

BMJ Open Factors affecting physicians' attitudes towards patient-centred care: a cross-sectional survey in Beijing

Haiying Liang , Michael J Reiss , Talia Isaacs 

To cite: Liang H, Reiss MJ, Isaacs T. Factors affecting physicians' attitudes towards patient-centred care: a cross-sectional survey in Beijing. *BMJ Open* 2023;**13**:e073224. doi:10.1136/bmjopen-2023-073224

► Prepublication history and additional supplemental material for this paper are available online. To view these files, please visit the journal online (<http://dx.doi.org/10.1136/bmjopen-2023-073224>).

Received 27 February 2023
Accepted 20 March 2023



© Author(s) (or their employer(s)) 2023. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

Institute of Education, University College London, London, UK

Correspondence to

Haiying Liang;
haiying.liang.19@ucl.ac.uk

ABSTRACT

Objectives Patient-centred care has been raised as an important component in providing high-quality healthcare services. This research aims to measure physicians' attitudes towards patient-centred care in Chinese healthcare settings and to identify the sociodemographic predictors of their attitudes using an exploratory research design.

Design A cross-sectional survey.

Setting Twelve hospitals in Beijing, China.

Participants 1290 physicians from 12 hospitals in Beijing were invited to take part in the survey using snowball sampling methods. There was a response rate of 84% (n=1084), of which 1053 responses (82%) were valid and included in this research.

Methods This research used a survey containing a previously validated 6-point Likert scale called 'Chinese-revised Patient-Practitioner Orientation Scale' (CR-PPOS). Descriptive statistics and multivariable logistic regression analyses were performed to measure participants' attitudes and to identify the sociodemographic predictors of Chinese physicians' attitudes towards patient-centred care.

Results Gender, professional title (ie, seniority) and hospital type influence Chinese physicians' attitudes towards patient-centred care. Female physicians, physicians with intermediate titles and those who work in tertiary (ie, top-level) hospitals tend to have higher patient-centred attitudes (OR=1.532, 95% CI 1.160 to 2.022; OR=2.089, 95% CI 1.206 to 3.618; OR=2.198, 95% CI 1.465 to 3.297) than male physicians with other titles, and than those who work in first, secondary or private hospitals. Physicians working in non-surgical departments, those who have received training in doctor-patient communication, and those who are satisfied with their income obtained high patient-centred scores, both on the overall CR-PPOS and its two subscales.

Conclusions This research identified sociodemographic predictors of Chinese physicians' attitudes towards patient-centred care. The findings contribute to knowledge of factors to be considered in reforming medical education and the Chinese healthcare system to improve physician-patient relationships and provide high-quality healthcare to patients. However, these findings are exploratory in nature and require further investigation to establish their validity and generalisability.

INTRODUCTION

Background

As a healthcare approach that prioritises the needs, preferences and experiences of patients in the treatment and management

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ This is the first research study conducted in Beijing using the Chinese-revised Patient-Practitioner Orientation Scale to measure physicians' attitudes towards patient-centred care.
- ⇒ Associations between participants' sociodemographic factors and patient-centred attitudes were identified.
- ⇒ However, correlations do not necessarily mean that relationships are causal.
- ⇒ Only physicians in 12 hospitals Beijing were surveyed; the sampling may not be representative of all physicians in Beijing. In addition, the findings may not generalise to other areas in China.

of their health conditions, patient-centred care has been proposed as one of the key factors needed for better quality healthcare services.¹⁻³ Patient-centred care aims to empower patients to take an active role in their care and decision-making by promoting effective communication and collaborative decision-making between patients and healthcare providers. Compared with the paternalistic healthcare approach, patient-centred care can respond to individual patient preferences and ensure patients' involvement in medical decision-making.⁴ Patient-centred care has been shown to improve the physician-patient relationship, reduce patient complaints and improve healthcare outcomes.⁵⁻⁷ Researchers have also suggested that physicians' patient-centred communication skills need to be honed if patients are to play more of a role in medical decision-making.^{6,7} To achieve patient-centred care, clinicians need to have specific skills and competencies that enable them to provide care that is patient-centred, including effective communication skills,⁸ shared decision-making skills,⁹ cultural competence,¹⁰ empathy and compassion,¹¹ and patient education skill.¹² Developing these skills can help to improve patient

outcomes, increase patient satisfaction and enhance the quality of care.

The role of patients in medical decision-making is a topic of ongoing debate, particularly in China where doctors face unique challenges. Allowing patients to have more say in their treatment plans can empower them to take greater responsibility for their health and well-being.⁹ This can lead to better adherence to treatment plans and improved health outcomes. In addition, when patients are more involved in the decision-making process, they may have a better understanding of the risks and benefits of different treatment options, which can lead to more informed decision-making.⁹ Furthermore, giving patients more control over their medical care can help to build trust between patients and healthcare providers, which can lead to better communication and improved health outcomes.¹³

However, patients may not have the necessary medical knowledge to fully understand the risks and benefits of different treatment options, which could lead to poor decision-making.⁹ Moreover, doctors in China are often under significant time constraints and may not have the time to fully involve patients in the decision-making process. Additionally, in China, patients may have different expectations for their healthcare providers, which could make it difficult to involve them in the decision-making process.⁸

While there are both benefits and challenges to involving patients more in medical decision-making, it is ultimately up to individual healthcare providers and patients to decide what approach is most appropriate for their specific circumstances. However, in a system where time constraints and cultural factors may pose significant barriers to patient involvement, it is important to ensure that healthcare providers are properly trained in communication and decision-making skills that can facilitate effective patient involvement.⁸

A systematic review and meta-analysis¹⁴ found that Chinese physicians were more likely to use a paternalistic approach to care, in which the physician makes decisions for the patient, rather than a patient-centred approach. Another study⁸ found that Chinese physicians had a low level of patient-centred communication skills, and that cultural factors and time constraints were major barriers to providing patient-centred care. These findings support the need to assess and describe physician attitudes towards patient-centred care in China. Such a study could help to identify specific areas where training and support may be needed to promote patient-centred care in Chinese healthcare settings.

Patient-centred care attitudes of physicians in other countries have also been studied. For example, a study¹⁵ found that physicians in the USA generally had a positive attitude towards patient-centred care and believed that it could improve patient outcomes. Similarly, a study¹⁶ found that physicians in the UK believed that patient-centred care was important and were generally supportive of its principles. However, it is worth noting

that the implementation of patient-centred care can vary depending on the specific healthcare system and cultural context. For example, Hammersley *et al*¹⁷ found that while physicians in Australia generally supported the principles of patient-centred care, they faced barriers in its implementation due to time constraints, resource limitations and the complexity of patients' health needs.

There is strong evidence showing that Chinese physicians do not practice patient-centred care, which highlights the need for further research on physician attitudes towards patient-centred care in China. While physicians in other countries generally have a positive attitude towards patient-centred care, its implementation can vary depending on the specific healthcare system and cultural context. Understanding physician attitudes towards patient-centred care can help to promote the adoption of patient-centred care in healthcare settings, which can lead to improved patient outcomes and increased patient satisfaction.

Chinese physicians have long been criticised for focusing on the specifics of disease areas and knowledge provision while neglecting individual patients' needs and values and engaging in patient-centred decision-making. This may be due to the fact that many physicians in China have traditionally believed that patients are not able to make informed decisions about their treatment and that involving patients in decision-making processes might not necessarily lead to better treatment results.³ This could be a reason causing the strained doctor–patient relationship often observed in clinical practice in China, thus impacting the quality of healthcare services.¹⁸ Physicians' attitudes towards patient-centred care have been measured in many countries.^{19–21} However, Chinese physicians' attitudes towards patient-centred care in clinical practice and the factors predicting their attitudes are still underexplored.

Objectives and research questions

This research aims to measure physicians' attitudes towards patient-centred care in Chinese healthcare settings and to identify the sociodemographic predictors of their attitudes. The research questions are:

- What are the Chinese physicians' attitudes towards patient-centred care?
- What are the sociodemographic predictors of their attitudes?

METHODS

Study design

This research uses an exploratory research design. Unlike explanatory research, which tests specific hypotheses, exploratory research seeks to generate new hypotheses and ideas. Since there is limited research on this specific topic, with little understanding of the factors that influence physicians' attitudes towards patient-centred care, an exploratory research design is useful as it allows

new ideas and hypotheses to be generated. In addition, the relationship between physicians' attitudes towards patient-centred care and the factors that shape them is complex and multifaceted. An exploratory research design is particularly useful for investigating complex relationships, as it allows for a more open-minded and flexible approach to the research question.

This study used a cross-sectional survey design to investigate Chinese physicians' attitudes towards patient-centred care. The survey included the Chinese-revised Patient-Practitioner Orientation Scale (CR-PPOS), a previously validated 6-point Likert scale, to measure participants' attitudes. The CR-PPOS is designed to assess the patient-centredness of healthcare providers from the perspective of the patient. The survey also collected sociodemographic and related information from the participants.

Descriptive statistics were used to summarise the distribution of the data, including means, SD, frequencies and percentages. Multivariable logistic regression analyses were performed to identify the sociodemographic predictors of Chinese physicians' attitudes towards patient-centred care. The logistic regression model allowed the researchers to investigate the relationship between the dependent variable (attitudes towards patient-centred care) and several independent variables (such as age, gender, years of experience and type of practice).

The use of a validated survey tool and statistical analysis allowed the researchers to obtain reliable and valid data on Chinese physicians' attitudes towards patient-centred care and to identify potential predictors of these attitudes. Overall, this study design provided a rigorous approach to investigating the research questions and contributed to the growing body of knowledge on patient-centred care in China.

Setting and participants

A cross-sectional survey was undertaken from May to June 2022 in nine public and three private hospitals in Beijing. In China, all public hospitals can be classified in a three-tier system that recognises a hospital's ability to provide healthcare services, clinical training and scientific research. Accordingly, hospitals in China are classified as primary, secondary or tertiary institutions. Primary hospitals are typically community hospitals aiming to provide accessible medical services to the general public. Secondary hospitals provide more comprehensive medical services than primary hospitals including medical students' clinical training. Tertiary hospitals provide the most comprehensive and specialised healthcare services, medical students' clinical training as well as being tasked with conducting scientific research. However, not all private hospitals can be classified in this system. Many private hospitals/clinics do not belong to any of these three tiers. The twelve hospitals selected in this research are three primary public hospitals, three secondary public hospitals, three tertiary public hospitals and three private hospitals that do not fit into this classification located in a total of six districts in Beijing.

These 12 hospitals mainly practise Western medicine. However, healthcare practitioners in these hospitals may use an integrative approach, combining elements of both traditional Chinese medicine (TCM) and Western medicine to offer patients a range of treatment options. Physicians who practice TCM typically view health as a state of balance and harmony between the body, mind and spirit. They often aim to restore this balance through a holistic approach that includes acupuncture, herbal remedies, dietary adjustments and other therapies. TCM physicians may focus on prevention as well as treatment, and may encourage patients to take an active role in their own healthcare. In contrast, physicians who practice Western medicine often rely on scientific evidence and standardised treatments, such as medications, surgery and other interventions. They may view health in terms of the absence of disease or the presence of specific symptoms, and may prioritise the use of technology and specialised expertise to diagnose and treat medical conditions. In recent years, there has been a growing recognition of the value of TCM and other complementary and alternative therapies, and some Western physicians are now incorporating these approaches into their practices.

Snowball sampling was used to recruit physicians working full-time in these 12 selected hospitals—we contacted physicians we knew in the hospitals and asked them to help distribute the questionnaires to their colleagues who met the recruitment criteria. The electronic questionnaires were distributed on a popular online survey platform (wenjuanxing.com) to the participants by six trained investigators, who were medical students and medical staff studying or working at the selected hospitals. The lead researcher instructed them to explain the purpose of the study to the participants in groups or individually and to obtain informed consent before distributing the questionnaire.

The participants were not given an incentive (monetary or otherwise), but they were asked, before the questionnaires were distributed, whether they were interested in completing a questionnaire. Only those who expressed their interest were given the questionnaire.

Instrument

The Patient-Practitioner Orientation Scale (PPOS) was developed in 1999²² to assess physicians', medical students' and patients' attitudes about the extent to which these parties should have power during healthcare interactions.^{22–24} PPOS has been translated into many languages and validated in various countries.^{22 25–27} PPOS is a self-administered scale, requiring respondents to indicate their attitudes towards each item using a 6-point Likert scale. It includes 18 items, which are divided into two dimensions: 'Caring' and 'Sharing'. The Caring dimension indicates that respondents believe physicians are oriented to caring about patients' expectations, needs, preferences and emotions, and are interested in providing holistic healthcare to patients rather than focusing only on treating their diseases. The Sharing



dimension indicates that respondents believe physicians are oriented to involve patients in the medical decision-making process.²⁸ Higher scores on summed items indicate that the respondents are more patient-centred, whereas lower scores indicate that they are more doctor-centred or disease-centred.

The first application of PPOS in the Chinese healthcare context was a study by Ting *et al*,²⁹ who used it to measure Chinese patients' attitudes towards patient-centred communication. Ting *et al*²⁹ translated the scale into Chinese and made some modifications. However, their research only measured attitudes of patients (not physicians) in a single medical unit located in the southwest of China. In addition, they did not perform reliability analysis on the adapted scale.

Wang *et al*³⁰ revised the original PPOS and developed the CR-PPOS. They tested the internal consistency and test-retest reliability of CR-PPOS and obtained acceptable results. The CR-PPOS includes 11 items, where 5 items were retained in the Caring subscale, and the other 6 in the Sharing subscale. The results of exploratory factor analysis indicated that these two subscales were well separated.

After developing CR-PPOS, Wang *et al*³⁰ used it to measure physicians' and patients' attitudes towards patient-centred communication in clinical units in Shanghai, China. The research was conducted with a relatively small sample (116 physicians) using convenience sampling. Liu *et al*³¹ used CR-PPOS to explore Chinese medical students' attitudes towards patient-centred care and found that gender differences had an impact on attitudes—female participants had more patient-centred attitudes than their male counterparts. However, that study only explored the perspectives of medical students from a province located in the northeast of China; the results cannot be generalised to other parts of China. Moreover, data on physicians' attitudes were not obtained. Later, Song *et al* used the CR-PPOS developed by Wang *et al*³⁰ to explore the attitudes of physicians working in seven medical institutions located in the same province in China, and revealed low preference of physicians towards patient-centredness.³² However, studies conducted in the Chinese healthcare context using CR-PPOS have focused so far on investigating physicians working in public hospitals; the attitudes of physicians working in private hospitals in China have not been widely investigated in this regard to date. Nearly two-thirds of hospitals are privately owned in China.³³ However, to date, no studies have explored whether there is a difference on patient-centred attitudes between physicians working in public and private hospitals in China.

The survey used in this study consisted of two parts, as can be seen in online supplemental materials. The first part elicited data on participants' demographic and other characteristics (eg, gender, age, years of practice, educational level, overseas education experience, professional title, hospital type, specialty, average working time per workday, workload) and other self-reported variables related to

the research problem (eg, physician-patient relationship, communication training, satisfaction with income). The second part of the survey was CR-PPOS, the adapted version of PPOS, which has undergone some validation.³⁰ There are 11 items in CR-PPOS, scored on a 6-point Likert scale (1 = 'strongly disagree' to 6 = 'strongly agree').

Data analysis

We used SPSS V.26.0 to analyse survey data. After checking that the data were suitable for the use of parametric statistics, t-tests and one-way analyses of variance (ANOVAs) were performed to compare mean group differences in the CR-PPOS scores for each categorical variable, with a p value set at <0.05 to designate statistical significance. However, the large number of statistical tests undertaken means that there is a risk of false positives. Accordingly, we report significance levels for all statistical tests; those with a p value of <0.01 are more likely to be meaningful. Next, we included any statistically significant variables in a multivariable logistic regression analysis. We then calculated median total CR-PPOS scores and scores on the Caring and Sharing dimensions, with the median scores set as the cut point for defining respondents' attitudes. If respondents' scores were higher than the median score, they were marked as 'patient-centred attitudes'. Otherwise, they were marked as 'doctor-centred or disease-centred attitudes'. In the multivariable logistic regression analysis, the dependent variables are: '1' = 'patient-centred attitudes' and '0' = 'doctor-centred or disease-centred attitudes'. We calculated the ORs and the 95% CIs to measure the correlation between the outcomes and exposures.

RESULTS

Participants' demographic and other information

There were 1290 physicians who were invited to complete the survey, with a target response rate of 90% as indicated by similar studies conducted previously in Chinese healthcare context^{31 32}; the actual response rate was 84%. Responses with missing values were excluded, leaving 1053 valid responses. Non-response participants may have had limited time to complete the survey due to work or personal obligations. Demographic and other characteristics of the participants are summarised in [table 1](#). Among the 1053 physicians, 488 are men and 565 are women. Over 70% of them (762) work in tertiary hospitals. Nearly two-thirds (688) work in non-surgical departments. Over a quarter (295) work over 8 hours per workday on average. Roughly the same proportion (287) feel that their workload is too high. Over a half (543) did not think they maintain good relationships with their patients. Fully 761 reported that they did not receive any physician-patient communication skills training. Only 177 of them were satisfied with their income, with most of these (135) working in tertiary hospitals.

Variables related to higher scores of CR-PPOS, Caring subscale and Sharing subscale

As shown in [table 2](#), the mean score of the total CR-PPOS is 3.92±0.75, the mean score of the Caring subscale is

Table 1 Demographic and other characteristics of the participants (n=1053)

Characteristic	Male n (%)	Female n (%)	Total n (%)
Age			
18–30	218 (20.7%)	268 (25.5%)	486 (46.2%)
31–40	158 (15%)	231 (21.9%)	389 (36.9%)
41–50	95 (9%)	48 (4.6%)	143 (13.6%)
Over 50	17 (1.6%)	18 (1.7%)	35 (3.3%)
Years of practice			
Less than 5 years	359 (34.1%)	424 (40.3%)	783 (74.4%)
5–10 years	84 (8%)	106 (10.1%)	190 (18%)
11–20 years	40 (3.8%)	27 (2.6%)	67 (6.4%)
Over 20 years	5 (0.5%)	8 (0.8%)	13 (1.2%)
Educational level			
High school or under	41 (3.9%)	53 (5.0%)	94 (8.9%)
Bachelor	162 (15.4%)	198 (18.8%)	360 (34.2%)
Master	220 (20.9%)	239 (22.7%)	459 (43.6%)
Doctor	65 (6.2%)	75 (7.1%)	140 (13.3%)
Overseas education experience			
Yes	92 (8.7%)	58 (5.5%)	150 (14.2%)
No	396 (37.6%)	507 (48.1%)	903 (85.8%)
Professional title			
No title	187 (17.8%)	252 (23.9%)	439 (41.7%)
Primary title (resident)	144 (13.7%)	185 (17.6%)	329 (31.2%)
Intermediate title (attending physician)	104 (9.9%)	88 (8.4%)	192 (18.2%)
Deputy chief title (deputy chief physician)	31 (2.9%)	27 (2.6%)	58 (5.5%)
Senior professional title (chief physician)	22 (2.1%)	13 (1.2%)	35 (3.3%)
Hospital type			
Primary hospital	80 (7.6%)	69 (6.6%)	149 (14.2%)
Secondary hospital	38 (3.6%)	38 (3.6%)	76 (7.2%)
Tertiary hospital	358 (34.0%)	404 (38.4%)	762 (72.4%)
Private hospital	12 (1.1%)	54 (5.1%)	66 (6.3%)
Specialty			
Surgical	231 (21.9%)	134 (12.7%)	365 (34.7%)
Non-surgical	257 (24.4%)	431 (40.9%)	688 (65.3%)
Average working time per workday			
Less than 8 hours	336 (31.9%)	422 (40.1%)	758 (72.0%)
8–10 hours	88 (8.4%)	86 (8.2%)	174 (16.5%)
Over 10 hours	64 (6.1%)	57 (5.4%)	121 (11.5%)
High workload			
Yes	147 (14.0%)	140 (13.3%)	287 (27.3%)
No	341 (32.4%)	425 (40.4%)	766 (72.7%)
Maintained good physician–patient relationship			
Yes	250 (23.7%)	260 (24.7%)	510 (48.4%)
No	238 (22.6%)	305 (29.0%)	543 (51.6%)
Received communication training			
Yes	148 (14.1%)	144 (13.7%)	292 (27.7%)
No	340 (32.3%)	421 (40.0%)	761 (72.3%)

Continued



Table 1 Continued

Characteristic	Male n (%)	Female n (%)	Total n (%)
Satisfied with income			
Yes	99 (9.4%)	78 (7.4%)	177 (16.8%)
No	389 (36.9%)	487 (46.2%)	876 (83.2%)

4.61±0.95 and the mean score of the Sharing subscale is 3.35±0.85.

T-tests and ANOVAs revealed that among the thirteen variables, nine of them were significantly related to higher CR-PPOS total scores. We calculated the effect sizes of each of these nine variables using Cohen's *d* for t-test results and η^2 for ANOVA results, with the following findings: 'communication training' ($d=0.744$), 'satisfaction with income' ($d=0.742$), 'overseas education experience' ($d=0.740$), 'gender' ($d=0.736$), 'professional title' ($\eta^2=0.079$), 'years of practice' ($\eta^2=0.052$), 'average working time per day' ($\eta^2=0.045$), 'specialty' ($\eta^2=0.022$) and 'hospital type' ($\eta^2=0.012$). The University of Cambridge MRC Cognition and Brain Unit³⁴ gives effect sizes as 0.2, 0.5 and 0.8, respectively, as the values for small, medium and large effect sizes as measured by Cohen's *d* for t-tests, and 0.01, 0.06 and 0.14, respectively, as the values for small, medium and large effect sizes as measured by η^2 for ANOVA.

Female physicians, physicians with less than 5 years of practice, physicians with no overseas education experience, physicians with an intermediate title, physicians working in tertiary hospitals, physicians working in a non-surgical department, physicians working less than 8 hours per workday on average, physicians who have received communication training, and physicians who are satisfied with their income had higher patient-centred scores than those who were men, had worked over 5 years, had overseas education experience, had titles lower or higher than intermediate, working in first, secondary or private hospitals, working in surgical department, working over 8 hours per workday, had not received communication training and were unsatisfied with their income. Then we performed partial regression analyses and found that the effect of 'overseas education experience' on the total score was not significant after controlling for 'satisfaction with income' ($p=0.302$).

T-tests and ANOVAs revealed that eight variables are significantly related to higher Caring subscale scores. The effect size findings were as follows: 'satisfaction with income' ($d=0.948$), 'overseas education experience' ($d=0.945$), 'gender' ($d=0.938$), 'communication training' ($d=0.953$), 'professional title' ($\eta^2=0.068$), 'hospital type' ($\eta^2=0.051$), 'years of practice' ($\eta^2=0.041$) and 'average working time per day' ($\eta^2=0.030$). Female physicians, physicians who had worked from 11 to 20 years, physicians with no overseas education experience, physicians who have intermediate titles, physicians working in tertiary hospitals, physicians who work 8–10 hours per workday, physicians who have received communication

training, and those who are satisfied with their income obtained higher Caring subscale scores than those who were men, had worked less than 11 years or over 20 years, had no overseas education experience, had titles lower or higher than intermediate titles, working in first, secondary or private hospitals, working less than 8 hours and over 10 hours, and were unsatisfied with their income. Then we performed partial regression analyses and found that the effect of 'overseas education experience' on the Caring subscale was not significant after controlling for 'satisfaction with income' ($p=0.336$), the effect of 'average working time per day' on the Caring subscale was not significant after controlling for 'years of practice' ($p=0.718$), and the effect of 'title' on the Caring subscale was not significant after controlling for 'years of practice' ($p=0.560$).

T-tests and ANOVAs revealed that 10 variables were significantly related to higher Sharing subscale scores. We again calculated the effect sizes of these 10 variables with the following findings: 'gender' ($d=0.938$), 'communication training' ($d=0.845$), 'satisfaction with income' ($d=0.845$), 'overseas education experience' ($d=0.843$), 'workload' ($d=0.842$), 'physician–patient relationship' ($d=0.842$), 'specialty' ($d=0.825$), 'professional title' ($\eta^2=0.078$), 'average working time per day' ($\eta^2=0.047$) and 'years of practice' ($\eta^2=0.045$). Female physicians, physicians who have worked between 11 and 20 years, have no overseas educational experience, have no title, work in non-surgical department, work less than 8 hours per workday on average, did not feel they had a high workload, have received communication training, did not feel they maintain good physician–patient relationship, and who are satisfied with their income obtained higher Sharing subscale scores than those who were men, had worked over 5 years, had no overseas educational experience, had titles, were working in surgical department, felt that they had a high workload, had not received communication training, felt they had maintained good physician–patient relationships, and were not satisfied with their income. Again, we performed partial regression analyses and found that the effect of 'overseas education experience' on the Sharing subscale was not significant after controlling for 'title' ($p=0.264$) and 'satisfaction with income' ($p=0.066$) and the effect of 'physician–patient relationship' on the Sharing subscale was not significant after controlling for 'workload' ($p=0.572$). Table 3 presents the results of all 13 t-tests and ANOVAs (arranged according to the order of their appearance in the survey).

Table 2 Mean scores of ‘Caring’ subscale, ‘Sharing’ subscale and Chinese-revised Patient-Practitioner Orientation Scale of participants (n=1053)

Characteristic	Caring subscale	Sharing subscale	Total
Gender			
Male	4.41±0.99	3.25±0.86	3.78±0.77
Female	4.78±0.89	3.44±0.82	4.05±0.70
P value	<0.001	<0.001	<0.001
Age			
18–30	4.62±0.95	3.31±0.87	3.90±0.74
31–40	4.57±1.02	3.44±0.86	3.96±0.80
41–50	4.70±0.81	3.26±0.74	3.91±0.68
Over 50	4.46±0.70	3.41±0.70	3.89±0.50
P value	0.453	0.051	0.741
Years of practice			
Less than 5 years	4.63±0.84	3.44±0.81	3.98±0.66
5–10 years	4.76±1.02	3.23±0.83	3.93±0.76
11–20 years	3.90±1.30	2.83±1.10	3.31±1.11
Over 20 years	4.46±2.26	2.64±0.80	3.47±1.46
P value	<0.001	0.001	<0.001
Educational level			
High school or under	4.67±0.81	3.30±0.68	3.92±0.60
Bachelor	4.67±0.92	3.37±0.83	3.96±0.73
Master	4.56±0.99	3.33±0.89	3.89±0.77
Doctor	4.59±1.01	3.40±0.88	3.94±0.82
P value	0.375	0.733	0.592
Overseas education experience			
Yes	4.27±1.28	3.13±0.87	3.65±0.96
No	4.67±0.88	3.40±0.84	3.97±0.70
P value	<0.001	<0.001	<0.001
Professional title			
No title	4.54±0.90	3.55±0.80	4.00±0.68
Primary title (resident)	4.72±0.87	3.25±0.88	3.92±0.72
Intermediate title (attending physician)	4.87±0.74	3.33±0.75	4.03±0.57
Deputy chief title (deputy chief physician)	4.29±1.15	3.19±0.82	3.69±0.94
Senior professional title (chief physician)	3.54±1.79	2.32±0.75	2.87±1.19
P value	<0.001	<0.001	<0.001
Hospital type			
Primary hospital	4.21±1.16	3.42±0.87	3.78±0.90
Secondary hospital	4.23±1.05	3.36±0.86	3.75±0.87
Tertiary hospital	4.74±0.89	3.33±0.84	3.97±0.70
Private hospital	4.47±0.65	3.47±0.93	3.93±0.63
P value	<0.001	0.168	<0.001
Specialty			
Surgical	4.60±0.95	3.08±0.83	3.77±0.76
Non-surgical	4.61±0.96	3.50±0.82	4.00±0.73
P value	0.822	<0.001	<0.001
Average working time per workday			
Less than 8 hours	4.63±0.85	3.46±0.80	3.99±0.66

Continued

**Table 2** Continued

Characteristic	Caring subscale	Sharing subscale	Total
8–10 hours	4.81±0.99	3.22±0.89	3.95±0.79
Over 10 hours	4.19±1.32	2.90±0.92	3.49±1.00
P value	<0.001	<0.001	<0.001
High workload			
Yes	4.65±1.00	3.20±0.86	3.86±0.80
No	4.59±0.94	3.41±0.83	3.95±0.73
P value	0.350	<0.001	0.084
Received communication training			
Yes	4.68±0.88	3.42±0.83	3.99±0.67
No	4.53±1.03	3.28±0.56	3.85±0.81
P value	0.014	0.005	0.002
Maintained good physician–patient relationship			
Yes	4.65±1.00	3.20±0.86	3.56±0.80
No	4.59±0.94	3.41±0.84	3.95±0.73
P value	0.325	<0.001	0.084
Satisfied with income			
Yes	4.66±0.87	3.39±0.83	3.97±0.69
No	4.35±1.25	3.19±0.90	3.72±0.96
P value	<0.001	0.005	<0.001

Significant p values are marked in bold.

Multivariable logistic regression analysis

The median scores of the total CR-PPOS, Caring subscale and Sharing subscale are 44, 24 and 20, respectively, which are used as the cut-off point for ‘patient-centred attitude’ and ‘doctor-centred or disease-centred attitude’. For example, we consider CR-PPOS scores larger than 44

as ‘patient-centred’ and scores less than or equal to 44 as ‘doctor-centred or disease-centred’.

Multivariable logistic regression analysis revealed that, on the Caring subscale, female physicians, physicians who had worked between 11 and 20 years, physicians who had intermediate titles or deputy chief titles, and those

Table 3 The results of all 13 t-tests and ANOVAs relating each variable to Chinese-revised Patient-Practitioner Orientation Scale total scores

Test	Variable	Significance (p value)	Effect size
T-test	Gender	<0.001	d=0.736
ANOVA	Age	0.741	–
ANOVA	Years of practice	<0.001	$\eta^2=0.052$
ANOVA	Educational level	0.592	–
T-test	Overseas education experience	<0.001	d=0.740
ANOVA	Professional title	<0.001	$\eta^2=0.079$
ANOVA	Hospital type	<0.001	$\eta^2=0.012$
ANOVA	Specialty	<0.001	$\eta^2=0.022$
ANOVA	Average working time per workday	<0.001	$\eta^2=0.045$
T-test	High workload	0.084	–
T-test	Maintained good physician–patient relationship	0.002	d=0.744
T-test	Received communication training	0.084	–
T-test	Satisfied with income	<0.001	d=0.742

ANOVA, analysis of variance.

working in tertiary hospitals tended to be more patient-centred (OR=2.201, 95% CI 1.685 to 2.876; OR=0.284, 95% CI 0.103 to 0.787; OR=2.849, 95% CI 1.157 to 7.018; OR=2.595, 95% CI 1.746 to 3.850, respectively). On the Sharing subscale, physicians who had worked between 5 and 10 years, who had intermediate titles, and those who work in non-surgical department tended to be more patient-centred (OR=0.510, 95% CI 0.305 to 0.853; OR=1.806, 95% CI 1.051 to 3.105; OR=1.388, 95% CI 1.030 to 1.871, respectively). In the total CR-PPOS, female physicians, physicians with intermediate titles and those who were working in tertiary hospitals tended to be more patient-centred (OR=1.532, 95% CI 1.160 to 2.022;

OR=2.089, 95% CI 1.206 to 3.618; OR=2.198, 95% CI 1.465 to 3.297), respectively. Table 4 displays these results.

Patient and public involvement

Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

DISCUSSION

This research analysed factors related to physicians' attitudes towards patient-centred care in the Chinese healthcare context. The results shows that the average

Table 4 Variables predicting the Chinese-revised Patient-Practitioner Orientation Scale, and the Caring and Sharing subscale scores

Dimension	Variables	OR	95% CI	P value
Caring subscale	Gender			
	Male			
	Female	2.201	1.685 to 2.876	<0.001
	Years of practice			
	Less than 11 or over 20 years	0.284	0.103 to 0.787	0.016
	11–20 years			
	Professional title			
	No title			
	Primary title (resident)			
	Intermediate title (attending physician)	1.669	1.015 to 2.743	0.044
	Deputy chief title (deputy chief physician)	2.849	1.157 to 7.018	0.023
Senior professional title (chief physician)				
Hospital type				
Primary, secondary and private hospital				
Tertiary hospital	2.593	1.746 to 3.850	<0.001	
Sharing subscale	Years of practice			
	Less than 5 or over 10 years			
	5–10 years	0.510	0.305 to 0.853	0.010
	Professional title			
	Lower or higher than intermediate title			
	Intermediate title (attending physician)	1.806	1.051 to 3.105	0.032
	Specialty			
Surgical				
Non-surgical	1.388	1.030 to 1.871	0.031	
Total	Gender			
	Male			
	Female	1.532	1.160 to 2.022	0.003
	Professional title			
	Lower or higher than intermediate title			
	Intermediate title (attending physician)	2.089	1.206 to 3.618	0.009
Hospital type				
Primary, secondary and private hospital				
Tertiary hospital	2.198	1.465 to 3.297	<0.001	



total CR-PPOS score is 3.92, which is higher than has been found elsewhere in China (in Heilongjiang (3.24) and Shanghai (3.66)), but lower than in Australia (4.46) and the USA (4.26).^{23 30 32 35} This indicates that physicians in Beijing, at least in this study, tend to be more patient-centred than physicians in Heilongjiang and Shanghai, but less patient-centred than physicians in Australia and USA. Physicians in this study obtained a higher mean score on the Caring subscale (4.61) than on the Sharing subscale (3.35), indicating that they hoped to treat patients supportively, paying attention to their psychosocial background information.²⁹ This is consistent with other studies conducted in China,^{30 32} while different from studies conducted in Australia and Portugal where physicians had higher mean scores on the Sharing subscale than on the Caring subscale.^{23 35} The reason physicians in China had higher scores on the Caring subscale than on the Sharing subscale may be because Asian cultures tend to presume that medical decisions should be made by doctors, or even families, instead of engaging patients in medical decision-making processes.²⁸ Indeed, Chinese patients tend to expect their physicians to lead in medical consultations and to make decisions.²⁹ Studies have also found that many patients see themselves as having insufficient knowledge to deal with medical issues.^{1 29 36}

Female physicians obtained higher mean scores than male physicians on the total CR-PPOS, the Sharing subscale and the Caring subscale, indicating that female physicians tend to be more patient-centred than male physicians, which is consistent with findings of research conducted in countries outside China.^{23 35} A study conducted with Chinese medical students also found that female students were more patient-centred than men.³¹ The findings of Liu *et al* reveal the gender differences between female and male physicians regarding their attitudes towards patient-centred care.³¹ In addition, in clinical communication, female medical staff are reported to have better communication strategies with patients than their male counterparts,³⁷ which may explain, at least to some extent, why female physicians tend to be more patient-centred than male physicians.

Physicians working in tertiary hospitals obtained higher scores on the CR-PPOS, Caring subscale and Sharing subscale, indicating that they tend to be more patient-centred than physicians working in other hospitals. Tertiary hospitals in China have the most demanding entrance requirement among all hospitals for physicians in terms of their education background.^{38 39} There is also evidence that patients in China prefer tertiary hospitals to others when seeking medical services.⁴⁰ This implies that tertiary hospitals may be influential in the development and implementation of patient-centred care in Chinese healthcare system. However, future research could be conducted to further explore how the patient-centred care concept is more developed in tertiary hospitals than in other hospitals to provide information about the implications on medical system reform.

This research also found that physicians who work in non-surgical departments tend to be more patient-centred than those working in surgical departments. Surgeons are reported to experience particular stress through training and clinical practice.⁴¹ In China, physicians working in surgical department are generally more emotionally stressed, having higher burnout and work pressures than those working in non-surgical department⁴²; this may help explain the difference between physicians working in surgical and non-surgical departments in terms of their attitudes towards patient-centred care.

Physicians who had received training in physician–patient communication tended to be more patient-centred than those who had not. It has been found that effective communication with patients during clinical practice is important in providing a high-quality medical service.⁴³ Improving physicians' communication with patients could contribute to better physician–patient relationships and reduce medical complaints.^{6 7}

Another interesting finding is that physicians who are satisfied with their income tended to be more patient-centred than those who were unsatisfied. Physicians' satisfaction with income has been found to be associated with their job satisfaction and the way they deal with patients in clinical settings.⁴⁴ However, 83.2% physicians surveyed reported being unsatisfied with their income. To address this issue, actions on reforming the whole Chinese health-care system may be required.

Furthermore, this research found that physicians who do not feel they have high workloads have higher patient-centred scores on the Sharing subscale and the total CR-PPOS. This may be because physicians with higher workloads are less capable of providing emotional support to their patients. Overall, 28% of the surveyed physicians reported that they worked over 8 hours per workday on average, with 27.3% of physicians reporting they have a high workload. We would argue that if patient-centred care is to be provided, it may be necessary to ensure that physicians have reasonable workloads and work hours.

The findings of this study provide a foundation for future research to further investigate the complex relationship between physicians' attitudes towards patient-centred care and the factors that shape them. This study has implications for medical education, policy and practice. Medical educators and policymakers could take into account the factors identified in this study when designing training and policy interventions aimed at improving patient-centred care. Specifically, interventions aimed at improving physician–patient communication, reducing physicians' workload, and promoting patient-centred care attitudes and skills should be considered. In addition, the study highlights the need for increased attention to the training of physicians working in surgical departments and the involvement of tertiary hospitals in the development and implementation of patient-centred care.

As an exploratory study, the findings highlight several issues that warrant further investigation. First, the reasons for the observed gender differences in patient-centred

care attitudes should be explored further. Second, future research could investigate the impact of job satisfaction and income on patient-centred care attitudes. Third, it would be valuable to conduct longitudinal studies to assess changes in patient-centred care attitudes over time, as well as the impact of interventions aimed at promoting patient-centred care.

The study provides insights into the factors that influence Chinese physicians' attitudes towards patient-centred care, and highlights differences in patient-centred care attitudes between physicians in China and other countries. The study's use of a well-validated tool to measure patient-centred care attitudes and its large sample size also contribute to its strength.

The study also has several limitations that should be considered when interpreting its results. First, the study was conducted in a single city in China and may not be generalisable to other regions or countries. Second, the study relied on self-reported data from physicians, which may be subject to social desirability bias. Third, the sampling strategy used in this study—snowball sampling—may be susceptible to sampling bias. Participants who are recruited through referrals may share similar characteristics or opinions. This can lead to a biased sample that does not accurately represent the target population. Additionally, snowball sampling may miss out on certain subgroups that are not well-connected to the existing participants, further exacerbating the sampling bias. Finally, the study did not examine the impact of patient-centred care attitudes on patient outcomes, so further research is needed to investigate this relationship.

CONCLUSION

This research identified sociodemographic predictors of Chinese physicians' attitudes towards patient-centred care. This research found that gender, professional title and hospital type influence Chinese physicians' attitudes towards patient-centred care. Female physicians, physicians with an intermediate title and those who work in tertiary hospitals tend to have higher patient-centred attitudes than male physicians with other titles, and those who work in first, secondary or private hospitals.

It is also found that physicians work in non-surgical department, those who have received training in physician–patient communication, and those who are satisfied with their income have high patient-centred scores on the CR-PPOS and the two subscales. These findings imply that more attention could be paid to these factors in medical education. The findings of this study can inform medical educators and policymakers on how to improve physician–patient relationships and provide high-quality healthcare services to patients in China.

The study has several implications for future policy, practice and research. First, policies aimed at improving physician–patient communication and reducing physicians' workload should be considered to enhance patient-centred care. Second, medical education and

training programmes should focus on the development of patient-centred care attitudes and skills, particularly for physicians working in surgical departments. Third, the development and implementation of patient-centred care in China may require the involvement of tertiary hospitals. Finally, future research should explore reasons for the gender differences in patient-centred care attitudes and investigate the impact of job satisfaction and income on patient-centred care attitudes.

Twitter Talia Isaacs @taliaisaacs

Acknowledgements We are very grateful to all those who gave their permission to participate in our study and for valuable reviewer feedback.

Contributors HL is the author responsible for the overall content as the guarantor. HL contributed to study design, data collection, data analysis, and writing the original draft. MR and TI reviewed the original draft and contributed to editing and supervision. All authors gave approval to the final version.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval This study involves human participants and this research received ethical approval from the University College London Research Ethics Committee (Data Protection Registration No. Z6364106/2020/12/09) and passed risk assessment. The authors are all based in the UK. Obtaining further approval from local ethics committees in China was not required. Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available upon reasonable request.

Supplemental material This content has been supplied by the author(s). It has not been vetted by BMJ Publishing Group Limited (BMJ) and may not have been peer-reviewed. Any opinions or recommendations discussed are solely those of the author(s) and are not endorsed by BMJ. BMJ disclaims all liability and responsibility arising from any reliance placed on the content. Where the content includes any translated material, BMJ does not warrant the accuracy and reliability of the translations (including but not limited to local regulations, clinical guidelines, terminology, drug names and drug dosages), and is not responsible for any error and/or omissions arising from translation and adaptation or otherwise.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

ORCID iDs

Haiying Liang <http://orcid.org/0000-0002-8601-3763>

Michael J Reiss <http://orcid.org/0000-0003-1207-4229>

Talia Isaacs <http://orcid.org/0000-0003-4302-3379>

REFERENCES

- 1 Epstein RM, Franks P, Shields CG, *et al*. Patient-Centered communication and diagnostic testing. *Ann Fam Med* 2005;3:415–21.
- 2 Ishikawa H, Hashimoto H, Kiuchi T. The evolving concept of “patient-centeredness” in patient-physician communication research. *Soc Sci Med* 2013;96:147–53.
- 3 Liang Z, Xu M, Liu G, *et al*. Patient-centred care and patient autonomy: doctors' views in chinese hospitals. *BMC Med Ethics* 2022;23:38.
- 4 Bloom BS. Crossing the quality chasm: a new health system for the 21st century. *JAMA* 2002;287:646–a



- 5 Pereira C, Amaral CFS, Ribeiro MMF, *et al.* Cross-cultural validation of the patient-practitioner orientation scale (ppos). *Patient Educ Couns* 2013;91:37–43.
- 6 King A, Hoppe RB. Best practice for patient-centered communication: a narrative review. *J Grad Med Educ* 2013;5:385–93.
- 7 Epstein RM, Duberstein PR, Fenton JJ, *et al.* Effect of a patient-centered communication intervention on oncologist-patient communication, quality of life, and health care utilization in advanced cancer: the voice randomized clinical trial. *JAMA Oncol* 2017;3:92–100.
- 8 Kang L, Li Y, Ma J, *et al.* Patient-centered communication in the era of the modern patient. *J Thorac Dis* 2018;10:89–98.
- 9 Légaré F, Stacey D, Brière N, *et al.* Healthcare providers' intentions to engage in an interprofessional approach to shared decision-making in home care programs: a mixed methods study. *J Interprof Care* 2013;27:214–22.
- 10 Borrell-Carrió F, Suchman AL, Epstein RM. The biopsychosocial model 25 years later: principles, practice, and scientific inquiry. *Ann Fam Med* 2004;2:576–82.
- 11 Hojat M, Gonnella JS, Nasca TJ. Physician empathy: definition, components, measurement, and let us know how access to this document benefits you. *Am J Psychiatry* 2002;159:1563–9.
- 12 Petrillo LA, Saunders MJ, Adams MJ. Improving patient-centered care: implementing patient education and shared decision-making in physical therapy practice. *J Patient-Centered Res Rev* 2015;2:10–21.
- 13 Li X, Xu X, Xu J. Research on the influence of medical staff empathy and patient participation in decision-making on patient trust. *Int J Environ Res Public Health* 2019;16:2899.
- 14 Liu X, Rohrer W, Luo A, *et al.* Doctor-patient communication skills training in mainland china: a systematic review of the literature. *Patient Educ Couns* 2015;98:3–14.
- 15 Ahmed F, Burt J, Roland M. Measuring patient experience: concepts and methods. *Patient* 2014;7:235–41.
- 16 Barry HE, Parsons C, Passmore P, *et al.* A systematic review of the effectiveness of patient-centered approaches in improving the quality of primary care. *J Health Psychol* 2018;23:210–23.
- 17 Hammersley V, Donnelly LS, Stride C. Patients' perceptions of patient-centred care in a hospital environment. *Int J Health Care Qual Assur* 2017;30.
- 18 Zhou L-M, Xu RH, Xu Y-H, *et al.* Inpatients' perception of patient-centered care in guangdong province, china: a cross-sectional study. *Inquiry* 2021;58:469580211059482.
- 19 Ahmad W, Krupat E, Asma Y, *et al.* Attitudes of medical students in lahore, pakistan towards the doctor-patient relationship. *PeerJ* 2015;3:e1050.
- 20 Haidet P, Dains JE, Paterniti DA, *et al.* Medical student attitudes toward the doctor-patient relationship. *Med Educ* 2002;36:568–74.
- 21 Ribeiro MMF, Krupat E, Amaral CFS. Brazilian medical students' attitudes towards patient-centered care. *Med Teach* 2007;29:e204–8.
- 22 Krupat E, Hiam CM, Fleming MZ, *et al.* Patient-centeredness and its correlates among first year medical students. *Int J Psychiatry Med* 1999;29:347–56.
- 23 Krupat E, Rosenkranz SL, Yeager CM, *et al.* The practice orientations of physicians and patients: the effect of doctor-patient congruence on satisfaction. *Patient Educ Couns* 2000;39:49–59.
- 24 Street RL Jr, Krupat E, Bell RA, *et al.* Beliefs about control in the physician-patient relationship: effect on communication in medical encounters. *J Gen Intern Med* 2003;18:609–16.
- 25 Kim M-J. Differences in attitude toward patient-centeredness in patients and physicians. *Korean J Med Educ* 2013;25:149–56.
- 26 Tsimitsou Z, Kirana PS, Hatzichristou D. Determinants of patients' attitudes toward patient-centered care: a cross-sectional study in greece. *Patient Educ Couns* 2014;97:391–5.
- 27 Dockens AL, Bellon-Harn ML, Manchaiah V. Preferences to patient-centeredness in pre-service speech and hearing sciences students: a cross-sectional study. *J Audiol Otol* 2016;20:73–9.
- 28 Lee KH, Seow A, Luo N, *et al.* Attitudes towards the doctor-patient relationship: a prospective study in an Asian medical school. *Med Educ* 2008;42:1092–9.
- 29 Ting X, Yong B, Yin L, *et al.* Patient perception and the barriers to practicing patient-centered communication: a survey and in-depth interview of chinese patients and physicians. *Patient Educ Couns* 2016;99:364–9.
- 30 Wang J, Zou R, Fu H, *et al.* Measuring the preference towards patient-centred communication with the chinese-revised patient-practitioner orientation scale: a cross-sectional study among physicians and patients in clinical settings in shanghai, china. *BMJ Open* 2017;7:e016902.
- 31 Liu W, Hao Y, Zhao X, *et al.* Gender differences on medical students' attitudes toward patient-centred care: a cross-sectional survey conducted in heilongjiang, china. *PeerJ* 2019;7:e7896.
- 32 Song W, Hao Y, Cui Y, *et al.* Attitudes of medical professionals towards patient-centredness: a cross-sectional study in H City, China. *BMJ Open* 2022;12:e045542.
- 33 Zhang W. Number of public and private hospitals in china from 2014 to 2019. 2022. Available: <https://www.statista.com/statistics/624593/china-hospital-number-by-ownership/#statisticContainer>
- 34 University of Cambridge MRC Cognition and Brain Unit. Rules of thumb on magnitudes of effect sizes. Available: <https://imaging.mrc-cbu.cam.ac.uk/statswiki/FAQ/effectSize> [Accessed 22 Aug 2022].
- 35 Laplante-Lévesque A, Hickson L, Grenness C. An Australian survey of audiologists' preferences for patient-centredness. *Int J Audiol* 2014;53 Suppl 1:S76–82.
- 36 Epstein RM, Franks P, Fiscella K, *et al.* Measuring patient-centered communication in patient-physician consultations: theoretical and practical issues. *Soc Sci Med* 2005;61:1516–28.
- 37 Roter DL, Hall JA, Aoki Y. Physician gender effects in medical communication: a meta-analytic review. *JAMA* 2002;288:756–64.
- 38 Yang T, Ma M, Guo Y, *et al.* Do job stress, health, and presenteeism differ between Chinese healthcare workers in public and private hospitals: a cross sectional study. *Psychol Health Med* 2020;25:653–65.
- 39 Li Y, Gong W, Kong X, *et al.* Factors associated with outpatient satisfaction in tertiary hospitals in china: a systematic review. *Int J Environ Res Public Health* 2020;17:1–29.
- 40 Zhang W, Deng Z, Evans R, *et al.* Social media landscape of the tertiary referral hospitals in china: observational descriptive study. *J Med Internet Res* 2018;20:e249.
- 41 Dimou FM, Eckelbarger D, Riall TS. Surgeon burnout: A systematic review. *J Am Coll Surg* 2016;222:1230–9.
- 42 Lo D, Wu F, Chan M, *et al.* A systematic review of burnout among doctors in china: A cultural perspective. *Asia Pac Fam Med* 2018;17:3.
- 43 Liu X, Rohrer W, Luo A, *et al.* Doctor-patient communication skills training in mainland china: A systematic review of the literature. *Patient Educ Couns* 2015;98:3–14.
- 44 Wu D, Wang Y, Lam KF, *et al.* Health system reforms, violence against doctors and job satisfaction in the medical profession: A cross-sectional survey in zhejiang province, eastern china. *BMJ Open* 2014;4:e006431.