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## Medical Staffs' Attitude Toward Patient-Centeredness in China's H City: A Cross-Sectional Study

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2020-045542
Article Type:	Original research
Date Submitted by the Author:	09-Oct-2020
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Keywords:	PUBLIC HEALTH, HEALTH SERVICES ADMINISTRATION & MANAGEMENT, MEDICAL EDUCATION & TRAINING



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# 1 Medical Staffs' Attitude Toward Patient-Centeredness in China's H City: A Cross- 2 Sectional Study

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## 39 Abstract

40  
41 **Objectives:** More patient-centred communication is associated with improved patient  
42 satisfaction and health status, fewer malpractice complaints, increased adherence and  
43 harmonious doctor-patient relationship. The study was based on doctor-patient relationships and  
44 the medical system in China, to measure preferences of physicians towards patient-centred  
45 communication of physicians in Northeast China, to explore background factors of patient-  
46 centred attitudes, and to provide references for medical reform and doctor-patient relationship.  
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51 **Methods:** A cross-sectional survey of medical staff conducted from January to February 2018 in  
52 H City of Heilongjiang Province, northeast China utilized the Chinese-revised Patient-  
53 Practitioner Orientation Scale (CR-PPOS), a validated instrument designed to measure individual  
54 preferences towards various aspects of the doctor-patient relationship and medical staff's  
55 attitudes. The medical staff demographic data were collected, including their gender, age, marital  
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status, service year, seniority, education level, pay satisfaction, and doctor-patient relationship cognition. A multiple logistic regression analysis was performed to identify factors associated with CR-PPOS.

**Patient and Public Involvement:**No patient involved

**Results:** A total of 618 valid questionnaires were obtained (representing 95.1% efficiency). The scale demonstrated sound reliability and validity. The Chinese medical staff scored considerably higher on the Caring subscale (20.42) (including patients' preferences into the decision-making process) than on the Sharing subscale (15.26) (sharing information/responsibility with patients), indicating that physicians showed a lower level of patient-centeredness in clinical communication. Medical staff's preference towards patient-centred communication was influenced by age, education level, average hours worked per day, and harmonious doctor-patient relationship cognition.

**Conclusions:** The present survey observed lower 'patient-centred' attitudes towards communication between doctors in Northeast China. Adapting physicians' communication strategies to patients' preferences based on their personal characteristics can be a viable approach towards improving doctor-patient relationship. The medical process should incorporate strong communication skills, and should provide required information on patients' health status. Society as a whole and the entire healthcare system also need to affirm the value.

### **Strengths and limitations of this study**

- This was the first report to use the CR-PPOS to measure PCC in Northeast China;
- Promoted a more comprehensive understanding of Chinese northeast physicians' PCC;
- Most physicians placed more emphasis on caring than sharing in Northeast China;
- It has significant implication for medical practice based on Chinese special Context,Possible intervention approaches were found to enhance the value of PCC;
- The analysis only included general hospitals that focused on physicians in one city,which could lead to limited external validity.

**Keywords:**Patient-Practitioner Orientation Scale (PPOS), Patient-Centered communication (PCC), China,Doctor-patient relationship

## **Introduction**

1  
2  
3 68 Traditional biomedicine practices are based on Western science, focusing on the specific  
4 69 disease rather than the patient as a whole, and tending to grant doctors the decision-making  
5 70 power [1]. Traditionally, the type of health care provided by medical practitioners in hospitals and  
6 71 general hospitals in particular has predominantly been doctor-centred. Patients in the process of  
7 72 diagnosis and treatment usually need to unconditionally obey the doctor's orders and accept the  
8 73 doctor's diagnosis, and if there are inappropriate, actions they will be reprimanded [2]. Because  
9 74 the suppressive relationship has ignored patients as unique human beings, transformation was  
10 75 imminent.

11 76 With the development of the Biopsychosocial paradigm, much attention has been directed  
12 77 to studying the varying orientations of physicians toward their patients, in particular the  
13 78 distinction between a patient-oriented style versus a doctor-oriented style of interaction<sup>[3-5]</sup>. The  
14 79 origin of patient-centred care can be traced to a period as far back as the time of Hippocrates  
15 80 within Western medical traditions.

16 81 Since then, each patient has been considered a relatively independent individual [6]. Patient-  
17 82 centeredness, however, has not been uniformly defined. It generally refers to establishment a  
18 83 partnership among physicians, patients and their families (when appropriate), in order to care for  
19 84 patients' needs, preferences and values, and to provide the necessary information and support, so  
20 85 that patients can actively participate in their own care and clinical decision-making [7, 8].

21 86 Patient-centred clinical practice is a holistic concept, in which components interact and  
22 87 unite in a unique way in each patient-doctor encounter [9]. Patient-centred communication (PCC),  
23 88 cultural sensitivity, and shared decision-making have become core values in medicine, and  
24 89 considerable research has been focused on improving communication between healthcare  
25 90 providers and their patients [10]. Communication has been considered crucial to high-quality  
26 91 health care. It is associated with higher patient and physician satisfaction, better biomedical  
27 92 outcomes related to patient adherence to treatment, decreased prescription-related adverse  
28 93 effects, improved self-management of chronic diseases, and improved health status [11]. Patient-  
29 94 centeredness has been regarded as one of the six core components of high-quality medical  
30 95 care<sup>[12]</sup>. It contributes to building a partnership between physicians and patients, instead of  
31 96 promoting the traditional paternalism<sup>[13]</sup>.

32 97 With increasing recognition of patient-centred care, it is becoming a core value of health  
33 98 services worldwide, and imparting patient-centred care has become an obligation for medical  
34 99 educators. However, it remains largely unexplored in practice, even as it is important for  
35 100 evaluating the tendencies of medical staff's clinical behaviour [14].

36 101 Harmonious doctor-patient relationship is the prerequisite for the progress of medical  
37 102 activities. At present, the doctor-patient relationship in China is complicated, medical disputes  
38 103 are frequent, and the crisis of mistrust between doctors and patients is deepening. The  
39 104 disharmony between doctors and patients has become a major obstacle to citizen's health rights  
40 105 and social harmony [15]. According to the 2017 'White Paper on the status of Medical  
41 106 Practitioners in China', 62% of doctors thought the working environment abominable, 50%  
42 107 thought that their work was not recognized by the society, and 66% have experienced some

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3 108 degree of doctor-patient conflict<sup>[16]</sup>. This may be caused by the doctor's service orientation.  
4 109 Doctors, as the provider of medical services and the leader of medical behaviour, play a vital role  
5 110 in building a harmonious doctor-patient relationship <sup>[17]</sup>. Moreover, the subjective feelings of  
6 111 doctors on the doctor-patient relationship affect their medical behaviours and attitudes, as well as  
7 112 the overall state of doctor-patient relationships <sup>[18]</sup>. Therefore, it is necessary to explore the  
8 113 centeredness orientation from the perspective of doctors and dig deeply into factors associated  
9 114 with the lack of doctor-patient trust in order to rebuild doctor-patient trust and a positive medical  
10 115 environment.

11 116 Assessing such attitudes has become increasingly important in the context of health care  
12 117 and clinical treatment process. Much of the existing research related to patient-centred  
13 118 communication involves questionnaires designed to assess patient and physician preferences, and  
14 119 their correlations with patient outcomes. One widely used scale is the Patient–Practitioner  
15 120 Orientation Scale (PPOS). Originally developed by American scholar Krupat et al , PPOS is a  
16 121 previously validated 18-item instrument designed to access the attitudes of physicians, medical  
17 122 students, and patients toward their respective roles<sup>[19]</sup>.The scale includes the ‘sharing’ and  
18 123 ‘caring’ dimensions<sup>[20]</sup>. The Caring subscale refers to the extent of the respondent’s belief about  
19 124 the importance of emotions, good interpersonal relationships during doctor patient encounters,  
20 125 and treating the patient as a whole person rather than as a medical condition. The Sharing  
21 126 subscale reflects the willingness to share information and power with patients, as well as the  
22 127 willingness to share control in decision-making <sup>[21]</sup>. Answers are based on a 6-point Likert scale  
23 128 (strongly agree-strongly disagree), with higher scores reflecting more patient-centred attitudes  
24 129 (score ranging from 1 to 6) in clinical communication. The PPOS has demonstrated strong  
25 130 psychometric properties and has been widely validated against a range of other attitudinal  
26 131 measures and relevant patient outcomes.

27 132 It has been extensively used in the US and has been translated into various languages,  
28 133 gaining worldwide popularity in measuring the preferences towards patient-centred  
29 134 communication .Shaw et al. conducted a secondary analysis to assess the validity of the PPOS  
30 135 from recorded visits for back pain<sup>[22]</sup>. Mudiyanse et al. translated and validated the PPOS in Sri  
31 136 Lanka<sup>[21]</sup> . Tsimtsiou et al. conducted a cross-sectional study of patients’ attitudes toward patient-  
32 137 centred care with the PPOS in Greece<sup>[23]</sup>. Moore carried out a cross-sectional survey, using an  
33 138 adapted version of the PPOS with a random sample of patients attending a general outpatient  
34 139 department in rural Nepal<sup>[24]</sup>. Kim used the PPOS to compare the attitudes of patients and  
35 140 doctors toward the roles that they should play in the health care process<sup>[25]</sup>. Lau et al. used the  
36 141 PPOS to investigate patients' preferences for patient-centred communication (PCC) in the  
37 142 encounter with healthcare professionals in an outpatient department in rural Sierra Leone <sup>[9]</sup>.

38 143 In China, accounts of patient–physician communication have been prominent in the new  
39 144 healthcare era, as patient-centeredness is increasingly highlighted in clinical practice. Scholars  
40 145 have gradually begun studying patient-centred doctor–patient relationships from different  
41 146 perspectives. Ting et al. conducted a survey to identify patients’ preferences towards patient-  
42 147 centred communication in a hospital in the southwest part of China, the earliest known attempt to



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2  
3 148 apply PPOS in China<sup>[26]</sup>. Later, Wang et al . conducted a cross-sectional study among physicians  
4 149 and patients in clinical settings in Shanghai, China to measure the preference towards patient-  
5 150 centred communication with the Chinese-revised Patient–Practitioner Orientation Scale (CR-  
6 151 PPOS)<sup>[27]</sup>. However, the economic development and the quantity of health resources in different  
7 152 regions of China vary greatly. It is thus unclear how well this instrument would work in other  
8 153 regions and surroundings.

11 154 China is a country with vast regional differences and uneven economic development, which  
12 155 have led to widening gaps between the rich and poor in terms of access to healthcare, quality of  
13 156 care, and health outcomes <sup>[28]</sup>. We conducted this research in H City, Heilongjiang, which is the  
14 157 northeast of China adjacent to the border, and China's old industrial base. The study measured  
15 158 preferences of physicians towards patient-centred communication on using the improved CR-  
16 159 PPOS, and further explored factors that might exert influence on physicians' preferences  
17 160 concerning patient-centred communication.

## 21 161 **Materials & Methods**

24 162 **Study population and data collection:** A cross-sectional survey of medical staff was conducted  
25 163 from January to February 2018 in H City of Heilongjiang Province, northeast China. A stratified  
26 164 sampling design was adopted to ensure that study data were representative of the area. Seven  
27 165 medical institutions were selected based on size and level of development. Considering the  
28 166 length of time allotted for this research and the limited time available to engage with medical  
29 167 staff, participants were intentionally selected for the study utilizing certain inclusion criteria. All  
30 168 staff had worked for at least one year in the clinical department, and had volunteered to  
31 169 participate; those who were absent were excluded. All respondents were also full-time  
32 170 employees of the hospital, thus ensuring the integrity and effectiveness of data collection; the  
33 171 average research time at each hospital was from one day to one and a half days. Self-reporting  
34 172 questionnaires were distributed in person by 14-trained investigators. The researchers obtained  
35 173 oral informed consent prior to beginning the study and a group-wide oral informed consent was  
36 174 read by the investigators to the participants., and the data were collected anonymously to ensure  
37 175 confidentiality. Respondents chose the best time to complete the questionnaire, and most  
38 176 completed questionnaires were collected on the same day by investigators. In cases where  
39 177 respondents wanted to participate but were unable to complete the questionnaire on the same  
40 178 day, it was collected on an agreed-upon date. Before distributing the questionnaire, the  
41 179 investigators informed all respondents of the purposes and methods of the study in a notification  
42 180 letter. The investigators stayed about half of the day in each hospital for data collection. They  
43 181 collected the questionnaires approximately 15 minutes after distribution, and they checked the  
44 182 completeness of each. If any key questions were not filled in, the investigator returned to the  
45 183 doctor for further answers.

184 Through this process, 650 questionnaires were distributed and 618 valid questionnaires  
185 were obtained (representing 95.1% efficiency). The sample represented 10.87% of all licensed  
186 physicians (nearly 5686 as of 2017) in the H City.

187 **Patient and Public Involvement:**No patient involved  
188

189 **Questionnaire design:** The original PPOS is a self-administered instrument that contains 18  
190 items regarding various aspects of doctor-patient relationship and communication. The responder  
191 expresses their level of agreement with each item on a six-point Likert scale from strongly agree  
192 to strongly disagree. Compared with the original PPOS, the 11-item Chinese-revised Patient-  
193 Practitioner Orientation Scale (CR-PPOS), revised by Chinese researcher Wang, et al. , obtained  
194 better psychometric indices, and displayed strong overall reliability and validity<sup>[27]</sup>. The CR-  
195 PPOS is a better instrument in a Chinese context than the original translated version. However,  
196 Jie Wang conducted this research in Shanghai, which is among the most developed cities in  
197 China and possesses abundant high-quality medical resources. Compared with Shanghai, China's  
198 Heilongjiang Province is an underdeveloped region, and medical resources are relatively scarce.  
199 Therefore, the differences in the investigation area and the limited educational level and  
200 cognitive ability of some medical staff needed to be taken into account. After obtaining the  
201 consent of the original author of PPOS and Professor Jie Wang, and combining suggestions and  
202 feedback from experts, scholars and respondents on the content and expression of the scale, we  
203 verbally revised the relevant items and formed the final scale consisting of two dimensions and  
204 11 items.

205 Moreover, according to the report, the income of Chinese physicians was inconsistent with  
206 their social contribution, and income was an indispensable factor affecting doctor-patient  
207 relationship. Medical staffs were increasingly dissatisfied with the working environment and  
208 doctor-patient relationship. Therefore, we supplemented these two items in the basic information  
209 section to measure the pay satisfaction and the cognition of doctor-patient relationship of  
210 Chinese medical staffs, and whether it would affect their clinical behaviour and patient-centred  
211 care or not. In the survey respondents answered: overall satisfaction with pay, and do you think  
212 the current doctor-patient relationship is harmonious?

213 Additionally, taking into account Chinese cultural differences and filling habits, the 6-point  
214 Likert scale represented in the questionnaire was :1 = 'strongly disagree', 2 = 'disagree', 3 =  
215 'somewhat disagree', 4 = 'somewhat agree', 5=' agree', 6= 'strongly agree'; and in order to  
216 facilitate comparison with the results of broader research, we have reversed all items before the  
217 statistical analysis.

218  
219 **Statistical analysis:** Descriptive statistics (mean scores and standard deviations for quantitative  
220 data, and frequencies and percentages for qualitative data) were computed to describe  
221 respondents' demographic characteristics and their work status. Cronbach's  $\alpha$  coefficient was  
222 used to evaluate the reliability of the scale, and confirmatory factor analysis (CFA) was used to  
223 evaluate the validity. In addition, multiple logistic regression was performed to analyse the

224 factors (including gender, age, marital status, education level, seniority, average working time  
 225 per day, pay satisfaction, harmonious doctor-patient relationship cognition) that were likely to  
 226 influence patient-centred clinical practice. Consequently, in this study, an overall score of over  
 227 the median indicated 'patient-centred', and a score below the median indicated 'clinician-  
 228 centred'. Multivariate logistic regression analyses of models Sharing, Caring, and Total was  
 229 performed to identify significant influencing factors of patient-centred clinical practice; The  
 230 median of the Sharing, Caring and Total was 15, 21 and 37; In the models, '0' equalled  
 231 'clinician-centred' and '1' equalled 'patient-centred'. Odds ratios (ORs) and 95% confidence  
 232 intervals (CIs) were calculated. SPSS V.19.0 (IBM Corporation, Armonk, NY, USA) and AMOS  
 233 21.0 were used to conduct the analysis.

234  
 235 **Ethical considerations:** Ethical approval to conduct this study was granted by the research  
 236 ethics committee of Harbin Medical University and informed consent to participate was obtained  
 237 from each hospital and healthcare worker involved in the investigation. All respondents who  
 238 gave their informed consent completed the questionnaire.

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240

## 241 Results

242 **Socio-demographic characteristics:** The demographic and professional characteristics of 618  
 243 study participants are shown in Table 1. Of the investigated medical staff members, 49.7% are  
 244 females. The ages ranged from 20 to 70, with an average age of 36. Over three-quarter of the  
 245 respondents were married (76.2%). The largest proportion of respondents held the 'intermediate'  
 246 professional title (38.6%), and the majority of respondents held a master's degree (52.8%). Only  
 247 a tenth of people were satisfied with their pay, while almost 90% medical staff felt that the  
 248 current doctor-patient relationship is not harmonious (Table 1).

249 **Table 1.** Respondents' social demographic characteristics ( $N = 618$ ).

Characteristic	n	%
<b>Gender</b>		
Male	311	50.3
Female	307	49.7
<b>Age</b>		

≤25	30	4.9
25–30	136	22.0
30–40	323	52.3
>40	129	20.9
<b>Marital status</b>		
Unmarried	134	21.7
Married	471	76.2
Divorced and others	13	2.1
<b>Service year</b>		
≤5	243	39.5
5–10	165	26.8
>10	207	33.7
<b>Seniority</b>		
Senior	66	10.7
Sub-senior	104	16.9
Intermediate	237	38.6
Primary	168	27.4
No title	39	6.4
<b>Education level</b>		
Junior college and below	4	0.6
Bachelor's degree	171	27.7

Master's degree and above	443	71.7
<b>Pay satisfaction</b>		
No	533	89.0
Yes	66	11.0
<b>Harmonious doctor-patient relationship cognition</b>		
No	553	89.6
Yes	64	10.4

250 **Reliability and validity of the scale:** Cronbach's alpha was calculated as a measure of internal  
 251 consistency. The following Cronbach's alpha coefficients for total score was 0.720, for Caring  
 252 subscale was 0.739 and Sharing subscale was 0.705. In the exploratory factor analysis, the  
 253 Bartlett's sphericity test yielded a value of 1457.716 (df = 55,  $p < 0.001$ ) and the Kaiser-Meyer-  
 254 Olkin (KMO) index was 0.780 (Table 2).

255 **Table 2.** The internal consistency of the scale

	Cronbach's $\alpha$
Sharing subscale	0.705
Caring subscale	0.739
Total score	0.720

256 Item to total and component to total correlations were performed using Pearson correlation  
 257 coefficient to substantiate these observations. For Sharing, item-to-total correlation varied from  
 258 0.573 to 0.705 ( $P < 0.05$ ) and for total PPOS from 0.372 to 0.613 ( $P < 0.05$ ). For Caring, item-to-  
 259 total correlation varied from 0.613 to 0.775 ( $P < 0.05$ ) and for total PPOS from 0.495 to 0.617 ( $P$   
 260  $< 0.05$ ). The correlation coefficient for the association between Sharing and Caring scores was  
 261 0.2 ( $P < 0.001$ ). Both Sharing and Caring components had very high correlations to the total  
 262 PPOS ( $P < 0.001$ ) (Table 3).

263 **Table 3.** Item-to-component and item-to-total CR-PPOS correlations

Items	Item-to-sharing	Item-to-caring	Item-to-total CR-PPOS
1s	0.641**		0.395**
2s	0.662**		0.372**
5s	0.631**		0.438**
7s	0.573**		0.613**
9s	0.705**		0.603**
11s	0.628**		0.423**
3c		0.613**	0.533**
4c		0.775**	0.560**
6c		0.676**	0.617**
8c		0.697**	0.495**
10c		0.748**	0.541**

264 Spearman correlation coefficients: \*\*, P<0.001; s indicates sharing items and c indicates caring items. CR-  
 265 PPOS =Chinese-revised Patient-Practitioner Orientation Scale

266 Confirmatory factor analysis was verified by maximum likelihood analysis and the  
 267 adjustment indices of the model: the RMSEA was 0.100, the CFI was 0.880 and IFI was 0.882 .

268 **CR-PPOS scale scores:** The scores were calculated using the standard scoring methods  
 269 proposed by the author of the original PPOS. Descriptive statistics were calculated for the total  
 270 score of CR-

271 PPOS and the Sharing and Caring components of the CR-PPOS for the participant. The  
 272 Sharing subscale score was 15.26±4.205; the Caring subscale score was 20.42±4.415; the Total  
 273 score was 35.62±6.642. For the all items, the highest score was Item 4: ‘If doctors are truly good  
 274 at diagnosis and treatment, the way they relate to patients is not that important’, with 4.68±1.234.  
 275 The lowest score was Item 2 ‘Patients should rely on their doctors’ knowledge and not try to find  
 276 out their conditions on their own’, with 2.08±0.941 (Table 4).

277 **Table 4.** Distribution of scores (Mean ± SD) of sharing, caring and total of CR-PPOS

Subscale	Items	Mean±SD	
S	1.The doctor is the one who should decide what gets talked about during a visit	2.39±1.060	15.26±4.205 Total score: 36 Standard score: 42.39
	2.Patients should rely on their doctors' knowledge and not try to find out their conditions on their own.	2.08±0.941	
	5.Many patients continue asking questions even though they are not learning anything.	2.37±1.063	
	7.When patients disagree with their doctor, this is a sign that the doctor does not have the patient's respect and trust.	3.27±1.260	
	9.The patient must always be aware that the doctor is in charge.	2.81±1.174	
	11.When patients find out medical information on their own, this usually confuses more than it helps.	2.43±1.162	
C	3.When doctors ask a lot of questions about a patient's background, they are prying too much into personal matters.	3.65±1.346	20.42±4.415 Total score: 30 Standard score: 68.06
	4.If doctors are truly good at diagnosis and treatment, the way they relate to patients is not that important.	4.68±1.234	
	6.If a doctor mainly relies on being open and warm, the doctor will not have a lot of success.	3.58±1.311	
	8.Most patients want to get in and out of the doctor's office as quickly as possible.	4.31±1,195	
	10.It is not that important to know a patient's culture and background to treat the person's illness.	4.19±1.236	
Total			35.62±6.642 Total score: 66

		Standard score: 53.96
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Notes: Score of 1 (strongly agree)=most clinician-centred; Score of 6 (strongly disagree)=most patient-centred.

**Analysis of factors influencing patient-centred clinical practice:** Multivariable logistic regression analysis was used to analyse the factors that influenced the respondents' patient-centred clinical practice. This study found several factors associated with medical staffs' clinical practice. The respondents' general characteristics and their work status were used in the multiple logistic regression analysis to examine the factors influencing their choices of the most useful strategies to improve clinical practice; an adjusted OR and a 95% CI are shown. In the Sharing Model, when compared with bachelor's degree and below, master's degree and above were more likely to share with patients (OR = 1.779, 95%CI:1.180~2.681); health-care workers who averaged less than an 8 hours work day were more likely to share with patients than those who did not (OR = 0.589, 95%CI:0.403~0.860); moreover, as far as the current cognition of the doctor-patient relationship was concerned, the medical staff who thought that the doctor-patient relationship was harmonious at present were more likely to share with the patients (OR = 1.918, 95%CI:1.345~2.736). In the Caring Model, medical staff aged 30-40 provided less care to patients than other age groups (OR = 0.587, 95%CI:0.345~1.000); however, it was of marginal significance. In the Total Model, medical staff aged over 40 were less patient-centred in clinical practice than those who were not (OR = 0.502, 95%CI:0.256~0.987); similarly to the Sharing Model, medical staff who thought that the doctor-patient relationship was harmonious were more likely to patient-centred in clinical practice (OR = 1.712, 95%CI:1.205~2.433) (Table 5).

**Table 5.** Multiple logistic regression analysis of factors associated with patient-centered clinical practice.

Category	Sharing		Caring		Total	
	<i>p</i>	OR (95CI%)	<i>p</i>	OR (95CI%)	<i>p</i>	OR (95CI%)
<b>Gender</b>						
Male	–	–	–	–	–	–
Female	0.523	1.120 (0.791~1.584)	0.559	1.105 (0.790~1.547)	0.102	1.332 (0.944~1.879)
<b>Age</b>						
≤30	0.457	–	0.144	–	0.708	–
30–40	0.225	0.717	<b>0.050*</b>	<b>0.587</b>	0.480	0.826



		(0.418~1.228 )		<b>(0.345~1.000)</b>		(0.485~1.404)
>40	0.502	0.794 (0.404~1.558 )	0.188	0.642 (0.332~1.241)	<b>0.046*</b>	<b>0.502</b> <b>(0.256~0.987)</b>
<b>Marital status</b>						
Unmarried	–	–	–	–	–	–
Married	0.311	0.766 (0.458~1.283 )	0.815	1.062 (0.640~1.763)	0.967	0.989 (0.595~1.644)
<b>Education level</b>						
Bachelor's degree and below	–	–	–	–	–	–
Master's degree and above	<b>0.006*</b>	<b>1.779</b> <b>(1.180~2.681</b> <b>)</b>	0.412	1.178 (0.797~1.741)	0.223	1.284 (0.859~1.918)
<b>Seniority</b>						
Primary and below	–	–	–	–	–	–
Intermediate and above	0.211	0.729 (0.445~1.196 )	0.304	1.292 (0.792~2.108)	0.622	1.131 (0.693~1.846)
<b>Average working time per day</b>						
≤8h	–	–	–	–	–	–
>8h	<b>0.006*</b>	<b>0.589</b> <b>(0.403~0.860</b> <b>)</b>	0.410	1.167 (0.808~1.685)	0.653	0.918 (0.631~1.334)
<b>Pay satisfaction</b>						
No	–	–	–	–	–	–
Yes	0.382	1.172 (0.821~1.674 )	0.408	0.864 (0.611~1.222)	0.402	1.164 (0.816~1.660)

<b>Harmonious doctor-patient relationship cognition</b>						
No	–	–	–	–	–	–
Yes	<b>0.000*</b>	<b>1.918</b> <b>(1.345~2.736)</b>	0.977	0.995 (0.704~1.405)	<b>0.003*</b>	<b>1.712</b> <b>(1.205~2.433)</b>

## Discussion

Although the PPOS has been widely used in various languages and areas, only a few studies have been reported in China, with no results related to China northeast physicians to date. Beginning with this premise, we adopted the verbally revised CR-PPOS to analyse China northeast physicians' perception. The revised CR-PPOS was demonstrated to be reliable and demonstrated good internal consistency, with moderate Cronbach's alphas for Caring and Sharing and Total scores. The survey scale is also suitable for further statistical analysis and comparison.

Standardized scores indicated similar trends in both the Sharing dimension and the Caring dimension. In the overall scale, the participants obtained medium scores (around the median value of 3.5), and both had relatively high scores on the Caring scale (over 3.0) and low scores on the Sharing scale (around 2.5 or below) respectively. Comparing the data of this study with that from at home and abroad, the majority showed a similar pattern that physicians were more patient-centred in Caring than in Sharing. There were still two exceptions; Surveys conducted in Portugal and in Australia indicated Sharing score was higher than Caring score<sup>[29, 30]</sup>, which may be due to the difference in physicians cognitive level and overall local medical systems. Thus, further research is needed to determine the reasons for such a distinction. According to previous studies, higher scores indicated patient-centred and lower scores indicated clinician-centred. Mean scores were ranked and divided into three groups for comparison: high scores (patient-centred, with a mean score of 5.00 or greater), medium scores (greater than 4.57 but less than 5.00), and low scores (doctor-centred, mean of 4.57 or less)<sup>[20]</sup>. The results indicated that although physicians showed a lower level of patient-centeredness in clinical communication, they still expressed higher preferences towards Caring from a biopsychosocial perspective than sharing information and involvement in decision-making.

The mean scores (3.24±0.604) in this study were comparable to Shanghai, China scores reported in Jie Wang, et al.<sup>[27]</sup>, which were 3.66±0.59; In Edward Krupat, et al. the survey was performed among physicians at Harvard Pilgrim Health Care (HPHC), the largest health maintenance organization in New England, which were 4.26±0.75<sup>[19]</sup>; Ariane Laplante-Lévesque, et al. conducted the audiologist survey in Australia (4.46).<sup>[31]</sup> Overall, a low preference to patient-centeredness is indicated. It noted that the scores were not only lower than other countries, but also lower than Shanghai, the developed region of China, showing a lower

level of patient-centeredness in clinical communication. These results might be explained by differences in socio-economic conditions or by religious and cultural differences across countries. In addition to the differences of the participants, in this study medical staffs were from public hospitals, while Jie Wang's research included medical personnel from public hospitals and community hospitals. Lower scores indicated that doctors' cognitive level was more likely to be associated with economic and health development levels in different regions<sup>[32]</sup>. At present, there are differences in the overall medical system and medical environment in different regions. The economic and health development level of Shanghai is close to that of the developed countries, while China's H City is at a relatively less developed level, and the patient-centred concept is still in the process of formation.

Of the scores that contributed most to the overall Caring subscale score, item four (i.e. if doctors are truly good at diagnosis and treatment, the way they relate to patients is not that important.) received the highest preference for patient-centeredness. The mean score of 4.68 indicated a strong preference to strengthen the relationship with patients, and medical staffs prefer a relationship between clinician and patient that includes shared perception, agreement on goals, and emotional context<sup>[33]</sup>. Additionally, of the scores that contributed most to the overall Sharing dimension score, item 7 (i.e. When patients disagree with their doctor, this is a sign that the doctor does not have the patient's respect and trust.) indicated the physicians' preference for trust and respect from the patient when there is disagreement. It also indicated a strong preference for sharing decision - making with the patient.

On the other hand, medical staff generally had relatively lower preference for item 2 and item 6. The mean scores of 2.08 on item 2 (i.e. Patients should rely on their doctors' knowledge and not try to find out their conditions on their own.) and 3.58 on item 6 (i.e. If a doctor mainly relies on being open and warm, the doctor will not have a lot of success.) suggest that while physicians value their knowledge and skills, improving the quality of medical services and technology to better meet the needs of their patients' health care may be deemed of greater importance. The results were generally consistent with other research<sup>[30, 33]</sup>.

Preference towards patient-centred communication, as measured by the CR-PPOS, may be influenced by both personal characteristics and social environmental factors. This study represents the attempt to detect the potential influential factors of patient-centred communication among Chinese northeast physicians. Overall, the current study results indicate incongruence among Sharing, Caring, and Total scores for patient-centeredness. This difference may be attributed to a number of factors, including gender, age, marital status, education level, seniority; average hours worked per day, pay satisfaction, and harmonious doctor-patient relationship cognition.

Notably, we found that physicians who work longer days on average were generally less likely to prefer patient-centeredness in clinical communication. This may have the potential link to another factor that was frequently mentioned in the existing research -doctors' burnout. Dana Loet al. found that burnout was higher among doctors who worked over 40 h/week in China<sup>[34]</sup>. The average working time could indicate the burnout level of the medical staff, meaning the

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3 370 longer working time, the higher burnout level. These results were consistent with several prior  
4 371 studies in other countries<sup>[32, 35]</sup>. The high burnout level showed a negative correlation with job  
5 372 satisfaction and higher incidence of medical mistakes, may lead physicians make negative  
6 373 evaluation of their work or even avoid contact with patients<sup>[36]</sup>. This indicates that burnout level  
7 374 might exert impact on physicians' sharing with patients. Sharing implies equal autonomy of the  
8 375 patient in making decisions. This requires time and effort on part of the physician to address  
9 376 patients' concerns and their choices. Physicians experiencing burnout from long hours worked  
10 377 and a heavy workload could display lack of sharing <sup>[32]</sup>.

14 378 Meanwhile, an interesting finding was the cognition of doctor-patient relationship may  
15 379 influence patient-centred clinical, especially for Sharing and Total orientation. A plausible  
16 380 explanation is that those who hold that the current doctor-patient relationship is harmonious may  
17 381 pay more attention to the communication and decision-making with the patients. In light of the  
18 382 reported growth in disputes between patients and healthcare providers in China, most doctors  
19 383 expected to emphasize power sharing with the patients in decision-making and  
20 384 responsibilities<sup>[26]</sup>. The physicians indicated a desire for interactive process-communication built  
21 385 on mutual-understanding. In particular they focused on being treated in a friendly manner and  
22 386 being cared for in a manner that was considerate of patients' psychosocial context.

26 387 Educational levels of physicians is also a factor. Physicians with higher degrees were more  
27 388 likely to share with patients, and were more likely to value information and desire active  
28 389 involvement with patients in the treatment process. This may be due to the difference in  
29 390 physician training modes and the cognitive level of different groups <sup>[37]</sup>. Also, there was lack of  
30 391 educational interventions like communication skills training aimed at improving doctor-patient  
31 392 relationship in lower grade curricula, which may be the reason for difference of the attitude. This  
32 393 result support the positive effects of education on health literacy and of health literacy on  
33 394 empowerment, self-efficacy and increased engagement in decision-making processes <sup>[28]</sup>.

36 395 In this study, younger physicians expressed a higher preference for patient-centred  
37 396 communication in both Caring and Total orientation. This may be related to the increased access  
38 397 of younger medical staffs to modern medical education model <sup>[37]</sup>. Therefore, strengthening the  
39 398 transformation of the medical model would be a good starting point to increase patient-centred  
40 399 communication in China.

43 400 **Strengths of this study:** This is the first study to report on Chinese northeast physicians'  
44 401 attitudes toward patient-centred care. Comparing the Chinese northeast physicians' scores with  
45 402 other research scores (measured with the same tool) promotes a more comprehensive  
46 403 understanding of Chinese northeast physicians' patient-centred attitudes.

48 404 Because it is a systematic study to access the Patient-centred orientation in China's  
49 405 northeast area, and considering the deteriorating physician-patient relationships in current  
50 406 Chinese society, this study has significant implications for medical practice.

52 407 The association between broader factors and participants' preference towards patient-  
53 408 centred communication was explored. Thus, possible intervention approaches were found to be  
54 409 needed to improve the patient-centred communication.

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3 410 **Limitations and suggestions for future research:** When interpreting our findings, we should  
4 411 bear in mind the limitations of our research. Through further research in the future, we will more  
5 412 comprehensively explore the patient-centred attitude of medical staff in different regions.

6 413 The participants in this study were sampled only from seven clinical units in the northeast  
7 414 of China, which could lead to limited external validity. Future related research could include  
8 415 large sample sizes to increase our understanding of this topic.

9 416 The analysis only included general hospitals that focused on physicians in one city. It would  
10 417 be helpful if future research incorporated longitudinal analyses or follow-up studies on other  
11 418 types of hospitals (e.g. primary hospital and specialized hospital).  
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## 17 420 **Conclusions**

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20 421 In general, the present survey observed lower 'patient-centred' attitudes towards communication  
21 422 between doctors in northeast China, and findings indicated that higher Caring subscale scores but  
22 423 less patient-centred as measured by the Sharing subscale scores. Age, education level, average  
23 424 working time per day, and harmonious doctor-patient relationship cognition had significant  
24 425 impact on medical staffs' patient-centred attitudes, Therefore, possible intervention approaches  
25 426 would be needed to improve the patient-centred communication in China's H City.

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28 427 Our research indicates that relieving burnout, and improving the cognition of doctor -  
29 428 patient relationship and medical education could help physicians to be more patient-centred in  
30 429 communication. Meanwhile, developing required medical educational interventions related to  
31 430 patient-centred care, establishing communication skills workshops, displaying the positive  
32 431 effects of a patient-centred relationship, increasing patients' awareness and abilities, and  
33 432 broadcasting activities about communication improvement methods on mass media are some  
34 433 approaches to address the low level of patient-centred care [35]. It is expected that these  
35 434 improvements would change the current status to a desired one in which physicians take their  
36 435 patients' needs into account, try to provide required information on their health status in an  
37 436 understandable way, and involve them more in the decision making process.

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40 437 Improving medical physicians' patient-centred skills can result in establishing higher-  
41 438 quality medical services in China. However, education reform alone cannot fully achieve patient-  
42 439 centred care; instead, society as a whole and the entire healthcare system also need to affirm the  
43 440 value and significance of patient-centred care before it can be fully realized.  
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## 50 442 **Acknowledgements**

51  
52 443 We sincerely thank Dr. Edward Krupat at Harvard Medical School for generously sharing  
53 444 information and giving valuable advice regarding the PPOS. We are also grateful to Wang Jie  
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445 and Wang Fan at Fudan University for using and revising the CR-PPOS .We would also like to  
446 thank the healthcare workers and participants for their support and participation in the project.

## 447 **Funding**

448 This work was supported by the National Natural Science Foundation of China (Grant Number:  
449 71673073, 71974049), Heilongjiang Postdoctoral Scientific Research Development Fund (LBH-  
450 Q18071), Think Tank of Public Health Security and Health Reform of Heilongjiang Province,

451 Special project supported by China Postdoctoral Foundation (2016T90318).

452 The funders had no role in study design, data collection and analysis, decision to publish, or  
453 preparation of the manuscript.

## 454 **Grant Disclosures**

455 The following grant information was disclosed by the authors:

456 National Natural Science Foundation of China: 71673073, 71974049

457 Heilongjiang Postdoctoral Scientific Research Development Fund: LBH-Q18071.

458 China Postdoctoral Foundation: 2016T90318.

459 Think Tank of Public Health Security and Health Reform of Heilongjiang Province.(N/A)

## 460 **Competing Interests**

461 The authors declare there are no competing interests.

## 462 **Authors' Contributors**

463 Weijian Song contributed as the first author to this article for the drafting of the manuscript.  
464 Libo Liang and Qunhong Wu designed the study and collected the data. Yanhua Hao and  
465 Xiaowen Zhao provided statistical expertise. Wei Liu and Siyi Tao analyzed the data. Yuxin Xue  
466 and Juan Zhao provided questionnaire translation and literature review. Qiao Zhang and Mingli  
467 Jiao provided administrative support. Yu Cui , Weilan Xu, Hong Sun, Ye Li and Linghan Shan  
468 made critical revisions to the paper for important scientific content and reviewed various drafts  
469 as well as the final manuscript. All authors read and approved the final manuscript.

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	Reporting Item	Page Number
<b>Title</b>		
	<a href="#">#1</a> Indicate that the manuscript concerns an initiative to improve healthcare (broadly defined to include the quality, safety, effectiveness, patientcenteredness, timeliness, cost, efficiency, and equity of healthcare)	1
<b>Abstract</b>		
	<a href="#">#02a</a> Provide adequate information to aid in searching and indexing	1
	<a href="#">#02b</a> Summarize all key information from various sections of the text using the abstract format of the intended publication or a structured summary such as: background, local problem, methods, interventions, results, conclusions	1-2
<b>Introduction</b>		
Problem description	<a href="#">#3</a> Nature and significance of the local problem	2-4

1	Available	<a href="#">#4</a>	Summary of what is currently known about the problem, including	2-4
2	knowledge		relevant previous studies	
3				
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5	Rationale	<a href="#">#5</a>	Informal or formal frameworks, models, concepts, and / or theories used	2-4
6			to explain the problem, any reasons or assumptions that were used to	
7			develop the intervention(s), and reasons why the intervention(s) was	
8			expected to work	
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11	Specific aims	<a href="#">#6</a>	Purpose of the project and of this report	3-5
12				
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14	<b>Methods</b>			
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16	Context	<a href="#">#7</a>	Contextual elements considered important at the outset of introducing	6
17			the intervention(s)	
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20	Intervention(s)	<a href="#">#08a</a>	Description of the intervention(s) in sufficient detail that others could	6
21			reproduce it	
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24	Intervention(s)	<a href="#">#08b</a>	Specifics of the team involved in the work	6
25				
26	Study of the	<a href="#">#09a</a>	Approach chosen for assessing the impact of the intervention(s)	6
27	Intervention(s)			
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30	Study of the	<a href="#">#09b</a>	Approach used to establish whether the observed outcomes were due to	6
31	Intervention(s)		the intervention(s)	
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34	Measures	<a href="#">#10a</a>	Measures chosen for studying processes and outcomes of the	6
35			intervention(s), including rationale for choosing them, their operational	
36			definitions, and their validity and reliability	
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38				
39	Measures	<a href="#">#10b</a>	Description of the approach to the ongoing assessment of contextual	6-7
40			elements that contributed to the success, failure, efficiency, and cost	
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43	Measures	<a href="#">#10c</a>	Methods employed for assessing completeness and accuracy of data	6-7
44				
45	Analysis	<a href="#">#11a</a>	Qualitative and quantitative methods used to draw inferences from the	6-7
46			data	
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49	Analysis	<a href="#">#11b</a>	Methods for understanding variation within the data, including the	6-7
50			effects of time as a variable	
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53	Ethical	<a href="#">#12</a>	Ethical aspects of implementing and studying the intervention(s) and	7
54	considerations		how they were addressed, including, but not limited to, formal ethics	
55			review and potential conflict(s) of interest	
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58	<b>Results</b>			
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1	<a href="#">#13a</a>	Initial steps of the intervention(s) and their evolution over time (e.g.,	6
2		time-line diagram, flow chart, or table), including modifications made to	
3		the intervention during the project	
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5			
6	<a href="#">#13b</a>	Details of the process measures and outcome	6-7
7			
8	<a href="#">#13c</a>	Contextual elements that interacted with the intervention(s)	6
9			
10			
11	<a href="#">#13d</a>	Observed associations between outcomes, interventions, and relevant	6-7
12		contextual elements	
13			
14			
15	<a href="#">#13e</a>	Unintended consequences such as unexpected benefits, problems,	7
16		failures, or costs associated with the intervention(s).	
17			
18	<a href="#">#13f</a>	Details about missing data	7
19			
20			
21	<b>Discussion</b>		
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23	Summary	<a href="#">#14a</a> Key findings, including relevance to the rationale and specific aims	8
24			
25	Summary	<a href="#">#14b</a> Particular strengths of the project	8-9
26			
27	Interpretation	<a href="#">#15a</a> Nature of the association between the intervention(s) and the outcomes	9-10
28			
29	Interpretation	<a href="#">#15b</a> Comparison of results with findings from other publications	9-10
30			
31	Interpretation	<a href="#">#15c</a> Impact of the project on people and systems	9-10
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33	Interpretation	<a href="#">#15d</a> Reasons for any differences between observed and anticipated	9-10
34		outcomes, including the influence of context	
35	Interpretation	<a href="#">#15e</a> Costs and strategic trade-offs, including opportunity costs	10
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37	Limitations	<a href="#">#16a</a> Limits to the generalizability of the work	11
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40		bias, or imprecision in the design, methods, measurement, or analysis	
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42			
43	Conclusion	<a href="#">#17a</a> Usefulness of the work	11-12
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47	Conclusion	<a href="#">#17c</a> Potential for spread to other contexts	11
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49	Conclusion	<a href="#">#17d</a> Implications for practice and for further study in the field	11
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1	Conclusion	<a href="#">#17e</a>	Suggested next steps	11-12
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3	<b>Other</b>			
4	<b>information</b>			
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7	Funding	<a href="#">#18</a>	Sources of funding that supported this work. Role, if any, of the funding organization in the design, implementation, interpretation, and reporting	12
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12 NC 4.0. This checklist was completed on 29. September 2020 using <https://www.goodreports.org/>, a tool made  
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# BMJ Open

## Medical professionals' Attitude Toward Patient-Centeredness in China's H City: A Cross-Sectional Study

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2020-045542.R1
Article Type:	Original research
Date Submitted by the Author:	24-May-2021
Complete List of Authors:	Song, Weijian; Harbin Medical University, School of Health Management, Department of Social Medicine; Harbin Medical University, Department of Humanities and Social Sciences Hao, Yanhua; Harbin Medical University, School of Health Management, Department of Social Medicine Zhao, Xiaowen; Harbin Medical University, School of Health Management, Department of Social Medicine Liu, Wei; Harbin Medical University, School of Health Management, Department of Social Medicine Tao, Siyi; Harbin Medical University, School of Health Management, Department of Social Medicine Xue, Yuxin; Chengyang People's Hospital Zhang, Qiao; Harbin Medical University, School of Health Management, Department of Social Medicine Jiao, Mingli; Harbin Medical University, School of Health Management, Department of Social Medicine Cui, Yu; Harbin Medical University, School of Health Management, Department of Social Medicine Xu, Weilan; Qiqihaer Medical University, College of International Education Sun, Hong; Harbin Medical University, School of Health Management, Department of Social Medicine Li, Ye; Harbin Medical University, School of Health Management, Department of Social Medicine Shan, Linghan; Harbin Medical University, School of Health Management, Department of Social Medicine Zhao, Juan; Harbin Medical University, School of Health Management, Department of Social Medicine Liang, Libo; Harbin Medical University, School of Health Management, Department of Social Medicine Wu, Qunhong; Harbin Medical University, School of Health Management, Department of Social Medicine
<b>Primary Subject Heading</b>:	Health services research
Secondary Subject Heading:	Medical management, Patient-centred medicine
Keywords:	PUBLIC HEALTH, HEALTH SERVICES ADMINISTRATION & MANAGEMENT, MEDICAL EDUCATION & TRAINING

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## 1 Medical professionals' Attitude Toward Patient-Centeredness in China's H City: A Cross- 2 Sectional Study

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### 27 Abstract

28 **Objectives:** More patient-centred communication is associated with improved patient  
29 satisfaction and health status, fewer malpractice complaints, increased adherence and  
30 harmonious doctor-patient relationship. The study was based on doctor-patient relationships and  
31 the medical system in China, to measure preferences of medical professionals towards patient-  
32 centred communication of medical professionals in Northeast China, to explore background  
33 factors of patient-centred attitudes, and to provide references for medical reform and doctor-  
34 patient relationship.  
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38 **Methods:** A cross-sectional survey of medical professionals conducted from January to February  
39 2018 in H City of Heilongjiang Province, northeast China utilized the Chinese-revised Patient-  
40 Practitioner Orientation Scale (CR-PPOS), a validated instrument designed to measure individual  
41 preferences towards various aspects of the doctor-patient relationship and medical professionals'  
42 attitudes. The medical professionals demographic data were collected, including their gender,  
43 age, marital status, service year, seniority, education level, pay satisfaction, and doctor-patient  
44 relationship cognition. A multiple logistic regression analysis was performed to identify factors  
45 associated with CR-PPOS.  
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49 **Patient and Public Involvement:** No patient involved  
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52 **Results:** A total of 618 valid questionnaires were obtained (representing 95.1% efficiency). The  
53 scale demonstrated sound reliability and validity. The Chinese medical professionals scored  
54 considerably higher on the Caring subscale (20.42) (including patients' preferences into the  
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decision-making process) than on the Sharing subscale (15.26) (sharing information/responsibility with patients), indicating that medical professionals showed a lower level of patient-centeredness in clinical communication. Medical professionals' preference towards patient-centred communication was influenced by age, education level, average hours worked per day, and harmonious doctor-patient relationship cognition.

**Conclusions:** The present survey observed lower 'patient-centred' attitudes towards communication between medical professionals in Northeast China. Adapting medical professionals' communication strategies to patients' preferences based on their personal characteristics can be a viable approach towards improving doctor-patient relationship. The medical process should incorporate strong communication skills, and should provide required information on patients' health status. Society as a whole and the entire healthcare system also need to affirm the value.

### Strengths and limitations of this study

- This was the first report to use the CR-PPOS to measure PCC in Northeast China;
- It has significant implication for medical practice based on Chinese special Context.
- Promoted a more comprehensive understanding of Chinese northeast medical professionals' PCC;
- Possible intervention approaches were found to enhance the value of PCC;
- Future related research might also include large medical sample sizes and patient opinions to increase our understanding of this topic.

**Keywords:** Patient-Practitioner Orientation Scale (PPOS), Patient-Centered communication (PCC), China, Doctor-patient relationship

### Introduction

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With the development of the Biopsychosocial paradigm, much attention has been directed to studying the varying orientations of medical professionals toward their patients, in particular the distinction between a patient-oriented style versus a doctor-oriented style of interaction<sup>[1-3]</sup>. The origin of patient-centred care can be traced to a period as far back as the time of Hippocrates within Western medical traditions. Since then, each patient has been considered a relatively independent individual<sup>[4]</sup>. Patient-centeredness, however, has not been uniformly defined. It generally refers to establishment a partnership among physicians, patients and their families (when appropriate), in order to care for patients' needs, preferences and values, and to provide the necessary information and support, so that patients can actively participate in their own care and clinical decision-making<sup>[5, 6]</sup>.

Patient-centred clinical practice is a holistic concept, in which components interact and unite in a unique way in each patient-doctor encounter<sup>[7]</sup>. Patient-centred communication (PCC), cultural sensitivity, and shared decision-making have become core values in medicine, and

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3 81 considerable research has been focused on improving communication between healthcare  
4 82 providers and their patients [8]. Communication also has been considered crucial to high-quality  
5 83 health care, it is associated with higher doctor-patient satisfaction, better biomedical outcomes  
6 84 [9]. Patient-centeredness has been regarded as one of the six core components of high-quality  
7 85 medical care<sup>[10]</sup>. It contributes to building a partnership between medical professionals and  
8 86 patients, instead of promoting the traditional paternalism<sup>[11]</sup>. With increasing recognition of  
9 87 patient-centred care, it is becoming a core value of health services worldwide, and imparting  
10 88 patient-centred care has become an obligation for medical educators. However, it remains largely  
11 89 unexplored in practice, even as it is important for evaluating the tendencies of medical  
12 90 professionals' clinical behaviour [12].

13 91 Harmonious doctor-patient relationship is the prerequisite for the progress of medical  
14 92 activities. At present, the doctor-patient relationship in China is complicated, medical disputes  
15 93 are frequent, and the crisis of mistrust between doctors and patients is deepening. The current  
16 94 situation of doctor-patient affected by various factors, including mechanism, legal system,  
17 95 society and public, as well as hospital management, medical concept and public cognition. The  
18 96 disharmony between doctors and patients has become a major obstacle to citizen's health rights  
19 97 and social harmony [13]. According to the 2017 'White Paper on the status of Medical  
20 98 Professionals in China', 62% of clinicians thought the working environment abominable, 50%  
21 99 thought that their work was not recognized by the society, and 66% have experienced some  
22 100 degree of doctor-patient conflict<sup>[14]</sup>. This may be caused by the professionals' service orientation.  
23 101 Medical professionals, as the provider of medical services and the leader of medical behaviour,  
24 102 play a vital role in building a harmonious doctor-patient relationship [15]. Moreover, the  
25 103 subjective feelings of medical professionals on the doctor-patient relationship affect their  
26 104 medical behaviours and attitudes, as well as the overall state of doctor-patient relationships [16].  
27 105 Therefore, it is necessary to explore the centeredness orientation from the perspective of medical  
28 106 professionals and dig deeply into factors associated with the lack of doctor-patient trust in order  
29 107 to rebuild doctor-patient trust and a positive medical environment.

30 108 Assessing such attitudes has become increasingly important in the context of health care  
31 109 and clinical treatment process. Much of the existing research related to patient-centred  
32 110 communication involves questionnaires designed to assess patient and medical professionals'  
33 111 preferences, and their correlations with patient outcomes. One widely used scale is the Patient-  
34 112 Practitioner Orientation Scale (PPOS). Originally developed by American scholar Krupat et al ,  
35 113 PPOS is a previously validated 18-item instrument designed to access the attitudes of medical  
36 114 professionals, medical students, and patients toward their respective roles<sup>[17]</sup>. The scale includes  
37 115 the 'sharing' and 'caring' dimensions<sup>[18]</sup>. The Caring subscale refers to the extent of the  
38 116 respondent's belief about the importance of emotions, good interpersonal relationships during  
39 117 doctor patient encounters, and treating the patient as a whole person rather than as a medical  
40 118 condition. The Sharing subscale reflects the willingness to share information and power with  
41 119 patients, as well as the willingness to share control in decision-making [19]. Answers are based on  
42 120 a 6-point Likert scale (strongly agree-strongly disagree), with higher scores reflecting more

121 patient-centred attitudes (score ranging from 1 to 6) in clinical communication. The PPOS has  
122 demonstrated strong psychometric properties and has been widely validated against a range of  
123 other attitudinal measures and relevant patient outcomes. Shaw et al. (2012)<sup>[20]</sup>, Mudiyanse et al.  
124 (2015)<sup>[19]</sup>, Tsimtsiou et al. (2014)<sup>[21]</sup>, Moore (2008)<sup>[22]</sup>, Kim (2013)<sup>[23]</sup>, Lau et al. (2013)<sup>[7]</sup> used the  
125 PPOS in the northeastern USA, Sri Lanka, Greece, rural Nepal, South Korea, rural Sierra Leone,  
126 respectively.

127 In China, accounts of patient–physician communication have been prominent in the new  
128 healthcare era, as patient-centeredness is increasingly highlighted in clinical practice. Scholars  
129 have gradually begun studying patient-centred doctor–patient relationships from different  
130 perspectives. Ting et al. (2016) conducted a survey to identify patients' preferences towards  
131 patient-centred communication in a hospital in the southwest part of China, the earliest known  
132 attempt to apply PPOS in China<sup>[24]</sup>. Later, Wang et al. (2017) conducted a cross-sectional study  
133 among medical professionals and patients in clinical settings in Shanghai, China to measure the  
134 preference towards patient-centred communication with the Chinese-revised Patient–Practitioner  
135 Orientation Scale (CR-PPOS)<sup>[25]</sup>. However, the economic development and the quantity of health  
136 resources in different regions of China vary greatly. It is thus unclear how well this instrument  
137 would work in other regions and surroundings.

138 China is a country with vast regional differences and uneven economic development, which  
139 have led to widening gaps between the rich and poor in terms of access to healthcare, quality of  
140 care, and health outcomes<sup>[26]</sup>. We conducted this research in H City, Heilongjiang, which is the  
141 northeast of China adjacent to the border, and China's old industrial base. The study measured  
142 preferences of medical professionals towards patient-centred communication on using the  
143 improved CR-PPOS, and further explored factors that might exert influence on medical  
144 professionals' preferences concerning patient-centred communication.

## 145 **Materials & Methods**

146 **Study population and data collection:** A cross-sectional survey of medical professionals was  
147 conducted from January to February 2018 in H City of Heilongjiang Province, northeast China.  
148 A stratified sampling design was adopted to ensure that study data were representative of the  
149 area. Seven medical institutions were selected based on size and level of development.  
150 Considering the length of time allotted for this research and the limited time available to engage  
151 with medical professionals, medical professionals were intentionally selected for the study  
152 utilizing certain inclusion criteria. Firstly, all medical professionals had worked for at least one  
153 year in the clinical department, and had volunteered to participate; those who were absent were  
154 excluded. Secondly, all respondents were also full-time employees of the hospital, including  
155 doctors, medical technical professionals (e.g., anesthesiologists), nurse were excluded, thus  
156 ensuring the integrity and effectiveness of data collection; Furthermore, to ensure a reliable  
157 results, the participants are conscious and have strong willingness to participate in research, can  
158 comprehend the questionnaire independently and have written ability. The average research time  
159 at each hospital was from one day to one and a half days. Self-reporting questionnaires were  
160 distributed in person by 14-trained investigators. Participants in the survey was voluntary, also,

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3 161 the investigators informed the participants of how to fill in the questionnaire. The researchers  
4 162 obtained verbal consent prior to beginning the study and a group-wide verbal consent was read  
5 163 by the investigators to the participants, and the data were collected anonymously to ensure  
6 164 confidentiality and quality. Respondents chose the best time to complete the questionnaire, and  
7 165 most completed questionnaires were collected on the same day by investigators. In cases where  
8 166 respondents wanted to participate but were unable to complete the questionnaire on the same  
9 167 day, it was collected on an agreed-upon date. Before distributing the questionnaire, the  
10 168 investigators informed all respondents of the purposes and methods of the study in a notification  
11 169 letter. The investigators stayed about half of the day in each hospital for data collection. They  
12 170 collected the questionnaires approximately 15 minutes after distribution, and they checked the  
13 171 completeness of each. If any key questions were not filled in, the investigator returned to the  
14 172 doctor for further answers.

15 173 Through this process, 650 questionnaires were distributed and 618 valid questionnaires  
16 174 were obtained (representing 95.1% efficiency). The sample represented 10.87% of all licensed  
17 175 medical professionals (nearly 5686 as of 2017) in the H City.

18 176 **Patient and Public Involvement:**No patient involved  
19 177

20 178 **Questionnaire design:** The original PPOS is a self-administered instrument that contains 18  
21 179 items regarding various aspects of doctor-patient relationship and communication. The responder  
22 180 expresses their level of agreement with each item on a six-point Likert scale from strongly agree  
23 181 to strongly disagree. Based on the original PPOS, the 11-item Chinese-revised Patient–  
24 182 Practitioner Orientation Scale (CR-PPOS), revised by Chinese researcher Wang, et al. , obtained  
25 183 better psychometric indices, and displayed strong overall reliability and validity<sup>[25]</sup>. The CR-  
26 184 PPOS is a better instrument in a Chinese context than the original translated version. In our  
27 185 research, we combined the original PPOS with the CR-PPOS and the unique medical background  
28 186 in China, this process involved three main stages:

29 187 1. Forward translation: A pair of bilingual translators, competent in both English and Chinese,  
30 188 independently translated the original questionnaire from English to Chinese. Then compared with  
31 189 CR-PPOS, considered Professor Jie Wang conducted this research in Shanghai, which is among  
32 190 the most developed cities in China and possesses abundant high-quality medical resources.  
33 191 However,, China's Heilongjiang Province is an underdeveloped region, and medical resources  
34 192 are relatively scarce. Therefore, the differences in the investigation area and cognitive ability of  
35 193 some medical professionals needed to be taken into account, several items were modified  
36 194 accordingly (e.g., Item 8 supplementary specification: to reduce communication time with  
37 195 doctors).

38 196 2. Expert back translation: After obtaining the consent of the original author of PPOS and  
39 197 Professor Jie Wang, and combining suggestions and feedback from experts, scholars and  
40 198 respondents on the content and expression of the scale, the translators synthesized the translation  
41 199 after reaching a consensus on the translation of words, phrases and items. Additionally, taking  
42 200 into account Chinese cultural differences and filling habits, the 6-point Likert scale represented

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3 201 in the questionnaire was : 1 = 'strongly disagree', 2 = 'disagree', 3 = 'somewhat disagree', 4 =  
4 202 'somewhat agree', 5 = 'agree', 6 = 'strongly agree'; and in order to facilitate comparison with the  
5 203 results of broader research, we have reversed all items before the statistical analysis.

6 204 3. Pretesting: Several medical professionals independently tested the cultural appropriateness,  
7 205 representativeness and content validity of the instrument, rating the degree that each item  
8 206 reflected the concept that it was intended to measure. The same professionals also rated the  
9 207 understandability of the translated instrument and the semantic and content equivalence of the  
10 208 Chinese version with the English original. Followed process of perfected, formed the final scale  
11 209 consisting of two dimensions and 11 items.

12 210 Moreover, according to the 2017 'White Paper on the status of Medical Professionals in  
13 211 China', the income of Chinese medical professionals was inconsistent with their social  
14 212 contribution, which means they generally deem that their income is far below their work  
15 213 intensity and stress, also medical professionals' income was an indispensable factor affecting  
16 214 doctor-patient relationship<sup>[14]</sup>. Medical professionals were increasingly dissatisfied with the  
17 215 working environment and doctor-patient relationship. Therefore, we supplemented these two  
18 216 items in the basic information section to measure the pay satisfaction and the cognition of  
19 217 doctor-patient relationship of Chinese medical professionals, and whether it would affect their  
20 218 clinical behaviour and patient-centred care or not. In the survey respondents answered: overall  
21 219 satisfaction with pay, and do you think the current doctor-patient relationship is harmonious?  
22 220

23 221 **Statistical analysis:** Descriptive statistics (mean scores and standard deviations for quantitative  
24 222 data, and frequencies and percentages for qualitative data) were computed to describe  
25 223 respondents' demographic characteristics and their work status. The demographic information  
26 224 collected in the survey included gender (male/female), age ( $\leq 25/25 - 30/30 - 40/>40$ ), marital  
27 225 status (unmarried/married/divorced and others), service year ( $\leq 5/5-10/>10$ ), seniority (senior/sub-  
28 226 senior/intermediate/primary/no title), education level (junior college and below/bachelor's  
29 227 degree/Master's degree and above), pay satisfaction (no/yes), harmonious doctor-patient  
30 228 relationship cognition (no/yes).

31 229 Cronbach's  $\alpha$  coefficient was used to evaluate the reliability of the scale, normally, a Cronbach's  
32 230  $\alpha$  of no less than 0.6 is deemed acceptable for an instrument, and confirmatory factor analysis  
33 231 (CFA) was used to evaluate the validity, including root mean square error of approximation  
34 232 (RMSEA), incremental fit index (IFI) and comparative fit index (CFI). RMSEA value  $< 0.08$   
35 233 and IFI and CFI  $> 0.9$  suggest ideal model fit. In order to compare with previous research results  
36 234 horizontally and vertically, considered the data itself and distribution, the CR-PPOS descriptive  
37 235 statistics for the items, subscale and total scores were analyzed by means and standard deviations.  
38 236 In addition, multiple logistic regression was performed to analyse the factors (including gender,  
39 237 age, marital status, education level, seniority, average working time per day, pay satisfaction,  
40 238 harmonious doctor-patient relationship cognition) that were likely to influence patient-centred  
41 239 clinical attitude. Consequently, in this study, an overall score of over the median indicated  
42 240 'patient-centred', and a score below the median indicated 'clinician-centred'. Multivariate

241 logistic regression analyses of models Sharing, Caring, and Total was performed to identify  
 242 significant influencing factors of patient-centred clinical attitude; The median of the Sharing,  
 243 Caring and Total was 15, 21 and 37; In the models, '0' equalled 'clinician-centred' and '1'  
 244 equalled 'patient-centred'. Odds ratios (ORs) and 95% confidence intervals (CIs) were  
 245 calculated. SPSS V.19.0 (IBM Corporation, Armonk, NY, USA) and AMOS 21.0 were used to  
 246 conduct the analysis.

247  
 248 **Ethical considerations:** Ethical approval to conduct this study was granted by the research  
 249 ethics committee of Harbin Medical University and informed consent to participate was obtained  
 250 from each hospital and healthcare worker involved in the investigation. All respondents who  
 251 gave their informed consent completed the questionnaire.

## 254 Results

255 **Socio-demographic characteristics:** The demographic and professional characteristics of 618  
 256 study participants are shown in Table 1. Of the investigated medical professional members,  
 257 49.7% are females. The ages ranged from 20 to 70, with an average age of 36. Over three-quarter  
 258 of the respondents were married (76.2%). The largest proportion of respondents held the  
 259 'intermediate' professional title (38.6%), and the majority of respondents held a master's degree  
 260 (52.8%). Only a tenth of people were satisfied with their pay, while almost 90% medical  
 261 professionals felt that the current doctor-patient relationship is not harmonious (Table 1).

262 **Table 1.** Respondents' social demographic characteristics ( $N = 618$ ).

Characteristic	n	%
<b>Gender</b>		
Male	311	50.3
Female	307	49.7
<b>Age</b>		
≤25	30	4.9
25–30	136	22.0
30–40	323	52.3
>40	129	20.9

<b>Marital status</b>		
Unmarried	134	21.7
Married	471	76.2
Divorced and others	13	2.1
<b>Service year</b>		
≤5	243	39.5
5–10	165	26.8
>10	207	33.7
<b>Seniority</b>		
Senior	66	10.7
Sub-senior	104	16.9
Intermediate	237	38.6
Primary	168	27.4
No title	39	6.4
<b>Education level</b>		
Junior college and below	4	0.6
Bachelor's degree	171	27.7
Master's degree and above	443	71.7
<b>Pay satisfaction</b>		
No	533	89.0



Yes	66	11.0
<b>Harmonious doctor-patient relationship cognition</b>		
No	553	89.6
Yes	64	10.4

263 **Reliability and validity of the scale:** Cronbach's alpha was calculated as a measure of internal  
 264 consistency and reliability. In the exploratory factor analysis, the Bartlett's sphericity test yielded  
 265 a value of 1457.716 (df = 55, p < 0.001) and the Kaiser-Meyer-Olkin (KMO) index was 0.780  
 266 (Table 2).

267 **Table 2.** The internal consistency of the scale

	Cronbach's $\alpha$
Sharing subscale	0.705
Caring subscale	0.739
Total score	0.720

268 Confirmatory factor analysis was verified by maximum likelihood analysis and the  
 269 adjustment indices of the model: the RMSEA( root mean square error of approximation) was  
 270 0.100, the CFI(comparative fit index) was 0.880 and IFI(incremental fit index) was 0.882 .The  
 271 CFA of the scale indicated moderate model fit , which called for further revision.

272 **Item-to-component and item-to-total CR-PPOS correlations:**Item to total and component to  
 273 total correlations were performed using Pearson correlation coefficient to substantiate these  
 274 observations. For Sharing, item-to-total correlation varied from 0.573 to 0.705 (P < 0.05) and for  
 275 total PPOS from 0.372 to 0.613 (P < 0.05). For Caring, item-to-total correlation varied from  
 276 0.613 to 0.775 (P < 0.05) and for total PPOS from 0.495 to 0.617 (P < 0.05). The correlation  
 277 coefficient for the association between Sharing and Caring scores was 0.2 (P < 0.001). Both  
 278 Sharing and Caring components had very high correlations to the total PPOS ( P < 0.001) (Table  
 279 3).

280 **CR-PPOS scale scores:** Descriptive statistics were calculated for the total score of CR-PPOS  
 281 and the Sharing and Caring components of the CR-PPOS for the participants. The Sharing  
 282 subscale score was 15.26±4.205; the Caring subscale score was 20.42±4.415; the Total score was  
 283 35.62±6.642. For the all items, the highest score was Item 4: 'If doctors are truly good at  
 284 diagnosis and treatment, the way they relate to patients is not that important', with 4.68±1.234.  
 285 The lowest score was Item 2 'Patients should rely on their doctors' knowledge and not try to find  
 286 out their conditions on their own', with 2.08±0.941 (Table 3).

287 **Table 3. Correlations and** distribution of scores (Mean ± SD) of sharing, caring and total of

## 288 CR-PPOS

Subscale	Items	Item-to-subscale	Item-to-total	Mean±SD	
S	1.The doctor is the one who should decide what gets talked about during a visit	0.641**	0.395**	2.39±1.060	<b>15.26±4.205</b> <b>Total score: 36</b> <b>Standard score: 42.39</b>
	2.Patients should rely on their doctors' knowledge and not try to find out their conditions on their own.	0.662**	0.372**	2.08±0.941	
	5.Many patients continue asking questions even though they are not learning anything.	0.631**	0.438**	2.37±1.063	
	7.When patients disagree with their doctor, this is a sign that the doctor does not have the patient's respect and trust.	0.573**	0.613**	3.27±1.260	
	9.The patient must always be aware that the doctor is in charge.	0.705**	0.603**	2.81±1.174	
	11.When patients find out medical information on their own, this usually confuses more than it helps.	0.628**	0.423**	2.43±1.162	
C	3.When doctors ask a lot of questions about a patient's background, they are prying too much into personal matters.	0.613**	0.533**	3.65±1.346	<b>20.42±4.415</b> <b>Total score: 30</b> <b>Standard score: 68.06</b>
	4.If doctors are truly good at diagnosis and treatment, the way they relate to patients is not that important.	0.775**	0.560**	4.68±1.234	
	6.If a doctor mainly relies on being open and warm, the doctor will not have a lot of success.	0.676**	0.617**	3.58±1.311	
	8.Most patients want to get in and out of the doctor's office as quickly as possible.	0.697**	0.495**	4.31±1.195	
	10.It is not that important to know a patient's culture and background to treat the person's illness.	0.748**	0.541**	4.19±1.236	
<b>Total</b>	<b>35.62±6.642 Total score: 66 Standard score: 53.96</b>				

289 Notes: Spearman correlation coefficients: \*\*, P<0.001; s indicates sharing items and c indicates caring items.

290 CR-PPOS =Chinese-revised Patient-Practitioner Orientation Scale

291 Score of 1 (strongly agree)=most clinician-centred; Score of 6 (strongly disagree)=most patient-centred.

292 **Analysis of factors influencing patient-centred clinical practice:** Multivariable logistic  
293 regression analysis was used to analyse the factors that influenced the respondents' patient-

centred clinical practice. This study found several factors associated with medical professionals' potential clinical practice. The respondents' general characteristics and their work status were used in the multiple logistic regression analysis to examine the factors influencing their choices of the most useful strategies to improve clinical practice; an adjusted OR and a 95% CI are shown. In the Sharing Model, when compared with bachelor's degree and below, master's degree and above were had higher patient-centred attitude (OR = 1.779, 95%CI:1.180~2.681); medical professionals who averaged less than an 8 hours work day had higher patient-centred attitude than those who did not (OR = 0.589, 95%CI:0.403~0.860); moreover, as far as the current cognition of the doctor-patient relationship was concerned, the medical professionals who thought that the doctor-patient relationship was harmonious at present had higher patient-centred attitude (OR = 1.918, 95%CI:1.345~2.736). In the Caring Model, medical professionals aged 30-40 had lower patient-centred attitude than other age groups (OR = 0.587, 95%CI:0.345~1.000); however, it was of marginal significance. In the Total Model, medical professionals aged over 40 had lower patient-centred attitude than those who were not (OR = 0.502, 95%CI:0.256~0.987); similarly to the Sharing Model, medical professionals who thought that the doctor-patient relationship was harmonious had higher patient-centred attitude (OR = 1.712, 95%CI:1.205~2.433) (Table 4).

**Table 4.** Multiple logistic regression analysis of factors associated with patient-centered clinical practice.

Category	Sharing		Caring		Total	
	<i>p</i>	OR (95CI%)	<i>p</i>	OR (95CI%)	<i>p</i>	OR (95CI%)
<b>Gender</b>						
Male	–	–	–	–	–	–
Female	0.523	1.120 (0.791~1.584)	0.559	1.105 (0.790~1.547)	0.102	1.332 (0.944~1.879)
<b>Age</b>						
≤30	0.457	–	0.144	–	0.708	–
30–40	0.225	0.717 (0.418~1.228)	<b>0.050*</b>	<b>0.587</b> <b>(0.345~1.000)</b>	0.480	0.826 (0.485~1.404)
>40	0.502	0.794 (0.404~1.558)	0.188	0.642 (0.332~1.241)	<b>0.046*</b>	<b>0.502</b> <b>(0.256~0.987)</b>
<b>Marital status</b>						

Unmarried	–	–	–	–	–	–
Married	0.311	0.766 (0.458~1.283 )	0.815	1.062 (0.640~1.763)	0.967	0.989 (0.595~1.644)
<b>Education level</b>						
Bachelor's degree and below	–	–	–	–	–	–
Master's degree and above	<b>0.006*</b>	<b>1.779</b> <b>(1.180~2.681</b> <b>)</b>	0.412	1.178 (0.797~1.741)	0.223	1.284 (0.859~1.918)
<b>Seniority</b>						
Primary and below	–	–	–	–	–	–
Intermediate and above	0.211	0.729 (0.445~1.196 )	0.304	1.292 (0.792~2.108)	0.622	1.131 (0.693~1.846)
<b>Average working time per day</b>						
≤8h	–	–	–	–	–	–
>8h	<b>0.006*</b>	<b>0.589</b> <b>(0.403~0.860</b> <b>)</b>	0.410	1.167 (0.808~1.685)	0.653	0.918 (0.631~1.334)
<b>Pay satisfaction</b>						
No	–	–	–	–	–	–
Yes	0.382	1.172 (0.821~1.674 )	0.408	0.864 (0.611~1.222)	0.402	1.164 (0.816~1.660)
<b>Harmonious doctor-patient relationship cognition</b>						
No	–	–	–	–	–	–
Yes	<b>0.000*</b>	<b>1.918</b> <b>(1.345~2.736</b> <b>)</b>	0.977	0.995 (0.704~1.405)	<b>0.003*</b>	<b>1.712</b> <b>(1.205~2.433)</b>

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## Discussion

Although the PPOS has been widely used in various languages and areas, only a few studies have been reported in China, with no results related to China northeast physicians to date. Beginning with this premise, we adopted the verbally revised CR-PPOS to analyse China northeast medical professionals' perception. The revised CR-PPOS was demonstrated to be reliable and demonstrated good internal consistency, with moderate Cronbach's alphas for Caring and Sharing and Total scores. The survey scale is also suitable for further statistical analysis and comparison.

Standardized scores indicated similar trends in both the Sharing dimension and the Caring dimension. In the overall scale, the participants obtained moderate scores (around the moderate value of 3.5), and both had relatively high scores on the Caring scale (over 3.0) and low scores on the Sharing scale (around 2.5 or below) respectively. Comparing the data of this study with that from at home and abroad, the majority showed a similar pattern that medical professionals were more patient-centred in Caring than in Sharing. There were still two exceptions; Surveys conducted in Portugal and in Australia indicated Sharing score was higher than Caring score<sup>[27, 28]</sup>, which may be due to the difference in medical professionals cognitive level and overall local medical systems. Thus, further research is needed to determine the reasons for such a distinction. According to previous studies, higher scores indicated patient-centred and lower scores indicated clinician-centred<sup>[17, 18, 25]</sup>. Mean scores were ranked and divided into three groups for comparison: high scores (patient-centred, with a mean score of 5.00 or greater), medium scores (greater than 4.57 but less than 5.00), and low scores (doctor-centred, mean of 4.57 or less)<sup>[18]</sup>. The results indicated that although medical professionals showed a lower level of patient-centeredness in clinical communication, they still expressed higher preferences towards Caring from a biopsychosocial perspective than sharing information and involvement in decision-making.

The mean scores ( $3.24 \pm 0.604$ ) in this study were lower than Shanghai, China ( $3.66 \pm 0.59$ )<sup>[25]</sup>, Harvard Pilgrim Health Care (HPHC) ( $4.26 \pm 0.75$ )<sup>[17]</sup>, Australia (4.46)<sup>[29]</sup>. Overall, a low preference to patient-centeredness was found in this study, compared to others. It noted that the scores were not only lower than other countries, but also lower than Shanghai, the developed region of China, showing a lower level of patient-centeredness in clinical communication. These results might be explained by differences in socio-economic conditions or by religious and cultural differences across countries. Lower scores indicated that medical professionals' cognitive level was more likely to be associated with economic and health development levels in different regions<sup>[30]</sup>. At present, there are differences in the overall medical system and medical environment in different regions. The economic and health development level of Shanghai is close to that of the developed countries, while China's H City is at a relatively less developed level, and the patient-centred concept is still in the process of formation.

Regarding the scores obtained, strengthen the relationship with patients and mutual respect also beneficial for patient-centeredness. Of the scores that contributed most to the overall Caring

352 subscale score, item four (i.e. if doctors are truly good at diagnosis and treatment, the way they  
353 relate to patients is not that important.) received the highest preference for patient-centeredness.  
354 The mean score of 4.68 indicated a strong preference to strengthen the relationship with patients,  
355 and medical professionals prefer a relationship between them and patient that includes shared  
356 perception, agreement on goals, and emotional context<sup>[31]</sup>. Additionally, of the scores that  
357 contributed most to the overall Sharing dimension score, item 7 (i.e. When patients disagree with  
358 their doctor, this is a sign that the doctor does not have the patient's respect and trust.) indicated  
359 the medical professionals' preference for trust and respect from the patient when there is  
360 disagreement. It also indicated a strong preference for sharing decision - making with the  
361 patient. On the other hand, medical professionals generally had relatively lower preference for  
362 item 2 and item 6. The mean scores of 2.08 on item 2 (i.e. Patients should rely on their doctors'  
363 knowledge and not try to find out their conditions on their own.) and 3.58 on item 6 (i.e. If a  
364 doctor mainly relies on being open and warm, the doctor will not have a lot of success.) suggest  
365 that while medical professionals value their knowledge and skills, improving the quality of  
366 medical services and technology to better meet the needs of their patients' health care may be  
367 deemed of greater importance. The results were generally consistent with other research<sup>[28, 31]</sup>.

368 Preference towards patient-centred communication, as measured by the CR-PPOS, may be  
369 influenced by both personal characteristics and social environmental factors. This study  
370 represents the attempt to detect the potential influential factors of patient-centred communication  
371 among Chinese northeast medical professionals. Overall, the current study results indicate  
372 incongruence among Sharing, Caring, and Total scores for patient-centeredness. This difference  
373 may be attributed to a number of factors, including gender, age, marital status, education level,  
374 seniority; average hours worked per day, pay satisfaction, and harmonious doctor-patient  
375 relationship cognition.

376 Notably, we found that medical professionals who work longer days on average were  
377 generally less likely to prefer patient-centeredness in clinical communication. This may have the  
378 potential link to another factor that was frequently mentioned in the existing research - doctors'  
379 burnout. Dana Loet al. found that burnout was higher among doctors who worked over 40  
380 h/week in China<sup>[32]</sup>. The average working time could indicate the burnout level of the medical  
381 professionals, meaning the longer working time, the higher burnout level. These results were  
382 consistent with several prior studies in other countries<sup>[30, 33]</sup>. The high burnout level showed a  
383 negative correlation with job satisfaction and higher incidence of medical mistakes, may lead  
384 medical professionals make negative evaluation of their work or even avoid contact with  
385 patients<sup>[34]</sup>. This indicates that burnout level might exert impact on medical professionals' sharing  
386 with patients. Sharing implies equal autonomy of the patient in making decisions. This requires  
387 time and effort on part of the medical professionals to address patients' concerns and their  
388 choices. Medical professionals experiencing burnout from long hours worked and a heavy  
389 workload could display lack of sharing<sup>[30]</sup>.

390 Meanwhile, an interesting finding was the cognition of doctor-patient relationship may  
391 influence patient-centred clinical, especially for Sharing and Total orientation. A plausible

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3 392 explanation is that those who hold that the current doctor-patient relationship is harmonious may  
4 393 pay more attention to the communication and decision-making with the patients. In light of the  
5 394 reported growth in disputes between patients and medical professionals in China, most medical  
6 395 professionals expected to emphasize power sharing with the patients in decision-making and  
7 396 responsibilities<sup>[24]</sup>. The medical professionals indicated a desire for interactive process-  
8  
9 397 communication built on mutual-understanding. In particular they focused on being treated in a  
10 398 friendly manner and being cared for in a manner that was considerate of patients' psychosocial  
11 399 context.

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14 400 Educational levels of medical professionals is also a factor. Medical professionals with  
15 401 higher degrees were more likely to share with patients, and were more likely to value  
16 402 information and desire active involvement with patients in the treatment process. This may be  
17 403 due to the difference in physician training modes and the cognitive level of different groups  
18 404 <sup>[35]</sup>. Also, there was lack of educational interventions like communication skills training aimed at  
19 405 improving doctor-patient relationship in lower grade curricula, which may be the reason for  
20 406 difference of the attitude. This result support the positive effects of education on health literacy  
21 407 and of health literacy on empowerment, self-efficacy and increased engagement in decision-  
22 408 making processes <sup>[26]</sup>.

23 409 In this study, younger medical professionals expressed a higher preference for patient-  
24 410 centred communication in both Caring and Total orientation. This may be related to the  
25 411 increased access of younger medical professionals to modern medical education model <sup>[35]</sup>.  
26 412 Therefore, strengthening the transformation of the medical model would be a good starting point  
27 413 to increase patient-centred communication in China.

28 414 **Strengths of this study:** This is the first study to report on Chinese northeast medical  
29 415 professionals' attitudes toward patient-centred care. Comparing the Chinese northeast medical  
30 416 professionals' scores with other research scores (measured with the same tool) promotes a more  
31 417 comprehensive understanding of Chinese northeast medical professionals' patient-centred  
32 418 attitudes.

33 419 Because it is a systematic study to access the Patient-centred orientation in China's  
34 420 northeast area, and considering the deteriorating physician-patient relationships in current  
35 421 Chinese society, this study has significant implications for medical practice.

36 422 The association between broader factors and participants' preference towards patient-  
37 423 centred communication was explored. Thus, possible intervention approaches were found to be  
38 424 needed to improve the patient-centred communication.

39 425 **Limitations and suggestions for future research:** When interpreting our findings, we should  
40 426 bear in mind the limitations of our research. Firstly, the duration of the cross-sectional survey may  
41 427 have an impact on the patient-centred attitudes of medical professionals.

42 428 Also, the participants in this study were sampled only from seven clinical units in the  
43 429 northeast of China, which could lead to limited external validity and the generalizability of our  
44 430 findings. Overall, the current study results indicate incongruence among Sharing, Caring, and  
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431 Total scores for patient-centeredness. Future related research could include large medical sample  
432 sizes and patient opinions to increase our understanding of this topic.

433 The analysis only included general hospitals that focused on medical professionals in one  
434 city. It would be helpful if future research incorporated longitudinal analyses or follow-up  
435 studies on other types of hospitals (e.g. primary hospital and specialized hospital).

436

## 437 **Conclusions**

438 In general, the present survey observed lower 'patient-centred' attitudes towards communication  
439 between medical professionals in northeast China, and findings indicated that higher Caring  
440 subscale scores but less patient-centred as measured by the Sharing subscale scores. Age,  
441 education level, average working time per day, and harmonious doctor-patient relationship  
442 cognition had significant impact on medical professionals' patient-centred attitudes. Therefore,  
443 possible intervention approaches would be needed to improve the patient-centred communication  
444 in China's H City.

445 Our research indicates that relieving burnout, and improving the cognition of doctor -  
446 patient relationship and medical education could help medical professionals to be more patient-  
447 centred in communication. Meanwhile, developing required medical educational interventions  
448 related to patient-centred care, establishing communication skills workshops, displaying the  
449 positive effects of a patient-centred relationship, increasing patients' awareness and abilities, and  
450 broadcasting activities about communication improvement methods on mass media are some  
451 approaches to address the low level of patient-centred care [33]. It is expected that these  
452 improvements would change the current status to a desired one in which medical professionals  
453 take their patients' needs into account, try to provide required information on their health status  
454 in an understandable way, and involve them more in the decision making process.

455 Improving medical professionals' patient-centred skills can result in establishing higher-  
456 quality medical services in China. However, education reform alone cannot fully achieve patient-  
457 centred care; instead, society as a whole and the entire healthcare system also need to affirm the  
458 value and significance of patient-centred care before it can be fully realized.

459

## 460 **Acknowledgements**

461 We sincerely thank Dr. Edward Krupat at Harvard Medical School for generously sharing  
462 information and giving valuable advice regarding the PPOS. We are also grateful to Wang Jie  
463 and Wang Fan at Fudan University for using and revising the CR-PPOS. We would also like to  
464 thank the healthcare workers and participants for their support and participation in the project.

## 465 **Funding**

466 This work was supported by the National Natural Science Foundation of China (Grant Number:  
467 71673073, 71974049), Heilongjiang Postdoctoral Scientific Research Development Fund (LBH-  
468 Q18071), Think Tank of Public Health Security and Health Reform of Heilongjiang Province,  
469 Special project supported by China Postdoctoral Foundation (2016T90318).



470 The funders had no role in study design, data collection and analysis, decision to publish, or  
471 preparation of the manuscript.

## 472 **Grant Disclosures**

473 The following grant information was disclosed by the authors:

474 National Natural Science Foundation of China: 71673073, 71974049

475 Heilongjiang Postdoctoral Scientific Research Development Fund: LBH-Q18071.

476 China Postdoctoral Foundation: 2016T90318.

477 Think Tank of Public Health Security and Health Reform of Heilongjiang Province.(N/A)

## 478 **Competing Interests**

479 The authors declare there are no competing interests.

## 480 **Authors' Contributors**

481 Weijian Song contributed as the first author to this article for the drafting of the manuscript.

482 Libo Liang and Qunhong Wu designed the study and collected the data. Yanhua Hao and

483 Xiaowen Zhao provided statistical expertise. Wei Liu and Siyi Tao analyzed the data. Yuxin Xue

484 and Juan Zhao provided questionnaire translation and literature review. Qiao Zhang and Mingli

485 Jiao provided administrative support. Yu Cui , Weilan Xu, Hong Sun, Ye Li and Linghan Shan

486 made critical revisions to the paper for important scientific content and reviewed various drafts

487 as well as the final manuscript. All authors read and approved the final manuscript.

488 **Data sharing statement** Data are available upon reasonable request,additional data from this  
489 study could be accessed by contacting the corresponding author Libo Liang via llbhit@163.com.  
490

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

	Item No	Recommendation	Page No
<b>Title and abstract</b>	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	1-2
<b>Introduction</b>			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	2-4
Objectives	3	State specific objectives, including any prespecified hypotheses	2-4
<b>Methods</b>			
Study design	4	Present key elements of study design early in the paper	4-6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	4-5
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	4-5
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	5-6
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	6-7
Bias	9	Describe any efforts to address potential sources of bias	5-6
Study size	10	Explain how the study size was arrived at	4-5
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	4-5
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	6-7
		(b) Describe any methods used to examine subgroups and interactions	6-7
		(c) Explain how missing data were addressed	6-7
		(d) If applicable, describe analytical methods taking account of sampling strategy	6-7
		(e) Describe any sensitivity analyses	6-7
<b>Results</b>			
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	7-9
		(b) Give reasons for non-participation at each stage	4-5
		(c) Consider use of a flow diagram	
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	7-9
		(b) Indicate number of participants with missing data for each variable of interest	
Outcome data	15*	Report numbers of outcome events or summary measures	
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	9-12

		(b) Report category boundaries when continuous variables were categorized	9-12
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	9-12
<b>Discussion</b>			
Key results	18	Summarise key results with reference to study objectives	13-15
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	15-46
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	16
Generalisability	21	Discuss the generalisability (external validity) of the study results	15-16
<b>Other information</b>			
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	16-17

\*Give information separately for exposed and unexposed groups.

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

# BMJ Open

## Attitudes of Medical Professionals Toward Patient-Centeredness: a Cross-Sectional Study in H City, China

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2020-045542.R2
Article Type:	Original research
Date Submitted by the Author:	21-Sep-2021
Complete List of Authors:	Song, Weijian; Harbin Medical University, School of Health Management, Department of Social Medicine; Harbin Medical University, Department of Humanities and Social Sciences Hao, Yanhua; Harbin Medical University, School of Health Management, Department of Social Medicine Cui, Yu; Harbin Medical University, School of Health Management, Department of Social Medicine Zhao, Xiaowen; Harbin Medical University, School of Health Management, Department of Social Medicine Liu, Wei; Harbin Medical University, School of Health Management, Department of Social Medicine Tao, Siyi; Harbin Medical University, School of Health Management, Department of Social Medicine Xue, Yuxin; Chengyang People's Hospital Liu, Chaojie; La Trobe University, Public Health Zhang, Qiao; Harbin Medical University, School of Health Management, Department of Social Medicine Jiao, Mingli; Harbin Medical University, School of Health Management, Department of Social Medicine Xu, Weilan; Qiqihaer Medical University, College of International Education Sun, Hong; Harbin Medical University, School of Health Management, Department of Social Medicine Li, Ye; Harbin Medical University, School of Health Management, Department of Social Medicine Shan, Linghan; Harbin Medical University, School of Health Management, Department of Social Medicine Zhao, Juan; Harbin Medical University, School of Health Management, Department of Social Medicine Liang, Libo; Harbin Medical University, School of Health Management, Department of Social Medicine Wu, Qunhong; Harbin Medical University, School of Health Management, Department of Social Medicine
<b>Primary Subject Heading</b>:	Health policy
Secondary Subject Heading:	Medical management, Patient-centred medicine, Health services research
Keywords:	PUBLIC HEALTH, HEALTH SERVICES ADMINISTRATION & MANAGEMENT, MEDICAL EDUCATION & TRAINING

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# Attitudes of Medical Professionals Toward Patient-Centeredness: a Cross-Sectional Study in H City, China

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## Abstract

**Objectives:** Patient-centred communication improves patient experiences and patient care outcomes. This study aimed to assess the preference of medical professionals in China towards patient-centred communication under the context of the deteriorating doctor-patient relationship.

**Methods:** A cross-sectional survey of medical professionals was conducted in January and February 2018 in H city of Heilongjiang province, the northeast of China. The Chinese-Revised Patient-Practitioner Orientation Scale (CR-PPOS) was adopted to measure the individual

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3 30 preference of respondents towards patient-centredness in clinical communication. Multivariate  
4 31 logistic regression models were established to identify the sociodemographic (gender, age,  
5 32 marital status, educational attainment) and work experience (years of working, seniority,  
6 33 satisfaction with income, daily workload, perceived doctor-patient relationship) predictors of the  
7 34 preference towards patient-centredness.  
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11 36 **Patient and Public Involvement:** Not applicable.  
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15 38 **Results:** A total of 618 valid questionnaires were returned. The CR-PPOS demonstrated  
16 39 acceptable reliability and validity. Overall, a low level of preference towards patient-  
17 40 centeredness in clinical communication was found. Relatively higher scores on “caring for  
18 41 patients” (20.42±4.42) was found compared with those on “information/responsibility sharing”  
19 42 (15.26±4.21). Younger age, higher educational attainment, lower daily workload, and a  
20 43 perception of harmonious doctor-patient relationship were associated with a higher preference  
21 44 towards patient-centredness in clinical communication.  
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26 46 **Conclusions:** A low level of preference towards patient-centredness in clinical communication  
27 47 was found in medical professionals in the northeast of China, which may further jeopardise the  
28 48 efforts to improve doctor-patient relationship.  
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### 31 50 **Strengths and limitations of this study**

- 32 51 • This study is the first of its kind in the northeast of China using the CR-PPOS;
- 33 52 • The study adopted a cross-sectional design with a large sample size, which can help  
34 53 improve our understanding on the attitudes of medical professionals toward patient-  
35 54 centredness in clinical communication;
- 36 55 • The findings have significant implications on the management of medical practice under  
37 56 the specific context of China;
- 38 57 • The study identified sociodemographic and work experience predictors of the preference of  
39 58 medical professionals towards patient-centredness in clinical communications, but no  
40 59 causal relationships can be assumed due to the cross-sectional design.  
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47 61 **Keywords:** Patient-Practitioner Orientation Scale (PPOS), Patient-Centered Communication  
48 62 (PCC), China, Doctor-Patient Relationship  
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## 52 64 **Introduction**

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4 65 With the shift to the biopsychosocial paradigm, people have become increasingly concerned  
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6 66 about the orientation of medical professionals towards clinical communication with their  
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8 67 patients. Studies have distinguished between the patient-oriented style versus a doctor-oriented  
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10 68 style of interaction [1-3]. The origin of the concept of patient-centred care can be traced back to  
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12 69 the ancient time of Hippocrates when each patient was considered as a relatively independent  
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14 70 individual [4]. The fundamental principles of patient-centeredness, however, have not been  
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16 71 consistently defined until recently. It generally refers to the establishment of a partnership  
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18 72 between providers and patients for the purpose of care tailored to the individual needs of patients  
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20 73 in line with their preferences and values. Patients are empowered to actively participate in their  
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22 74 own care and clinical decision-making [5, 6].

23 75 Patient-centred care has to be holistic, with multiple components being integrated in each  
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25 76 patient-doctor encounter [7]. At the core of patient centred care is patient-centred communication  
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27 77 (PCC). It needs to be cultural sensitive, but meanwhile encourages shared decision-making.  
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29 78 Extensive studies have been conducted with a focus on improving communication between  
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31 79 healthcare providers and their patients [8]. Empirical evidence shows that effective  
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33 80 communication is crucial to high quality care as measured by patient experience and patient care  
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35 81 outcomes [9]. Indeed, patient-centeredness itself has become one of the indicators of quality care  
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37 82 in the 21<sup>st</sup> century [10]. It represents a serious challenge to the traditional medical approach of  
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39 83 paternalism [11]. However, our understanding on the tendency of medical professionals towards  
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41 84 patient-centredness is very limited [12].

42 85 Arguably, PCC requires a harmonious doctor-patient relationship. Unfortunately, China is  
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44 86 currently experiencing serious challenges in relation to the doctor-patient relationship. Medical  
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46 87 disputes are frequently reported. There exists a crisis of distrust and mistrust between medical  
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48 88 professionals and patients due to a wide range of reasons within and outside of the health sector.  
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50 89 The disharmony between medical professionals and patients has been deemed a major obstacle  
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52 90 of the health system reform [13]. According to the 2017 ‘White Paper on Medical Workforce in  
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54 91 China’, only half of medical workers believed that their contributions were appreciated by the  
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56 92 society. More than 65% experienced disputes with their patients and 62% were dissatisfied with

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4 93 their working environment [14]. A lack of patient-centredness can fuel distrust and mistrust from  
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6 94 the patients. Therefore, medical professionals can and should play a vital role in building a  
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8 95 harmonious doctor-patient relationship through patient-centred care [15]. However, a perception  
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10 96 of poor doctor-patient relationship may deter medical professionals from adopting a PCC  
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12 97 approach in clinical practices [16].

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14 98 This study aimed to advance our understanding on the preference of medical professionals  
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16 99 in China towards patient-centredness in clinical communication. The study adopted the Patient-  
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18 100 Practitioner Orientation Scale (PPOS) to measure PCC. The PPOS was developed by Krupat et  
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20 101 al [17], containing 18 items measuring two dimensions ‘sharing’ and ‘caring’ [18]. The caring  
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22 102 dimension assesses the tendency of treating patients as a whole person, concerning not only their  
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24 103 medical conditions but also their emotional and social needs. The sharing subscale assesses  
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26 104 willingness of medical professionals to share information and decision making power with their  
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28 105 patients [19]. It has been validated in a variety of study settings, including in the USA, Sri Lanka,  
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30 106 Greece, Nepal, South Korea, Sierra Leone [7][19][20][21][22][23].

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32 107 Although PCC has started to gain momentum in China, there are only a few studies  
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34 108 documenting the attitudes of medical professionals in China toward patient-centredness in  
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36 109 clinical communication. Ting et al. (2016) made the earliest known attempt to apply the PPOS to  
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38 110 assess patient preference towards PCC in a hospital in the southwest of China [24]. Since then, the  
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40 111 Chinese-Revised Patient-Practitioner Orientation Scale (CR-PPOS) has been validated in the  
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42 112 medical professionals and the patients in Shanghai [25]. However, there is paucity in the literature  
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44 113 documenting the preference of medical professionals in other regions in China toward patient-  
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46 114 centredness. Significant regional disparities in economic development exist in China, which has  
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48 115 a profound impact on health resources and health services [26].

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50 116 This study addressed the gap in the literature by conducting a cross-sectional study of the  
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52 117 medical professionals in China's oldest industrial base - H city in Heilongjiang province using  
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54 118 the CR-PPOS.

## 54 119 **Materials & Methods**

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4 120 **Study population and data collection:** A cross-sectional questionnaire survey of medical  
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6 121 professionals was conducted in January and February 2018. Study participants were recruited  
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8 122 through a stratified sampling strategy to ensure representativeness. Seven medical institutions in  
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10 123 H City were selected first considering a balance of size and economic zones. Eligible medical  
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12 124 professionals from the participating institutions were invited to participate in the survey. The  
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14 125 eligibility criteria included: (1) full-time employees of registered medical doctors in various  
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16 126 disciplines including anesthetists; (2) working in clinical practice for at least one year. Those  
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18 127 who were not registered medical doctors (such as nurses) and were absent on the day of data  
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20 128 collection were excluded. The survey was voluntary and the respondents had to be able to  
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22 129 complete the questionnaire independently without assistance. The survey was open to each  
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24 130 hospital for one day or one and a half days.

25 131 The questionnaire was distributed in person to the study participants by 14 trained  
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27 132 investigators. They explained the purpose and the study protocol in line with the informed  
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29 133 consent letter to the participants in groups before distributing the questionnaire. They also  
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31 134 provided instructions about how to fill in the questionnaire. Verbal informed consent was  
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33 135 obtained from the participants prior to the commencement of the survey. Completion and return  
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35 136 of the completed questionnaire was voluntary and anonymous. The respondents did not have to  
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37 137 complete the questionnaire on the same day although most did so. In cases where the respondents  
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39 138 wanted to participate but were unable to complete the questionnaire on the same day, another  
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41 139 date was set up in negotiation with the respondents. Collection of the returned questionnaires  
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43 140 started approximately 15 minutes after the questionnaire distribution. The investigators checked  
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45 141 completeness of each returned questionnaire. Missing data, if found, were filled through a  
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47 142 request with the original respondents.

48 143 In total, 650 questionnaires were distributed and 618 (95.1%) valid questionnaires were  
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50 144 obtained. The sample represented 10.9% of all registered medical professionals (nearly 5686 as  
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52 145 of 2017) in H City.

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56 147 **Patient and Public Involvement:** There was no patient and public involvement.  
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**Questionnaire design:** The original PPOS contains 18 items. The CR-PPOS reduced the number of items to 11, which demonstrated better psychometric properties and high overall reliability and validity [25]. In this study, we adopted the CR-PPOS with the consent from the authors of both PPOS and CR-PPOS. Each item was rated on a six-point Likert scale: 1 = ‘strongly disagree’, 2 = ‘disagree’, 3 = ‘somewhat disagree’, 4 = ‘somewhat agree’, 5 = ‘agree’, 6 = ‘strongly agree’.

The questionnaire also collected the sociodemographic characteristics (gender, age, marital status, educational attainment) and work experience (years of working, seniority, daily workload) of the respondents. In addition, we assessed the degree of satisfaction of the respondents with their income and their perceived relationship with patients. It is not uncommon in China for medical professionals to complain about their income, which can adversely affect their relationship with patients [14]. Such a problem is particularly profound in the less developed regions of China.

**Statistical analysis:** Frequency distributions of respondents across different groups were described, which included gender (male, female), age ( $\leq 25$ , 26~30, 31~40, >40 years), marital status (unmarried, married, divorced, others), educational attainment (<bachelor, bachelor degree, postgraduate degree), years of working ( $\leq 5$ , 6~10, >10), professional title (senior, sub-senior, intermediate, primary, no title), satisfaction with income (no, yes), and perceived harmonious doctor-patient relationship (no, yes).

The scores of the CR-PPOS items were aligned to the same direction before a summed score was calculated for the “caring” and “sharing” dimensions and the entire scale. They were described using mean values and standard deviations. A higher score indicates a higher preference toward patient-centredness. The reliability of the CR-PPOS scale was assessed using Cronbach’s  $\alpha$  coefficient. A Cronbach’s  $\alpha$  of above 0.6 was deemed acceptable. Confirmatory factor analysis (CFA) was performed to assess the construct validity of the CR-PPOS scale. Root

175 mean square error of approximation (RMSEA<0.08), incremental fit index (IFI>0.90) and  
176 comparative fit index (CFI>0.90) were examined to assess fitness of the data into the model.

177 The “sharing”, “caring” and total scores of the CR-PPOS were dichotomised using the  
178 median value (15, 21 and 37, respectively) as a cut-off point. A more patient-centred approach  
179 was assigned with a value of 1, otherwise 0. Multivariate logistic regression models were  
180 established to identify the sociodemographic (gender, age, marital status, educational attainment)  
181 and work experience (years of working, seniority, satisfaction with income, daily workload,  
182 perceived doctor-patient relationship) predictors of the preference towards patient-centredness.  
183 Adjusted odds ratio (OR) and its 95% confidence interval (95% CI) for each tested predictor was  
184 presented.

185 The statistical analyses were performed using SPSS V.19.0 (IBM Corporation, Armonk,  
186 NY, USA) and AMOS 21.0.

187  
188 **Ethical considerations:** Ethics approval was granted by the research ethics committee of Harbin  
189 Medical University. Informed consent was obtained from each participating hospital and each  
190 study participant. The survey was anonymous and voluntary.

## 193 Results

194 **Socio-demographic characteristics of respondents:** About half respondents were female and in  
195 the age between 31 and 40 years. Over 76% of respondents were married at the time of the  
196 survey. Intermediate professional title was the most common title (38.6%), followed by primary  
197 title (27.4%). The majority of respondents (71.7%) had a postgraduate degree. Only a tenth of  
198 respondents were satisfied with their income and perceived a harmonious relationship with  
199 patients (Table 1).

200 **Table 1. Characteristics of respondents (n=618)**

Characteristic	n	%
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<b>Gender</b>		
Male	311	50.3
Female	307	49.7
<b>Age</b>		
≤25	30	4.9
26~30	136	22.0
31~40	323	52.3
>40	129	20.9
<b>Marital status</b>		
Unmarried	134	21.7
Married	471	76.2
Divorced and others	13	2.1
<b>Years of working</b>		
≤5	243	39.5
6~10	165	26.8
>10	207	33.7
<b>Professional title</b>		
Senior	66	10.7
Sub-senior	104	16.9
Intermediate	237	38.6
Primary	168	27.4
No title	39	6.4
<b>Educational attainment</b>		
< Bachelor	4	0.6
Bachelor degree	171	27.7
Postgraduate degree	443	71.7
<b>Satisfaction with income</b>		
No	533	89.0
Yes	66	11.0
<b>Harmonious doctor-patient relationship</b>		
No	553	89.6
Yes	64	10.4

**Reliability and validity of the CR-PPOS scale:** The Cronbach's alpha coefficients of the CR-PPOS scale exceeded 0.7, indicating good internal consistency (Table 2).

**Table 2. The internal consistency of the CR-PPOS scale**

	Cronbach's $\alpha$
Sharing subscale	0.705
Caring subscale	0.739



Total score	0.720
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207 The Bartlett's sphericity test yielded a value of 1457.716 (df = 55, p<0.001) and the Kaiser-Meyer-Olkin (KMO) index was 0.780, indicating appropriateness for factor analyses. The  
208 confirmatory factor analysis showed a weak model fit: RMSEA=0.100; CFI=0.880; IFI=0.882.  
209 The results indicate a need for further revisions.

211

212 **Item-to-component and item-to-total correlations:** The Pearson correlation coefficients showed  
213 strong item-to-component correlations: 0.573-0.705 for sharing (P<0.05) and 0.613-0.775 for  
214 caring (P<0.05); and moderate item-to-total correlations: 0.372-0.613 for sharing (P<0.05) and  
215 0.495-0.617 for caring (P<0.05). Both sharing and caring were highly correlated with the total CR-  
216 PPOS scores (P<0.001) despite a weak correlation between the sharing and caring scores (0.2,  
217 P<0.001) (Table 3).

218

219 **CR-PPOS scale scores:** The respondents had a mean sharing score of 15.26 (SD=4.21),  
220 compared with a mean caring score of 20.42 (SD=4.42). The total CR-PPOS score reached  
221 35.62±6.64. The highest item score was found in the question 'If doctors are truly good at  
222 diagnosis and treatment, the way they relate to patients is not that important' (4.68±1.23).  
223 Whereas, the lowest score was found in the question 'Patients should rely on their doctors'  
224 knowledge and not try to find out their conditions on their own' (2.08±0.94) (Table 3).

225

226 **Table 3. CR-PPOS item and scale scores and their correlations**

Subscale	Items	Item-to-subscale correlation	Item-to-total correlation	Mean±SD	Standardised score ranging from 0 to 100
Sharing				15.26±4.21	30.86
	1. The doctor is the one who should decide what gets talked about during a visit	0.641**	0.395**	2.39±1.06	
	2. Patients should rely on their doctors' knowledge and not try to find	0.662**	0.372**	2.08±0.94	

	<i>out their conditions on their own.</i>				
	5. Many patients continue asking questions even though they are not learning anything.	0.631**	0.438**	2.37±1.06	
	<b>7. When patients disagree with their doctor, this is a sign that the doctor does not have the patient's respect and trust.</b>	0.573**	0.613**	<b>3.27±1.26</b>	
	9. The patient must always be aware that the doctor is in charge.	0.705**	0.603**	<b>2.81±1.17</b>	
	11. When patients find out medical information on their own, this usually confuses more than it helps.	0.628**	0.423**	2.43±1.16	
<b>Caring</b>				<b>20.42±4.42</b>	<b>61.68</b>
	3. When doctors ask a lot of questions about a patient's background, they are prying too much into personal matters.	0.613**	0.533**	3.65±1.35	
	<b>4. If doctors are truly good at diagnosis and treatment, the way they relate to patients is not that important.</b>	0.775**	0.560**	<b>4.68±1.23</b>	
	<i>6. If a doctor mainly relies on being open and warm, the doctor will not have a lot of success.</i>	0.676**	0.617**	3.58±1.31	
	8. Most patients want to get in and out of the doctor's office as quickly as possible.	0.697**	0.495**	4.31±1.20	
	10. It is not that important to know a patient's culture and background to treat the person's illness.	0.748**	0.541**	4.19±1.24	
<b>Total</b>				<b>35.62±6.6</b>	<b>44.76</b>
				<b>4</b>	

Notes: \*\*Spearman correlation coefficients, P<0.001; CR-PPOS =Chinese-revised Patient-Practitioner Orientation Scale; Score of 1 (strongly agree)=most clinician-centred; Score of 6 (strongly disagree)=most patient-centred.

**Predictors of patient-centredness in clinical communications:** The multivariate logistic regression models showed that the respondents who had a postgraduate degree (AOR=1.779, 95% CI: 1.180~2.681), worked less than 8 hours per day (AOR=0.589, 95% CI: 0.403~0.860), and perceived a harmonious doctor-patient relationship (AOR=1.918, 95% CI: 1.345~2.736) were more likely than others to agree with sharing information and decision power. The respondents aged between 31 and 40 years were marginally less likely to agree with caring centred around patients than their younger counterparts (AOR = 0.587, 95% CI: 0.345~1.000). In terms of the total scores, the respondents aged over 40 years were less likely to endorse patient-centredness

238 (AOR = 0.502, 95% CI: 0.256~0.987) than their younger counterparts; but those who perceived a  
 239 harmonious doctor-patient relationship were more likely to endorse patient-centredness  
 240 (AOR=1.712, 95% CI: 1.205~2.433) (Table 4).

241

242 **Table 4. Logistic regression analyses on factors associated with patient-centeredness in**  
 243 **clinical communications**

Category	Sharing		Caring		Total	
	<i>p</i>	AOR (95% CI)	<i>p</i>	AOR (95% CI)	<i>p</i>	OR (95% CI)
<b>Gender</b>						
Male	–	–	–	–	–	–
Female	0.523	1.120 (0.791~1.584)	0.559	1.105 (0.790~1.547)	0.102	1.332 (0.944~1.879)
<b>Age</b>						
≤30	0.457	–	0.144	–	0.708	–
31~40	0.225	0.717 (0.418~1.228)	<b>0.050*</b>	<b>0.587</b> <b>(0.345~1.000)</b>	0.480	0.826 (0.485~1.404)
>40	0.502	0.794 (0.404~1.558)	0.188	0.642 (0.332~1.241)	<b>0.046*</b>	<b>0.502</b> <b>(0.256~0.987)</b>
<b>Marital status</b>						
Unmarried	–	–	–	–	–	–
Married	0.311	0.766 (0.458~1.283)	0.815	1.062 (0.640~1.763)	0.967	0.989 (0.595~1.644)
<b>Educational attainment</b>						
≤ Bachelor	–	–	–	–	–	–
Postgraduate degree	<b>0.006*</b>	<b>1.779</b> <b>(1.180~2.681)</b>	0.412	1.178 (0.797~1.741)	0.223	1.284 (0.859~1.918)
<b>Professional title</b>						
Primary and below	–	–	–	–	–	–
Intermediate and above	0.211	0.729 (0.445~1.196)	0.304	1.292 (0.792~2.108)	0.622	1.131 (0.693~1.846)
<b>Average working hours per day</b>						
≤8h	–	–	–	–	–	–
>8h	<b>0.006*</b>	<b>0.589</b> <b>(0.403~0.860)</b>	0.410	1.167 (0.808~1.685)	0.653	0.918 (0.631~1.334)
<b>Satisfaction with income</b>						
No	–	–	–	–	–	–
Yes	0.382	1.172 (0.821~1.674)	0.408	0.864 (0.611~1.222)	0.402	1.164 (0.816~1.660)

<b>Harmonious doctor-patient relationship</b>						
No	–	–	–	–	–	–
Yes	<b>0.000*</b>	<b>1.918</b> <b>(1.345~2.736)</b>	0.977	0.995 (0.704~1.405)	<b>0.003*</b>	<b>1.712</b> <b>(1.205~2.433)</b>

## Discussion

Although the PPOS has been widely used in the international community and its Chinese version (CR-PPOS) has also been made available<sup>[7] [19] [20][21][22][23]</sup>, only a few studies reported the results in China using the CR-PPOS<sup>[25]</sup>. This study represents the first attempt of using the CR-PPOS to measure the attitudes of medical professionals toward patient-centredness in the northeast region of China. The CR-PPOS demonstrated good internal consistency.

Overall, the study participants reported an attitude not in favour of patient-centredness in clinical communication, with the standardised score below 50. The participants gave a relatively higher rating on caring (standardised score of 62) than on sharing (standardises score of 31). This pattern is consistent with the findings of most existing studies. However, there are two exceptions. The studies in Portugal and Australia revealed relatively higher scores in sharing compared with caring<sup>[27, 28]</sup>. The underlying reasons are unknown. But it is likely to be associated with the professional culture and local medical system environments. Further comparative studies are warranted.

In some studies, the PPOS scores were ranked and categorised into three groups using an average item score of 5 indicating a high preference, 4.57-4.59 indicating a medium preference, and less than 4.57 indicating a low preference towards patient centredness<sup>[18]</sup>. Our study participants would be deemed to have extremely low preference towards patient-centredness using these criteria despite a slightly higher tendency towards caring for the needs of the whole person. Indeed, the mean item scores (3.24±0.604) revealed in this study are lower than those found in the studies in Shanghai (3.66±0.59)<sup>[25]</sup>, the US Pilgrim Health Care (HPHC) (4.26±0.75)<sup>[17]</sup>, and Australia (4.46)<sup>[29]</sup>. The differences in the results may be partly explained by the differences in socio-economic conditions and religious beliefs and cultural values. The

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4 268 attitudes of medical professionals may also change with the economic and health system  
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6 269 development [30]. The level of economic and health development in Shanghai has matched that of  
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8 270 the developed countries. There exist great disparities between Shanghai and our study setting H  
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10 271 city. The concept of patient-centred care in H city is still in its infant stage of development.

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12       It is worth noting that the caring item “If doctors are truly good at diagnosis and treatment,  
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14 273 the way they relate to patients is not that important” attracted the highest score (4.68), indicating  
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16 274 a relatively strong awareness of the study participants in regard to the need of skills beyond  
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18 275 technical skills in caring for patients. There is consensus in medical professionals that patient  
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20 276 care outcomes depend on shared goals and actions between patients and their care providers [31].  
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22 277 This sentiment is support by the highest scored item in sharing “When patients disagree with  
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24 278 their doctor, this is a sign that the doctor does not have the patients' respect and trust”. It  
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26 279 indicates that the study participants understood that patients might want to engage in clinical  
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28 280 decision making in a respectful way. It is concerning, however, that the study participants  
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30 281 showed low confidence in the ability of patients to meaningfully engage in clinical decision  
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32 282 making. The sharing question “Patients should rely on their doctors' knowledge and not try to  
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34 283 find out their conditions on their own” (2.08) and the caring question “If a doctor mainly relies  
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36 284 on being open and warm, the doctor will not have a lot of success” (3.58) attracted the lowest  
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38 285 scores, respectively, suggesting that the study participants put very high values on their technical  
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40 286 inputs in clinical communication. These results are generally consistent with the findings of other  
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42 287 studies [28, 31].

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44 288       Both sociodemographic characteristics and working environmental factors are associated  
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46 289 with the attitudes of medical professionals toward patient-centredness in clinical communication.  
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48 290 We found in this study that higher workloads are associated with a lower preference towards  
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50 291 patient-centeredness. Previous studies revealed that high workloads of health workers have  
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52 292 become a serious concern in China, which can lead to burnout [32]. Burnout in turn can result in  
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54 293 low job satisfaction, high incidence of medical errors, worsened relationship with patients [30, 33],  
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56 294 and even avoidance of direct contacts with patients [34]. It is hard to imagine how a medical

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4 295 doctor experiencing burnout can dedicate time and efforts to share information and power and  
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6 296 address the concerns and choices of their patients [30].

7 297 An interesting finding of this study is that a perceived harmonious relationship with patients  
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9 298 is positively associated with the preference towards patient-centredness in clinical  
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11 299 communication, especially in regard to sharing information and decision making power. A  
12  
13 300 plausible explanation is that those who perceive a harmonious doctor-patient relationship may  
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15 301 place high trust in their patients and are less likely to be hesitated to share information and power  
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17 302 with their patients. The growing medical disputes reported in China may become a serious  
18  
19 303 barrier for promoting patient-centredness in clinical communication [24]. Medical professionals  
20  
21 304 desire a process of communication built on mutual-respect and mutual-understanding.

22  
23 305 Education can also play a role in promoting patient centredness. Our study found that the  
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25 306 study participants with a postgraduate qualification were more likely to prefer sharing  
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27 307 information and power with patients. The medical educational curricula may have contributed to  
28  
29 308 the results [35]. There has been a lack of emphasis on the communication components in  
30  
31 309 vocational training curricula for medical practitioners. Researchers have called for strengthening  
32  
33 310 the educational role of medical practitioners for their patients [26]. It appeared that the medical  
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35 311 training curricula in China may have started to adapt to the changing trend [35]. The younger  
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37 312 medical professionals in this study were found to have a relatively higher preference towards  
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39 313 patient-centredness in clinical communication.

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42 315 **Strengths of this study:** This is the first study of its kind to report the attitudes of medical  
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44 316 professionals in the northeast of China toward patient-centred care. Low levels of preference  
45  
46 317 towards patient-centredness in clinical communication were found. Findings of this study have  
47  
48 318 significant implications on the management of medical practice under the specific context of  
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50 319 China. The sample size of this study was large, which enabled us to identify the  
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52 320 sociodemographic and work experience predictors of the attitudes toward patient-centredness.

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54 321 **Limitations and suggestions for future research:** The study adopted a cross-sectional  
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56 322 design. No causal relationships can be assumed. It is also important to note the short survey

323 period. The attitudes of medical professionals may change over time. In addition, the participants  
324 in this study were sampled from seven medical institutions in H city, which limits the external  
325 validity of the study and generalisability of the findings. Further studies are needed in a more  
326 representative large sample, which can include a comparative study across different regions and  
327 settings. It is also important to understand the view of patients on this matter. A longitudinal  
328 study is also desired to determine changes in the attitudes of medical professionals over time.

329

## 330 **Conclusions**

331 Overall, the survey revealed a low preference of medical professionals in the northeast of China  
332 towards patient-centredness in clinical communication. A relatively higher preference towards  
333 caring was found in comparison with sharing. Younger age, higher education, lower working  
334 loads, and a perception of harmonious doctor-patient relationship are significant predictors of  
335 more favourable attitudes toward patient-centredness in clinical communication.

336 Improving medical education and working environments may be plausible strategies for  
337 promoting patient-centredness. However, the intense patient-provider relationship in China  
338 presents a serious challenge. It is equally important to empower patients and enhance their  
339 endorsement of partnership building with medical professionals. This should include the use of  
340 mass media <sup>[33]</sup>.

341 Training is important for improving the communication skills of medical professionals.  
342 However, training alone is not enough. The society as a whole and the entire healthcare system  
343 need to embrace the value and significance of patient-centred care.

344

## 345 **Acknowledgements**

346 We sincerely thank Dr. Edward Krupat from Harvard Medical School for generously sharing  
347 information and giving valuable advice regarding the PPOS. We are also grateful to Jie Wang  
348 and Fan Wang from Fudan University for developing the CR-PPOS. We would like to thank all  
349 of the study participants and participating institutions for their involvement and support.

## 350 **Funding**

351 This work was supported by the National Natural Science Foundation of China (Grant Number:  
352 71673073, 71974049), Heilongjiang Postdoctoral Scientific Research Development Fund (LBH-  
353 Q18071), Think Tank of Public Health Security and Health Reform of Heilongjiang Province,  
354 Special project supported by China Postdoctoral Foundation (2016T90318).

355 The funders had no role in study design, data collection and analysis, decision to publish, or  
356 preparation of the manuscript.

## 357 **Grant Disclosures**

358 The following grant information was disclosed by the authors:

359 National Natural Science Foundation of China: 71673073, 71974049

360 Heilongjiang Postdoctoral Scientific Research Development Fund: LBH-Q18071.

361 China Postdoctoral Foundation: 2016T90318.

362 Think Tank of Public Health Security and Health Reform of Heilongjiang Province.(N/A)

## 363 **Competing Interests**

364 The authors declare there are no competing interests.

## 365 **Authors' Contributors**

366 Weijian Song and Mingli Jiao contributed equally as the first author to this article. Libo Liang  
367 and Qunhong Wu designed the study and collected the data. Yu Cui, Yanhua Hao and Xiaowen  
368 Zhao provided statistical expertise. Chaojie Liu critically revised the manuscript. Wei Liu and  
369 Siyi Tao analyzed the data. Yuxin Xue and Juan Zhao performed questionnaire translation and  
370 literature review. Qiao Zhang provided administrative support. Weilan Xu, Hong Sun, Ye Li and  
371 Linghan Shan made critical revisions to the paper for important scientific content and reviewed  
372 various drafts as well as the final manuscript. All authors read and approved the final manuscript.

373 **Data sharing statement** Data are available upon reasonable request, additional data from this  
374 study could be accessed by contacting the corresponding author Libo Liang via llbhit@163.com.  
375

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

	Item No	Recommendation	Page No
<b>Title and abstract</b>	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	1-2
<b>Introduction</b>			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	2-3
Objectives	3	State specific objectives, including any prespecified hypotheses	2-3
<b>Methods</b>			
Study design	4	Present key elements of study design early in the paper	4-5
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	4-5
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	4-5
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	4-5
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	4-5
Bias	9	Describe any efforts to address potential sources of bias	4-5
Study size	10	Explain how the study size was arrived at	4-5
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	4-5
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	5
		(b) Describe any methods used to examine subgroups and interactions	5
		(c) Explain how missing data were addressed	5
		(d) If applicable, describe analytical methods taking account of sampling strategy	5
		(e) Describe any sensitivity analyses	5
<b>Results</b>			
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	5-6
		(b) Give reasons for non-participation at each stage	5-6
		(c) Consider use of a flow diagram	
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	5-6
		(b) Indicate number of participants with missing data for each variable of interest	
Outcome data	15*	Report numbers of outcome events or summary measures	
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	5-9

		(b) Report category boundaries when continuous variables were categorized	5-9
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	
<b>Discussion</b>			
Key results	18	Summarise key results with reference to study objectives	9-11
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	11
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	11
Generalisability	21	Discuss the generalisability (external validity) of the study results	11-12
<b>Other information</b>			
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	12

\*Give information separately for exposed and unexposed groups.

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