associated systemic factors.
- Our study documents for the first time that increasing patient violence is a major contributor to doctors' low morale
- The generalizability of the study is constrained by the limited number of participating health facilities and the small sample size.

INTRODUCTION

The Chinese medical profession is facing serious problems with recruitment and retention of doctors. Evidence from a number of sources illustrates low levels of morale in the profession. In a study of 933 doctors in 29 public hospitals in Shandong province, 49% said they intended to leave the profession.[1] Other studies have shown that only 24% of doctors would choose the profession if they had a second chance[2] and 78% would not want their own children to be doctors.[3] At Shanghai Jiao Tong University, which is among the top five in the country, 10% of the second year medical students transferred to other majors in 2013.[4] These worrying manifestations of discontent come at a time when more doctors are needed, given the pressures of an ageing population[5] and a growing non-communicable diseases burden.[6] Recruitment and retention of doctors have become major challenges for the health system in China.[7]

There is evidence that this situation is worsening[8], so urgent measures are needed to reverse this trend. Clearly, such measures need to include addressing the underlying causes of this discontent. The aim of this study was to explore these underlying causes through surveying the views of doctors working at three levels of the health system: tertiary, secondary and primary care. Primary level facilities are supposed to provide preventive and basic medical services, while secondary and tertiary hospitals provide specialized care. The study was conducted in 2012, three years after the inception of major health system reforms, aiming to provide universal healthcare by 2020 with a focus on strengthening primary care. The reforms have also had impacts on doctors' working conditions: changes to health insurance have made healthcare more affordable at all levels, resulting in increased workload for doctors, especially at

secondary and tertiary level hospitals, even for minor illness. The introduction of an essential drug list for primary care, which aims to reduce perverse incentives for overprescribing to forbid profit on drugs, has reduced doctors' autonomy and reduced their income.[9] This loss of income from the mark-up in primary care has been replaced with a fixed salary and in some places a performance-based bonus, which in most cases is lower than previous earnings.[10]

Another important contributor to morale is a recent deterioration in the doctor-patient relationship.[11] The most extreme manifestation of this is a rise in levels of violence against health workers, along with damage and disturbance to health facilities. In China, this phenomenon is known as Yi Nao, which translates as (medical or hospital disturbance). This is usually caused by patients or their relatives as a reaction to what may be perceived, rightly or wrongly, as failures or mistakes by hospital staff. Sometimes the situation escalates with aggrieved patients and relatives hiring criminal gangs, prepared to go to extreme lengths, to threaten the hospital to provide compensation.[12] Yi Nao events are not rare. The Ministry of Health reported that the number of "major disturbances" involving physical violence nearly doubled from 9,831 in 2006 to 17,243 in 2010.[13] In a 2006 study of 270 hospitals, over 70% reported that they had experienced Yi Nao incidents.[14] A study of 12 hospitals in 2009 revealed that, of 2,464 medical professionals, 50% experienced workplace violence over the last 12 months, with 20% encountering physical abuse at least once.[15] A 2012 survey conducted by the Chinese Hospital Association in 316 public hospitals in 30 provinces revealed that the proportion of hospitals, which reported incidents of physical violence causing harm, had increased from 48% in 2008 to 64% in 2012. Of these, 8% of hospitals reported six or more incidents of physical violence every

year.[16] Violence against health personnel is not unique to China. It has been reported from many other countries, including countries as diverse as the UK, US, Italy, Saudi Arabia, Pakistan and Japan.[17-25] And many other countries are facing challenges with the recruitment and retention of doctors.[26] Therefore, lessons from the Chinese experience are relevant for other countries.

The overall objectives of this study were: 1) to explore the factors influencing doctors' job satisfaction and morale, with a special focus on the impacts of health system reforms and the deteriorating doctor-patient relationship, and 2) to compare doctors working at the three levels in the Chinese health system.

METHODS

Sampling and data collection

This cross-sectional survey was conducted from March to May 2012 in health facilities in Zhejiang province, Eastern China. Zhejiang has a population of 55 million and is ranked fourth in terms of GDP per capita among China's 33 provinces.

A multi-stage stratified purposive sampling method was adopted (Table 1).We first selected four cities or counties which represented high (Hangzhou and Yiwu), middle (Anji) and low-level (Xianju) economic development in Zhejiang province. In the second stage 10 health facilities were purposively sampled in the four cities/counties to represent a range of health facilities: in urban areas a multi-specialism provincial hospital (tertiary level) in Hangzhou, the main county hospitals (secondary level) in Anji and Xianju respectively, and two community health centres/township health centres (providers of primary care in urban and rural areas) in each city/county were

invited to participate (one in Xianju county refused). In total, four community health centres (CHCs) in urban cities and three township health centres (THCs) in rural counties were selected based on their general representativeness in the city/county.

Table 1 Sampling strategy and achieved sample size by area

Cities	Income level	Participating hospitals	Sample size	Total sample size
Hangzhou	High-income	1 provincial hospital	48	60
		2 CHCs[a]	12	
Yiwu	High-income	2 CHCs	54	54
Anji	Middle-income	1 county hospital	24	41
		2 THCs[b]	17	
Xianju	Low-income	1 county hospital	19	47
		1 THC	28	
Total		10		202

[a]CHCs: Community Health Centres

[b]THCs: Township Health Centres

At provincial level hospitals and county hospitals participants were internal medical doctors and surgeons, who were present in inpatient wards at the time of the survey. At CHCs and THCs, primary care physicians present in clinics at the time of the survey were recruited.

Prospective participants were told that the questionnaire was about job satisfaction, that completion was voluntary, and that respondent anonymity and confidentiality would be strictly protected. Ethical approval was obtained from University College London. Local approvals were obtained from Zhejiang Health Bureau and local health authorities.

Measurement methods

We developed the questionnaire based partly on existing questionnaires[27-30] with some items added and modified to specifically reflect the Chinese setting. Most questions used a five-point Likert scale ranging from 1 (not satisfied at all or strongly disagree) to 5 (extremely satisfied or strongly agree). The questionnaire included items about job satisfaction in general, perceptions about patients' health seeking behaviours and experience of patient aggression. Reverse scoring was used for questions phrased in the negative. The questionnaire was piloted, and modifications were made according to feedback.

Statistical analysis

The data were analysed using IBM SPSS version 21. Comparisons between three levels of facility were conducted using Chi-square tests. We generated an overall job satisfaction score by computing the mean of 19 satisfaction items. The satisfaction score ranges from 1 (the lowest satisfaction) to 5 (the highest satisfaction). A higher score means higher satisfaction level. Analysis of Covariance (ANCOVA) was performed to compare satisfaction scores by level of response of associated factors controlling for gender, age and education.

RESULTS

Sample characteristics

Characteristics of the study sample are shown in Table 2. Two hundred and two doctors completed questionnaires with a response rate of 81%. Forty-eight were from the provincial hospital, 43 from county hospitals, and 111 from primary care facilities. The mean age was 35.2 (SD=7.6), and 105 doctors were male, with 85 female. Only

29% of primary care doctors had obtained a five-year formal medical education qualification compared with 93% and 96% at county and provincial level respectively.

Table 2 Characteristics of the sample and basic working conditions by level of hospital n (%)

	Total	Level of hospital			p value
		CHCs	County	Provincial	
	N=202	N=111	N=43	N=48	(χ^2 tests)
Age (mean and SD)	35.2(7.6)	36.1(8.6)	34.2(7.4)	34.0(4.1)	0.196
Gender					0.001
Male	105(52.0)	45(40.5)	33(76.7)	27(56.3)	
Female	85(42.1)	59(53.2)	10(23.3)	16(33.3)	
Missing	12(5.9)	7(6.3)	0	5(10.4)	
Education level					0.000
Post-secondary level or less	78(38.6)	75(67.6)	3(7.0)	0(0)	
Undergraduate or higher	118(58.4)	32(28.8)	40(93.0)	46(95.8)	
Missing	6(3.0)	4(3.6)	0	2(4.2)	
Position rank					0.001
Low	81(40.1)	51(45.9)	21(48.8)	9(18.8)	
Middle	81(40.1)	36(32.4)	16(37.2)	29(60.4)	
High	18(8.9)	4(3.6)	6(14.0)	8(16.7)	
Missing	22(10.9)	20(18.0)	0	2(4.2)	
Work hours/week					0.000
< 40	16(8.2)	15(13.5)	0	1(2.1)	
40 to 50	60(30.6)	42(37.8)	13(30.2)	5(10.4)	
50 to 60	48(24.5)	27(24.3)	10(23.3)	11(22.9)	
≥ 60	72(36.7)	23(20.7)	20(46.5)	29(60.4)	
Missing	6(3.0)	4(3.6)	0	2(4.2)	
Outpatient visits per doctor per day					0.000
< 50	67(33.2)	45(40.5)	17(39.5)	5(10.4)	
50 to 100	58(28.7)	34(30.6)	13(30.2)	11(22.9)	
≥100	27(13.4)	3(2.7)	2(4.7)	22(45.8)	
Not applicable	40(20.8)	24(21.6)	9(20.9)	7(14.6)	
Missing	10(5.0)	5(4.5)	2(4.7)	3(6.3)	
Average visit time/patient (minutes)					0.001
≤ 4	32(15.8)	8(7.2)	6(14.0)	18(37.5)	
5-9	83(41.1)	46(41.4)	21(48.8)	16(33.3)	
10-14	31(15.3)	18(16.2)	8(18.6)	5(10.4)	
15-20	10(5.0)	7(6.3)	1(2.3)	2(4.2)	
≥20	5(2.5)	4(3.6)	1(2.3)	0(0)	
Not applicable	33(16.3)	24(21.6)	4 (9.3)	5(10.4)	

Missing	8(4.0)	4(3.6)	2(4.7)	2(4.2)	
Overtime hours per week					0.000
< 10	103(51.0)	69(62.2)	23(53.5)	11(22.9)	
10 to 30	74(36.6)	35(31.5)	15(34.9)	24(50.0)	
≥ 30	17(8.4)	2(1.8)	4(9.3)	11(22.9)	
Missing	8(4.0)	5(4.5)	1(2.3)	2(4.2)	
On-call duties					0.000
Yes	131(64.9)	53(47.7)	35(81.4)	43(89.6)	
No	61(30.2)	52(46.8)	7(16.3)	2(4.2)	
Missing	10(5.0)	6(5.4)	1(2.3)	3(6.2)	
Monthly salary					0.000
< 1,000 RMB	20(10.2)	2(1.8)	16(37.2)	2(4.2)	
1,000 – 3,000 RMB	146(74.1)	84(75.7)	27(62.8)	35(72.9)	
3,000 – 5,000 RMB	29(14.7)	21(18.9)	0	8(16.7)	
≥ 5,000 RMB	2(1.0)	1(0.9)	0	1(2.1)	
Missing	5(2.5)	3(2.7)	0	2(4.2)	
Total bonus last year (RMB)					0.000
< 10,000	34(17.4)	27(24.3)	4(9.3)	3(6.2)	
10,000 – 30,000	106(54.4)	57(51.4)	35(81.4)	14(29.1)	
30,000 – 50,000	43(22.1)	16(14.4)	4(9.3)	23(47.9)	
50,000 – 100,000	9(4.6)	7(6.3)	0	2(4.2)	
100,000 or higher	3(1.5)	0	0	3(6.3)	
Missing	7(3.5)	4(3.6)	0	3(6.3)	
The need to do research					0.000
Yes	88(44.9)	30(27.0)	18(41.9)	40(83.3)	
No	108(55.1)	77(69.3)	25(58.2)	6(6.3)	
Missing	6(3.0)	4(3.6)	0	2(4.2)	

Workload and pay (Table 2)

Workload varied considerably with level of hospital. Provincial hospital doctors worked the longest hours, 60% routinely worked more than 60 hours per week with 23% working more than 30 hours per week in overtime (additional work hours and on a "forced voluntary" basis largely due to heavy workload). For county level doctors these figures were 47% and 9%, and primary level doctors reported 21% and 2%. Sixty-nine percent of provincial hospital doctors saw over 50 patients in clinic per day with 46% seeing over 100 patients a day. Thirty-five per cent of doctors at secondary level facilities saw over 50 outpatients per day and 33% at the primary level. Not

surprisingly, consultation times were reported to be very short. Nearly 38% of provincial hospital doctors spent 4 minutes or less on average for each outpatient. These compared to 14% in county hospitals, and 7% in primary care. Ninety per cent of doctors at the provincial hospital reported that they did on-call duties (which usually involved being available on site overnight to deal with referrals and problems), followed by the county level (81%) and primary level (48%). Eighty-seven percent of provincial hospital doctors were required to do research in order to be eligible for promotion. This compared to 42% and 28% in county level and primary care respectively.

Remuneration consists of two parts: a basic salary and a bonus. For most doctors (74%) their monthly salary was between 1, 000 and 3,000 RMB (1 USD = 6.16 RMB in 2012), with only 1% paid more than 5,000 RMB per month and 29% paid between 3,000 and 5,000 RMB. Interestingly, 37% of county hospital doctors were paid less than 1,000 RMB monthly and none of them earned over 3,000 RMB. But 19% and 17% respectively in primary care and tertiary hospitals were paid between 3,000 RMB and 5,000 RMB. Up to 94% of junior doctors were paid 3,000 RMB or less, compared to 77% middle ranked doctors and 65% of senior doctors. Annual bonuses, varied mainly by the level of the hospital, 79% in primary care, 91% in secondary hospitals and 38% in the tertiary hospital reported 30,000 RMB or less. Half (51%) in the tertiary hospital received a bonus between 30,000 and 50,000, while only 15% and 9% respectively in primary and secondary hospitals earned this amount. Overall only 12 doctors (6%) reported 50,000 RMB or more; seven of these were primary care doctors, five tertiary care doctors with none being county hospital doctors. Of those who did overtime, more than 80% were not paid for it.

Job satisfaction

Doctors' satisfaction with various aspects of work and conditions is shown in Table 3. Most striking are the differences between primary care practitioners and doctors in higher-level hospitals (county and provincial hospitals). Very low proportions of high-level hospital doctors were satisfied with their working conditions: only 7% at high-level hospitals were satisfied with work hours, compared to 43% in primary care. Percentages for satisfaction with basic salary were 3% and 27% respectively for higher level and primary care. Similar variations in bonuses were reported (6% at higher level versus 20% in primary care). Less than 10% at high levels were satisfied with the amount of paid vacation time (3%), amount of paid sick leave (5%) and opportunities for promotion (9%), with 38%, 41% and 25% respectively in primary care. Interestingly, primary care doctors were most likely to feel they had high social recognition (58%), compared with 29% at the provincial hospital and 23% at the county hospitals. Work relationships showed high levels of satisfaction across all health facilities. Levels of satisfaction with utilization of expertise, opportunity to update expertise and support for training showed only small differences by level.

Table 3 Doctors' job satisfaction by level of hospital (% of completely satisfied or satisfied)

Items	Satisfied No (%)	95% CIs of percentages	Satisfied (%) By level of hospital			p value (χ^2 tests)
			CHCs (N=111)	County (N=43)	Provincial (N=48)	
Work schedule and job reward						
Hours of work	52(25.7)	20.2 - 32.2	46(42.6)	2(4.7)	4(8.30)	0.000
Flexibility in scheduling	47(23.3)	18.0 - 29.6	38(35.5)	5(11.6)	4(8.30)	0.000
Geographical location of work	118(58.4)	51.5 - 65.0	68(63.0)	24(57.1)	26(54.2)	0.439
Basic salary	32(15.8)	11.5 - 21.5	29(27.4)	0(0.0)	3(6.3)	0.000
Bonus	26(12.9)	8.9 - 18.2	21(20.0)	3(7.0)	2(4.2)	0.000
Benefits (insurances, travelling etc.)	41(20.3)	15.3 - 26.4	32(30.2)	6(14.0)	3(6.3)	0.000
Amount of paid vacation time offered	43(21.3)	16.2 - 27.4	40(37.7)	1(2.3)	2(4.2)	0.000
Amount of paid sick leave offered	48(23.8)	18.4 - 30.1	43(41.0)	3(7.0)	2(4.2)	0.000
Opportunities for Promotion	34(16.8)	12.3 - 22.6	26(24.5)	4(9.8)	4(8.7)	0.004
Job security	94(46.5)	39.8 - 53.4	55(50.9)	15(36.6)	24(51.1)	0.536
Recognition for work by supervisors/senior staff	113(55.9)	49.1 - 62.6	65(60.2)	22(52.4)	26(55.3)	0.742
Recognition in society	87(43.1)	36.4 - 50.0	63(58.3)	10(23.3)	14(29.2)	0.000
Work relationships						
Relationships with co workers	168(83.2)	77.4 - 87.7	96(88.1)	37(86.0)	35(72.9)	0.116
Relationship(s) with supervisor(s)	142(70.3)	63.7 - 76.2	79(75.2)	35(81.4)	28(59.6)	0.032
Relationships with subordinates	150(74.3)	67.8 - 79.8	85(86.7)	32(80.0)	33(73.3)	0.247
Relationships with nurses	168(83.2)	77.4 - 87.7	94(86.2)	38(88.4)	36(75.0)	0.271

Use and update of professional knowledge						
Opportunity to utilize your professional skills and talents	105(52.0)	45.1 - 58.8	60(56.1)	21(48.8)	24(51.1)	0.938
Opportunity to learn new skills and new knowledge	83(41.1)	34.5 - 48.0	42(38.9)	16(37.2)	25(52.1)	0.573
Support for training and education	87(43.1)	36.4 - 50.0	49(47.6)	19(44.2)	19(39.6)	0.914

Patients' help seeking behaviours, demands and aggression (Table 4)

Across all levels of facilities doctors felt patients were becoming more demanding: 84% reported that patients often went to higher level hospitals for simple medical problems which could be solved at primary care facilities, 80% said that patients just want to get drugs or tests rather than medical advice. Across all levels of facilities doctors reported that patients were becoming more aggressive in their demands, with perceptions of high and increasing levels of complaints from patients, who are much more likely to sue than previously, with 87% reporting that there was an increasing trend of violence against doctors. County level doctors consistently reported higher levels for all these items.

Table 4 Patients' help seeking behaviours, demands and aggression by level of hospital (% of strongly agree or agree)

Items	Agree No (%)	95% CIs of percentage	Agree(percent) CHCs (N=111)	County (N=43)	Provincial (N=48)	p value (χ^2 tests)
Patients often go to higher level hospitals (e.g. tertiary hospitals) with simple complaints which could be dealt with at a lower level hospital	169(83.7)	78.0 - 88.1	95(87.2)	35(81.4)	39(83.0)	0.790
Sometimes patients just want to get drugs and tests rather than really seeking medical advice from doctors	162(80.2)	74.2 - 85.1	84(79.2)	38(88.4)	40(85.1)	0.631
Nowadays patients are better informed about their own medical conditions so that sometimes they demand specific treatments from doctors	168(83.2)	77.4 - 87.7	93(86.9)	36(85.7)	39(83.0)	0.949
Patients are becoming more aggressive in their demands	144(71.3)	64.7 - 77.1	66(60.6)	40(93.0)	38(80.9)	0.001
The number of complaints by patients has increased in recent years	153(75.7)	69.4 - 81.1	77(72.6)	41(95.3)	35(72.9)	0.006
Patients are becoming more likely to sue them even when doctors are trying to do their best	176(87.1)	81.8 - 91.1	93(87.7)	43(100.0)	40(83.3)	0.107
Violence against doctors by their own patients is increasing	176(87.1)	81.8 - 91.1	92(86.8)	43(100.0)	41(85.4)	0.126

Influencing factors of job satisfaction

Analysis of Covariance (ANCOVA) comparing job satisfaction scores among sub-groups, adjusted by gender, age and education, are presented in Table 5. Doctors in the provincial hospital appeared to be the most dissatisfied group, and primary care physicians were most satisfied with their work ($p < 0.001$). Those who had worked longer hours ($p < 0.001$), did longer overtime hours ($p < 0.05$), took on-call duties ($p < 0.01$) were more likely to be dissatisfied. Doctors who reported average consultation times of 10-20 minutes per patient and higher monthly salary showed higher satisfaction ($p < 0.01$). Doctors who had more negative perceptions of the doctor-patient relationship (thought patients were more demanding and aggressive) also had lower satisfaction scores.

Table 5 Influencing factors of doctors' job satisfaction controlling for gender, age and education

	Overall job satisfaction		
Variables	Mean	SD	p value*
Level of hospital			0.000
Primary (CHCs and THCs)	3.23	0.06	
Secondary (county hospitals)	2.83	0.08	
Tertiary(provincial hospital)	2.82	0.09	
Position rank			0.064
Low	3.12	0.06	
Middle	2.91	0.06	
High	2.97	0.15	
Work hours per week			0.000
＜50	3.23	0.06	
50 or more	2.92	0.05	
Outpatient visits per doctor per day			0.102
＜50	3.14	0.07	
50to 100	2.99	0.07	
≥100	2.85	0.11	
Not applicable	3.12	0.08	
Average visit time per patient (minutes)			0.004

＜10	2.92	0.05	
10-20	3.23	0.08	
≥20	2.97	0.25	
Not applicable	3.22	0.09	
Overtime hours per week			0.020
＜10	3.15	0.05	
10 to 30	2.95	0.06	
≥ 30	2.83	0.13	
On-call duties			0.001
Yes	2.94	0.05	
No	3.26	0.08	
Monthly salary			0.004
＜1,000 RMB	2.72	0.12	
1,000-3,000 RMB	3.05	0.04	
≥ 3,000 RMB	3.24	0.10	
Patients' help seeking behaviours and aggression			
Patients often go to higher level hospitals (e.g. tertiary hospitals) with simple complaints which could be dealt with at a lower level hospital			0.718
Disagree	3.07	0.10	
Agree	3.04	0.04	
Sometimes patients just want to get drugs and tests rather than really seeking medical advice from doctors			0.040
Disagree	3.22	0.09	
Agree	3.01	0.04	
Nowadays patients are better informed about their own medical conditions so that sometimes they demand specific treatments from doctors			0.586
Disagree	2.99	0.11	
Agree	3.05	0.04	
Patients are becoming more aggressive in their demands			0.008
Disagree	3.22	0.08	
Agree	2.98	0.04	
Patients are becoming more likely to sue them even when doctors are trying to do their best			0.532
Disagree	3.12	0.13	
Agree	3.04	0.04	
The number of complaints by patients has increased in recent years			0.052
Disagree	3.19	0.09	
Agree	3.00	0.04	
Violence against doctors by their own patients is increasing			0.063
Disagree	3.27	0.13	
Agree	3.02	0.04	

*p values for Analysis of Covariance (ANCOVA) controlling gender, age and education

Finally, 88% (177) of the doctors said they would not want their children to be doctors. Of those 125 who provided a reason, 42 (34%) said poor pay, 22 (18%) said high pressure from work, and 21 (17%) said it was a high-risk profession. Eleven (9%) expressed concerns about personal insecurity or patient violence and conflicts, 11 (9%) cited the poor doctor patient relationship, and 17 (14%) stated low status and social recognition.

DISCUSSION

This study provides some insights into the reasons for the low morale in the medical profession in China. Given perceived low status, high perceived risk of violence and increasing litigation, it is perhaps not surprising that job satisfaction is low and that the overwhelming majority of our sample (88%) do not want their children to be doctors. Concerns for the future of the medical profession, and threats to the health system are being voiced quite openly even by senior Chinese authorities.[31]

Our findings highlight the causes of low job satisfaction among doctors. They also show that despite being the best qualified, and having the highest status and the highest income, doctors at the provincial hospital were the most dissatisfied group, followed by county hospital doctors with primary care doctors the most satisfied. The causes of dissatisfaction fall into three main areas: low income, heavy workload and patient aggression. We will discuss these three factors together with the policy implications.

Income

Low income is a major grievance, mirroring findings in previous studies.[28 32] Even at provincial level, 80% earned an annual salary of 36,000 RMB or less. Among senior doctors 35% earned more than this. This compared to the average annual income of 34,550 RMB in urban Zhejiang in 2012.[33] While bonuses increase this considerably for some doctors, the overall income is still not regarded by most as sufficient compensation for the long hours, and the risks incurred.

To better remunerate doctors of course demands more resources, but government investment in health remains insufficient. Total health expenditure remained under 5% of GDP before the health reforms in 2009 and saw a slight increase to 5.36% in 2012, compared to a GDP growth of 9.3% in 2011 and 7.8% in 2012.[34 35] This compares with total health spending of around 10% of GDP in UK, Germany, France, Norway, Canada, and Japan.[36] Government subsidy into these so-called public health facilities, accounts for less than 10% of higher-level hospital revenue and 40% of community health centre revenue.[37 38]

Fees for basic medical services, including doctors' consultation, nursing services and surgical procedures, have been kept low ostensibly in order to ensure access to basic care for all.[39] For example in Beijing[40], a doctor consultation fee in an outpatient department is 2.5 RMB at a community health centre and 4 RMB at a tertiary hospital. The staff costs (surgeons, nurses, anaesthetists) for an appendectomy are 150 RMB. These low costs are blamed in medical circles for the undervaluing medical expertise.[41] Because these charges are kept low, facilities operate a market system, making profits from prescribing drugs and tests. The health reforms were meant to address the problem of perverse incentives, partly through the introduction of the zero mark-up essential drug policy in 2009. The government started the policy in primary

care level and it is now being rolled-out in higher-level hospitals. With no mark-up from drugs now possible, the basic salary for the majority of doctors remains low.[10] A series of experimental initiatives aiming to augment doctors' income are being launched, such as pay-for-performance and raising prices of services, including consultation fees and procedures. But this may not fill the gap and doctors' income remains low. Some doctors are finding other ways to complement income. For example a shift is being seen towards prescribing more Traditional Chinese Medicine.

Appropriate measures to address effort-reward imbalance must be taken. First, increasing government funding to increase doctors' salary can help to attract and retain good doctors. Second, increasing charges for healthcare may be useful to increase hospital revenue, to reflect the value of doctors' expertise and to improve their self-value and morale. This increase should be covered by governmental insurance schemes. Third, involving doctors in proper evaluation and modifications of essential drug list policy is necessary, especially in deciding which drugs are on the list. There are known to be grievances about the content of the list and doctors want more autonomy in this regard.[9] Also, it is important to note the socioeconomic disparities across China. It is extremely difficult to prescribe a national strategy, and exploration of local policies tailored to local social-economic conditions is warranted.

Workload

Long working hours appear to be a major contributor to dissatisfaction, especially at provincial and county hospitals. Here the huge volume of outpatients makes it difficult to spend sufficient time with patients, affecting quality of care and the doctor-patient relationship. With no gatekeeping systems in primary care, many

patients bypass lower levels to go to where they think they will get the best care, that is, provincial level hospitals. Inappropriate use of higher level care was commented on by 84% of our respondents. The health reform measures taken to strengthen primary care aimed partly to address this problem of massive overutilization of secondary and tertiary facilities for mostly minor conditions. But the reforms have probably made no difference.[9] This is because improvements in health insurance re-imbursement have improved access, especially to higher-level facilities. Around 96% of the population now have health insurance.[42] The outpatient throughput from 2009 to 2012 increased by 50% from 303 million to 455 million.[43]

With 46% of all out-patient consultations occurring at county level and above in 2012[44], the sheer volume of out-patient visits necessitates a very short consultation, inevitably jeopardising the quality of care. The health reforms have failed to discourage patients from inappropriately using higher-level care for minor conditions and this was a major goal of the reforms.

The discrepancy in workload and pressure between primary and higher level care partly explains the differences in job satisfaction. In primary care doctors are not subject to the same pressures of long working hours, short and rushed consultations, and often unpaid overtime. In addition, primary care doctors mainly manage patients who are not seriously ill, and hence are less likely to be the target of patient complaints or aggression. To tackle the underlying problem of inappropriate use of higher level facilities, the primary care system needs to be further strengthened with the addition of a gate-keeping role. As we found in our study, primary care doctors have much lower educational attainment, and this may contribute to the long standing mistrust among the public. It has been 15 years since the introduction of community

health services as a new primary health care model in urban areas. Despite the increasing government support, the general public still lack trust in these urban primary care physicians.[45] The medical education curriculum needs to include more primary care and thus attract more well-qualified doctors into primary care. This would help to reduce patient flow to high level hospitals, and be far more cost-effective. However, the potential impact of a gate-keeping policy on primary care is not clear. Although it would make financial sense, a shift in workload to primary care may reduce job satisfaction for doctors at this level, creating new problems. A number of ongoing pilots in limited forms of gate-keeping[46], may provide some insights into the effects on job satisfaction across the three levels.

Patient aggression

Patients' aggressive demands and violence are having a serious impact on doctors' job satisfaction.[11 47] The situation is compounded by the fact that many of these violent events take place not only with impunity of the legal authorities, but also with the tolerance of the general public. In addition, while many receive scant media publicity, the internet spreads news of these events rapidly and widely. This has bred fears and insecurity, contributing to low morale in the profession.[12]

The causes of this patient aggression are complex. First, perverse incentives and doctors' profit seeking behaviours have compromised quality of care, and led to erosion of professional ethics and higher medical costs.[48] Certain areas of the media have taken to criticising doctors for their "irresponsible and wrong" advice, and occasional cases of extremely high medical expenses, which make patients feel

exploited.[49] In addition, patients are better informed about medical problems due to increasingly accessible health information, leading them to be more demanding.

Second, in a commoditized health care system, despite high coverage of medical insurance, patients are still paying a large portion of their medical expenses out-of-pocket.[37] Together with long waiting times and short consultation times, poor communication between doctors and patients can easily trigger tension between the two parties when doctors fail to meet patients' high expectations. Third, as doctors are the ones who dictate patient care, they are an easy target for patients' complaints and frustration.

Measures to prevent patient aggression against doctors are necessary. National measures to strengthen hospital security and criminalize any acts causing hospital disturbance were taken[50] soon after a doctor was killed by a 17 year-old patient in 2012. But these have been poorly enforced and critics argue that this does not solve the underlying systemic issues. More radical solutions are needed to prevent violence in health facilities. Policies of 'zero tolerance' towards violence in healthcare sectors are recommended by the most influential medical associations in China.[51] But the medical associations have no enforcement powers and are very rarely actually involved in medical disputes. Education programs assisting doctors to prevent and manage patient violence may also be beneficial.[52] An emphasis on doctor-patient communication skills in the medical school syllabus may help improve the doctor-patient relationship, and reduce patient aggression.[53]

Limitations

The study has some limitations. First, we sampled only four cities and counties in the province and only one provincial hospital. So the results have limited generalisability. The sample size was relatively small and doctors' participation was voluntary, leading to potential bias. However, we did sample across three levels of health institutions in four places, with different economic levels. Second, as there are almost no studies on this topic, comparisons could not be made. Thirdly, the job satisfaction score was developed for the paper and has not been formally validated. Nevertheless, it enabled us to compare the job satisfaction of doctors across different levels of hospital. But as a first study comparing job satisfaction at three levels of facility and exploring associated systemic factors, we have provided a starting point for further research into exploring related issues in China.

CONCLUSION

Doctors in Zhejiang province, China, have low job satisfaction overall. Measures must be taken to address this in order to address future problems of recruitment and retention of doctors. These measures must include reduction of doctors' workload, especially at provincial hospitals, increase in doctors' salary, and more punitive measures against individuals who commit violent acts against doctors.

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Authors' contributions

TH and DW designed the study and the questionnaire. DW carried out the survey. KFL and YW performed the statistical analysis. DW, TH and YW interpreted the analysis. DW and TH drafted the manuscript. All authors read and approved the final manuscript.

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Competing interests

The authors declare that they have no competing interests.

Ethical approvals

The study is a student research project that has received ethical approval from the UCL Research Ethics Committee.

Data sharing statement

No additional data are available.

REFERENCES

1. Li D, Yin W, Zhang X, et al. Investigation on turnover intention of medical staff in public hospitals and research of early-warning system's construction. *Chinese Journal of Hospital Administration* 2010;**26**(03):218-21.

2. National Health and Family Planning Commission PRC. *Research on relationship between Yi and Huan in China, 2008*: Center for Health Statistics and Information 2008:P106.

3. Wang ZG. *Worrying conditions of doctors' practising environment: 78% of the doctors do not want their children to be doctors 2013.* http://news.china.com.cn/2013-10/27/content_30414901.htm (accessed 3 Mar 2014).

4. Shanghai Jiao Tong University. *Announcement of results of changing majors for students admitted in 2013*. http://www.jwc.sjtu.edu.cn/web/sjtu/198015-1980000004584.htm (accessed 27 May 2014).

5. Flaherty JH, Liu ML, Ding L, et al. China: the aging giant. *J Am Geriatr Soc* 2007;**55**(8):1295-300.

6. CDC US. *U.S. CDC IN CHINA: 2010-2011 Annual Report Healthy People in a Health China*, 2013.

7. Song K, Scott A, Sivey P, et al. Improving Chinese primary care providers' recruitment and retention: a discrete choice experiment. *Health Policy Plan* 2013.

8. China Daily. *WeChat poll revealed "90% of participants do not want children to be doctors: high pressure and intense doctor-patient conflicts are main reasons"*. http://www.chinadaily.com.cn/micro-reading/dzh/2014-04-23/content_11627822.html (accessed 23 May 2014).

9. Zhou XD, Li L, Hesketh T. Health system reform in rural China: Voices of healthworkers and service-users. *Soc Sci Med* 2014;**117**:134-41.

10. Guan XD, Liang HG, Xue YJ, et al. An analysis of China's national essential medicines policy. *J Public Health Policy* 2011;**32**(3):305-19.

11. Zhang X, Sleeboom-Faulkner M. Tensions between medical professionals and patients in mainland China. *Camb Q Healthc Ethics* 2011;**20**(3):458.

12. Hesketh T, Wu D, Mao LN, et al. Violence against doctors in China. *Br Med J* 2012;**345**.

13. Wang ZG. *Yi Nao incidents increased by 7000 over last five years: illegal gangs made huge profits 2012.* http://www.china.com.cn/news/2012-05/03/content_25287333_2.htm (accessed 23 Jul 2014).

14. Xiong C. *Medical malpractice and medical disputes.* Chinese Hospital Association Guide 2006.

15. Wu SY, Zhu W, Li HY, et al. Workplace violence and influencing factors among medical professionals in China. *Am J Ind Med* 2012;**55**(11):1000-08.

16. Ding Xiang Yuan. *Chinese Hospital Association: violence against doctors gets worse*. http://vote.dxy.cn/report/dxy/id/57914 (accessed 28 Feb 2014).

17. BMA. *Violence at work: the experience of UK doctors*: Health Policy and Economic Research Unit, British Medical Association, 2003.

18. Algwaiz WM, Alghanim SA. Violence exposure among health care professionals in Saudi public hospitals. A preliminary investigation. *Saudi Med J* 2012;**33**(1):76-82.

19. Behnam M, Tillotson RD, Davis SM, et al. Violence in the emergency department: a national survey of emergency medicine residents and attending physicians. *J Emerg Med* 2011;**40**(5):565-79.

20. Forrest LE, Herath PM, McRae IS, et al. A national survey of general practitioners' experiences of patient-initiated aggression in Australia. *Med J Aus* 2011;**194**(11):605-08.

21. Joa TS, Morken T. Violence towards personnel in out-of-hours primary care: a cross-sectional study. *Scand J Prim Health Care* 2012;**30**(1):55-60.

22. Kowalenko T, Walters BL, Khare RK, et al. Workplace violence: a survey of emergency physicians in the state of Michigan. *Ann Emerg Med* 2005;**46**(2):142-47.

23. Magnavita N, Heponiemi T. Violence towards health care workers in a Public Health Care Facility in Italy: a repeated cross-sectional study. *BMC Health Serv Res* 2012;**12**(1):108.

24. Mirza NM, Amjad AI, Bhatti ABH, et al. Violence and abuse faced by junior physicians in the emergency department from patients and their caretakers: a nationwide study from Pakistan. *J Emerg Med* 2012;**42**(6):727-33.

25. Saeki K, Okamoto N, Tomioka K, et al. Work-related aggression and violence committed by patients and its psychological influence on doctors. *J Occup Health* 2011;**53**(5):356-64.

26. Sibbald B, Bojke C, Gravelle H. National survey of job satisfaction and retirement intentions among general practitioners in England. *Br Med J* 2003;**326**(7379):22.

27. Liu JA, Wang Q, Lu ZX. Job satisfaction and its modeling among township health center employees: a quantitative study in poor rural China. *BMC Health Serv Res* 2010;**10**(1):115.

28. Shi L, Song K, Rane S, et al. Factors associated with job satisfaction by Chinese primary care providers. *Prim Health Care Res Dev* 2014;**15**(01):46-57.

29. Thakur M. Job satisfaction in banking: A study of private and public sector banks. *The IUP Journal of Bank Management* 2007;**6**(4):60-68.

30. Buciuniene I, Blazeviciene A, Bliudziute E. Health care reform and job satisfaction of primary health care physicians in Lithuania. *BMC Fam Pract* 2005;**6**(1):10.

31. Ren Min Wang PRC. *Liao Xin Bo: Improve doctors' dignity.* http://www.people.com.cn/n/2014/0213/c347759-24348138.html (accessed 23 May 2014).

32. Lim M-K, Yang H, Zhang T, et al. China's evolving health care market: how doctors feel and what they think. *Health Policy* 2004;**69**(3):329-37.

33. Zhejiang Provincial Bureau of Statistics. *Statistical report on national economy and social development in Zhejiang Province, 2012.*

http://tjj.zj.gov.cn/tjgb/gmjjshfzgb/201302/t20130208_122162.html (accessed 21 Feb 2014).

34. The World Bank. *World Development Indicators: GDP growth (annual %).* http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG (accessed 7 Apr 2014).

35. National Health and Family Planning Commission PRC. *Health statistics in China, 2012*. http://www.moh.gov.cn/zwgkzt/ptjty/201206/55044/files/3ca7756121334b7a870a25ac79988f23.pdf (accessed 7 Apr 2014).

36. The World Bank. *Health expenditure, total (% of GDP) 2012*. http://data.worldbank.org/indicator/SH.XPD.TOTL.ZS (accessed 24 May 2014).

37. National Health and Family Planning Commission PRC. *China Health Statistics Yearbook 2013*. http://www.nhfpc.gov.cn/htmlfiles/zwgkzt/ptjnj/year2013/index2013.html (accessed 23 May 2014).

38. Ren YJ, Ji QY. Analysis of salary distribution system in public hospitals. *Journal of Shanghai Jiaotong University (Medical Science)* 2013;**33**(6).

39. Yip W, Hsiao WC. The Chinese health system at a crossroads. *Health Aff* 2008;**27**(2):460-68.

40. Beijing Municipal Commission of Development and Reform. *Prices of medical services in Beijing*. http://service2.bjpc.gov.cn/bjpc/mediprice/MedicalService1.jsp (accessed 28 Apr 2014).

41. Wang XH. *Zhong Nan Shan: Chinese doctors survive by selling drugs and the value of their expertise is not being reflected*. http://news.xinhuanet.com/health/2014-03/06/c_126226620.htm (accessed 24 May 2014).

42. Meng Q, Xu L, Zhang Y, et al. Trends in access to health services and financial protection in China between 2003 and 2011: a cross-sectional study. *Lancet* 2012;**379**(9818):805-14.

43. Health Bureau of Zhejiang Province. *Health statistics in Zhejiang Province*. http://www.zjwst.gov.cn/col/col320/index.html### (accessed 31 Mar 2014).

44. Health Bureau of Zhejiang Province. *Outpatient services in health facilities in Zhejiang Province, 2012*. http://www.zjwst.gov.cn/art/2013/4/15/art_320_227356.html (accessed 31 Mar 2014).

45. Du J, Lu X, Wang Y, et al. Mutual referral: a survey of GPs in Beijing. *Fam Pract* 2012;**29**(4):441-7.

46. Jia L, Ze Yong F. Dilemma of Community First Contact Care. Chinese General Practice 2012;**15**(3A):720-22.

47. Yao Y, Wang W, Wang F, et al. General self-efficacy and the effect of hospital workplace violence on doctors' stress and job satisfaction in China. *Int J Occup Med Environ Health* 2014;**27**(3):1-11.

48. Yip WC-M, Hsiao W, Meng Q, et al. Realignment of incentives for health-care providers in China. *Lancet* 2010;**375**(9720):1120-30.

49. Jie YX. *10 doctors calls for apologies from mass media about fasified reports 2014*. http://www.yxj.org.cn/news/yijieyaowen/shehuijiaodian/20140521095829366651.htm (accessed 23 May 2014).

50. National Health and Family Planning Commission PRC. *The directive of maintaining order at medical institutions by Police Department, Ministry of Health.* http://wsb.moh.gov.cn/zwgkzt/ptg/201204/54578.shtml (accessed 11 Feb 2014).

51. CMA. *United call for "Zero tolerance to medical violence" by Chinese Medical Association, Chinese Medical Doctor Association, Chinese Hospital Association and Chinese Health Law Society.* http://www.cma.org.cn/index/xhdt/20131029/1383026180011_1.html (accessed 11 Feb 2014).

52. Zernike W, Sharpe P. Patient aggression in a general hospital setting: do nurses perceive it to be a problem? *Int J Nurs Pract* 1998;**4**(2):126-33.

53. Ong LM, De Haes JC, Hoos AM, et al. Doctor-patient communication: a review of the literature. *Soc Sci Med* 1995;**40**(7):903-18.

Health system reforms, violence against doctors and job satisfaction in the medical profession: a cross-sectional survey in Zhejiang Province, Eastern China

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Abstract

Objective: To explore the factors influencing doctors' job satisfaction and morale in China, in the context of the ongoing health system reforms and the deteriorating doctor-patient relationship

Design: Cross-sectional survey using self-completion questionnaires.

Study setting: The survey was conducted from March to May 2012 among doctors at provincial, county and primary care levels, in Zhejiang Province, China.

Results: The questionnaire was completed by 202 doctors. Factors which contributed most to low job satisfaction were low income and long working hours. Provincial level doctors were most dissatisfied while primary care doctors were the least dissatisfied. Three percent of doctors at high-level hospitals and 27% of those in primary care were satisfied with the salary. Only 7% at high-level hospitals were satisfied with work hours, compared to 43% in primary care. Less than 10% at high levels were satisfied with amount of paid vacation time (3%) and paid sick leave (5%), compared with 38% and 41% respectively in primary care.

Overall, 87% reported that patients were more likely to sue and that patient violence against doctors was increasing. Only 4.5% wanted their children to be doctors. Of those 125 who provided a reason, 34% said poor pay, 17% said it was a high-risk profession, and 9% expressed concerns about personal insecurity or patient violence.

Conclusions: Doctors have low job satisfaction overall. Recruitment and retention of doctors have become major challenges for the Chinese health system. Measures must be taken to address this, in order to ensure recruitment and retention of doctors in the

future. ~~prevent a serious human resource crisis in the profession.~~ These measures must include reduction of doctors' workload especially at provincial hospitals, increase in doctors' salary and more effective measures to tackl~~ing~~ patient violence against doctors.

Strengths and limitations of this study

- Our study is one of the first to ~~studies~~ investigat~~ing~~ doctors' job satisfaction in China, since the instigation of the health reforms in 2009.
- We compared doctors' job satisfaction across three levels of health facility and explored associated systemic factors.
- Our study document~~ed~~ for the first time that ~~the~~ increasing patient violence is a major contributor to doctors' low morale
- The generalizability of the study is constrained by the limited number of participating health facilities and the small sample size.

INTRODUCTION

The Chinese medical profession is facing serious problems with recruitment and retention of doctors. ~~a human resource crisis~~Evidence from a number of sources illustrates low levels of morale in the profession. In a study of 933 doctors in 29 public hospitals in Shandong province, 49% said they intended to leave the profession.[1] Other studies have shown that only 24% of doctors would choose the profession if they had a second chance[2] and 78% would not want their own children to be doctors.[3] At Shanghai Jiao Tong University, which is among the top five in the country, 10% of the second year medical students transferred to other majors in 2013.[4] These worrying manifestations of discontent come at a time when more doctors are needed, given the pressures of an ageing population[5] and a growing non-communicable diseases burden.[6] Recruitment and retention of doctors have become major challenges for the health system in China.[7]

There is evidence that this situation is worsening[8], so urgent measures are needed to reverse this trend. Clearly, such measures need to include addressing the underlying causes of this discontent. The aim of this study was to explore these underlying causes through surveying the views of doctors working at three levels of the health system: tertiary, secondary and primary care. Primary level facilities are supposed to provide preventive and basic medical services, while secondary and tertiary hospitals provide specialized care. The study was conducted in 2012, three years after the inception of major health system reforms, aiming to provide universal healthcare by 2020 with a focus on strengthening primary care. The reforms have also had impacts on doctors' working conditions: changes to health insurance have made healthcare more affordable at all levels, resulting in increased workload for doctors, especially at

secondary and tertiary level hospitals, even for minor illness. The introduction of an essential drug list for primary care, which aims to reduce perverse incentives for overprescribing to forbid profit on drugs, has reduced doctors' autonomy and reduced their income.[9] This loss of income from the mark-up in primary care has been replaced with a fixed salary and in some places a performance-based bonus, which in most cases is lower than previous earnings.[10]

Another important contributor to morale is a recent deterioration in the doctor-patient relationship.[11] The most extreme manifestation of this is a rise in levels of violence against health workers, along with damage and disturbance to health facilities. In China, this phenomenon is known as Yi Nao, which translates as (medical or hospital disturbance). This is usually caused by patients or their relatives as a reaction to what may be perceived, rightly or wrongly, as failures or mistakes by hospital staff. Sometimes the situation escalates with aggrieved patients and relatives hiring criminal gangs, prepared to go to extreme lengths, to threaten the hospital to provide compensation.[12] Yi Nao events are not rare. The Ministry of Health reported that the number of "major disturbances" involving physical violence nearly doubled from 9,831 in 2006 to 17,243 in 2010.[13] In a 2006 study of 270 hospitals, over 70% reported that they had experienced Yi Nao incidents.[14] A study of 12 hospitals in 2009 revealed that, of 2,464 medical professionals, 50% experienced workplace violence over the last 12 months, with 20% encountering physical abuse at least once.[15] A 2012 survey conducted by the Chinese Hospital Association in 316 public hospitals in 30 provinces revealed that the proportion of hospitals, which reported incidents of physical violence causing harm, had increased from 48% in 2008 to 64% in 2012. Of these, 8% of hospitals reported six or more incidents of physical violence every

year.[16] Violence against health personnel is not unique to China. It has been reported from many other countries, including countries as diverse as the UK, US, Italy, Saudi Arabia, Pakistan and Japan.[17-25] And many other countries are facing challenges with the recruitment and retention of doctors.[26] Therefore, lessons from the Chinese experience are relevant for other countries.

The overall objectives of this study were: 1) to explore the factors influencing doctors' job satisfaction and morale, with a special focus on the impacts of health system reforms and the deteriorating doctor-patient relationship, and 2) to compare doctors working at the three levels in the Chinese health system.

METHODS

Sampling and data collection

This cross-sectional survey was conducted from March to May 2012 in health facilities in Zhejiang province, Eastern China. Zhejiang has a population of 55 million and is ranked fourth in terms of GDP per capita among China's 33 provinces.

A multi-stage stratified purposive sampling method was adopted (Table 1).We first selected four cities or counties which represented high (Hangzhou and Yiwu), middle (Anji) and low-level (Xianju) economic development in Zhejiang province. In the second stage 10 health facilities were purposively sampled in the four cities/counties to represent a range of health facilities: in urban areas a multi-specialism provincial hospital (tertiary level) in Hangzhou, the main county hospitals (secondary level) in Anji and Xianju respectively, and two community health centres/township health centres (providers of primary care in urban and rural areas) in each city/county were

invited to participate (one in Xianju county refused). In total, four community health centres (CHCs) in urban cities and three township health centres (THCs) in rural counties were selected based on their general representativeness in the city/county.

Table 1 Sampling strategy and achieved sample size by area

Cities	Income level	Participating hospitals	Sample size	Total sample size
Hangzhou	High-income	1 provincial hospital	48	60
		2 CHCs[a]	12	
Yiwu	High-income	2 CHCs	54	54
Anji	Middle-income	1 county hospital	24	41
		2 THCs[b]	17	
Xianju	Low-income	1 county hospital	19	47
		1 THC	28	
Total		10		202

[a]CHCs: Community Health Centres

[b]THCs: Township Health Centres

At provincial level hospitals and county hospitals participants were internal medical doctors and surgeons, who were present in inpatient wards at the time of the survey. At CHCs and THCs, primary care physicians present in clinics at the time of the survey were recruited.

Prospective participants were told that the questionnaire was about job satisfaction, that completion was voluntary, and that respondent anonymity and confidentiality would be strictly protected. Ethical approval was obtained from University College London. Local approvals were obtained from Zhejiang Health Bureau and local health authorities.

Measurement methods

We developed the questionnaire based partly on existing questionnaires[27-30] with some items added and modified to specifically reflect the Chinese setting. Most questions used a five-point Likert scale ranging from 1 (not satisfied at all or strongly disagree) to 5 (extremely satisfied or strongly agree). The questionnaire included items about job satisfaction in general, perceptions about patients' health seeking behaviours and experience of patient aggression. Reverse scoring was used for questions phrased in the negative. The questionnaire was piloted, and modifications were made according to feedback.

Statistical analysis

The data were analysed using IBM SPSS version 21. Comparisons between three levels of facility were conducted using Chi-square tests. We generated an overall job satisfaction score by computing the mean of 19 satisfaction items. The satisfaction score ranges from 1 (the lowest satisfaction) to 5 (the highest satisfaction). A higher score means higher satisfaction level. Analysis of Covariance (ANCOVA) was performed to compare satisfaction scores by level of response of associated factors controlling for gender, age and education.

RESULTS

Sample characteristics

Characteristics of the study sample are shown in Table 2. Two hundred and two doctors completed questionnaires with a response rate of 81%. Forty-eight were from the provincial hospital, 43 from county hospitals, and 111 from primary care facilities. The mean age was 35.2 (SD=7.6), and 105 doctors were male, with 85 female. Only

29% of primary care doctors had ~~an undergraduate degree~~ obtained a five-year formal medical education qualification compared with 93% and 96% at county and provincial level respectively.

Table 2 Characteristics of the sample and basic working conditions by level of hospital n (%)

	Total	Level of hospital			p value
		CHCs	County	Provincial	
	N=202	N=111	N=43	N=48	(χ^2 tests)
Age (mean and SD)	35.2(7.6)	36.1(8.6)	34.2(7.4)	34.0(4.1)	0.196
Gender					0.001
Male	105(52.0)	45(40.5)	33(76.7)	27(56.3)	
Female	85(42.1)	59(53.2)	10(23.3)	16(33.3)	
Missing	12(5.9)	7(6.3)	0	5(10.4)	
Education level					0.000
Post-secondary level or less	78(38.6)	75(67.6)	3(7.0)	0(0)	
Undergraduate or higher	118(58.4)	32(28.8)	40(93.0)	46(95.8)	
Missing	6(3.0)	4(3.6)	0	2(4.2)	
Position rank					0.001
Low	81(40.1)	51(45.9)	21(48.8)	9(18.8)	
Middle	81(40.1)	36(32.4)	16(37.2)	29(60.4)	
High	18(8.9)	4(3.6)	6(14.0)	8(16.7)	
Missing	22(10.9)	20(18.0)	0	2(4.2)	
Work hours/week					0.000
< 40	16(8.2)	15(13.5)	0	1(2.1)	
40 to 50	60(30.6)	42(37.8)	13(30.2)	5(10.4)	
50 to 60	48(24.5)	27(24.3)	10(23.3)	11(22.9)	
≥ 60	72(36.7)	23(20.7)	20(46.5)	29(60.4)	
Missing	6(3.0)	4(3.6)	0	2(4.2)	
Outpatient visits per doctor per day					0.000
< 50	67(33.2)	45(40.5)	17(39.5)	5(10.4)	
50 to 100	58(28.7)	34(30.6)	13(30.2)	11(22.9)	
≥100	27(13.4)	3(2.7)	2(4.7)	22(45.8)	
Not applicable	40(20.8)	24(21.6)	9(20.9)	7(14.6)	
Missing	10(5.0)	5(4.5)	2(4.7)	3(6.3)	
Average visit time/patient (minutes)					0.001
≤ 4	32(15.8)	8(7.2)	6(14.0)	18(37.5)	
5-9	83(41.1)	46(41.4)	21(48.8)	16(33.3)	
10-14	31(15.3)	18(16.2)	8(18.6)	5(10.4)	
15-20	10(5.0)	7(6.3)	1(2.3)	2(4.2)	

≥20	5(2.5)	4(3.6)	1(2.3)	0(0)	
Not applicable	33(16.3)	24(21.6)	4 (9.3)	5(10.4)	
Missing	8(4.0)	4(3.6)	2(4.7)	2(4.2)	
Overtime hours per week					0.000
< 10	103(51.0)	69(62.2)	23(53.5)	11(22.9)	
10 to 30	74(36.6)	35(31.5)	15(34.9)	24(50.0)	
≥ 30	17(8.4)	2(1.8)	4(9.3)	11(22.9)	
Missing	8(4.0)	5(4.5)	1(2.3)	2(4.2)	
On-call duties					0.000
Yes	131(64.9)	53(47.7)	35(81.4)	43(89.6)	
No	61(30.2)	52(46.8)	7(16.3)	2(4.2)	
Missing	10(5.0)	6(5.4)	1(2.3)	3(6.2)	
Monthly salary					0.000
< 1,000 RMB	20(10.2)	2(1.8)	16(37.2)	2(4.2)	
1,000 – 3,000 RMB	146(74.1)	84(75.7)	27(62.8)	35(72.9)	
3,000 – 5,000 RMB	29(14.7)	21(18.9)	0	8(16.7)	
≥ 5,000 RMB	2(1.0)	1(0.9)	0	1(2.1)	
Missing	5(2.5)	3(2.7)	0	2(4.2)	
Total bonus last year (RMB)					0.000
< 10,000	34(17.4)	27(24.3)	4(9.3)	3(6.2)	
10,000 – 30,000	106(54.4)	57(51.4)	35(81.4)	14(29.1)	
30,000 – 50,000	43(22.1)	16(14.4)	4(9.3)	23(47.9)	
50,000 – 100,000	9(4.6)	7(6.3)	0	2(4.2)	
100,000 or higher	3(1.5)	0	0	3(6.3)	
Missing	7(3.5)	4(3.6)	0	3(6.3)	
The need to do research					0.000
Yes	88(44.9)	30(27.0)	18(41.9)	40(83.3)	
No	108(55.1)	77(69.3)	25(58.2)	6(6.3)	
Missing	6(3.0)	4(3.6)	0	2(4.2)	

Workload and pay (Table 2)

Workload varied considerably with level of hospital. Provincial hospital doctors worked the longest hours, 60% routinely worked more than 60 hours per week with 23% working more than 30 hours per week in overtime (additional work hours and on a "forced voluntary" basis largely due to heavy workload). For county level doctors these figures were 47% and 9%, and primary level doctors reported 21% and 2%. Sixty-nine percent of provincial hospital doctors saw over 50 patients in clinic per day with 46% seeing over 100 patients a day. Thirty-five per cent of doctors at secondary

level facilities saw over 50 outpatients per day and 33% at the primary level. Not surprisingly, consultation times were reported to be very short. Nearly 38% of provincial hospital doctors spent 4 minutes or less on average for each outpatient. These compared to 14% in county hospitals, and 7% in primary care. Ninety per cent of doctors at the provincial hospital reported that they did on-call duties (which usually involved being available on site overnight to deal with referrals and problems), followed by the county level (81%) and primary level (48%). Eighty-seven percent of provincial hospital doctors were required to do research in order to be eligible for promotion. This compared to 42% and 28% in county level and primary care respectively.

Remuneration consists of two parts: a basic salary and a bonus. For most doctors (74%) their monthly salary was between 1, 000 and 3,000 RMB (1 USD = 6.16 RMB in 2012), with only 1% paid more than 5,000 RMB per month and 29% paid between 3,000 and 5,000 RMB. Interestingly, 37% of county hospital doctors were paid less than 1,000 RMB monthly and none of them earned over 3,000 RMB. But 19% and 17% respectively in primary care and tertiary hospitals were paid between 3,000 RMB and 5,000 RMB. Up to 94% of junior doctors were paid 3,000 RMB or less, compared to 77% middle ranked doctors and 65% of senior doctors. Annual bonuses, varied mainly by the level of the hospital, 79% in primary care, 91% in secondary hospitals and 38% in the tertiary hospital reported 30,000 RMB or less. Half (51%) in the tertiary hospital received a bonus between 30,000 and 50,000, while only 15% and 9% respectively in primary and secondary hospitals earned this amount. Overall only 12 doctors (6%) reported 50,000 RMB or more; seven of these were primary care

doctors, five tertiary care doctors with none being county hospital doctors. Of those who did overtime, more than 80% were not paid for it.

Job satisfaction

Doctors' satisfaction with various aspects of work and conditions is shown in Table 3. Most striking are the differences between primary care practitioners and doctors in higher-level hospitals (county and provincial hospitals). Very low proportions of high-level hospital doctors were satisfied with their working conditions: only 7% at high-level hospitals were satisfied with work hours, compared to 43% in primary care. Percentages for satisfaction with basic salary were 3% and 27% respectively for higher level and primary care. Similar variations in bonuses were reported (6% at higher level versus 20% in primary care). Less than 10% at high levels were satisfied with the amount of paid vacation time (3%), amount of paid sick leave (5%) and opportunities for promotion (9%), with 38%, 41% and 25% respectively in primary care. Interestingly, primary care doctors were most likely to feel they had high social recognition (58%), compared with 29% at the provincial hospital and 23% at the county hospitals. Work relationships showed high levels of satisfaction across all health facilities. Levels of satisfaction with utilization of expertise, opportunity to update expertise and support for training showed only small differences by level.

Table 3 Doctors' job satisfaction by level of hospital (% of completely satisfied or satisfied)

Items	Satisfied No (%)	95% CIs of percentages	Satisfied (%) By level of hospital			p value (χ^2 tests)
			CHCs (N=111)	County (N=43)	Provincial (N=48)	
Work schedule and job reward						
Hours of work	52(25.7)	20.2 - 32.2	46(42.6)	2(4.7)	4(8.30)	0.000
Flexibility in scheduling	47(23.3)	18.0 - 29.6	38(35.5)	5(11.6)	4(8.30)	0.000
Geographical location of work	118(58.4)	51.5 - 65.0	68(63.0)	24(57.1)	26(54.2)	0.439
Basic salary	32(15.8)	11.5 - 21.5	29(27.4)	0(0.0)	3(6.3)	0.000
Bonus	26(12.9)	8.9 - 18.2	21(20.0)	3(7.0)	2(4.2)	0.000
Benefits (insurances, travelling etc.)	41(20.3)	15.3 - 26.4	32(30.2)	6(14.0)	3(6.3)	0.000
Amount of paid vacation time offered	43(21.3)	16.2 - 27.4	40(37.7)	1(2.3)	2(4.2)	0.000
Amount of paid sick leave offered	48(23.8)	18.4 - 30.1	43(41.0)	3(7.0)	2(4.2)	0.000
Opportunities for Promotion	34(16.8)	12.3 - 22.6	26(24.5)	4(9.8)	4(8.7)	0.004
Job security	94(46.5)	39.8 - 53.4	55(50.9)	15(36.6)	24(51.1)	0.536
Recognition for work by supervisors/senior staff	113(55.9)	49.1 - 62.6	65(60.2)	22(52.4)	26(55.3)	0.742
Recognition in society	87(43.1)	36.4 - 50.0	63(58.3)	10(23.3)	14(29.2)	0.000
Work relationships						
Relationships with co workers	168(83.2)	77.4 - 87.7	96(88.1)	37(86.0)	35(72.9)	0.116
Relationship(s) with supervisor(s)	142(70.3)	63.7 - 76.2	79(75.2)	35(81.4)	28(59.6)	0.032
Relationships with subordinates	150(74.3)	67.8 - 79.8	85(86.7)	32(80.0)	33(73.3)	0.247
Relationships with nurses	168(83.2)	77.4 - 87.7	94(86.2)	38(88.4)	36(75.0)	0.271

Use and update of professional knowledge						
Opportunity to utilize your professional skills and talents	105(52.0)	45.1 - 58.8	60(56.1)	21(48.8)	24(51.1)	0.938
Opportunity to learn new skills and new knowledge	83(41.1)	34.5 - 48.0	42(38.9)	16(37.2)	25(52.1)	0.573
Support for training and education	87(43.1)	36.4 - 50.0	49(47.6)	19(44.2)	19(39.6)	0.914

Patients' help seeking behaviours, demands and aggression (Table 4)

Across all levels of facilities doctors felt patients were becoming more demanding: 84% reported that patients often went to higher level hospitals for simple medical problems which could be solved at primary care facilities, 80% said that patients just want to get drugs or tests rather than medical advice. Across all levels of facilities doctors reported that patients were becoming more aggressive in their demands, with perceptions of high and increasing levels of complaints from patients, who are much more likely to sue than previously, with 87% reporting that there was an increasing trend of violence against doctors. County level doctors consistently reported higher levels for all these items.

Table 4 Patients' help seeking behaviours, demands and aggression by level of hospital (% of strongly agree or agree)

Items	Agree No (%)	95% CIs of percentage	Agree(percent) CHCs (N=111)	County (N=43)	Provincial (N=48)	p value (χ^2 tests)
Patients often go to higher level hospitals (e.g. tertiary hospitals) with simple complaints which could be dealt with at a lower level hospital	169(83.7)	78.0 - 88.1	95(87.2)	35(81.4)	39(83.0)	0.790
Sometimes patients just want to get drugs and tests rather than really seeking medical advice from doctors	162(80.2)	74.2 - 85.1	84(79.2)	38(88.4)	40(85.1)	0.631
Nowadays patients are better informed about their own medical conditions so that sometimes they demand specific treatments from doctors	168(83.2)	77.4 - 87.7	93(86.9)	36(85.7)	39(83.0)	0.949
Patients are becoming more aggressive in their demands	144(71.3)	64.7 - 77.1	66(60.6)	40(93.0)	38(80.9)	0.001
The number of complaints by patients has increased in recent years	153(75.7)	69.4 - 81.1	77(72.6)	41(95.3)	35(72.9)	0.006
Patients are becoming more likely to sue them even when doctors are trying to do their best	176(87.1)	81.8 - 91.1	93(87.7)	43(100.0)	40(83.3)	0.107
Violence against doctors by their own patients is increasing	176(87.1)	81.8 - 91.1	92(86.8)	43(100.0)	41(85.4)	0.126

Influencing factors of job satisfaction

Analysis of Covariance (ANCOVA) comparing job satisfaction scores among sub-groups, adjusted by gender, age and education, are presented in Table 5. Doctors in the provincial hospital appeared to be the most dissatisfied group, and primary care physicians were most satisfied with their work ($p < 0.001$). Those who had worked longer hours ($p < 0.001$), did longer overtime hours ($p < 0.05$), took on-call duties ($p < 0.01$) were more likely to be dissatisfied. Doctors who reported average consultation times of 10-20 minutes per patient and higher monthly salary showed higher satisfaction ($p < 0.01$). Doctors who had more negative perceptions of the doctor-patient relationship (thought patients were more demanding and aggressive) also had lower satisfaction scores.

Table 5 Influencing factors of doctors' job satisfaction controlling for gender, age and education

	Overall job satisfaction		
Variables	Mean	SD	p value*
Level of hospital			0.000
Primary (CHCs and THCs)	3.23	0.06	
Secondary (county hospitals)	2.83	0.08	
Tertiary(provincial hospital)	2.82	0.09	
Position rank			0.064
Low	3.12	0.06	
Middle	2.91	0.06	
High	2.97	0.15	
Work hours per week			0.000
＜50	3.23	0.06	
50 or more	2.92	0.05	
Outpatient visits per doctor per day			0.102
＜50	3.14	0.07	
50to 100	2.99	0.07	
≥100	2.85	0.11	
Not applicable	3.12	0.08	
Average visit time per patient (minutes)			0.004

＜10	2.92	0.05	
10-20	3.23	0.08	
≥20	2.97	0.25	
Not applicable	3.22	0.09	
Overtime hours per week			0.020
＜10	3.15	0.05	
10 to 30	2.95	0.06	
≥ 30	2.83	0.13	
On-call duties			0.001
Yes	2.94	0.05	
No	3.26	0.08	
Monthly salary			0.004
＜1,000 RMB	2.72	0.12	
1,000-3,000 RMB	3.05	0.04	
≥ 3,000 RMB	3.24	0.10	
Patients' help seeking behaviours and aggression			
Patients often go to higher level hospitals (e.g. tertiary hospitals) with simple complaints which could be dealt with at a lower level hospital			0.718
Disagree	3.07	0.10	
Agree	3.04	0.04	
Sometimes patients just want to get drugs and tests rather than really seeking medical advice from doctors			0.040
Disagree	3.22	0.09	
Agree	3.01	0.04	
Nowadays patients are better informed about their own medical conditions so that sometimes they demand specific treatments from doctors			0.586
Disagree	2.99	0.11	
Agree	3.05	0.04	
Patients are becoming more aggressive in their demands			0.008
Disagree	3.22	0.08	
Agree	2.98	0.04	
Patients are becoming more likely to sue them even when doctors are trying to do their best			0.532
Disagree	3.12	0.13	
Agree	3.04	0.04	
The number of complaints by patients has increased in recent years			0.052
Disagree	3.19	0.09	
Agree	3.00	0.04	
Violence against doctors by their own patients is increasing			0.063
Disagree	3.27	0.13	
Agree	3.02	0.04	

*p values for Analysis of Covariance (ANCOVA) controlling gender, age and education

Finally, 88% (177) of the doctors said they would not want their children to be doctors. Of those 125 who provided a reason, 42 (34%) said poor pay, 22 (18%) said high pressure from work, and 21 (17%) said it was a high-risk profession. Eleven (9%) expressed concerns about personal insecurity or patient violence and conflicts, 11 (9%) cited the poor doctor patient relationship, and 17 (14%) stated low status and social recognition.

DISCUSSION

This study provides some insights into the reasons for the low morale in the medical profession in China. Given perceived low status, high perceived risk of violence and increasing litigation, it is perhaps not surprising that job satisfaction is low and that the overwhelming majority of our sample (88%) do not want their children to be doctors. Concerns for the future of the medical profession, and threats to the health system are being voiced quite openly even by senior Chinese authorities.[31]

Our findings highlight the causes of low job satisfaction among doctors. They also show that despite being the best qualified, and having the highest status and the highest income, doctors at the provincial hospital were the most dissatisfied group, followed by county hospital doctors with primary care doctors the most satisfied. The causes of dissatisfaction fall into three main areas: low income, heavy workload and patient aggression. We will discuss these three factors ~~and their~~ together with the policy implications.

Income

Low income is a major grievance, mirroring findings in previous studies.[28 32] Even at provincial level, 80% earned an annual salary of 36,000 RMB or less. Among senior doctors 35% earned more than this. This compared to the average annual income of 34,550 RMB in urban Zhejiang in 2012.[33] While bonuses increase this considerably for some doctors, the overall income is still not regarded by most as sufficient compensation for the long hours, and the risks incurred.

To better remunerate doctors of course demands more resources, but government investment in health remains insufficient. Total health expenditure remained under 5% of GDP before the health reforms in 2009 and saw a slight increase to 5.36% in 2012, compared to a GDP growth of 9.3% in 2011 and 7.8% in 2012.[34 35] This compares with total health spending of around 10% of GDP in UK, Germany, France, Norway, Canada, and Japan.[36] Government subsidy into these so-called public health facilities, accounts for less than 10% of higher-level hospital revenue and 40% of community health centre revenue.[37 38]

Fees for basic medical services, including doctors' consultation, nursing services and surgical procedures, have been kept low ostensibly in order to ensure access to basic care for all.[39] For example in Beijing[40], a doctor consultation fee in an outpatient department is 2.5 RMB at a community health centre and 4 RMB at a tertiary hospital. The staff costs (surgeons, nurses, anaesthetists) for an appendectomy are 150 RMB. These low costs are blamed in medical circles for the undervaluing medical expertise.[41] Because these charges are kept low, facilities operate a market system, making profits from prescribing drugs and tests. The health reforms were meant to address the problem of perverse incentives, partly through the introduction of the zero mark-up essential drug policy in 2009. The government started the policy in primary

care level and it is now being rolled-out in higher-level hospitals. With no mark-up from drugs now possible, the basic salary for the majority of doctors remains low.[10] A series of experimental initiatives aiming to augment doctors' income are being launched, such as pay-for-performance and raising prices of services, including consultation fees and procedures. But this may not fill the gap and doctors' income remains low. Some doctors are finding other ways to complement income. For example a shift is being seen towards prescribing more Traditional Chinese Medicine.

Appropriate measures to address effort-reward imbalance must be taken. First, increasing government funding to increase doctors' salary can help to attract and retain good doctors. Second, increasing charges for healthcare may be useful to increase hospital revenue, to reflect the value of doctors' expertise and to improve their self-value and morale. This increase should be covered by governmental insurance schemes. Third, involving doctors in proper evaluation and modifications of essential drug list policy is necessary, especially in deciding which drugs are on the list. There are known to be grievances about the content of the list and doctors want more autonomy in this regard.[9] Also, it is important to note the socioeconomic disparities across China. It is extremely difficult to prescribe a national strategy, and exploration of local policies tailored to local social-economic conditions is warranted.

Workload

Long working hours appear to be a major contributor to dissatisfaction, especially at provincial and county hospitals. Here the huge volume of outpatients makes it difficult to spend sufficient time with patients, affecting quality of care and the doctor-patient relationship. With no gatekeeping systems in primary care, many

patients bypass lower levels to go to where they think they will get the best care, that is, provincial level hospitals. Inappropriate use of higher level care was commented on by 84% of our respondents. The health reform measures taken to strengthen primary care aimed ~~were~~ partly to address this problem of massive overutilization of secondary and tertiary facilities for mostly minor conditions. But the reforms have probably made no difference.[9] This is because improvements in health insurance re-imbursement have improved access, especially to higher-level facilities. Around 96% of the population now have health insurance.[42] The outpatient throughput from 2009 to 2012 increased by 50% from 303 million to 455 million.[43]

With 46% of all out-patient consultations occurring at county level and above in 2012[44], the sheer volume of out-patient visits necessitates a very short consultation, inevitably jeopardising the quality of care. The health reforms have failed to discourage patients from inappropriately using higher-level care for minor conditions and this was a major goal of the reforms.

The discrepancy in workload and pressure between primary and higher level care partly explains the differences in job satisfaction. In primary care doctors are not subject to the same pressures of long working hours, short and rushed consultations, and often unpaid overtime. In addition, primary care doctors mainly manage patients who are not seriously ill, and hence are less likely to be the target of patient complaints or aggression.

To tackle the underlying problem of inappropriate use of higher level facilities~~is~~, the primary care system needs to be further strengthened with the addition of a gate-keeping role. As we found in our study, primary care doctors have much lower

educational attainment, and this may contribute to the long standing mistrust among the public. It has been 15 years since the introduction of community health services as a new primary health care model in urban areas. Despite the increasing government support, the general public still lack trust in these urban primary care physicians.[45] The medical education curriculum needs to include more primary care and thus attract more well-qualified doctors into primary care. This would help to reduce patient flow to high level hospitals, and be far more cost-effective. However, the potential impact of a gate-keeping policy on primary care is not clear. Although it would make financial sense, a shift in workload to primary care may reduce job satisfaction for doctors at this level, creating new problems. A number of ongoing pilots in limited forms of gate-keeping[46], may provide some insights into the effects on job satisfaction across the three levels.

Patient aggression

Patients' aggressive demands and violence are having a serious impact on doctors' job satisfaction.[11 47] The situation is compounded by the fact that many of these violent events take place not only with impunity of the legal authorities, but also with the tolerance of the general public. In addition, while many receive scant media publicity, the internet spreads news of these events rapidly and widely. This has bred fears and insecurity, contributing to low morale in the profession.[12]

The causes of this patient aggression are complex. First, perverse incentives and doctors' profit seeking behaviours have compromised quality of care, and led to erosion of professional ethics and higher medical costs.[48] Certain areas of the media have taken to criticising doctors for their "irresponsible and wrong" advice, and

occasional cases of extremely high medical expenses, which make patients feel exploited.[49] In addition, patients are better informed about medical problems due to increasingly accessible health information, leading them to be more demanding.

Second, in a commoditized health care system, despite high coverage of medical insurance, patients are still paying a large portion of their medical expenses out-of-pocket.[37] Together with long waiting times and short consultation times, poor communication between doctors and patients can easily trigger tension between the two parties when doctors fail to meet patients' high expectations. Third, as doctors are the ones who dictate patient care, they are an easy target for patients' complaints and frustration.

Measures to prevent patient aggression against doctors are necessary. National measures to strengthen hospital security and criminalize any acts causing hospital disturbance were taken[50] soon after a doctor was killed by a 17 year-old patient in 2012. But these have been poorly enforced and critics argue that this does not solve the underlying systemic issues. More radical solutions are needed to prevent violence in health facilities. Policies of 'zero tolerance' towards violence in healthcare sectors are recommended by the most influential medical associations in China.[51] But the medical associations have no enforcement powers and are very rarely actually involved in medical disputes. Education programs assisting doctors to prevent and manage patient violence may also be beneficial.[52] An emphasis on doctor-patient communication skills in the medical school syllabus may help improve the doctor-patient relationship, and reduce patient aggression.[53]

Limitations

The study has some limitations. First, we sampled only four cities and counties in the province and only one provincial hospital. So ~~the generalizability of~~ the results have limited generalisability. ~~is questionable.~~ The sample size was relatively small and doctors' participation was voluntary, leading to potential bias. However, we did sample across three levels of health institutions in four places, with different economic levels. Second, as there are almost no studies on this topic, comparisons could not be made. Thirdly, the job satisfaction score was developed for the paper and has not been formally validated. Nevertheless, it enabled us to compare the job satisfaction of doctors across different levels of hospital. But as a ~~very~~ first study comparing job satisfaction at three levels of facility and exploring associated systemic factors, we have provided a starting point for further research into exploring related issues in China.

CONCLUSION

Doctors in Zhejiang province, China, have low job satisfaction overall. Measures must be taken to address this in order to ~~prevent a serious~~ address future problems of recruitment and retention of doctors.~~human resource crisis in the profession~~ These ~~. Urgent~~ measures must include reduction of doctors' workload, especially at provincial hospitals, increase in doctors' salary, and more punitive measures against individuals who commit violent acts against doctors.

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Authors' contributions

TH and DW designed the study and the questionnaire. DW carried out the survey. KFL and YW performed the statistical analysis. DW, TH and YW interpreted the analysis. DW and TH drafted the manuscript. All authors read and approved the final manuscript.

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Competing interests

The authors declare that they have no competing interests.

Ethical approvals

The study is a student research project that has received ethical approval from the UCL Research Ethics Committee.

Data sharing statement

No additional data are available.

REFERENCES

1. Li D, Yin W, Zhang X, et al. Investigation on turnover intention of medical staff in public hospitals and research of early-warning system's construction. *Chinese Journal of Hospital Administration* 2010;**26**(03):218-21.

2. National Health and Family Planning Commission PRC. *Research on relationship between Yi and Huan in China, 2008*: Center for Health Statistics and Information 2008:P106.

3. Wang ZG. *Worrying conditions of doctors' practising environment: 78% of the doctors do not want their children to be doctors 2013.* http://news.china.com.cn/2013-10/27/content_30414901.htm (accessed 3 Mar 2014).

4. Shanghai Jiao Tong University. *Announcement of results of changing majors for students admitted in 2013*. http://www.jwc.sjtu.edu.cn/web/sjtu/198015-1980000004584.htm (accessed 27 May 2014).

5. Flaherty JH, Liu ML, Ding L, et al. China: the aging giant. *J Am Geriatr Soc* 2007;**55**(8):1295-300.

6. CDC US. *U.S. CDC IN CHINA: 2010-2011 Annual Report Healthy People in a Health China*, 2013.

7. Song K, Scott A, Sivey P, et al. Improving Chinese primary care providers' recruitment and retention: a discrete choice experiment. *Health Policy Plan* 2013.

8. China Daily. *WeChat poll revealed "90% of participants do not want children to be doctors: high pressure and intense doctor-patient conflicts are main reasons"*. http://www.chinadaily.com.cn/micro-reading/dzh/2014-04-23/content_11627822.html (accessed 23 May 2014).

9. Zhou XD, Li L, Hesketh T. Health system reform in rural China: Voices of healthworkers and service-users. *Soc Sci Med* 2014;**117**:134-41.

10. Guan XD, Liang HG, Xue YJ, et al. An analysis of China's national essential medicines policy. *J Public Health Policy* 2011;**32**(3):305-19.

11. Zhang X, Sleeboom-Faulkner M. Tensions between medical professionals and patients in mainland China. *Camb Q Healthc Ethics* 2011;**20**(3):458.

12. Hesketh T, Wu D, Mao LN, et al. Violence against doctors in China. *Br Med J* 2012;**345**.

13. Wang ZG. *Yi Nao incidents increased by 7000 over last five years: illegal gangs made huge profits 2012.* http://www.china.com.cn/news/2012-05/03/content_25287333_2.htm (accessed 23 Jul 2014).

14. Xiong C. *Medical malpractice and medical disputes.* Chinese Hospital Association Guide 2006.

15. Wu SY, Zhu W, Li HY, et al. Workplace violence and influencing factors among medical professionals in China. *Am J Ind Med* 2012;**55**(11):1000-08.

16. Ding Xiang Yuan. *Chinese Hospital Association: violence against doctors gets worse*. http://vote.dxy.cn/report/dxy/id/57914 (accessed 28 Feb 2014).

17. BMA. *Violence at work: the experience of UK doctors*: Health Policy and Economic Research Unit, British Medical Association, 2003.

18. Algwaiz WM, Alghanim SA. Violence exposure among health care professionals in Saudi public hospitals. A preliminary investigation. *Saudi Med J* 2012;**33**(1):76-82.

19. Behnam M, Tillotson RD, Davis SM, et al. Violence in the emergency department: a national survey of emergency medicine residents and attending physicians. *J Emerg Med* 2011;**40**(5):565-79.

20. Forrest LE, Herath PM, McRae IS, et al. A national survey of general practitioners' experiences of patient-initiated aggression in Australia. *Med J Aus* 2011;**194**(11):605-08.

21. Joa TS, Morken T. Violence towards personnel in out-of-hours primary care: a cross-sectional study. *Scand J Prim Health Care* 2012;**30**(1):55-60.

22. Kowalenko T, Walters BL, Khare RK, et al. Workplace violence: a survey of emergency physicians in the state of Michigan. *Ann Emerg Med* 2005;**46**(2):142-47.

23. Magnavita N, Heponiemi T. Violence towards health care workers in a Public Health Care Facility in Italy: a repeated cross-sectional study. *BMC Health Serv Res* 2012;**12**(1):108.

24. Mirza NM, Amjad AI, Bhatti ABH, et al. Violence and abuse faced by junior physicians in the emergency department from patients and their caretakers: a nationwide study from Pakistan. *J Emerg Med* 2012;**42**(6):727-33.

25. Saeki K, Okamoto N, Tomioka K, et al. Work-related aggression and violence committed by patients and its psychological influence on doctors. *J Occup Health* 2011;**53**(5):356-64.

26. Sibbald B, Bojke C, Gravelle H. National survey of job satisfaction and retirement intentions among general practitioners in England. *Br Med J* 2003;**326**(7379):22.

27. Liu JA, Wang Q, Lu ZX. Job satisfaction and its modeling among township health center employees: a quantitative study in poor rural China. *BMC Health Serv Res* 2010;**10**(1):115.

28. Shi L, Song K, Rane S, et al. Factors associated with job satisfaction by Chinese primary care providers. *Prim Health Care Res Dev* 2014;**15**(01):46-57.

29. Thakur M. Job satisfaction in banking: A study of private and public sector banks. *The IUP Journal of Bank Management* 2007;**6**(4):60-68.

30. Buciuniene I, Blazeviciene A, Bliudziute E. Health care reform and job satisfaction of primary health care physicians in Lithuania. *BMC Fam Pract* 2005;**6**(1):10.

31. Ren Min Wang PRC. *Liao Xin Bo: Improve doctors' dignity.* http://www.people.com.cn/n/2014/0213/c347759-24348138.html (accessed 23 May 2014).

32. Lim M-K, Yang H, Zhang T, et al. China's evolving health care market: how doctors feel and what they think. *Health Policy* 2004;**69**(3):329-37.

33. Zhejiang Provincial Bureau of Statistics. *Statistical report on national economy and social development in Zhejiang Province, 2012.* http://tjj.zj.gov.cn/tjgb/gmjjshfzgb/201302/t20130208_122162.html (accessed 21 Feb 2014).

34. The World Bank. *World Development Indicators: GDP growth (annual %).* http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG (accessed 7 Apr 2014).

35. National Health and Family Planning Commission PRC. *Health statistics in China, 2012*. http://www.moh.gov.cn/zwgkzt/ptjty/201206/55044/files/3ca7756121334b7a870a25ac79988f23.pdf (accessed 7 Apr 2014).

36. The World Bank. *Health expenditure, total (% of GDP) 2012*. http://data.worldbank.org/indicator/SH.XPD.TOTL.ZS (accessed 24 May 2014).

37. National Health and Family Planning Commission PRC. *China Health Statistics Yearbook 2013*. http://www.nhfpc.gov.cn/htmlfiles/zwgkzt/ptjnj/year2013/index2013.html (accessed 23 May 2014).

38. Ren YJ, Ji QY. Analysis of salary distribution system in public hospitals. *Journal of Shanghai Jiaotong University (Medical Science)* 2013;**33**(6).

39. Yip W, Hsiao WC. The Chinese health system at a crossroads. *Health Aff* 2008;**27**(2):460-68.

40. Beijing Municipal Commission of Development and Reform. *Prices of medical services in Beijing*. http://service2.bjpc.gov.cn/bjpc/mediprice/MedicalService1.jsp (accessed 28 Apr 2014).

41. Wang XH. *Zhong Nan Shan: Chinese doctors survive by selling drugs and the value of their expertise is not being reflected*. http://news.xinhuanet.com/health/2014-03/06/c_126226620.htm (accessed 24 May 2014).

42. Meng Q, Xu L, Zhang Y, et al. Trends in access to health services and financial protection in China between 2003 and 2011: a cross-sectional study. *Lancet* 2012;**379**(9818):805-14.

43. Health Bureau of Zhejiang Province. *Health statistics in Zhejiang Province*. http://www.zjwst.gov.cn/col/col320/index.html### (accessed 31 Mar 2014).

44. Health Bureau of Zhejiang Province. *Outpatient services in health facilities in Zhejiang Province, 2012*. http://www.zjwst.gov.cn/art/2013/4/15/art_320_227356.html (accessed 31 Mar 2014).

45. Du J, Lu X, Wang Y, et al. Mutual referral: a survey of GPs in Beijing. *Fam Pract* 2012;**29**(4):441-7.

46. Jia L, Ze Yong F. Dilemma of Community First Contact Care. Chinese General Practice 2012;**15**(3A):720-22.

47. Yao Y, Wang W, Wang F, et al. General self-efficacy and the effect of hospital workplace violence on doctors' stress and job satisfaction in China. *Int J Occup Med Environ Health* 2014;**27**(3):1-11.

48. Yip WC-M, Hsiao W, Meng Q, et al. Realignment of incentives for health-care providers in China. *Lancet* 2010;**375**(9720):1120-30.

49. Jie YX. *10 doctors calls for apologies from mass media about fasified reports 2014.* http://www.yxj.org.cn/news/yijieyaowen/shehuijiaodian/2014052109582936651.htm (accessed 23 May 2014).

50. National Health and Family Planning Commission PRC. *The directive of maintaining order at medical institutions by Police Department, Ministry of Health.* http://wsb.moh.gov.cn/zwgkzt/ptg/201204/54578.shtml (accessed 11 Feb 2014).

51. CMA. *United call for "Zero tolerance to medical violence" by Chinese Medical Association, Chinese Medical Doctor Association, Chinese Hospital Association and Chinese Health Law Society.* http://www.cma.org.cn/index/xhdt/20131029/1383026180011_1.html (accessed 11 Feb 2014).

52. Zernike W, Sharpe P. Patient aggression in a general hospital setting: do nurses perceive it to be a problem? *Int J Nurs Pract* 1998;**4**(2):126-33.

53. Ong LM, De Haes JC, Hoos AM, et al. Doctor-patient communication: a review of the literature. *Soc Sci Med* 1995;**40**(7):903-18.

STROBE 2007 (v4) checklist of items to be included in reports of observational studies in epidemiology*

Checklist for cohort, case-control, and cross-sectional studies (combined)

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4–5
Objectives	3	State specific objectives, including any pre-specified hypotheses	6
Methods			
Study design	4	Present key elements of study design early in the paper	6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6-7
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants	6-7
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case	N/A
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7-8
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	*8*
Bias	9	Describe any efforts to address potential sources of bias	N/A
Study size	10	Explain how the study size was arrived at	6-7
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	8
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	8
		(*b*) Describe any methods used to examine subgroups and interactions	8
		(*c*) Explain how missing data were addressed	N/A
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed	N/A

		Cross-sectional study—If applicable, describe analytical methods taking account of sampling strategy	
		(*e*) Describe any sensitivity analyses	N/A
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	8
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	8-11
		(b) Indicate number of participants with missing data for each variable of interest	9-10
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)	N/A
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time	N/A
		Case-control study—Report numbers in each exposure category, or summary measures of exposure	N/A
		Cross-sectional study—Report numbers of outcome events or summary measures	13-14
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	8-19
		(*b*) Report category boundaries when continuous variables were categorized	N/A
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	17-18
Discussion			
Key results	18	Summarise key results with reference to study objectives	19
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	24
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	N/A
Generalisability	21	Discuss the generalisability (external validity) of the study results	24
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	N/A

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

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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Health system reforms, violence against doctors and job satisfaction in the medical profession: a cross-sectional survey in Zhejiang Province, Eastern China

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Health system reforms, violence against doctors and job satisfaction in the medical profession: a cross-sectional survey in Zhejiang Province, Eastern China

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Checklist used for structuring the article: STROBE

Abstract

Objective: To explore the factors influencing doctors' job satisfaction and morale in China, in the context of the ongoing health system reforms and the deteriorating doctor-patient relationship

Design: Cross-sectional survey using self-completion questionnaires.

Study setting: The survey was conducted from March to May 2012 among doctors at provincial, county and primary care levels, in Zhejiang Province, China.

Results: The questionnaire was completed by 202 doctors. Factors which contributed most to low job satisfaction were low income and long working hours. Provincial level doctors were most dissatisfied while primary care doctors were the least dissatisfied. Three percent of doctors at high-level hospitals and 27% of those in primary care were satisfied with the salary. Only 7% at high-level hospitals were satisfied with work hours, compared to 43% in primary care. Less than 10% at high levels were satisfied with amount of paid vacation time (3%) and paid sick leave (5%), compared with 38% and 41% respectively in primary care.

Overall, 87% reported that patients were more likely to sue and that patient violence against doctors was increasing. Only 4.5% wanted their children to be doctors. Of those 125 who provided a reason, 34% said poor pay, 17% said it was a high-risk profession, and 9% expressed concerns about personal insecurity or patient violence.

Conclusions: Doctors have low job satisfaction overall. Recruitment and retention of doctors have become major challenges for the Chinese health system. Measures must be taken to address this, in order to ensure recruitment and retention of doctors in the

future. These measures must first include reduction of doctors' workload especially at provincial hospitals partly through incentivisation of appropriate utilisation of primary care, increase in doctors' salary and more effective measures to tackle patient violence against doctors.

Strengths and limitations of this study

- Our study is one of the first to investigate doctors' job satisfaction in China, since the instigation of the health reforms in 2009.
- We compared doctors' job satisfaction across three levels of health facility and explored associated systemic factors.
- Our study documents for the first time that increasing patient violence is a major contributor to doctors' low morale
- The generalizability of the study is constrained by the limited number of participating health facilities and the small sample size.

INTRODUCTION

The Chinese medical profession is facing serious problems with recruitment and retention of doctors. Evidence from a number of sources illustrates low levels of morale in the profession. In a study of 933 doctors in 29 public hospitals in Shandong province, 49% said they intended to leave the profession.[1] Other studies have shown that only 24% of doctors would choose the profession if they had a second chance[2] and 78% would not want their own children to be doctors.[3] At Shanghai Jiao Tong University, which is among the top five in the country, 10% of the second year medical students transferred to other majors in 2013.[4] These worrying manifestations of discontent come at a time when more doctors are needed, given the pressures of an ageing population[5] and a growing non-communicable diseases burden.[6] Recruitment and retention of doctors have become major challenges for the health system in China.[7]

There is evidence that this situation is worsening[8], so urgent measures are needed to reverse this trend. Clearly, such measures need to include addressing the underlying causes of this discontent. The aim of this study was to explore these underlying causes through surveying the views of doctors working at three levels of the health system: tertiary, secondary and primary care. Primary level facilities are supposed to provide preventive and basic medical services, while secondary and tertiary hospitals provide specialized care. The study was conducted in 2012, three years after the inception of major health system reforms, aiming to provide universal healthcare by 2020 with a focus on strengthening primary care. The reforms have also had impacts on doctors' working conditions: changes to health insurance have made healthcare more affordable at all levels, resulting in increased workload for doctors, especially at

secondary and tertiary level hospitals, even for minor illness. The introduction of an essential drug list for primary care, which aims to reduce perverse incentives for overprescribing to forbid profit on drugs, has reduced doctors' autonomy and reduced their income.[9] This loss of income from the mark-up in primary care has been replaced with a fixed salary and in some places a performance-based bonus, which in most cases is lower than previous earnings.[10]

Another important contributor to morale is a recent deterioration in the doctor-patient relationship.[11] The most extreme manifestation of this is a rise in levels of violence against health workers, along with damage and disturbance to health facilities. In China, this phenomenon is known as Yi Nao, which translates as (medical or hospital disturbance). This is usually caused by patients or their relatives as a reaction to what may be perceived, rightly or wrongly, as failures or mistakes by hospital staff. Sometimes the situation escalates with aggrieved patients and relatives hiring criminal gangs, prepared to go to extreme lengths, to threaten the hospital to provide compensation.[12] Yi Nao events are not rare. The Ministry of Health reported that the number of "major disturbances" involving physical violence nearly doubled from 9,831 in 2006 to 17,243 in 2010.[13] In a 2006 study of 270 hospitals, over 70% reported that they had experienced Yi Nao incidents.[14] A study of 12 hospitals in 2009 revealed that, of 2,464 medical professionals, 50% experienced workplace violence over the last 12 months, with 20% encountering physical abuse at least once.[15] A 2012 survey conducted by the Chinese Hospital Association in 316 public hospitals in 30 provinces revealed that the proportion of hospitals, which reported incidents of physical violence causing harm, had increased from 48% in 2008 to 64% in 2012. Of these, 8% of hospitals reported six or more incidents of physical violence every

year.[16] Violence against health personnel is not unique to China. It has been reported from many other countries, including countries as diverse as the UK, US, Italy, Saudi Arabia, Pakistan and Japan.[17-25] And many other countries are facing challenges with the recruitment and retention of doctors.[26] Therefore, lessons from the Chinese experience are relevant for other countries.

The overall objectives of this study were: 1) to explore the factors influencing doctors' job satisfaction and morale, with a special focus on the impacts of health system reforms and the deteriorating doctor-patient relationship, and 2) to compare doctors working at the three levels in the Chinese health system.

METHODS

Sampling and data collection

This cross-sectional survey was conducted from March to May 2012 in health facilities in Zhejiang province, Eastern China. Zhejiang has a population of 55 million and is ranked fourth in terms of GDP per capita among China's 33 provinces.

A multi-stage stratified purposive sampling method was adopted (Table 1).We first selected four cities or counties which represented high (Hangzhou and Yiwu), middle (Anji) and low-level (Xianju) economic development in Zhejiang province. In the second stage 10 health facilities were purposively sampled in the four cities/counties to represent a range of health facilities: in urban areas a multi-specialism provincial hospital (tertiary level) in Hangzhou, the main county hospitals (secondary level) in Anji and Xianju respectively, and two community health centres/township health centres (providers of primary care in urban and rural areas) in each city/county were

invited to participate (one in Xianju county refused). In total, four community health centres (CHCs) in urban cities and three township health centres (THCs) in rural counties were selected based on their general representativeness in the city/county.

Table 1 Sampling strategy and achieved sample size by area

Cities	Income level	Participating hospitals	Sample size	Total sample size
Hangzhou	High-income	1 provincial hospital	48	60
		2 CHCs[a]	12	
Yiwu	High-income	2 CHCs	54	54
Anji	Middle-income	1 county hospital	24	41
		2 THCs[b]	17	
Xianju	Low-income	1 county hospital	19	47
		1 THC	28	
Total		10		202

[a]CHCs: Community Health Centres

[b]THCs: Township Health Centres

At provincial level hospitals and county hospitals participants were internal medical doctors and surgeons, who were present in inpatient wards at the time of the survey. At CHCs and THCs, primary care physicians present in clinics at the time of the survey were recruited.

Prospective participants were told that the questionnaire was about job satisfaction, that completion was voluntary, and that respondent anonymity and confidentiality would be strictly protected. Ethical approval was obtained from University College London. Local approvals were obtained from Zhejiang Health Bureau and local health authorities.

Measurement methods

We developed the questionnaire based partly on existing questionnaires[27-30] with some items added and modified to specifically reflect the Chinese setting. Most questions used a five-point Likert scale ranging from 1 (not satisfied at all or strongly disagree) to 5 (extremely satisfied or strongly agree). The questionnaire included items about job satisfaction in general, perceptions about patients' health seeking behaviours and experience of patient aggression. Reverse scoring was used for questions phrased in the negative. The questionnaire was piloted, and modifications were made according to feedback.

Statistical analysis

The data were analysed using IBM SPSS version 21. Comparisons between three levels of facility were conducted using Chi-square tests. We generated an overall job satisfaction score by computing the mean of 19 satisfaction items. The satisfaction score ranges from 1 (the lowest satisfaction) to 5 (the highest satisfaction). A higher score means higher satisfaction level. Analysis of Covariance (ANCOVA) was performed to compare satisfaction scores by level of response of associated factors controlling for gender, age and education.

RESULTS

Sample characteristics

Characteristics of the study sample are shown in Table 2. Two hundred and two doctors completed questionnaires with a response rate of 81%. Forty-eight were from the provincial hospital, 43 from county hospitals, and 111 from primary care facilities. The mean age was 35.2 (SD=7.6), and 105 doctors were male, with 85 female. Only

29% of primary care doctors had obtained a five-year formal medical education qualification compared with 93% and 96% at county and provincial level respectively.

Table 2 Characteristics of the sample and basic working conditions by level of hospital n (%)

	Total	Level of hospital			p value
		CHCs	County	Provincial	
	N=202	N=111	N=43	N=48	(χ^2 tests)
Age (mean and SD)	35.2(7.6)	36.1(8.6)	34.2(7.4)	34.0(4.1)	0.196
Gender					0.001
Male	105(52.0)	45(40.5)	33(76.7)	27(56.3)	
Female	85(42.1)	59(53.2)	10(23.3)	16(33.3)	
Missing	12(5.9)	7(6.3)	0	5(10.4)	
Education level					0.000
Post-secondary level or less	78(38.6)	75(67.6)	3(7.0)	0(0)	
Undergraduate or higher	118(58.4)	32(28.8)	40(93.0)	46(95.8)	
Missing	6(3.0)	4(3.6)	0	2(4.2)	
Position rank					0.001
Low	81(40.1)	51(45.9)	21(48.8)	9(18.8)	
Middle	81(40.1)	36(32.4)	16(37.2)	29(60.4)	
High	18(8.9)	4(3.6)	6(14.0)	8(16.7)	
Missing	22(10.9)	20(18.0)	0	2(4.2)	
Work hours/week					0.000
< 40	16(8.2)	15(13.5)	0	1(2.1)	
40 to 50	60(30.6)	42(37.8)	13(30.2)	5(10.4)	
50 to 60	48(24.5)	27(24.3)	10(23.3)	11(22.9)	
≥ 60	72(36.7)	23(20.7)	20(46.5)	29(60.4)	
Missing	6(3.0)	4(3.6)	0	2(4.2)	
Outpatient visits per doctor per day					0.000
< 50	67(33.2)	45(40.5)	17(39.5)	5(10.4)	
50 to 100	58(28.7)	34(30.6)	13(30.2)	11(22.9)	
≥100	27(13.4)	3(2.7)	2(4.7)	22(45.8)	
Not applicable	40(20.8)	24(21.6)	9(20.9)	7(14.6)	
Missing	10(5.0)	5(4.5)	2(4.7)	3(6.3)	
Average visit time/patient (minutes)					0.001
≤ 4	32(15.8)	8(7.2)	6(14.0)	18(37.5)	
5-9	83(41.1)	46(41.4)	21(48.8)	16(33.3)	
10-14	31(15.3)	18(16.2)	8(18.6)	5(10.4)	
15-20	10(5.0)	7(6.3)	1(2.3)	2(4.2)	
≥20	5(2.5)	4(3.6)	1(2.3)	0(0)	
Not applicable	33(16.3)	24(21.6)	4 (9.3)	5(10.4)	

Missing	8(4.0)	4(3.6)	2(4.7)	2(4.2)	
Overtime hours per week					0.000
< 10	103(51.0)	69(62.2)	23(53.5)	11(22.9)	
10 to 30	74(36.6)	35(31.5)	15(34.9)	24(50.0)	
≥ 30	17(8.4)	2(1.8)	4(9.3)	11(22.9)	
Missing	8(4.0)	5(4.5)	1(2.3)	2(4.2)	
On-call duties					0.000
Yes	131(64.9)	53(47.7)	35(81.4)	43(89.6)	
No	61(30.2)	52(46.8)	7(16.3)	2(4.2)	
Missing	10(5.0)	6(5.4)	1(2.3)	3(6.2)	
Monthly salary					0.000
< 1,000 RMB	20(10.2)	2(1.8)	16(37.2)	2(4.2)	
1,000 – 3,000 RMB	146(74.1)	84(75.7)	27(62.8)	35(72.9)	
3,000 – 5,000 RMB	29(14.7)	21(18.9)	0	8(16.7)	
≥ 5,000 RMB	2(1.0)	1(0.9)	0	1(2.1)	
Missing	5(2.5)	3(2.7)	0	2(4.2)	
Total bonus last year (RMB)					0.000
< 10,000	34(17.4)	27(24.3)	4(9.3)	3(6.2)	
10,000 – 30,000	106(54.4)	57(51.4)	35(81.4)	14(29.1)	
30,000 – 50,000	43(22.1)	16(14.4)	4(9.3)	23(47.9)	
50,000 – 100,000	9(4.6)	7(6.3)	0	2(4.2)	
100,000 or higher	3(1.5)	0	0	3(6.3)	
Missing	7(3.5)	4(3.6)	0	3(6.3)	
The need to do research					0.000
Yes	88(44.9)	30(27.0)	18(41.9)	40(83.3)	
No	108(55.1)	77(69.3)	25(58.2)	6(6.3)	
Missing	6(3.0)	4(3.6)	0	2(4.2)	

Workload and pay (Table 2)

Workload varied considerably with level of hospital. Provincial hospital doctors worked the longest hours, 60% routinely worked more than 60 hours per week with 23% working more than 30 hours per week in overtime (additional work hours and on a "forced voluntary" basis largely due to heavy workload). For county level doctors these figures were 47% and 9%, and primary level doctors reported 21% and 2%. Sixty-nine percent of provincial hospital doctors saw over 50 patients in clinic per day with 46% seeing over 100 patients a day. Thirty-five per cent of doctors at secondary level facilities saw over 50 outpatients per day and 33% at the primary level. Not

surprisingly, consultation times were reported to be very short. Nearly 38% of provincial hospital doctors spent 4 minutes or less on average for each outpatient. These compared to 14% in county hospitals, and 7% in primary care. Ninety per cent of doctors at the provincial hospital reported that they did on-call duties (which usually involved being available on site overnight to deal with referrals and problems), followed by the county level (81%) and primary level (48%). Eighty-seven percent of provincial hospital doctors were required to do research in order to be eligible for promotion. This compared to 42% and 28% in county level and primary care respectively.

Remuneration consists of two parts: a basic salary and a bonus. For most doctors (74%) their monthly salary was between 1, 000 and 3,000 RMB (1 USD = 6.16 RMB in 2012), with only 1% paid more than 5,000 RMB per month and 29% paid between 3,000 and 5,000 RMB. Interestingly, 37% of county hospital doctors were paid less than 1,000 RMB monthly and none of them earned over 3,000 RMB. But 19% and 17% respectively in primary care and tertiary hospitals were paid between 3,000 RMB and 5,000 RMB. Up to 94% of junior doctors were paid 3,000 RMB or less, compared to 77% middle ranked doctors and 65% of senior doctors. Annual bonuses, varied mainly by the level of the hospital, 79% in primary care, 91% in secondary hospitals and 38% in the tertiary hospital reported 30,000 RMB or less. Half (51%) in the tertiary hospital received a bonus between 30,000 and 50,000, while only 15% and 9% respectively in primary and secondary hospitals earned this amount. Overall only 12 doctors (6%) reported 50,000 RMB or more; seven of these were primary care doctors, five tertiary care doctors with none being county hospital doctors. Of those who did overtime, more than 80% were not paid for it.

Job satisfaction

Doctors' satisfaction with various aspects of work and conditions is shown in Table 3. Most striking are the differences between primary care practitioners and doctors in higher-level hospitals (county and provincial hospitals). Very low proportions of high-level hospital doctors were satisfied with their working conditions: only 7% at high-level hospitals were satisfied with work hours, compared to 43% in primary care. Percentages for satisfaction with basic salary were 3% and 27% respectively for higher level and primary care. Similar variations in bonuses were reported (6% at higher level versus 20% in primary care). Less than 10% at high levels were satisfied with the amount of paid vacation time (3%), amount of paid sick leave (5%) and opportunities for promotion (9%), with 38%, 41% and 25% respectively in primary care. Interestingly, primary care doctors were most likely to feel they had high social recognition (58%), compared with 29% at the provincial hospital and 23% at the county hospitals. Work relationships showed high levels of satisfaction across all health facilities. Levels of satisfaction with utilization of expertise, opportunity to update expertise and support for training showed only small differences by level.

Table 3 Doctors' job satisfaction by level of hospital (% of completely satisfied or satisfied)

Items	Satisfied No (%)	95% CIs of percentages	Satisfied (%) By level of hospital CHCs (N=111)	County (N=43)	Provincial (N=48)	p value (χ^2 tests)
Work schedule and job reward						
Hours of work	52(25.7)	20.2 - 32.2	46(42.6)	2(4.7)	4(8.30)	0.000
Flexibility in scheduling	47(23.3)	18.0 - 29.6	38(35.5)	5(11.6)	4(8.30)	0.000
Geographical location of work	118(58.4)	51.5 - 65.0	68(63.0)	24(57.1)	26(54.2)	0.439
Basic salary	32(15.8)	11.5 - 21.5	29(27.4)	0(0.0)	3(6.3)	0.000
Bonus	26(12.9)	8.9 - 18.2	21(20.0)	3(7.0)	2(4.2)	0.000
Benefits (insurances, travelling etc.)	41(20.3)	15.3 - 26.4	32(30.2)	6(14.0)	3(6.3)	0.000
Amount of paid vacation time offered	43(21.3)	16.2 - 27.4	40(37.7)	1(2.3)	2(4.2)	0.000
Amount of paid sick leave offered	48(23.8)	18.4 - 30.1	43(41.0)	3(7.0)	2(4.2)	0.000
Opportunities for Promotion	34(16.8)	12.3 - 22.6	26(24.5)	4(9.8)	4(8.7)	0.004
Job security	94(46.5)	39.8 - 53.4	55(50.9)	15(36.6)	24(51.1)	0.536
Recognition for work by supervisors/senior staff	113(55.9)	49.1 - 62.6	65(60.2)	22(52.4)	26(55.3)	0.742
Recognition in society	87(43.1)	36.4 - 50.0	63(58.3)	10(23.3)	14(29.2)	0.000
Work relationships						
Relationships with co workers	168(83.2)	77.4 - 87.7	96(88.1)	37(86.0)	35(72.9)	0.116
Relationship(s) with supervisor(s)	142(70.3)	63.7 - 76.2	79(75.2)	35(81.4)	28(59.6)	0.032
Relationships with subordinates	150(74.3)	67.8 - 79.8	85(86.7)	32(80.0)	33(73.3)	0.247
Relationships with nurses	168(83.2)	77.4 - 87.7	94(86.2)	38(88.4)	36(75.0)	0.271

Use and update of professional knowledge						
Opportunity to utilize your professional skills and talents	105(52.0)	45.1 - 58.8	60(56.1)	21(48.8)	24(51.1)	0.938
Opportunity to learn new skills and new knowledge	83(41.1)	34.5 - 48.0	42(38.9)	16(37.2)	25(52.1)	0.573
Support for training and education	87(43.1)	36.4 - 50.0	49(47.6)	19(44.2)	19(39.6)	0.914

Patients' help seeking behaviours, demands and aggression (Table 4)

Across all levels of facilities doctors felt patients were becoming more demanding: 84% reported that patients often went to higher level hospitals for simple medical problems which could be solved at primary care facilities, 80% said that patients just want to get drugs or tests rather than medical advice. Across all levels of facilities doctors reported that patients were becoming more aggressive in their demands, with perceptions of high and increasing levels of complaints from patients, who are much more likely to sue than previously, with 87% reporting that there was an increasing trend of violence against doctors. County level doctors consistently reported higher levels for all these items.

Table 4 Patients' help seeking behaviours, demands and aggression by level of hospital (% of strongly agree or agree)

Items	Agree No (%)	95% CIs of percentage	Agree(percent) CHCs (N=111)	County (N=43)	Provincial (N=48)	p value (χ^2 tests)
Patients often go to higher level hospitals (e.g. tertiary hospitals) with simple complaints which could be dealt with at a lower level hospital	169(83.7)	78.0 - 88.1	95(87.2)	35(81.4)	39(83.0)	0.790
Sometimes patients just want to get drugs and tests rather than really seeking medical advice from doctors	162(80.2)	74.2 - 85.1	84(79.2)	38(88.4)	40(85.1)	0.631
Nowadays patients are better informed about their own medical conditions so that sometimes they demand specific treatments from doctors	168(83.2)	77.4 - 87.7	93(86.9)	36(85.7)	39(83.0)	0.949
Patients are becoming more aggressive in their demands	144(71.3)	64.7 - 77.1	66(60.6)	40(93.0)	38(80.9)	0.001
The number of complaints by patients has increased in recent years	153(75.7)	69.4 - 81.1	77(72.6)	41(95.3)	35(72.9)	0.006
Patients are becoming more likely to sue them even when doctors are trying to do their best	176(87.1)	81.8 - 91.1	93(87.7)	43(100.0)	40(83.3)	0.107
Violence against doctors by their own patients is increasing	176(87.1)	81.8 - 91.1	92(86.8)	43(100.0)	41(85.4)	0.126

Influencing factors of job satisfaction

Analysis of Covariance (ANCOVA) comparing job satisfaction scores among sub-groups, adjusted by gender, age and education, are presented in Table 5. Doctors in the provincial hospital appeared to be the most dissatisfied group, and primary care physicians were most satisfied with their work ($p < 0.001$). Those who had worked longer hours ($p < 0.001$), did longer overtime hours ($p < 0.05$), took on-call duties ($p < 0.01$) were more likely to be dissatisfied. Doctors who reported average consultation times of 10-20 minutes per patient and higher monthly salary showed higher satisfaction ($p < 0.01$). Doctors who had more negative perceptions of the doctor-patient relationship (thought patients were more demanding and aggressive) also had lower satisfaction scores.

Table 5 Influencing factors of doctors' job satisfaction controlling for gender, age and education

	Overall job satisfaction		
Variables	Mean	SD	p value*
Level of hospital			0.000
Primary (CHCs and THCs)	3.23	0.06	
Secondary (county hospitals)	2.83	0.08	
Tertiary (provincial hospital)	2.82	0.09	
Position rank			0.064
Low	3.12	0.06	
Middle	2.91	0.06	
High	2.97	0.15	
Work hours per week			0.000
＜50	3.23	0.06	
50 or more	2.92	0.05	
Outpatient visits per doctor per day			0.102
＜50	3.14	0.07	
50to 100	2.99	0.07	
≥100	2.85	0.11	
Not applicable	3.12	0.08	
Average visit time per patient (minutes)			0.004

＜10	2.92	0.05	
10-20	3.23	0.08	
≥20	2.97	0.25	
Not applicable	3.22	0.09	
Overtime hours per week			0.020
＜10	3.15	0.05	
10 to 30	2.95	0.06	
≥ 30	2.83	0.13	
On-call duties			0.001
Yes	2.94	0.05	
No	3.26	0.08	
Monthly salary			0.004
＜1,000 RMB	2.72	0.12	
1,000-3,000 RMB	3.05	0.04	
≥ 3,000 RMB	3.24	0.10	
Patients' help seeking behaviours and aggression			
Patients often go to higher level hospitals (e.g. tertiary hospitals) with simple complaints which could be dealt with at a lower level hospital			0.718
Disagree	3.07	0.10	
Agree	3.04	0.04	
Sometimes patients just want to get drugs and tests rather than really seeking medical advice from doctors			0.040
Disagree	3.22	0.09	
Agree	3.01	0.04	
Nowadays patients are better informed about their own medical conditions so that sometimes they demand specific treatments from doctors			0.586
Disagree	2.99	0.11	
Agree	3.05	0.04	
Patients are becoming more aggressive in their demands			0.008
Disagree	3.22	0.08	
Agree	2.98	0.04	
Patients are becoming more likely to sue them even when doctors are trying to do their best			0.532
Disagree	3.12	0.13	
Agree	3.04	0.04	
The number of complaints by patients has increased in recent years			0.052
Disagree	3.19	0.09	
Agree	3.00	0.04	
Violence against doctors by their own patients is increasing			0.063
Disagree	3.27	0.13	
Agree	3.02	0.04	

*p values for Analysis of Covariance (ANCOVA) controlling gender, age and education

Finally, 88% (177) of the doctors said they would not want their children to be doctors. Of those 125 who provided a reason, 42 (34%) said poor pay, 22 (18%) said high pressure from work, and 21 (17%) said it was a high-risk profession. Eleven (9%) expressed concerns about personal insecurity or patient violence and conflicts, 11 (9%) cited the poor doctor patient relationship, and 17 (14%) stated low status and social recognition.

DISCUSSION

This study provides some insights into the reasons for the low morale in the medical profession in China. Given perceived low status, high perceived risk of violence and increasing litigation, it is perhaps not surprising that job satisfaction is low and that the overwhelming majority of our sample (88%) do not want their children to be doctors. Concerns for the future of the medical profession, and threats to the health system are being voiced quite openly even by senior Chinese authorities.[31]

Our findings highlight the causes of low job satisfaction among doctors. They also show that despite being the best qualified, and having the highest status and the highest income, doctors at the provincial hospital were the most dissatisfied group, followed by county hospital doctors with primary care doctors the most satisfied. The causes of dissatisfaction fall into three main areas: low income, heavy workload and patient aggression. We will discuss these three factors together with the policy implications.

Income

Low income is a major grievance, mirroring findings in previous studies.[28 32] Even at provincial level, 80% earned an annual salary of 36,000 RMB or less. Among senior doctors 35% earned more than this. This compared to the average annual income of 34,550 RMB in urban Zhejiang in 2012.[33] While bonuses increase this considerably for some doctors, the overall income is still not regarded by most as sufficient compensation for the long hours, and the risks incurred.

To better remunerate doctors of course demands more resources, but government investment in health remains insufficient. Total health expenditure remained under 5% of GDP before the health reforms in 2009 and saw a slight increase to 5.36% in 2012, compared to a GDP growth of 9.3% in 2011 and 7.8% in 2012.[34 35] This compares with total health spending of around 10% of GDP in UK, Germany, France, Norway, Canada, and Japan.[36] Government subsidy into these so-called public health facilities, accounts for less than 10% of higher-level hospital revenue and 40% of community health centre revenue.[37 38]

Fees for basic medical services, including doctors' consultation, nursing services and surgical procedures, have been kept low ostensibly in order to ensure access to basic care for all.[39] For example in Beijing[40], a doctor consultation fee in an outpatient department is 2.5 RMB at a community health centre and 4 RMB at a tertiary hospital. The staff costs (surgeons, nurses, anaesthetists) for an appendectomy are 150 RMB. These low costs are blamed in medical circles for the undervaluing medical expertise.[41] Because these charges are kept low, facilities operate a market system, making profits from prescribing drugs and tests. The health reforms were meant to address the problem of perverse incentives, partly through the introduction of the zero mark-up essential drug policy in 2009. The government started the policy in primary

care level and it is now being rolled-out in higher-level hospitals. With no mark-up from drugs now possible, the basic salary for the majority of doctors remains low.[10] A series of experimental initiatives aiming to augment doctors' income are being launched, such as pay-for-performance and raising prices of services, including consultation fees and procedures. But this may not fill the gap and doctors' income remains low. Some doctors are finding other ways to complement income. For example a shift is being seen towards prescribing more Traditional Chinese Medicine.

Appropriate measures to address effort-reward imbalance must be taken. First, increasing government funding to increase doctors' salary can help to attract and retain good doctors. Second, increasing charges for healthcare may be useful to increase hospital revenue, to reflect the value of doctors' expertise and to improve their self-value and morale. This increase should be covered by governmental insurance schemes. Third, involving doctors in proper evaluation and modifications of essential drug list policy is necessary, especially in deciding which drugs are on the list. There are known to be grievances about the content of the list and doctors want more autonomy in this regard.[9] Also, it is important to note the socioeconomic disparities across China. It is extremely difficult to prescribe a national strategy, and exploration of local policies tailored to local social-economic conditions is warranted.

Workload

Long working hours appear to be a major contributor to dissatisfaction, especially at provincial and county hospitals. Here the huge volume of outpatients makes it difficult to spend sufficient time with patients, affecting quality of care and the doctor-patient relationship. With no gatekeeping systems in primary care, many

patients bypass lower levels to go to where they think they will get the best care, that is, provincial level hospitals. Inappropriate use of higher level care was commented on by 84% of our respondents. The health reform measures taken to strengthen primary care aimed partly to address this problem of massive overutilization of secondary and tertiary facilities for mostly minor conditions. But the reforms have probably made no difference.[9] This is because improvements in health insurance re-imbursement have improved access, especially to higher-level facilities. Around 96% of the population now have health insurance.[42] The outpatient throughput from 2009 to 2012 increased by 50% from 303 million to 455 million.[43]

With 46% of all out-patient consultations occurring at county level and above in 2012[44], the sheer volume of out-patient visits necessitates a very short consultation, inevitably jeopardising the quality of care. The health reforms have failed to discourage patients from inappropriately using higher-level care for minor conditions and this was a major goal of the reforms.

The discrepancy in workload and pressure between primary and higher level care partly explains the differences in job satisfaction. In primary care doctors are not subject to the same pressures of long working hours, short and rushed consultations, and often unpaid overtime. In addition, primary care doctors mainly manage patients who are not seriously ill, and hence are less likely to be the target of patient complaints or aggression. To tackle the underlying problem of inappropriate use of higher level facilities, the primary care system needs to be further strengthened with the addition of a gate-keeping role. As we found in our study, primary care doctors have much lower educational attainment, and this may contribute to the long standing mistrust among the public. It has been 15 years since the introduction of community

health services as a new primary health care model in urban areas. Despite the increasing government support, the general public still lack trust in these urban primary care physicians.[45] The medical education curriculum needs to include more primary care and thus attract more well-qualified doctors into primary care. This would help to reduce patient flow to high level hospitals, and be far more cost-effective. However, the potential impact of a gate-keeping policy on primary care is not clear. Although it would make financial sense, a shift in workload to primary care may reduce job satisfaction for doctors at this level, creating new problems. A number of ongoing pilots in limited forms of gate-keeping[46], may provide some insights into the effects on job satisfaction across the three levels.

Patient aggression

Patients' aggressive demands and violence are having a serious impact on doctors' job satisfaction.[11 47] The situation is compounded by the fact that many of these violent events take place not only with impunity of the legal authorities, but also with the tolerance of the general public. In addition, while many receive scant media publicity, the internet spreads news of these events rapidly and widely. This has bred fears and insecurity, contributing to low morale in the profession.[12]

The causes of this patient aggression are complex. First, perverse incentives and doctors' profit seeking behaviours have compromised quality of care, and led to erosion of professional ethics and higher medical costs.[48] Certain areas of the media have taken to criticising doctors for their "irresponsible and wrong" advice, and occasional cases of extremely high medical expenses, which make patients feel

exploited.[49] In addition, patients are better informed about medical problems due to increasingly accessible health information, leading them to be more demanding.

Second, in a commoditized health care system, despite high coverage of medical insurance, patients are still paying a large portion of their medical expenses out-of-pocket.[37] Together with long waiting times and short consultation times, poor communication between doctors and patients can easily trigger tension between the two parties when doctors fail to meet patients' high expectations. Third, as doctors are the ones who dictate patient care, they are an easy target for patients' complaints and frustration.

Measures to prevent patient aggression against doctors are necessary. National measures to strengthen hospital security and criminalize any acts causing hospital disturbance were taken[50] soon after a doctor was killed by a 17 year-old patient in 2012. But these have been poorly enforced and critics argue that this does not solve the underlying systemic issues. More radical solutions are needed to prevent violence in health facilities. Policies of 'zero tolerance' towards violence in healthcare sectors are recommended by the most influential medical associations in China.[51] But the medical associations have no enforcement powers and are very rarely actually involved in medical disputes. Education programs assisting doctors to prevent and manage patient violence may also be beneficial.[52] An emphasis on doctor-patient communication skills in the medical school syllabus may help improve the doctor-patient relationship, and reduce patient aggression.[53]

Limitations

The study has some limitations. First, we sampled only four cities and counties in the province and only one provincial hospital. So the results have limited generalisability. The sample size was relatively small and doctors' participation was voluntary, leading to potential bias. However, we did sample across three levels of health institutions in four places, with different economic levels. Second, as there are almost no studies on this topic, comparisons could not be made. Thirdly, the job satisfaction score was developed for the paper and has not been formally validated. Nevertheless, it enabled us to compare the job satisfaction of doctors across different levels of hospital. But as a first study comparing job satisfaction at three levels of facility and exploring associated systemic factors, we have provided a starting point for further research into exploring related issues in China.

CONCLUSION

Doctors in Zhejiang province, China, have low job satisfaction overall. Measures must be taken to address this in order to address future problems of recruitment and retention of doctors. These measures must first include reduction of doctors' workload, especially at provincial hospitals partly through incentivisation of appropriate utilisation of primary care, increase in doctors' salary, and more punitive measures against individuals who commit violent acts against doctors. More research is needed to explore in depth the underlying causes of job satisfaction and discontent in Chinese doctors. There may be lessons from other countries and systems, where job satisfaction among doctors is generally high.[54 55]

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Authors' contributions

TH and DW designed the study and the questionnaire. DW carried out the survey. KFL and YW performed the statistical analysis. DW, TH and YW interpreted the analysis. DW and TH drafted the manuscript. All authors read and approved the final manuscript.

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Competing interests

The authors declare that they have no competing interests.

Ethical approvals

The study is a student research project that has received ethical approval from the UCL Research Ethics Committee.

Data sharing statement

No additional data are available.

REFERENCES

1. Li D, Yin W, Zhang X, et al. Investigation on turnover intention of medical staff in public hospitals and research of early-warning system's construction. *Chinese Journal of Hospital Administration* 2010;**26**(03):218-21.

2. National Health and Family Planning Commission PRC. *Research on relationship between Yi and Huan in China, 2008*: Center for Health Statistics and Information 2008:P106.

3. Wang ZG. *Worrying conditions of doctors' practising environment: 78% of the doctors do not want their children to be doctors 2013.* http://news.china.com.cn/2013-10/27/content_30414901.htm (accessed 3 Mar 2014).

4. Shanghai Jiao Tong University. *Announcement of results of changing majors for students admitted in 2013.* http://www.jwc.sjtu.edu.cn/web/sjtu/198015-1980000004584.htm (accessed 27 May 2014).

5. Flaherty JH, Liu ML, Ding L, et al. China: the aging giant. *J Am Geriatr Soc* 2007;**55**(8):1295-300.

6. CDC US. *U.S. CDC IN CHINA: 2010-2011 Annual Report Healthy People in a Health China*, 2013.

7. Song K, Scott A, Sivey P, et al. Improving Chinese primary care providers' recruitment and retention: a discrete choice experiment. *Health Policy Plan* 2013.

8. China Daily. *WeChat poll revealed "90% of participants do not want children to be doctors: high pressure and intense doctor-patient conflicts are main reasons".* http://www.chinadaily.com.cn/micro-reading/dzh/2014-04-23/content_11627822.html (accessed 23 May 2014).

9. Zhou XD, Li L, Hesketh T. Health system reform in rural China: Voices of healthworkers and service-users. *Soc Sci Med* 2014;**117**:134-41.

10. Guan XD, Liang HG, Xue YJ, et al. An analysis of China's national essential medicines policy. *J Public Health Policy* 2011;**32**(3):305-19.

11. Zhang X, Sleeboom-Faulkner M. Tensions between medical professionals and patients in mainland China. *Camb Q Healthc Ethics* 2011;**20**(3):458.

12. Hesketh T, Wu D, Mao LN, et al. Violence against doctors in China. *Br Med J* 2012;**345**.

13. Wang ZG. *Yi Nao incidents increased by 7000 over last five years: illegal gangs made huge profits 2012.* http://www.china.com.cn/news/2012-05/03/content_25287333_2.htm (accessed 23 Jul 2014).

14. Xiong C. *Medical malpractice and medical disputes.* Chinese Hospital Association Guide 2006.

15. Wu SY, Zhu W, Li HY, et al. Workplace violence and influencing factors among medical professionals in China. *Am J Ind Med* 2012;**55**(11):1000-08.

16. Ding Xiang Yuan. *Chinese Hospital Association: violence against doctors gets worse*. http://vote.dxy.cn/report/dxy/id/57914 (accessed 28 Feb 2014).

17. BMA. *Violence at work: the experience of UK doctors*: Health Policy and Economic Research Unit, British Medical Association, 2003.

18. Algwaiz WM, Alghanim SA. Violence exposure among health care professionals in Saudi public hospitals. A preliminary investigation. *Saudi Med J* 2012;**33**(1):76-82.

19. Behnam M, Tillotson RD, Davis SM, et al. Violence in the emergency department: a national survey of emergency medicine residents and attending physicians. *J Emerg Med* 2011;**40**(5):565-79.

20. Forrest LE, Herath PM, McRae IS, et al. A national survey of general practitioners' experiences of patient-initiated aggression in Australia. *Med J Aus* 2011;**194**(11):605-08.

21. Joa TS, Morken T. Violence towards personnel in out-of-hours primary care: a cross-sectional study. *Scand J Prim Health Care* 2012;**30**(1):55-60.

22. Kowalenko T, Walters BL, Khare RK, et al. Workplace violence: a survey of emergency physicians in the state of Michigan. *Ann Emerg Med* 2005;**46**(2):142-47.

23. Magnavita N, Heponiemi T. Violence towards health care workers in a Public Health Care Facility in Italy: a repeated cross-sectional study. *BMC Health Serv Res* 2012;**12**(1):108.

24. Mirza NM, Amjad AI, Bhatti ABH, et al. Violence and abuse faced by junior physicians in the emergency department from patients and their caretakers: a nationwide study from Pakistan. *J Emerg Med* 2012;**42**(6):727-33.

25. Saeki K, Okamoto N, Tomioka K, et al. Work-related aggression and violence committed by patients and its psychological influence on doctors. *J Occup Health* 2011;**53**(5):356-64.

26. Sibbald B, Bojke C, Gravelle H. National survey of job satisfaction and retirement intentions among general practitioners in England. *Br Med J* 2003;**326**(7379):22.

27. Liu JA, Wang Q, Lu ZX. Job satisfaction and its modeling among township health center employees: a quantitative study in poor rural China. *BMC Health Serv Res* 2010;**10**(1):115.

28. Shi L, Song K, Rane S, et al. Factors associated with job satisfaction by Chinese primary care providers. *Prim Health Care Res Dev* 2014;**15**(01):46-57.

29. Thakur M. Job satisfaction in banking: A study of private and public sector banks. *The IUP Journal of Bank Management* 2007;**6**(4):60-68.

30. Buciuniene I, Blazeviciene A, Bliudziute E. Health care reform and job satisfaction of primary health care physicians in Lithuania. *BMC Fam Pract* 2005;**6**(1):10.

31. Ren Min Wang PRC. *Liao Xin Bo: Improve doctors' dignity.* http://www.people.com.cn/n/2014/0213/c347759-24348138.html (accessed 23 May 2014).

32. Lim M-K, Yang H, Zhang T, et al. China's evolving health care market: how doctors feel and what they think. *Health Policy* 2004;**69**(3):329-37.

33. Zhejiang Provincial Bureau of Statistics. *Statistical report on national economy and social development in Zhejiang Province, 2012.* http://tjj.zj.gov.cn/tjgb/gmjjshfzgb/201302/t20130208_122162.html (accessed 21 Feb 2014).

34. The World Bank. *World Development Indicators: GDP growth (annual %).* http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG (accessed 7 Apr 2014).

35. National Health and Family Planning Commission PRC. *Health statistics in China, 2012*. http://www.moh.gov.cn/zwgkzt/ptjty/201206/55044/files/3ca7756121334b7a870a25ac79988f23.pdf (accessed 7 Apr 2014).

36. The World Bank. *Health expenditure, total (% of GDP) 2012*. http://data.worldbank.org/indicator/SH.XPD.TOTL.ZS (accessed 24 May 2014).

37. National Health and Family Planning Commission PRC. *China Health Statistics Yearbook 2013*. http://www.nhfpc.gov.cn/htmlfiles/zwgkzt/ptjnj/year2013/index2013.html (accessed 23 May 2014).

38. Ren YJ, Ji QY. Analysis of salary distribution system in public hospitals. *Journal of Shanghai Jiaotong University (Medical Science)* 2013;**33**(6).

39. Yip W, Hsiao WC. The Chinese health system at a crossroads. *Health Aff* 2008;**27**(2):460-68.

40. Beijing Municipal Commission of Development and Reform. *Prices of medical services in Beijing*. http://service2.bjpc.gov.cn/bjpc/mediprice/MedicalService1.jsp (accessed 28 Apr 2014).

41. Wang XH. *Zhong Nan Shan: Chinese doctors survive by selling drugs and the value of their expertise is not being reflected*. http://news.xinhuanet.com/health/2014-03/06/c_126226620.htm (accessed 24 May 2014).

42. Meng Q, Xu L, Zhang Y, et al. Trends in access to health services and financial protection in China between 2003 and 2011: a cross-sectional study. *Lancet* 2012;**379**(9818):805-14.

43. Health Bureau of Zhejiang Province. *Health statistics in Zhejiang Province*. http://www.zjwst.gov.cn/col/col320/index.html### (accessed 31 Mar 2014).

44. Health Bureau of Zhejiang Province. *Outpatient services in health facilities in Zhejiang Province, 2012*.

http://www.zjwst.gov.cn/art/2013/4/15/art_320_227356.html (accessed 31 Mar 2014).

45. Du J, Lu X, Wang Y, et al. Mutual referral: a survey of GPs in Beijing. *Fam Pract* 2012;**29**(4):441-7.

46. Jia L, Ze Yong F. Dilemma of Community First Contact Care. Chinese General Practice 2012;**15**(3A):720-22.

47. Yao Y, Wang W, Wang F, et al. General self-efficacy and the effect of hospital workplace violence on doctors' stress and job satisfaction in China. *Int J Occup Med Environ Health* 2014;**27**(3):1-11.

48. Yip WC-M, Hsiao W, Meng Q, et al. Realignment of incentives for health-care providers in China. *Lancet* 2010;**375**(9720):1120-30.

49. Jie YX. *10 doctors calls for apologies from mass media about fasified reports 2014.* http://www.yxj.org.cn/news/yijieyaowen/shehuijiaodian/20140521095829366651.htm (accessed 23 May 2014).

50. National Health and Family Planning Commission PRC. *The directive of maintaining order at medical institutions by Police Department, Ministry of Health.* http://wsb.moh.gov.cn/zwgkzt/ptg/201204/54578.shtml (accessed 11 Feb 2014).

51. CMA. *United call for "Zero tolerance to medical violence" by Chinese Medical Association, Chinese Medical Doctor Association, Chinese Hospital Association and Chinese Health Law Society.* http://www.cma.org.cn/index/xhdt/20131029/1383026180011_1.html (accessed 11 Feb 2014).

52. Zernike W, Sharpe P. Patient aggression in a general hospital setting: do nurses perceive it to be a problem? *Int J Nurs Pract* 1998;**4**(2):126-33.

53. Ong LM, De Haes JC, Hoos AM, et al. Doctor-patient communication: a review of the literature. *Soc Sci Med* 1995;**40**(7):903-18.

54. Aasland OG, Rosta J, Nylenna M. Health care reforms and job satisfaction among doctors in Norway. *Scand J Public Health* 2010.

55. Voltmer E, Rosta J, Siegrist J, et al. Job stress and job satisfaction of physicians in private practice: comparison of German and Norwegian physicians. *Int Arch Occup Environ Health* 2012;**85**(7):819-28.

Health system reforms, violence against doctors and job satisfaction in the medical profession: a cross-sectional survey in Zhejiang Province, Eastern China

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Abstract

Objective: To explore the factors influencing doctors' job satisfaction and morale in China, in the context of the ongoing health system reforms and the deteriorating doctor-patient relationship

Design: Cross-sectional survey using self-completion questionnaires.

Study setting: The survey was conducted from March to May 2012 among doctors at provincial, county and primary care levels, in Zhejiang Province, China.

Results: The questionnaire was completed by 202 doctors. Factors which contributed most to low job satisfaction were low income and long working hours. Provincial level doctors were most dissatisfied while primary care doctors were the least dissatisfied. Three percent of doctors at high-level hospitals and 27% of those in primary care were satisfied with the salary. Only 7% at high-level hospitals were satisfied with work hours, compared to 43% in primary care. Less than 10% at high levels were satisfied with amount of paid vacation time (3%) and paid sick leave (5%), compared with 38% and 41% respectively in primary care.

Overall, 87% reported that patients were more likely to sue and that patient violence against doctors was increasing. Only 4.5% wanted their children to be doctors. Of those 125 who provided a reason, 34% said poor pay, 17% said it was a high-risk profession, and 9% expressed concerns about personal insecurity or patient violence.

Conclusions: Doctors have low job satisfaction overall. Recruitment and retention of doctors have become major challenges for the Chinese health system. Measures must be taken to address this, in order to ensure recruitment and retention of doctors in the

future. These measures must first include reduction of doctors' workload especially at provincial hospitals partly through incentivisation of appropriate utilisation of primary care, increase in doctors' salary and more effective measures to tackle patient violence against doctors.

Strengths and limitations of this study

- Our study is one of the first to investigate doctors' job satisfaction in China, since the instigation of the health reforms in 2009.
- We compared doctors' job satisfaction across three levels of health facility and explored associated systemic factors.
- Our study documents for the first time that increasing patient violence is a major contributor to doctors' low morale
- The generalizability of the study is constrained by the limited number of participating health facilities and the small sample size.

INTRODUCTION

The Chinese medical profession is facing serious problems with recruitment and retention of doctors. Evidence from a number of sources illustrates low levels of morale in the profession. In a study of 933 doctors in 29 public hospitals in Shandong province, 49% said they intended to leave the profession.[1] Other studies have shown that only 24% of doctors would choose the profession if they had a second chance[2] and 78% would not want their own children to be doctors.[3] At Shanghai Jiao Tong University, which is among the top five in the country, 10% of the second year medical students transferred to other majors in 2013.[4] These worrying manifestations of discontent come at a time when more doctors are needed, given the pressures of an ageing population[5] and a growing non-communicable diseases burden.[6] Recruitment and retention of doctors have become major challenges for the health system in China.[7]

There is evidence that this situation is worsening[8], so urgent measures are needed to reverse this trend. Clearly, such measures need to include addressing the underlying causes of this discontent. The aim of this study was to explore these underlying causes through surveying the views of doctors working at three levels of the health system: tertiary, secondary and primary care. Primary level facilities are supposed to provide preventive and basic medical services, while secondary and tertiary hospitals provide specialized care. The study was conducted in 2012, three years after the inception of major health system reforms, aiming to provide universal healthcare by 2020 with a focus on strengthening primary care. The reforms have also had impacts on doctors' working conditions: changes to health insurance have made healthcare more affordable at all levels, resulting in increased workload for doctors, especially at

secondary and tertiary level hospitals, even for minor illness. The introduction of an essential drug list for primary care, which aims to reduce perverse incentives for overprescribing to forbid profit on drugs, has reduced doctors' autonomy and reduced their income.[9] This loss of income from the mark-up in primary care has been replaced with a fixed salary and in some places a performance-based bonus, which in most cases is lower than previous earnings.[10]

Another important contributor to morale is a recent deterioration in the doctor-patient relationship.[11] The most extreme manifestation of this is a rise in levels of violence against health workers, along with damage and disturbance to health facilities. In China, this phenomenon is known as Yi Nao, which translates as (medical or hospital disturbance). This is usually caused by patients or their relatives as a reaction to what may be perceived, rightly or wrongly, as failures or mistakes by hospital staff. Sometimes the situation escalates with aggrieved patients and relatives hiring criminal gangs, prepared to go to extreme lengths, to threaten the hospital to provide compensation.[12] Yi Nao events are not rare. The Ministry of Health reported that the number of "major disturbances" involving physical violence nearly doubled from 9,831 in 2006 to 17,243 in 2010.[13] In a 2006 study of 270 hospitals, over 70% reported that they had experienced Yi Nao incidents.[14] A study of 12 hospitals in 2009 revealed that, of 2,464 medical professionals, 50% experienced workplace violence over the last 12 months, with 20% encountering physical abuse at least once.[15] A 2012 survey conducted by the Chinese Hospital Association in 316 public hospitals in 30 provinces revealed that the proportion of hospitals, which reported incidents of physical violence causing harm, had increased from 48% in 2008 to 64% in 2012. Of these, 8% of hospitals reported six or more incidents of physical violence every

year.[16] Violence against health personnel is not unique to China. It has been reported from many other countries, including countries as diverse as the UK, US, Italy, Saudi Arabia, Pakistan and Japan.[17-25] And many other countries are facing challenges with the recruitment and retention of doctors.[26] Therefore, lessons from the Chinese experience are relevant for other countries.

The overall objectives of this study were: 1) to explore the factors influencing doctors' job satisfaction and morale, with a special focus on the impacts of health system reforms and the deteriorating doctor-patient relationship, and 2) to compare doctors working at the three levels in the Chinese health system.

METHODS

Sampling and data collection

This cross-sectional survey was conducted from March to May 2012 in health facilities in Zhejiang province, Eastern China. Zhejiang has a population of 55 million and is ranked fourth in terms of GDP per capita among China's 33 provinces.

A multi-stage stratified purposive sampling method was adopted (Table 1).We first selected four cities or counties which represented high (Hangzhou and Yiwu), middle (Anji) and low-level (Xianju) economic development in Zhejiang province. In the second stage 10 health facilities were purposively sampled in the four cities/counties to represent a range of health facilities: in urban areas a multi-specialism provincial hospital (tertiary level) in Hangzhou, the main county hospitals (secondary level) in Anji and Xianju respectively, and two community health centres/township health centres (providers of primary care in urban and rural areas) in each city/county were

invited to participate (one in Xianju county refused). In total, four community health centres (CHCs) in urban cities and three township health centres (THCs) in rural counties were selected based on their general representativeness in the city/county.

Table 1 Sampling strategy and achieved sample size by area

Cities	Income level	Participating hospitals	Sample size	Total sample size
Hangzhou	High-income	1 provincial hospital	48	60
		2 CHCs[a]	12	
Yiwu	High-income	2 CHCs	54	54
Anji	Middle-income	1 county hospital	24	41
		2 THCs[b]	17	
Xianju	Low-income	1 county hospital	19	47
		1 THC	28	
Total		10		202

[a]CHCs: Community Health Centres

[b]THCs: Township Health Centres

At provincial level hospitals and county hospitals participants were internal medical doctors and surgeons, who were present in inpatient wards at the time of the survey. At CHCs and THCs, primary care physicians present in clinics at the time of the survey were recruited.

Prospective participants were told that the questionnaire was about job satisfaction, that completion was voluntary, and that respondent anonymity and confidentiality would be strictly protected. Ethical approval was obtained from University College London. Local approvals were obtained from Zhejiang Health Bureau and local health authorities.

Measurement methods

We developed the questionnaire based partly on existing questionnaires[27-30] with some items added and modified to specifically reflect the Chinese setting. Most questions used a five-point Likert scale ranging from 1 (not satisfied at all or strongly disagree) to 5 (extremely satisfied or strongly agree). The questionnaire included items about job satisfaction in general, perceptions about patients' health seeking behaviours and experience of patient aggression. Reverse scoring was used for questions phrased in the negative. The questionnaire was piloted, and modifications were made according to feedback.

Statistical analysis

The data were analysed using IBM SPSS version 21. Comparisons between three levels of facility were conducted using Chi-square tests. We generated an overall job satisfaction score by computing the mean of 19 satisfaction items. The satisfaction score ranges from 1 (the lowest satisfaction) to 5 (the highest satisfaction). A higher score means higher satisfaction level. Analysis of Covariance (ANCOVA) was performed to compare satisfaction scores by level of response of associated factors controlling for gender, age and education.

RESULTS

Sample characteristics

Characteristics of the study sample are shown in Table 2. Two hundred and two doctors completed questionnaires with a response rate of 81%. Forty-eight were from the provincial hospital, 43 from county hospitals, and 111 from primary care facilities. The mean age was 35.2 (SD=7.6), and 105 doctors were male, with 85 female. Only

29% of primary care doctors had obtained a five-year formal medical education qualification compared with 93% and 96% at county and provincial level respectively.

Table 2 Characteristics of the sample and basic working conditions by level of hospital n (%)

	Total	Level of hospital			p value
		CHCs	County	Provincial	
	N=202	N=111	N=43	N=48	(χ^2 tests)
Age (mean and SD)	35.2(7.6)	36.1(8.6)	34.2(7.4)	34.0(4.1)	0.196
Gender					0.001
Male	105(52.0)	45(40.5)	33(76.7)	27(56.3)	
Female	85(42.1)	59(53.2)	10(23.3)	16(33.3)	
Missing	12(5.9)	7(6.3)	0	5(10.4)	
Education level					0.000
Post-secondary level or less	78(38.6)	75(67.6)	3(7.0)	0(0)	
Undergraduate or higher	118(58.4)	32(28.8)	40(93.0)	46(95.8)	
Missing	6(3.0)	4(3.6)	0	2(4.2)	
Position rank					0.001
Low	81(40.1)	51(45.9)	21(48.8)	9(18.8)	
Middle	81(40.1)	36(32.4)	16(37.2)	29(60.4)	
High	18(8.9)	4(3.6)	6(14.0)	8(16.7)	
Missing	22(10.9)	20(18.0)	0	2(4.2)	
Work hours/week					0.000
< 40	16(8.2)	15(13.5)	0	1(2.1)	
40 to 50	60(30.6)	42(37.8)	13(30.2)	5(10.4)	
50 to 60	48(24.5)	27(24.3)	10(23.3)	11(22.9)	
≥ 60	72(36.7)	23(20.7)	20(46.5)	29(60.4)	
Missing	6(3.0)	4(3.6)	0	2(4.2)	
Outpatient visits per doctor per day					0.000
< 50	67(33.2)	45(40.5)	17(39.5)	5(10.4)	
50 to 100	58(28.7)	34(30.6)	13(30.2)	11(22.9)	
≥100	27(13.4)	3(2.7)	2(4.7)	22(45.8)	
Not applicable	40(20.8)	24(21.6)	9(20.9)	7(14.6)	
Missing	10(5.0)	5(4.5)	2(4.7)	3(6.3)	
Average visit time/patient (minutes)					0.001
≤ 4	32(15.8)	8(7.2)	6(14.0)	18(37.5)	
5-9	83(41.1)	46(41.4)	21(48.8)	16(33.3)	
10-14	31(15.3)	18(16.2)	8(18.6)	5(10.4)	
15-20	10(5.0)	7(6.3)	1(2.3)	2(4.2)	
≥20	5(2.5)	4(3.6)	1(2.3)	0(0)	
Not applicable	33(16.3)	24(21.6)	4 (9.3)	5(10.4)	

Missing	8(4.0)	4(3.6)	2(4.7)	2(4.2)	
Overtime hours per week					0.000
< 10	103(51.0)	69(62.2)	23(53.5)	11(22.9)	
10 to 30	74(36.6)	35(31.5)	15(34.9)	24(50.0)	
≥ 30	17(8.4)	2(1.8)	4(9.3)	11(22.9)	
Missing	8(4.0)	5(4.5)	1(2.3)	2(4.2)	
On-call duties					0.000
Yes	131(64.9)	53(47.7)	35(81.4)	43(89.6)	
No	61(30.2)	52(46.8)	7(16.3)	2(4.2)	
Missing	10(5.0)	6(5.4)	1(2.3)	3(6.2)	
Monthly salary					0.000
< 1,000 RMB	20(10.2)	2(1.8)	16(37.2)	2(4.2)	
1,000 – 3,000 RMB	146(74.1)	84(75.7)	27(62.8)	35(72.9)	
3,000 – 5,000 RMB	29(14.7)	21(18.9)	0	8(16.7)	
≥ 5,000 RMB	2(1.0)	1(0.9)	0	1(2.1)	
Missing	5(2.5)	3(2.7)	0	2(4.2)	
Total bonus last year (RMB)					0.000
< 10,000	34(17.4)	27(24.3)	4(9.3)	3(6.2)	
10,000 – 30,000	106(54.4)	57(51.4)	35(81.4)	14(29.1)	
30,000 – 50,000	43(22.1)	16(14.4)	4(9.3)	23(47.9)	
50,000 – 100,000	9(4.6)	7(6.3)	0	2(4.2)	
100,000 or higher	3(1.5)	0	0	3(6.3)	
Missing	7(3.5)	4(3.6)	0	3(6.3)	
The need to do research					0.000
Yes	88(44.9)	30(27.0)	18(41.9)	40(83.3)	
No	108(55.1)	77(69.3)	25(58.2)	6(6.3)	
Missing	6(3.0)	4(3.6)	0	2(4.2)	

Workload and pay (Table 2)

Workload varied considerably with level of hospital. Provincial hospital doctors worked the longest hours, 60% routinely worked more than 60 hours per week with 23% working more than 30 hours per week in overtime (additional work hours and on a "forced voluntary" basis largely due to heavy workload). For county level doctors these figures were 47% and 9%, and primary level doctors reported 21% and 2%. Sixty-nine percent of provincial hospital doctors saw over 50 patients in clinic per day with 46% seeing over 100 patients a day. Thirty-five per cent of doctors at secondary level facilities saw over 50 outpatients per day and 33% at the primary level. Not

surprisingly, consultation times were reported to be very short. Nearly 38% of provincial hospital doctors spent 4 minutes or less on average for each outpatient. These compared to 14% in county hospitals, and 7% in primary care. Ninety per cent of doctors at the provincial hospital reported that they did on-call duties (which usually involved being available on site overnight to deal with referrals and problems), followed by the county level (81%) and primary level (48%). Eighty-seven percent of provincial hospital doctors were required to do research in order to be eligible for promotion. This compared to 42% and 28% in county level and primary care respectively.

Remuneration consists of two parts: a basic salary and a bonus. For most doctors (74%) their monthly salary was between 1, 000 and 3,000 RMB (1 USD = 6.16 RMB in 2012), with only 1% paid more than 5,000 RMB per month and 29% paid between 3,000 and 5,000 RMB. Interestingly, 37% of county hospital doctors were paid less than 1,000 RMB monthly and none of them earned over 3,000 RMB. But 19% and 17% respectively in primary care and tertiary hospitals were paid between 3,000 RMB and 5,000 RMB. Up to 94% of junior doctors were paid 3,000 RMB or less, compared to 77% middle ranked doctors and 65% of senior doctors. Annual bonuses, varied mainly by the level of the hospital, 79% in primary care, 91% in secondary hospitals and 38% in the tertiary hospital reported 30,000 RMB or less. Half (51%) in the tertiary hospital received a bonus between 30,000 and 50,000, while only 15% and 9% respectively in primary and secondary hospitals earned this amount. Overall only 12 doctors (6%) reported 50,000 RMB or more; seven of these were primary care doctors, five tertiary care doctors with none being county hospital doctors. Of those who did overtime, more than 80% were not paid for it.

Job satisfaction

Doctors' satisfaction with various aspects of work and conditions is shown in Table 3. Most striking are the differences between primary care practitioners and doctors in higher-level hospitals (county and provincial hospitals). Very low proportions of high-level hospital doctors were satisfied with their working conditions: only 7% at high-level hospitals were satisfied with work hours, compared to 43% in primary care. Percentages for satisfaction with basic salary were 3% and 27% respectively for higher level and primary care. Similar variations in bonuses were reported (6% at higher level versus 20% in primary care). Less than 10% at high levels were satisfied with the amount of paid vacation time (3%), amount of paid sick leave (5%) and opportunities for promotion (9%), with 38%, 41% and 25% respectively in primary care. Interestingly, primary care doctors were most likely to feel they had high social recognition (58%), compared with 29% at the provincial hospital and 23% at the county hospitals. Work relationships showed high levels of satisfaction across all health facilities. Levels of satisfaction with utilization of expertise, opportunity to update expertise and support for training showed only small differences by level.

Table 3 Doctors' job satisfaction by level of hospital (% of completely satisfied or satisfied)

Items	Satisfied No (%)	95% CIs of percentages	Satisfied (%) By level of hospital			p value (χ^2 tests)
			CHCs (N=111)	County (N=43)	Provincial (N=48)	
Work schedule and job reward						
Hours of work	52(25.7)	20.2 - 32.2	46(42.6)	2(4.7)	4(8.30)	0.000
Flexibility in scheduling	47(23.3)	18.0 - 29.6	38(35.5)	5(11.6)	4(8.30)	0.000
Geographical location of work	118(58.4)	51.5 - 65.0	68(63.0)	24(57.1)	26(54.2)	0.439
Basic salary	32(15.8)	11.5 - 21.5	29(27.4)	0(0.0)	3(6.3)	0.000
Bonus	26(12.9)	8.9 - 18.2	21(20.0)	3(7.0)	2(4.2)	0.000
Benefits (insurances, travelling etc.)	41(20.3)	15.3 - 26.4	32(30.2)	6(14.0)	3(6.3)	0.000
Amount of paid vacation time offered	43(21.3)	16.2 - 27.4	40(37.7)	1(2.3)	2(4.2)	0.000
Amount of paid sick leave offered	48(23.8)	18.4 - 30.1	43(41.0)	3(7.0)	2(4.2)	0.000
Opportunities for Promotion	34(16.8)	12.3 - 22.6	26(24.5)	4(9.8)	4(8.7)	0.004
Job security	94(46.5)	39.8 - 53.4	55(50.9)	15(36.6)	24(51.1)	0.536
Recognition for work by supervisors/senior staff	113(55.9)	49.1 - 62.6	65(60.2)	22(52.4)	26(55.3)	0.742
Recognition in society	87(43.1)	36.4 - 50.0	63(58.3)	10(23.3)	14(29.2)	0.000
Work relationships						
Relationships with co workers	168(83.2)	77.4 - 87.7	96(88.1)	37(86.0)	35(72.9)	0.116
Relationship(s) with supervisor(s)	142(70.3)	63.7 - 76.2	79(75.2)	35(81.4)	28(59.6)	0.032
Relationships with subordinates	150(74.3)	67.8 - 79.8	85(86.7)	32(80.0)	33(73.3)	0.247
Relationships with nurses	168(83.2)	77.4 - 87.7	94(86.2)	38(88.4)	36(75.0)	0.271

Use and update of professional knowledge						
Opportunity to utilize your professional skills and talents	105(52.0)	45.1 - 58.8	60(56.1)	21(48.8)	24(51.1)	0.938
Opportunity to learn new skills and new knowledge	83(41.1)	34.5 - 48.0	42(38.9)	16(37.2)	25(52.1)	0.573
Support for training and education	87(43.1)	36.4 - 50.0	49(47.6)	19(44.2)	19(39.6)	0.914

Patients' help seeking behaviours, demands and aggression (Table 4)

Across all levels of facilities doctors felt patients were becoming more demanding: 84% reported that patients often went to higher level hospitals for simple medical problems which could be solved at primary care facilities, 80% said that patients just want to get drugs or tests rather than medical advice. Across all levels of facilities doctors reported that patients were becoming more aggressive in their demands, with perceptions of high and increasing levels of complaints from patients, who are much more likely to sue than previously, with 87% reporting that there was an increasing trend of violence against doctors. County level doctors consistently reported higher levels for all these items.

Table 4 Patients' help seeking behaviours, demands and aggression by level of hospital (% of strongly agree or agree)

Items	Agree No (%)	95% CIs of percentage	Agree(percent) CHCs (N=111)	County (N=43)	Provincial (N=48)	p value (χ^2 tests)
Patients often go to higher level hospitals (e.g. tertiary hospitals) with simple complaints which could be dealt with at a lower level hospital	169(83.7)	78.0 - 88.1	95(87.2)	35(81.4)	39(83.0)	0.790
Sometimes patients just want to get drugs and tests rather than really seeking medical advice from doctors	162(80.2)	74.2 - 85.1	84(79.2)	38(88.4)	40(85.1)	0.631
Nowadays patients are better informed about their own medical conditions so that sometimes they demand specific treatments from doctors	168(83.2)	77.4 - 87.7	93(86.9)	36(85.7)	39(83.0)	0.949
Patients are becoming more aggressive in their demands	144(71.3)	64.7 - 77.1	66(60.6)	40(93.0)	38(80.9)	0.001
The number of complaints by patients has increased in recent years	153(75.7)	69.4 - 81.1	77(72.6)	41(95.3)	35(72.9)	0.006
Patients are becoming more likely to sue them even when doctors are trying to do their best	176(87.1)	81.8 - 91.1	93(87.7)	43(100.0)	40(83.3)	0.107
Violence against doctors by their own patients is increasing	176(87.1)	81.8 - 91.1	92(86.8)	43(100.0)	41(85.4)	0.126

Influencing factors of job satisfaction

Analysis of Covariance (ANCOVA) comparing job satisfaction scores among sub-groups, adjusted by gender, age and education, are presented in Table 5. Doctors in the provincial hospital appeared to be the most dissatisfied group, and primary care physicians were most satisfied with their work ($p < 0.001$). Those who had worked longer hours ($p < 0.001$), did longer overtime hours ($p < 0.05$), took on-call duties ($p < 0.01$) were more likely to be dissatisfied. Doctors who reported average consultation times of 10-20 minutes per patient and higher monthly salary showed higher satisfaction ($p < 0.01$). Doctors who had more negative perceptions of the doctor-patient relationship (thought patients were more demanding and aggressive) also had lower satisfaction scores.

Table 5 Influencing factors of doctors' job satisfaction controlling for gender, age and education

	Overall job satisfaction		
Variables	Mean	SD	p value*
Level of hospital			0.000
Primary (CHCs and THCs)	3.23	0.06	
Secondary (county hospitals)	2.83	0.08	
Tertiary (provincial hospital)	2.82	0.09	
Position rank			0.064
Low	3.12	0.06	
Middle	2.91	0.06	
High	2.97	0.15	
Work hours per week			0.000
＜50	3.23	0.06	
50 or more	2.92	0.05	
Outpatient visits per doctor per day			0.102
＜50	3.14	0.07	
50to 100	2.99	0.07	
≥100	2.85	0.11	
Not applicable	3.12	0.08	
Average visit time per patient (minutes)			0.004

＜10	2.92	0.05	
10-20	3.23	0.08	
≥20	2.97	0.25	
Not applicable	3.22	0.09	
Overtime hours per week			0.020
＜10	3.15	0.05	
10 to 30	2.95	0.06	
≥ 30	2.83	0.13	
On-call duties			0.001
Yes	2.94	0.05	
No	3.26	0.08	
Monthly salary			0.004
＜1,000 RMB	2.72	0.12	
1,000-3,000 RMB	3.05	0.04	
≥ 3,000 RMB	3.24	0.10	
Patients' help seeking behaviours and aggression			
Patients often go to higher level hospitals (e.g. tertiary hospitals) with simple complaints which could be dealt with at a lower level hospital			0.718
Disagree	3.07	0.10	
Agree	3.04	0.04	
Sometimes patients just want to get drugs and tests rather than really seeking medical advice from doctors			0.040
Disagree	3.22	0.09	
Agree	3.01	0.04	
Nowadays patients are better informed about their own medical conditions so that sometimes they demand specific treatments from doctors			0.586
Disagree	2.99	0.11	
Agree	3.05	0.04	
Patients are becoming more aggressive in their demands			0.008
Disagree	3.22	0.08	
Agree	2.98	0.04	
Patients are becoming more likely to sue them even when doctors are trying to do their best			0.532
Disagree	3.12	0.13	
Agree	3.04	0.04	
The number of complaints by patients has increased in recent years			0.052
Disagree	3.19	0.09	
Agree	3.00	0.04	
Violence against doctors by their own patients is increasing			0.063
Disagree	3.27	0.13	
Agree	3.02	0.04	

*p values for Analysis of Covariance (ANCOVA) controlling gender, age and education

Finally, 88% (177) of the doctors said they would not want their children to be doctors. Of those 125 who provided a reason, 42 (34%) said poor pay, 22 (18%) said high pressure from work, and 21 (17%) said it was a high-risk profession. Eleven (9%) expressed concerns about personal insecurity or patient violence and conflicts, 11 (9%) cited the poor doctor patient relationship, and 17 (14%) stated low status and social recognition.

DISCUSSION

This study provides some insights into the reasons for the low morale in the medical profession in China. Given perceived low status, high perceived risk of violence and increasing litigation, it is perhaps not surprising that job satisfaction is low and that the overwhelming majority of our sample (88%) do not want their children to be doctors. Concerns for the future of the medical profession, and threats to the health system are being voiced quite openly even by senior Chinese authorities.[31]

Our findings highlight the causes of low job satisfaction among doctors. They also show that despite being the best qualified, and having the highest status and the highest income, doctors at the provincial hospital were the most dissatisfied group, followed by county hospital doctors with primary care doctors the most satisfied. The causes of dissatisfaction fall into three main areas: low income, heavy workload and patient aggression. We will discuss these three factors together with the policy implications.

Income

Low income is a major grievance, mirroring findings in previous studies.[28 32] Even at provincial level, 80% earned an annual salary of 36,000 RMB or less. Among senior doctors 35% earned more than this. This compared to the average annual income of 34,550 RMB in urban Zhejiang in 2012.[33] While bonuses increase this considerably for some doctors, the overall income is still not regarded by most as sufficient compensation for the long hours, and the risks incurred.

To better remunerate doctors of course demands more resources, but government investment in health remains insufficient. Total health expenditure remained under 5% of GDP before the health reforms in 2009 and saw a slight increase to 5.36% in 2012, compared to a GDP growth of 9.3% in 2011 and 7.8% in 2012.[34 35] This compares with total health spending of around 10% of GDP in UK, Germany, France, Norway, Canada, and Japan.[36] Government subsidy into these so-called public health facilities, accounts for less than 10% of higher-level hospital revenue and 40% of community health centre revenue.[37 38]

Fees for basic medical services, including doctors' consultation, nursing services and surgical procedures, have been kept low ostensibly in order to ensure access to basic care for all.[39] For example in Beijing[40], a doctor consultation fee in an outpatient department is 2.5 RMB at a community health centre and 4 RMB at a tertiary hospital. The staff costs (surgeons, nurses, anaesthetists) for an appendectomy are 150 RMB. These low costs are blamed in medical circles for the undervaluing medical expertise.[41] Because these charges are kept low, facilities operate a market system, making profits from prescribing drugs and tests. The health reforms were meant to address the problem of perverse incentives, partly through the introduction of the zero mark-up essential drug policy in 2009. The government started the policy in primary

care level and it is now being rolled-out in higher-level hospitals. With no mark-up from drugs now possible, the basic salary for the majority of doctors remains low.[10] A series of experimental initiatives aiming to augment doctors' income are being launched, such as pay-for-performance and raising prices of services, including consultation fees and procedures. But this may not fill the gap and doctors' income remains low. Some doctors are finding other ways to complement income. For example a shift is being seen towards prescribing more Traditional Chinese Medicine.

Appropriate measures to address effort-reward imbalance must be taken. First, increasing government funding to increase doctors' salary can help to attract and retain good doctors. Second, increasing charges for healthcare may be useful to increase hospital revenue, to reflect the value of doctors' expertise and to improve their self-value and morale. This increase should be covered by governmental insurance schemes. Third, involving doctors in proper evaluation and modifications of essential drug list policy is necessary, especially in deciding which drugs are on the list. There are known to be grievances about the content of the list and doctors want more autonomy in this regard.[9] Also, it is important to note the socioeconomic disparities across China. It is extremely difficult to prescribe a national strategy, and exploration of local policies tailored to local social-economic conditions is warranted.

Workload

Long working hours appear to be a major contributor to dissatisfaction, especially at provincial and county hospitals. Here the huge volume of outpatients makes it difficult to spend sufficient time with patients, affecting quality of care and the doctor-patient relationship. With no gatekeeping systems in primary care, many

patients bypass lower levels to go to where they think they will get the best care, that is, provincial level hospitals. Inappropriate use of higher level care was commented on by 84% of our respondents. The health reform measures taken to strengthen primary care aimed partly to address this problem of massive overutilization of secondary and tertiary facilities for mostly minor conditions. But the reforms have probably made no difference.[9] This is because improvements in health insurance re-imbursement have improved access, especially to higher-level facilities. Around 96% of the population now have health insurance.[42] The outpatient throughput from 2009 to 2012 increased by 50% from 303 million to 455 million.[43]

With 46% of all out-patient consultations occurring at county level and above in 2012[44], the sheer volume of out-patient visits necessitates a very short consultation, inevitably jeopardising the quality of care. The health reforms have failed to discourage patients from inappropriately using higher-level care for minor conditions and this was a major goal of the reforms.

The discrepancy in workload and pressure between primary and higher level care partly explains the differences in job satisfaction. In primary care doctors are not subject to the same pressures of long working hours, short and rushed consultations, and often unpaid overtime. In addition, primary care doctors mainly manage patients who are not seriously ill, and hence are less likely to be the target of patient complaints or aggression. To tackle the underlying problem of inappropriate use of higher level facilities, the primary care system needs to be further strengthened with the addition of a gate-keeping role. As we found in our study, primary care doctors have much lower educational attainment, and this may contribute to the long standing mistrust among the public. It has been 15 years since the introduction of community

health services as a new primary health care model in urban areas. Despite the increasing government support, the general public still lack trust in these urban primary care physicians.[45] The medical education curriculum needs to include more primary care and thus attract more well-qualified doctors into primary care. This would help to reduce patient flow to high level hospitals, and be far more cost-effective. However, the potential impact of a gate-keeping policy on primary care is not clear. Although it would make financial sense, a shift in workload to primary care may reduce job satisfaction for doctors at this level, creating new problems. A number of ongoing pilots in limited forms of gate-keeping[46], may provide some insights into the effects on job satisfaction across the three levels.

Patient aggression

Patients' aggressive demands and violence are having a serious impact on doctors' job satisfaction.[11 47] The situation is compounded by the fact that many of these violent events take place not only with impunity of the legal authorities, but also with the tolerance of the general public. In addition, while many receive scant media publicity, the internet spreads news of these events rapidly and widely. This has bred fears and insecurity, contributing to low morale in the profession.[12]

The causes of this patient aggression are complex. First, perverse incentives and doctors' profit seeking behaviours have compromised quality of care, and led to erosion of professional ethics and higher medical costs.[48] Certain areas of the media have taken to criticising doctors for their "irresponsible and wrong" advice, and occasional cases of extremely high medical expenses, which make patients feel

exploited.[49] In addition, patients are better informed about medical problems due to increasingly accessible health information, leading them to be more demanding.

Second, in a commoditized health care system, despite high coverage of medical insurance, patients are still paying a large portion of their medical expenses out-of-pocket.[37] Together with long waiting times and short consultation times, poor communication between doctors and patients can easily trigger tension between the two parties when doctors fail to meet patients' high expectations. Third, as doctors are the ones who dictate patient care, they are an easy target for patients' complaints and frustration.

Measures to prevent patient aggression against doctors are necessary. National measures to strengthen hospital security and criminalize any acts causing hospital disturbance were taken[50] soon after a doctor was killed by a 17 year-old patient in 2012. But these have been poorly enforced and critics argue that this does not solve the underlying systemic issues. More radical solutions are needed to prevent violence in health facilities. Policies of 'zero tolerance' towards violence in healthcare sectors are recommended by the most influential medical associations in China.[51] But the medical associations have no enforcement powers and are very rarely actually involved in medical disputes. Education programs assisting doctors to prevent and manage patient violence may also be beneficial.[52] An emphasis on doctor-patient communication skills in the medical school syllabus may help improve the doctor-patient relationship, and reduce patient aggression.[53]

Limitations

The study has some limitations. First, we sampled only four cities and counties in the province and only one provincial hospital. So the results have limited generalisability. The sample size was relatively small and doctors' participation was voluntary, leading to potential bias. However, we did sample across three levels of health institutions in four places, with different economic levels. Second, as there are almost no studies on this topic, comparisons could not be made. Thirdly, the job satisfaction score was developed for the paper and has not been formally validated. Nevertheless, it enabled us to compare the job satisfaction of doctors across different levels of hospital. But as a first study comparing job satisfaction at three levels of facility and exploring associated systemic factors, we have provided a starting point for further research into exploring related issues in China.

CONCLUSION

Doctors in Zhejiang province, China, have low job satisfaction overall. Measures must be taken to address this in order to address future problems of recruitment and retention of doctors. These measures must first include reduction of doctors' workload, especially at provincial hospitals partly through incentivisation of appropriate utilisation of primary care, ~~and ,~~ increase in doctors' salary, and more punitive measures against individuals who commit violent acts against doctors. More research is needed to explore in depth the underlying causes of job satisfaction and discontent in Chinese doctors. There may be lessons from other countries and systems, where job satisfaction among doctors is generally high.[54 55]

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Authors' contributions

TH and DW designed the study and the questionnaire. DW carried out the survey. KFL and YW performed the statistical analysis. DW, TH and YW interpreted the analysis. DW and TH drafted the manuscript. All authors read and approved the final manuscript.

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Competing interests

The authors declare that they have no competing interests.

Ethical approvals

The study is a student research project that has received ethical approval from the UCL Research Ethics Committee.

Data sharing statement

No additional data are available.

REFERENCES

1. Li D, Yin W, Zhang X, et al. Investigation on turnover intention of medical staff in public hospitals and research of early-warning system's construction. *Chinese Journal of Hospital Administration* 2010;**26**(03):218-21.

2. National Health and Family Planning Commission PRC. *Research on relationship between Yi and Huan in China, 2008*: Center for Health Statistics and Information 2008:P106.

3. Wang ZG. *Worrying conditions of doctors' practising environment: 78% of the doctors do not want their children to be doctors 2013.* http://news.china.com.cn/2013-10/27/content_30414901.htm (accessed 3 Mar 2014).

4. Shanghai Jiao Tong University. *Announcement of results of changing majors for students admitted in 2013.* http://www.jwc.sjtu.edu.cn/web/sjtu/198015-1980000004584.htm (accessed 27 May 2014).

5. Flaherty JH, Liu ML, Ding L, et al. China: the aging giant. *J Am Geriatr Soc* 2007;**55**(8):1295-300.

6. CDC US. *U.S. CDC IN CHINA: 2010-2011 Annual Report Healthy People in a Health China*, 2013.

7. Song K, Scott A, Sivey P, et al. Improving Chinese primary care providers' recruitment and retention: a discrete choice experiment. *Health Policy Plan* 2013.

8. China Daily. *WeChat poll revealed "90% of participants do not want children to be doctors: high pressure and intense doctor-patient conflicts are main reasons".* http://www.chinadaily.com.cn/micro-reading/dzh/2014-04-23/content_11627822.html (accessed 23 May 2014).

9. Zhou XD, Li L, Hesketh T. Health system reform in rural China: Voices of healthworkers and service-users. *Soc Sci Med* 2014;**117**:134-41.

10. Guan XD, Liang HG, Xue YJ, et al. An analysis of China's national essential medicines policy. *J Public Health Policy* 2011;**32**(3):305-19.

11. Zhang X, Sleeboom-Faulkner M. Tensions between medical professionals and patients in mainland China. *Camb Q Healthc Ethics* 2011;**20**(3):458.

12. Hesketh T, Wu D, Mao LN, et al. Violence against doctors in China. *Br Med J* 2012;**345**.

13. Wang ZG. *Yi Nao incidents increased by 7000 over last five years: illegal gangs made huge profits 2012.* http://www.china.com.cn/news/2012-05/03/content_25287333_2.htm (accessed 23 Jul 2014).

14. Xiong C. *Medical malpractice and medical disputes.* Chinese Hospital Association Guide 2006.

15. Wu SY, Zhu W, Li HY, et al. Workplace violence and influencing factors among medical professionals in China. *Am J Ind Med* 2012;**55**(11):1000-08.

16. Ding Xiang Yuan. *Chinese Hospital Association: violence against doctors gets worse*. http://vote.dxy.cn/report/dxy/id/57914 (accessed 28 Feb 2014).

17. BMA. *Violence at work: the experience of UK doctors*: Health Policy and Economic Research Unit, British Medical Association, 2003.

18. Algwaiz WM, Alghanim SA. Violence exposure among health care professionals in Saudi public hospitals. A preliminary investigation. *Saudi Med J* 2012;**33**(1):76-82.

19. Behnam M, Tillotson RD, Davis SM, et al. Violence in the emergency department: a national survey of emergency medicine residents and attending physicians. *J Emerg Med* 2011;**40**(5):565-79.

20. Forrest LE, Herath PM, McRae IS, et al. A national survey of general practitioners' experiences of patient-initiated aggression in Australia. *Med J Aus* 2011;**194**(11):605-08.

21. Joa TS, Morken T. Violence towards personnel in out-of-hours primary care: a cross-sectional study. *Scand J Prim Health Care* 2012;**30**(1):55-60.

22. Kowalenko T, Walters BL, Khare RK, et al. Workplace violence: a survey of emergency physicians in the state of Michigan. *Ann Emerg Med* 2005;**46**(2):142-47.

23. Magnavita N, Heponiemi T. Violence towards health care workers in a Public Health Care Facility in Italy: a repeated cross-sectional study. *BMC Health Serv Res* 2012;**12**(1):108.

24. Mirza NM, Amjad AI, Bhatti ABH, et al. Violence and abuse faced by junior physicians in the emergency department from patients and their caretakers: a nationwide study from Pakistan. *J Emerg Med* 2012;**42**(6):727-33.

25. Saeki K, Okamoto N, Tomioka K, et al. Work-related aggression and violence committed by patients and its psychological influence on doctors. *J Occup Health* 2011;**53**(5):356-64.

26. Sibbald B, Bojke C, Gravelle H. National survey of job satisfaction and retirement intentions among general practitioners in England. *Br Med J* 2003;**326**(7379):22.

27. Liu JA, Wang Q, Lu ZX. Job satisfaction and its modeling among township health center employees: a quantitative study in poor rural China. *BMC Health Serv Res* 2010;**10**(1):115.

28. Shi L, Song K, Rane S, et al. Factors associated with job satisfaction by Chinese primary care providers. *Prim Health Care Res Dev* 2014;**15**(01):46-57.

29. Thakur M. Job satisfaction in banking: A study of private and public sector banks. *The IUP Journal of Bank Management* 2007;**6**(4):60-68.

30. Buciuniene I, Blazeviciene A, Bliudziute E. Health care reform and job satisfaction of primary health care physicians in Lithuania. *BMC Fam Pract* 2005;**6**(1):10.

31. Ren Min Wang PRC. *Liao Xin Bo: Improve doctors' dignity.* http://www.people.com.cn/n/2014/0213/c347759-24348138.html (accessed 23 May 2014).

32. Lim M-K, Yang H, Zhang T, et al. China's evolving health care market: how doctors feel and what they think. *Health Policy* 2004;**69**(3):329-37.

33. Zhejiang Provincial Bureau of Statistics. *Statistical report on national economy and social development in Zhejiang Province, 2012.* http://tjj.zj.gov.cn/tjgb/gmjjshfzgb/201302/t20130208_122162.html (accessed 21 Feb 2014).

34. The World Bank. *World Development Indicators: GDP growth (annual %).* http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG (accessed 7 Apr 2014).

35. National Health and Family Planning Commission PRC. *Health statistics in China, 2012*. http://www.moh.gov.cn/zwgkzt/ptjty/201206/55044/files/3ca7756121334b7a870a25ac79988f23.pdf (accessed 7 Apr 2014).

36. The World Bank. *Health expenditure, total (% of GDP) 2012*. http://data.worldbank.org/indicator/SH.XPD.TOTL.ZS (accessed 24 May 2014).

37. National Health and Family Planning Commission PRC. *China Health Statistics Yearbook 2013*. http://www.nhfpc.gov.cn/htmlfiles/zwgkzt/ptjnj/year2013/index2013.html (accessed 23 May 2014).

38. Ren YJ, Ji QY. Analysis of salary distribution system in public hospitals. *Journal of Shanghai Jiaotong University (Medical Science)* 2013;**33**(6).

39. Yip W, Hsiao WC. The Chinese health system at a crossroads. *Health Aff* 2008;**27**(2):460-68.

40. Beijing Municipal Commission of Development and Reform. *Prices of medical services in Beijing*. http://service2.bjpc.gov.cn/bjpc/mediprice/MedicalService1.jsp (accessed 28 Apr 2014).

41. Wang XH. *Zhong Nan Shan: Chinese doctors survive by selling drugs and the value of their expertise is not being reflected*. http://news.xinhuanet.com/health/2014-03/06/c_126226620.htm (accessed 24 May 2014).

42. Meng Q, Xu L, Zhang Y, et al. Trends in access to health services and financial protection in China between 2003 and 2011: a cross-sectional study. *Lancet* 2012;**379**(9818):805-14.

43. Health Bureau of Zhejiang Province. *Health statistics in Zhejiang Province*. http://www.zjwst.gov.cn/col/col320/index.html### (accessed 31 Mar 2014).

44. Health Bureau of Zhejiang Province. *Outpatient services in health facilities in Zhejiang Province, 2012*.

http://www.zjwst.gov.cn/art/2013/4/15/art_320_227356.html (accessed 31 Mar 2014).

45. Du J, Lu X, Wang Y, et al. Mutual referral: a survey of GPs in Beijing. *Fam Pract* 2012;**29**(4):441-7.

46. Jia L, Ze Yong F. Dilemma of Community First Contact Care. Chinese General Practice 2012;**15**(3A):720-22.

47. Yao Y, Wang W, Wang F, et al. General self-efficacy and the effect of hospital workplace violence on doctors' stress and job satisfaction in China. *Int J Occup Med Environ Health* 2014;**27**(3):1-11.

48. Yip WC-M, Hsiao W, Meng Q, et al. Realignment of incentives for health-care providers in China. *Lancet* 2010;**375**(9720):1120-30.

49. Jie YX. *10 doctors calls for apologies from mass media about fasified reports 2014.* http://www.yxj.org.cn/news/yijieyaowen/shehuijiaodian/20140521095829366651.htm (accessed 23 May 2014).

50. National Health and Family Planning Commission PRC. *The directive of maintaining order at medical institutions by Police Department, Ministry of Health.* http://wsb.moh.gov.cn/zwgkzt/ptg/201204/54578.shtml (accessed 11 Feb 2014).

51. CMA. *United call for "Zero tolerance to medical violence" by Chinese Medical Association, Chinese Medical Doctor Association, Chinese Hospital Association and Chinese Health Law Society.* http://www.cma.org.cn/index/xhdt/20131029/1383026180011_1.html (accessed 11 Feb 2014).

52. Zernike W, Sharpe P. Patient aggression in a general hospital setting: do nurses perceive it to be a problem? *Int J Nurs Pract* 1998;**4**(2):126-33.

53. Ong LM, De Haes JC, Hoos AM, et al. Doctor-patient communication: a review of the literature. *Soc Sci Med* 1995;**40**(7):903-18.

54. Aasland OG, Rosta J, Nylenna M. Health care reforms and job satisfaction among doctors in Norway. *Scand J Public Health* 2010.

55. Voltmer E, Rosta J, Siegrist J, et al. Job stress and job satisfaction of physicians in private practice: comparison of German and Norwegian physicians. *Int Arch Occup Environ Health* 2012;**85**(7):819-28.

STROBE 2007 (v4) checklist of items to be included in reports of observational studies in epidemiology*

Checklist for cohort, case-control, and cross-sectional studies (combined)

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1–2
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4–6
Objectives	3	State specific objectives, including any pre-specified hypotheses	6
Methods			
Study design	4	Present key elements of study design early in the paper	6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6-7
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants	6-7
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case	N/A
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7-8
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	*8*
Bias	9	Describe any efforts to address potential sources of bias	N/A
Study size	10	Explain how the study size was arrived at	6-7
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	8
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	8
		(*b*) Describe any methods used to examine subgroups and interactions	8
		(*c*) Explain how missing data were addressed	N/A
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed	N/A

		Cross-sectional study—If applicable, describe analytical methods taking account of sampling strategy	
		(*e*) Describe any sensitivity analyses	N/A
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	8
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	8-11
		(b) Indicate number of participants with missing data for each variable of interest	9-10
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)	N/A
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time	N/A
		Case-control study—Report numbers in each exposure category, or summary measures of exposure	N/A
		Cross-sectional study—Report numbers of outcome events or summary measures	13-14
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	8-19
		(*b*) Report category boundaries when continuous variables were categorized	N/A
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	17-18
Discussion			
Key results	18	Summarise key results with reference to study objectives	19
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	25
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	N/A
Generalisability	21	Discuss the generalisability (external validity) of the study results	25
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	N/A

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.
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.