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Evaluation of Patient Experience in County-level Public Hospitals in China: A Multi-Centre Empirical Study

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Title Page

Title: Evaluation of Patient Experience in County-level Public Hospitals in China: A Multi-Centre Empirical Study

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Abstract

Objectives: Patient experience is being widely considered in the evaluation of healthcare service quality, which is a key target for public hospitals under China's New Healthcare Reform. This study aimed to illustrate patients' experiences in county-level public hospitals, and identify aspects that need to be improved.

***Setting & participants*:** Between 2016 and 2018, a cross-sectional study with 500 outpatients and 800 inpatients was conducted in 10 county-level public hospitals from Shandong Province, Hubei Province, and Chongqing Municipality.

Method: A three-part questionnaire was used to evaluate patients' experiences during their visits to hospitals. It comprised a questionnaire for basic information, the Picker Patient Experience questionnaire (PPE-15), and the overall evaluation (a 3-point Likert scale to express patients' satisfaction and patient loyalty). Patients' experiences were classified according to six dimensions (information transmission and patient education, respect for patient preference, emotional support, physical comfort, involvement of family or friends, and continuity of medical service). Both univariate and multivariate analyses were performed to evaluate patient experience.

***Results*:** A total of 1,241 valid questionnaires were analysed. The mean PPE-15 score was 41.33 (range, 23–56). The better the patient experience and satisfaction, the higher the patient loyalty ($P<0.001$). Except for hospital disparities, patients' age and occupation status had a significant impact on patient experience ($P<0.05$). Of the six dimensions, the physical comfort score was the highest, while the respect for patient preference score was the lowest. Additionally, a strong correlation was found between the respect for patient preference dimension and patients' overall satisfaction with their treatment experience.

***Conclusions*:** Hospital managers and staff members should pay close attention to the preferences of patients and their families to improve patient experience.

Keywords: Health services management, Health service safety, Quality in health care, Patient experiences

Article summary

Strengths and limitations of this study

1. The Picker Patients Experience questionnaire was first used to reflect patients experience during visiting time in China's county-level hospitals.
2. This was a cross-sectional study comprising a large sample size of 1300 patients from three different provinces.
3. The experiences of both inpatients and outpatients were evaluated with the same mature scale without considering the visit type.
4. Both unitary analysis and multivariate analysis were used to examine the present status and obtain a better understanding of patients' negative experiences in China's county-level hospitals.
5. As this is a real-time survey, the findings may not reflect the changes in patients' experiences.

MAIN TEXT

INTRODUCTION

Healthcare service quality is the essence of hospital development and a key factor influencing patient loyalty[1-3]. Traditionally, from a healthcare supplier's perspective, professional service skills and advanced technology were regarded as key factors to improve healthcare service quality[4]. However, from a healthcare user's perspective, one important and obvious factor influencing patients' choice of hospital is their experience or thoughts when receiving medical services[1, 5, 6], including the opportunity to express any concern, anxiety, fear, or pain that they may experience[7].

Patients are the receivers of healthcare services, and patients' experiences, are one of the most common indicators used to evaluate the quality of healthcare services[2, 6, 8-10]. As an integral component of healthcare quality, patient experience includes several aspects of healthcare delivery that patients value highly when they seek and receive care; for example, timely appointments, easy access to information, and good communication with healthcare providers[1, 11, 12]. Regardless of the development of medications and technology, patient experience of illness and medical care is always at the heart of clinical services[2, 13-15]. Among the various aspects of patient experience, one can assess the extent to which patients receive care that is respectful of and responsive to individual patient preferences, needs, and values [1, 16, 17]. Patient experience and patient satisfaction appear to be synonymous but are entirely different [8, 12]. Patient satisfaction surveys tend to ask patients subjective questions about their satisfaction with their care (e.g., outcome measure: satisfaction with health status following treatment)[8, 9, 18], while patient experience evaluations focus on patients' actual objective experiences during their visit to healthcare institutions and aim to avoid value judgments that influence existing expectations[1, 19, 20].

County-level hospitals play an important role in providing basic healthcare in China[21]. Accounting

for 94% of the geographical area, counties are the most important and fundamental administrative units in China [22]. Over 900 million residents live in the county area, comprising 60% of the population. County-level hospitals are the main providers of health services in rural areas[22, 23]. Based on the functional orientation of the three-tiered healthcare system, tertiary general hospitals are the topmost healthcare service providers in China, whereas county-level hospitals are the main providers of secondary care, providing comprehensive medical services for rural residents, who normally present with common diseases. A total of 13,640 typical county-level hospitals with a capacity of 2.33 million beds and 2.40 million healthcare workers are mainly responsible for healthcare delivery in rural areas[23]. Compared with urban tertiary hospitals with highly qualified medical staff and high-quality facilities, county-level hospitals are associated with limited health resources, leading the public to distrust their healthcare quality. A comprehensive reform of county-level hospitals focusing on quality improvement initiated by the state council was launched in pilot counties from 2011 to 2015 and in all counties thereafter. With a great financial subsidy [24], county hospitals have demonstrated a tremendous improvement in the quantity and quality of healthcare service delivery after the reform (**Appendix Ⅰ**).

As a slogan and target of the national 'Further Improvement of Healthcare Services' action plan, understanding patient experience is a key step in moving towards patient-centred care, which has been widely advocated at home and abroad[7, 11, 24, 25]. At the same time, as a guidance on orderly medical service in the new healthcare reform, the development of a hierarchical medical system aimed to treat 90% of diseases in county-level hospitals[26, 27]. Moreover, when implementing the project of hierarchical diagnosis and treatment, the most important issue in improving the quantity of healthcare services in county-level hospitals is to increase the trust and loyalty of rural citizens. A great amount of work has been conducted to evaluate the reform effects, such as operating efficiency evaluation, assessment of diagnosis and treatment level, and

calculation and prediction of hospital scale[28-30]. Meanwhile, most patient experience studies have focused on urban tertiary hospitals[4, 17], and established scales and self-developed questionnaires have both been used after verifying its validity and reliability to evaluate patient satisfaction and experience[31, 32]. However, reports on patients' experiences using international scales in county-level hospitals are lacking[17, 21]; thus, performing a horizontal comparison of patient experience with other areas is difficult. Moreover, the lack of uniform standards could hinder the improvement of patient experience in rural patient-centred healthcare systems in China.

Patient experience during hospital visits is an effective indicator that can directly reflect the progress and results of the comprehensive reform of county-level hospitals[1, 3, 20]. To better understand the improvement of healthcare service quality in county-level hospitals, the present study aimed to analyse the current situation of patient experience in these hospitals focusing on the whole visit process, and to identify the main problems affecting patient experience.

METHOD

Study design and setting

A multicentre, cross-sectional, questionnaire-based survey was conducted from August 2016 to March 2018 with patients in 10 county-level public hospitals from different areas to evaluate patient experience. Data were obtained from the patient questionnaires and official statistical reports.

Under the proposal of China Statistical Bureau, all provinces were divided into three areas, namely eastern, central, and western, based on their economic development and geographical position at the time of the study. Data from the special administrative regions and Taiwan Province were excluded from this study. The eastern area refers to developed areas[22], including 11 provinces or municipalities (i.e. Beijing, Tianjin, Hebei, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, and Hainan). The central area

refers to developing areas, including eight provinces (i.e. Shanxi, Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei, and Hunan). The western area refers to underdeveloped areas, including 11 provinces or autonomous regions (i.e. Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Inner Mongolia, Ningxia, Qinghai, and Xinjiang). A pilot study was conducted in a county-level hospital in Hubei Province to ensure that the questionnaire was intuitive, understandable, and flexible. Subsequently, the main field research was conducted by randomly selecting one province from the different areas: Shandong Province (Eastern China), Hubei Province (Central China), and Chongqing Municipality (Western China). Three counties from each of the three provinces were then chosen by convenience sampling. In each county, the public hospital with the largest healthcare delivery system was selected, and the questionnaire-based investigation of patients was conducted.

Participant selection and procedure

A total of 1300 patients (50 outpatients and 80 inpatients per hospital) who visited the county-level hospitals from 2016 to 2018 were recruited into the study (**Appendix II**). Supplementary Appendix Ⅲ provides the sample size formula.

The inclusion criteria were as follows: a) patients over 18 years of age; b) received treatment at the department of internal medicine, gynaecology, or surgery; c) able to understand the questions and provide clear responses; and d) having already received the medical service.

The two exclusion criteria were a) not completing the questionnaire; and b) more than 20% missing information in the questionnaire. The effective sample size and selection is provided in **Appendix Ⅳ.**

A convenience sampling method was used to select interviewees for the patient questionnaire. Two teams, each with two interviewers conducted the survey in the outpatient and inpatient department, respectively. To avoid influencing the medical service process and the intervention of the medical staff, all

interviews were conducted after the patients received treatment. The interviewers randomly selected patients that they encountered and assessed the inclusion criteria, and ended the survey when the number of interviewees met the required sample size (80 inpatients/50 outpatients). The present study excluded some participants during the analysis process because of missing information. Participants' concerns, such as privacy protection, refusal to answer, and responsibility to answer questions based on their true experiences were explained in both oral and written form. All participants provided verbal consent for their information to be used. Trained team members from our college who had professional interviewing skills conducted the investigation in each province to ensure quality control and reliability of the data.

The Patient experience questionnaire

The Picker Patient Experience (PPE) questionnaire is a valid and reliable tool assessing inpatient experience that has been used to evaluate hospital service quality in many countries[7, 13, 14, 33, 34]. The present study used the PPE-15, which is a short version and is considered to represent a universal set of items applicable for most patients[33]. After an expert consultation and two rounds of group discussions, we used the PPE-15 to assess both inpatient and outpatient experience and to compare the different service types. The PPE-15 questionnaire was translated into Chinese based on Brislin's translation model[35]. Orthogonal translation, synthesis, back translation, and group discussions were performed by one professor and four students with extensive experience in medical service research and proficient English translation skills (**Appendix Ⅴ**).

Overall satisfaction and patient loyalty (i.e. possibility of re-visiting) were also assessed for comparison with other studies conducted in China. Patient satisfaction directly reflects the thoughts and the pleasure level of patients regarding the healthcare service, whereas the possibility of re-visiting the hospital indicates patients' loyalty and trust toward the hospital.

Overall, the questionnaire survey contained 25 items divided in three parts: basic information of patients

(gender, age, education level, marital status, occupation status, basic health insurance type, and service type), specific aspects of patient experience (PPE-15), and overall evaluation. The PPE-15 comprised 15 items divided into six dimensions (S1: information transmission and patient education, S2: respect for patient preference, S3: emotional support, S4: physical comfort, S5: involvement of family or friends, and S6: continuity of medical service). The third part contained the overall evaluation of visit satisfaction and patient loyalty (i.e. possibility of re-visiting). Both the PPE-15 and overall evaluation mainly included closed questions and used a 3/4-point Likert scale (e.g. graded as 1–4 corresponding to 'often', 'sometimes', 'never', and 'I don't need to ask', respectively). The higher the score, the better the patient experience (**Appendix VI**)[7, 13, 25].

Patient and Public Involvement

Health is a basic human right, and people seek help from medical staff not only for themselves but also for their family or friends, which means that not only patients but other individuals also have their opinions and experiences regarding hospitals. Patients and public were involved in the questionnaire translation stage of the study to make the questionnaire easy to understand. All evaluation results were shared with relevant hospitals as evidence of feedback for the improvement of healthcare service quality. (**Box 1**)

Box 1: Public involvement in PPE-15 according to BMJ guidance

At what stage in the research process were patients/the public first involved in the research and how?
The public was first involved in the research during the questionnaire translation period to make the questionnaire easy to understand.

How was the development of the research question and outcome measures informed by patients' priorities, experience, and preferences?
After translation of the original questionnaire to Chinese, a pilot study with 100 patients was conducted in a county-level hospital in Hubei Province. Patients with different diseases, educational backgrounds, occupations, and visit experiences were involved in the pilot study after providing verbal consent.

How was the public involved in the design of this study?

Five volunteers who had hospital visiting experience and three hospital managers helped in designing the questionnaire and training the investigators.

Were they asked to assess the burden of the intervention and time required to participate in the research?
They were aware of the participation time, investigation details, and also the possible burden before completing the questionnaire. Volunteers were invited to share their worries and doubts about the investigation to ensure they were comfortable about the interview. The time taken to complete the questionnaire was also assessed to estimate the average answering time.

How were (or will) they be involved in your plans to disseminate the study results to participants and relevant wider patient communities (e.g. by choosing what information/results to share, when, and in what format)?
The patient experience questionnaire was disseminated to all research partners, managers at sample hospitals, and anyone interested in patient experience. All evaluation results have been shared with the relevant hospitals as evidence of feedback for the improvement of healthcare service quality.

Statistical analysis

EpiData3.0 (The EpiData Association, Odense, Denmark) was used for data entry, and SPSS13.0 (SPSS Inc., Chicago, IL, USA) was used for statistical analysis. All of the data from the pilot study hospital and nine formal survey hospitals were analysed. The content validity index (CVI) was used to determine content validity, while Cronbach's α and Kaiser-Meyer-Olkin (KMO) were used to verify the reliability of the questionnaires. Univariate and bivariate statistical models were adopted to evaluate the data. Continuous variables (age, evaluation scores) were described using mean and standard deviation. Categorical variables (gender, age group, education level, marital status, occupation status, basic health insurance type, service type, and problems identified in each item of PPE-15) were reported as counts and percentages. The six dimensions of the PPE-15 scale were specified as six separate criterion variables. Furthermore, the t-test, ANOVA test, and Student–Newman–Keuls (SNK) test were used to compare mean scores of patient experiences of different subgroups. The gamma grade correlation coefficient was used to analyse the association between patient experience items (the independent variables) and overall evaluation (the dependent variable). Demographic and other basic information were analysed using Pearson correlation analysis and multiple regression analysis to determine the factors affecting patient experience during visiting

time: the dependent variable of linear regression analysis was PPE-15 score, while the dependent variable of the order regression analysis was overall satisfaction. Statistical significance was set at $P < 0.05$ for a two-sided test.

Ethical considerations

The study was granted approval from the ethics committee of our college (IORG No: IORG0003571, **Appendix Ⅶ**). Personal identifying information was removed and participants remained anonymous during the entire study process. All the paper questionnaires and electronic data were maintained by the research team.

RESULTS

Sample

The CVI for the questionnaire was 0.9 and the item- CVI was [0.85, 1.00], while the validity test results of the questionnaire's reliability (Cronbach's α = 0.82, Kaiser-Meyer-Olkin (KMO) = 0.77) showed good internal consistency, and the correlation coefficient test ($P<0.001$) showed good structural validity amongst different dimensions and the overall score.

A total of 1241 questionnaires were analysed (effective response rate of 95.46%, **Appendix Ⅳ**). Amongst all participants, 54% were female and their mean age was 43.54 years; 55% of patients were employed, while 51.7% were covered by the New Rural Cooperative Medical System. Those aged 25-44 years accounted for 43.7% of the study population (**Table 1).**

Table 1. Participants' demographic information and PPE-15 scores

	Basic information		PPE-15 score	
	Obs.	**（%）**	**Mean**	***P*-value§**
Total	**1241**	**100.0**	41.33	
Gender				
Male	569	45.9	41.33	0.985
Female	672	54.1	41.33	
Age group (years)				

-24	135	10.9	41.18	0.003*
25-44	542	43.7	40.82	
45-64	416	33.5	41.73	
65-	148	11.9	42.19	
Education level				
- Middle school	552	44.5	41.64	0.014*
High school	355	28.6	40.92	
Undergraduate	314	25.3	41.33	
Master/doctorate	20	1.6	37.38	
Marital status				
Single	165	13.3	40.74	0.011*
Married	1005	81.0	41.51	
Other	71	5.7	40.15	
Occupation status				
Employed	681	55.0	40.95	0.001*
Retired	142	11.4	41.46	
Student	65	5.2	40.44	
Unemployed	353	28.4	42.11	
Basic health insurance type#				
Employee Medical Insurance	331	26.7	41.60	0.230
Residence Medical Insurance	218	17.6	41.57	
New Rural Cooperative Medical System	641	51.7	41.09	
Service type				
Sickness	934	75.3	41.21	0.187
Recovery & second visit	111	8.9	41.36	
Public health & health examination	196	15.8	41.89	

Note: Obs. is short for objectives; PPE-15= Picker Patient Experience; #: the coverage rate of Basic health insurance was 95.9% in the present study; § : T-test and ANOVA test was used to compare scores of different subgroups. *: significant at the 95% level;

Patient experiences evaluation

The maximum and minimum PPE-15 scores were 56 and 15, respectively. The mean PPE-15 score was 41.33±4.749 (range, 23 to 56); a total of 628 patients (50.4%) thought that they received a very satisfactory healthcare service. Meanwhile, 767 patients (61.8%) provided a positive answer to the possibility of choosing the same hospital again if they have other healthcare demands (**Table 2, Figure 1**).

Table 2. Scores of patient experience in sample hospitals

Section	Mean	Minimum	Maximum	S.D.
A) Score of PPE-15				
total score of PPE-15	41.33	23.00	56.00	4.75
: S1	8.17	3.00	11.00	1.15
S2	7.99	2.00	10.00	1.25
S3	8.34	3.00	12.00	1.71
S4	2.97	1.00	4.00	0.83
S5	5.41	2.00	8.00	1.11
S6	8.45	3.00	13.00	1.17
B) Score of overall evaluation				

overall satisfaction	3.45	1.00	4.00	0.61
patient loyalty (re-visiting possibility)	3.48	1.00	4.00	0.78

Note: objectives=1241; PPE-15= Picker Patient Experience; S.D.= Std. Deviation; S1: information transmission and patient education, S2: respect for patient preference, S3: emotional support, S4: physical comfort, S5: involvement of family or friends, and S6: continuity of medical service;

For the convenience of comparison, an adjusted score of the 6 dimensions is showed in **Figure 2**. Amongst the six dimensions, the physical comfort dimension (S4, Score=2.97) score was the highest, whereas respect for patient preference dimension score (S2, Score=2.67) was the lowest. Patients from the study hospitals reported 'staff providing conflicting information' to be the most common problem (39.24%; **Figure 3, Appendix Ⅵ**). Moreover, the total scores of PPE-15 in the 10 participating hospitals showed a significant difference (ANOVA test, F=15.361, P<0.01).

Patient Satisfaction, loyalty, and experience

Pearson's correlation results showed a positive relationship between patient experience (PPE-15)-satisfaction (P<0.05), and experience (PPE-15)-loyalty(P<0.05). The higher the patient experience score, the higher the patient satisfaction, and higher the possibility for patients with health demands to visit the hospital again. Pearson's correlation coefficients of experience-satisfaction and experience-loyalty were 0.366 and 0.474, respectively.

Associations between different factors and patient experience

The t-test and ANOVA test showed that patients in different subgroups (age group, education level, marital status, occupation status) showed significant different patient experience (**Table 1**); the score of outpatients (41.39) and inpatients (41.29) did not differ significantly (P=0.73), except in the dimension of respect for patient preferences (t=-2.933, P =0.003<0.05) and physical comfort (t=2.849, P=0.004<0.05). (**Table 3)**

Table 3. Patient experience (PPE-15) scores of outpatients and inpatients

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig.	Mean Difference	Std. Error Difference	95% C.I. of the Difference	
								Lower	Upper

Total	Equal variances assumed	4.30	0.04	0.34	1239.00	0.73	0.09	0.27	-0.44	0.63
	Equal variances not assumed			0.34	1154.72	0.73	0.09	0.27	-0.44	0.62
S1	Equal variances assumed	3.38	0.07	1.59	1239.00	0.11	0.11	0.07	-0.02	0.24
	Equal variances not assumed			1.61	1158.74	0.11	0.11	0.07	-0.02	0.23
S2	Equal variances assumed	4.38	0.04	-2.93	1239.00	0.00*	-0.21	0.07	-0.35	-0.07
	Equal variances not assumed			-2.90	1069.58	0.00	-0.21	0.07	-0.35	-0.07
S3	Equal variances assumed	2.18	0.14	0.10	1239.00	0.92	0.01	0.10	-0.18	0.20
	Equal variances not assumed			0.10	1136.96	0.92	0.01	0.10	-0.18	0.20
S4	Equal variances assumed	14.72	0.00	2.85	1239.00	0.00*	0.14	0.05	0.04	0.23
	Equal variances not assumed			2.76	984.79	0.01	0.14	0.05	0.04	0.23
S5	Equal variances assumed	5.85	0.02	0.22	1239.00	0.83	0.01	0.06	-0.11	0.14
	Equal variances not assumed			0.21	1031.37	0.83	0.01	0.07	-0.11	0.14
S6	Equal variances assumed	0.47	0.49	0.57	1239.00	0.57	0.04	0.07	-0.09	0.17
	Equal variances not assumed			0.56	1074.63	0.58	0.04	0.07	-0.10	0.17

Note: PPE-15= Picker Patient Experience; § : Independent Samples Test was used to compare scores of outpatients and inpatients. *: significant at the 95% level; C.I.= Confidence Interval .

The gamma correlation coefficients indicated that six items were significantly correlated with overall satisfaction (G≥0.5, P <0.05): respect for patient preference (S2) and continuity of medical service (S6) were strongly correlated with overall satisfaction (**Table 4**).

Table 4. Gamma grade correlation coefficient between different items of the Picker Patient Experience (PPE-15) questionnaire and overall satisfaction

Correlation with Overall Patient Satisfaction	Items*	Dimension**	*G*#
Strong correlation (G≥0.5)	I8	S2	0.663
	I1	S1	0.627
	I14	S6	0.554
	I7	S2	0.521
	I5	S3	0.514
Medium correlation (0.4≤G<0.5)	I15	S6	0.507
	I11	S5	0.495
	I9	S3	0.485
	I6	S3	0.432
	I4	S2	0.415
Weak correlation (G<0.4)	I13	S6	0.363
	I12	S5	0.352
	I2	S1	0.325
	I10	S4	0.322
	I3	S1	0.283

Note: Gamma grade correlation analysis was used.

* I1 to I15 are the 15 items of PPE-15 scale; **S1: information transmission and patient education, S2: respect for patient preference, S3: emotional support, S4: physical comfort, S5: involvement of family or friends, and S6: continuity of medical service; #G=gamma coefficient.

Table 5 shows the multiple correlations between different factors and patient experience. The linear regression analysis showed that except for hospital difference, age and occupation status had a strong influence on patient experience. Moreover, respect for patient preference(S2) was the most important predictor of overall satisfaction.

Table 5 A). Results of the linear regression analysis between different factors and patient experience (PPE-15)

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% C. I for B	
	B	Std. Error	Beta			Lower	Upper
(Constant)	**41.09**	**1.11**		**36.89**	**0.00 ***	**38.90**	**43.27**
hospital	-0.13	0.04	-0.09	-2.99	0.00 *	-0.21	-0.04
patient type	-0.31	0.28	-0.03	-1.11	0.27	-0.86	0.24
gender	0.11	0.27	0.01	0.41	0.68	-0.42	0.65
age	0.59	0.19	0.10	3.09	0.00 *	0.22	0.97
education level	0.02	0.19	0.00	0.09	0.93	-0.35	0.38
marital status	-0.42	0.25	-0.05	-1.70	0.09	-0.90	0.06
occupation status	0.30	0.11	0.09	2.74	0.01 *	0.09	0.52
insurance type	-0.18	0.14	-0.04	-1.34	0.18	-0.45	0.08
service type	0.31	0.18	0.05	1.72	0.09	-0.04	0.66

Note: a. Dependent Variable: total score of PPE-15; adjusted R^2=0.022; *: significant at the 95% level; C.I.= Confidence Interval

Table 5 B). Results of the order regression analysis between different dimensions of PPE-15 and overall satisfaction

	Estimate	Std. Error	Wald	df	Sig.	95% C. I.	
						Lower	Upper
Dependent Variable: overall satisfaction (very dissatisfied as reference category)							
[Very satisfied]	5.63	0.65	74.02	1.00	0.00*	4.34	6.91
[Satisfied]	6.90	0.63	121.27	1.00	0.00*	5.67	8.13
[Dissatisfied]	11.07	0.71	246.18	1.00	0.00*	9.69	12.46
[Very dissatisfied]#	-	-	-	-	-	-	-
Independent Variables: dimensions of PPE-15							
S1	0.20	0.06	11.01	1.00	0.00*	0.08	0.32
S2	0.30	0.06	25.44	1.00	0.00*	0.18	0.41
S3	0.27	0.04	40.00	1.00	0.00*	0.19	0.36
S4	0.28	0.08	13.27	1.00	0.00*	0.13	0.43
S5	0.26	0.06	17.70	1.00	0.00*	0.14	0.39
S6	0.29	0.06	22.07	1.00	0.00*	0.17	0.41

Note: a. #: very dissatisfied as reference category; Link function: logistic regression; Pseudo R2=0.317; *: significant at the 95% level; C.I.= Confidence Interval; S1: information transmission and patient education, S2: respect for patient preference, S3: emotional support, S4: physical comfort, S5: involvement of family or friends, and S6: continuity of medical service; #G=gamma coefficient.

DISCUSSION

Principle findings

After the new healthcare reform in China, the quality of healthcare services in county-level hospitals gradually improved, especially in terms of patient experience and satisfaction[21, 24]. The mean PPE-15 score in the 10 sample hospitals was 41.33. Moreover, 61.8% patients thought that they received a very satisfactory healthcare service, and 50.6% responded positively to the possibility of visiting the hospital again in case of a need. In general, patients visiting county-level hospitals during the study period had a good experience and were satisfied, and the better the patient experience, the higher the satisfaction and also the patient loyalty [36, 37]. Our findings also showed that outpatients and inpatients had a similar experience during their visits.

Strengths and weakness

As a universally used scale to evaluate patients' experiences in hospitals, the PPE-15 focuses more on inpatient experience [7, 34]. Nevertheless, in China, hospitals play a key role in providing both inpatient and outpatient services. This study evaluated both outpatient and inpatient experience of county-level hospitals with a well-established scale. The translated PPE-15 questionnaire showed good validity and reliability in the pilot study. The research was conducted in only 10 hospitals from three provinces, which might not be enough to reflect the national status of patient experience in county-level hospitals. As a cross-sectional study, this work might not reflect the changes in patient experience during the reform. In future, we aim to expand the sample size and continue to focus on the improvement of healthcare services in the sample hospitals. Additionally, measures of patient experience vary widely, with different tools using complex or ambiguous concepts. Thus, the evaluation of inpatient and outpatient experience with the PPE-15 may yield different findings from those obtained using other evaluation scales or tools. Last but not the least, there are many

different kinds of factors that influence experience during visiting time, and we would like to consider other influencing factors of patient experience in a subsequent study to improve the quality of healthcare services in China's county-level hospitals.

Interesting findings on patient experience in China's county-level hospitals

In general, improving inpatient experience and overall satisfaction is an effective way to increase patients' loyalty to a hospital, which is a crucial issue to improve the quality of healthcare services in county-level hospitals. Other research groups also reported similar findings[36, 37]. Our findings also showed that outpatients and inpatients had a similar experience during their visiting time. Using a well-established scale, our findings thus suggest that the service improvement program led to a balanced ability of fulfilling different health demands of various kinds of patients. Reducing the pain that patients experience is more feasible for improving patient experience[8].

China's new healthcare reform has improved the services of county hospitals; however, patient experience still needs to be improved[29, 37, 38]. Different subgroups of patients had different experiences during their visit. Patients of different age groups and occupation status showed significant differences in patient experience, whereas gender, education level, marital status, service type, and insurance type had no significant effect on PPE-15 scores; these findings partly differed from the results of previous research conducted in other areas in China[7, 29, 36, 38], India[5], and Southeast Norway[11]. Regardless of the differences in results, these finding cannot be used as an excuse for medical staff to deal with selected patients but need to guide professionals to manage different kinds of patients more effectively.

Analysing the details of patient experience, we identified several problems that need to be addressed. Even though overall patient experience was good, there were obvious problems that needed to be handled. The lowest score of PPE-15 was respect for patient preference in the present study. In the correlations

between different patient experience items and overall satisfaction, the items with strong correlations suggest that county-level hospitals in core areas could improve patients' satisfaction by showing more respect for patient preference, which was similar to findings in other countries[25, 34]. However, items with weak correlations cannot be considered unimportant factors, and they should be given more attention in future studies. Information transmission and patient education are not only essential steps for medical staff to improve the health literacy of rural citizens[21, 26], but are also goals of the 'Healthy China' strategy[24].

Furthermore, the most common problem was receiving answers from different medical staff. More than one-third of the participants reported that 'staff provided conflicting information' (39.24%). Conflicting information may confuse patients about their condition and diminish their trust in doctors. Once patients fail to trust the medical staff, their loyalty to the hospital will decrease[39, 40]. About 38.44% of patients thought 'family or friends did not get the opportunity to talk to doctors'. The present study showed that doctors, patients, their family and friends were all considered important in terms of communication. With the rapid development of treatment skills, patients are more concerned about the comfort of the service than the quality of the treatment and diagnosis they receive[4, 10, 41]. The longer the communication time with medical staff, the better the experience of patients during their visit[1, 10, 25, 42]. Compared with urban tertiary hospitals, having fewer patients allows medical staff in county-level hospitals to spend more time taking care of patients' demands, and this aspect should be developed into a strength for county-level hospitals. These results suggest that the need for more effective communication, which involves more talking time with patients and those close to them, and more consistent information are core problems of patient experience improvement in China's county-level hospitals.

Conclusion

Among the elaborate goals of the hospital reform, improving patient experience can enhance the quality of

care, governance, public accountability, and patient choice[20]. The results of this study can lay the foundation for further comparisons with international reports and enrich multi-centre research on patients' experiences in county-level hospitals. The results from patient experience surveys can be added to the hospital performance evaluation scale for continuous quality improvement and for identifying the main problems from the patients' perspectives. In the development of modern county-level hospitals, managers and health service providers in county-level hospitals should listen closely and properly address the demands of patients and their families by meeting patients' needs, improving the consistency of information, and respecting patient preferences.

Declarations

Availability of data and materials

Data collected from yearbooks can be accessed from the website listed in related references. Patient data are available from the corresponding author upon reasonable request.

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Authors' contributions

P.F. planned the study. P.F., R.M., C.Z. and C.T. performed the research in the sample hospitals. R.M., L.L., and C.Z cleaned and analysed the data and drafted the manuscript. All the authors contributed substantially

to the interpretation of the results and the writing of the manuscript. All the authors have read and approved the final version of the manuscript.

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Role of the Sponsor

The sponsors played no role in the design and implementation of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and the decision to submit the manuscript for publication.

Competing Interests

The authors declare no competing interests for this study.

Supplementary information files

Appendix Ⅰ Data related to patient safety in county-level hospitals

Appendix Ⅱ Field study samples

Appendix Ⅲ Formula for calculating the sample size

Appendix Ⅳ Effective sample size

Appendix Ⅴ Patient experience questionnaire

Appendix Ⅵ Ethics approval

Appendix Ⅶ Explanations of the Picker Patient Experience-15 (PPE-15)

Figure legends

Figure 1. Pie charts of patients' overall evaluation

Figure 2. Score for each dimension of patient experience in the 10 sample hospitals

Figure 3. Problems identified by the Picker Patient Experience (PPE-15) questionnaire

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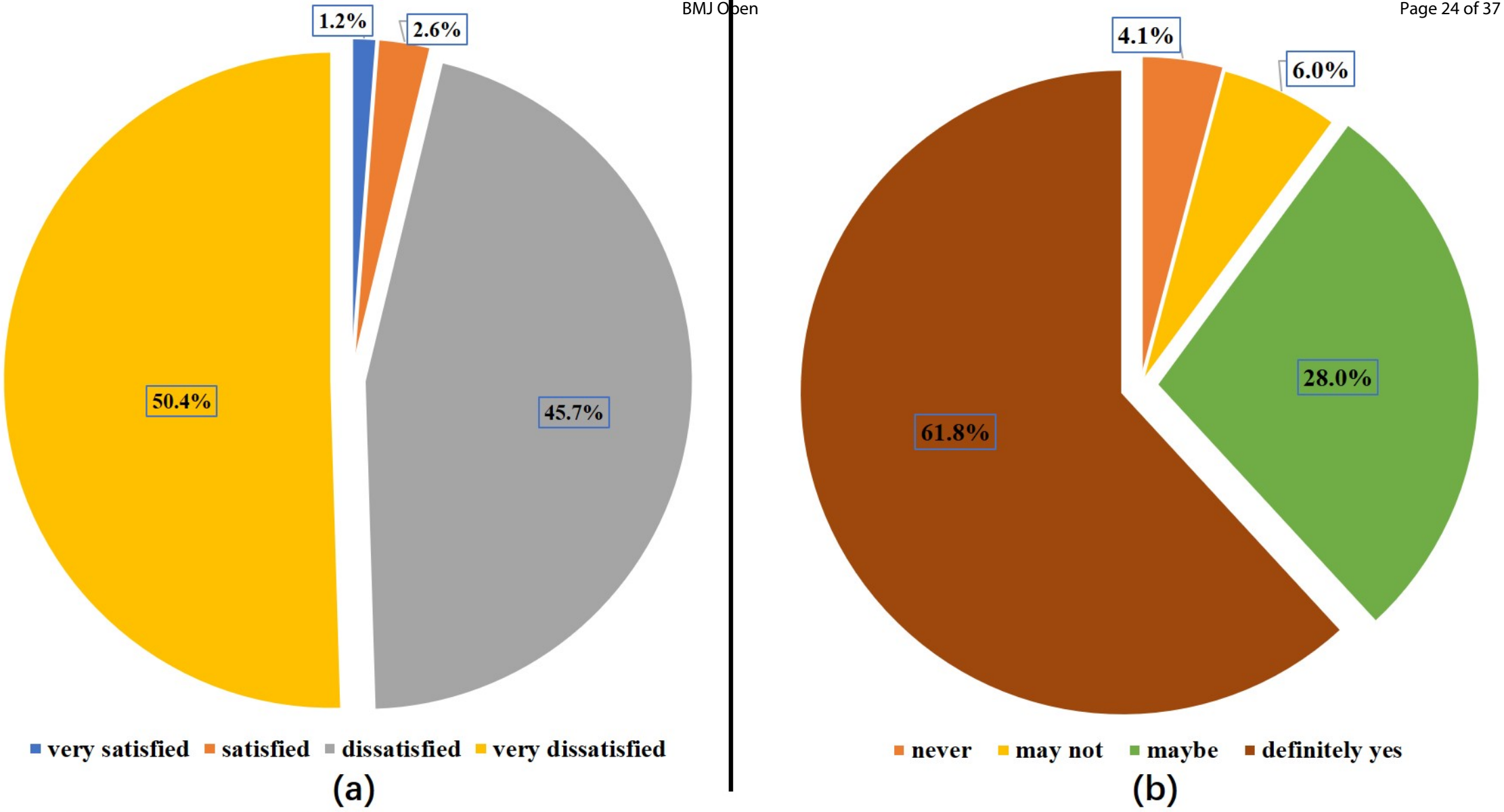


Figure 1. pie charts of patient overall evaluation

a) pie chart of patient overall satisfaction (4-level); b) pie chart of patient re-visiting possibility/ patient loyalty(4-level)

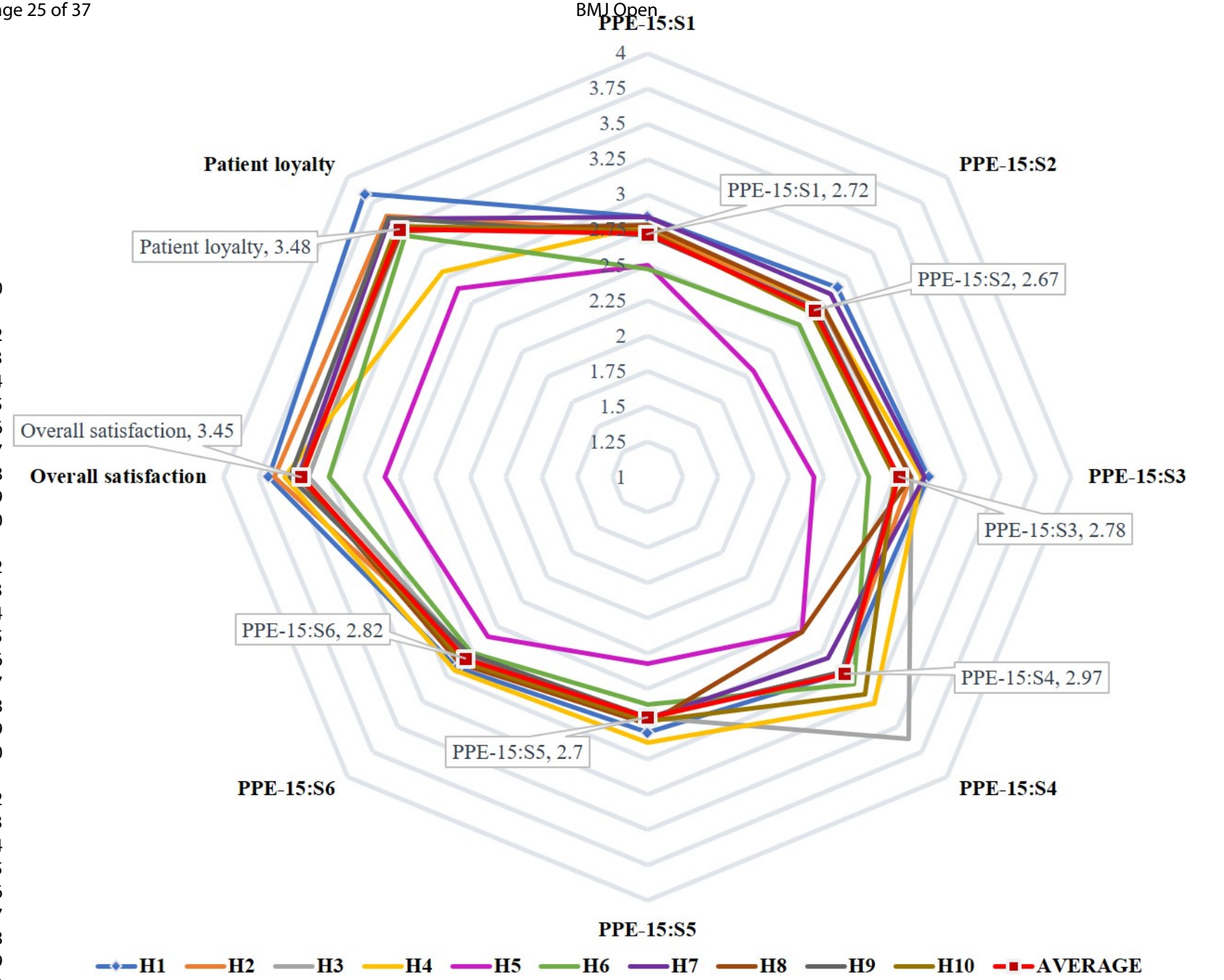


Figure 2. Score for each dimension of patient experience in the 10 sample hospitals

Note: PPE-15= Picker Patient Experience; S1: information transmission and patient education, S2: respect for patient preference, S3: emotional support, S4: physical comfort, S5: involvement of family or friends, and S6: continuity of medical service.

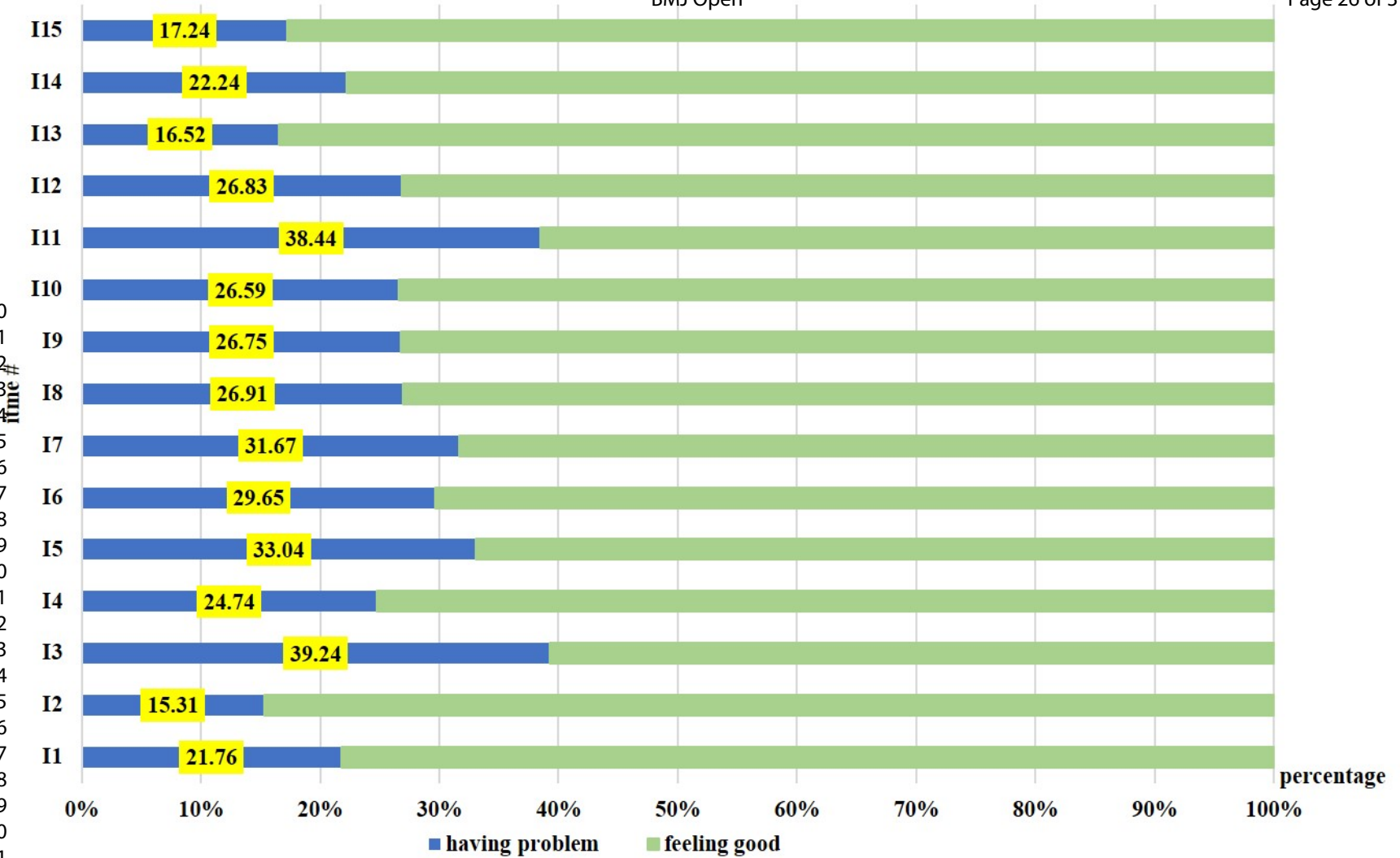


Figure 3. Problems identified in the Picker Patient Experience (PPE-15) questionnaire

Appendix I

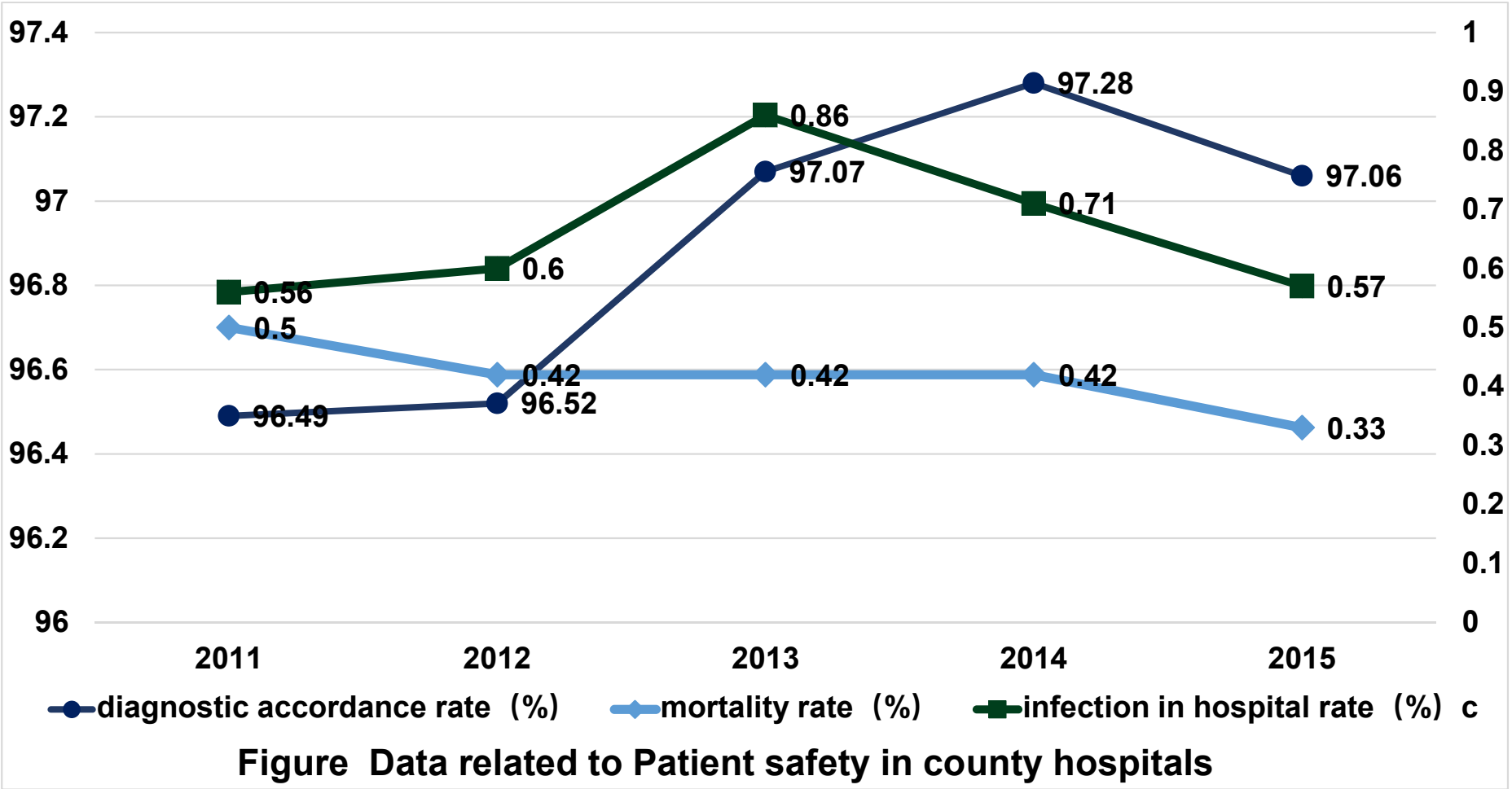
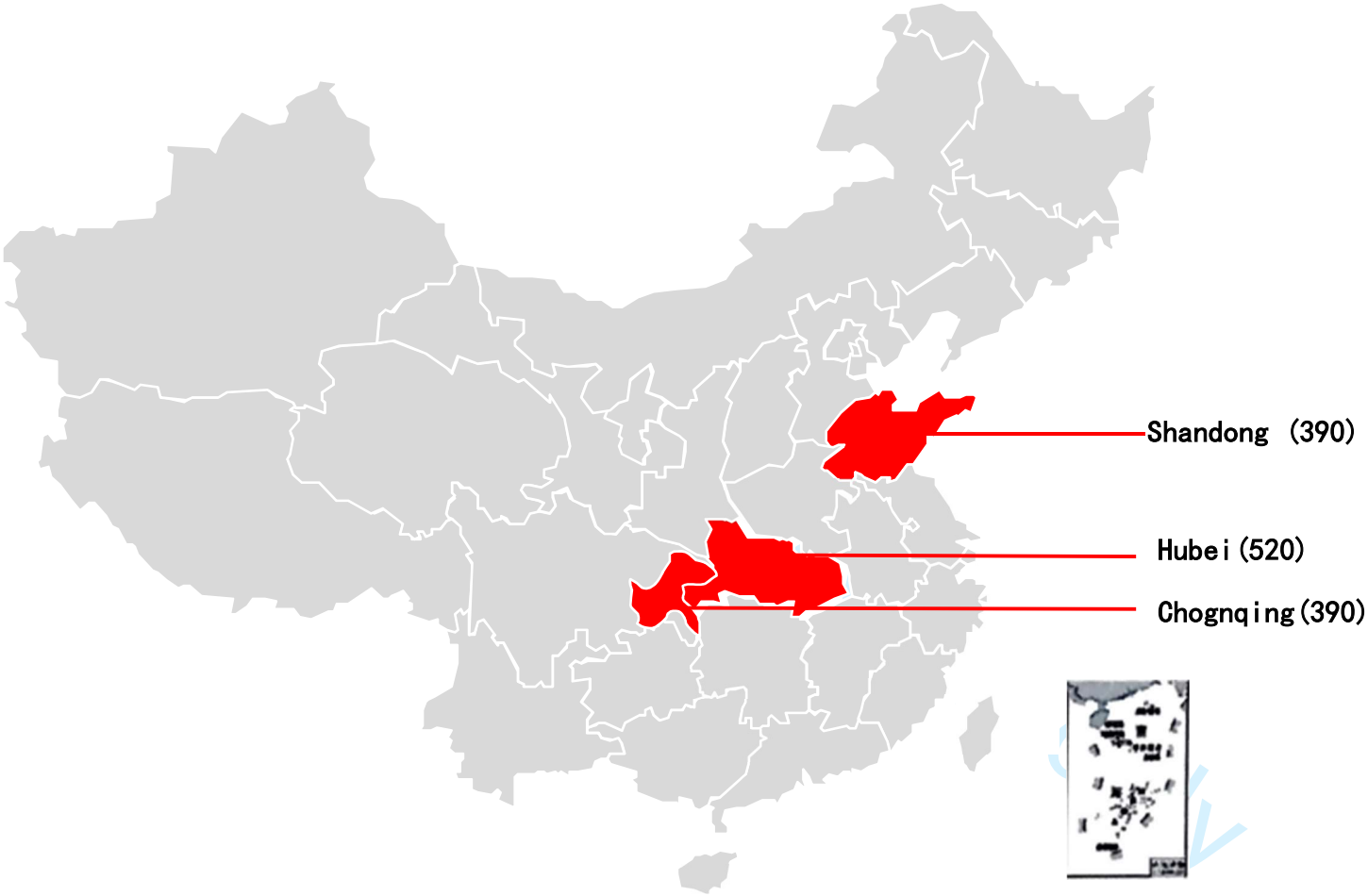


Figure Data related to Patient safety in county hospitals

Data source: data from 10 sample county hospitals from 2011-2015

Appendix II Field study samples



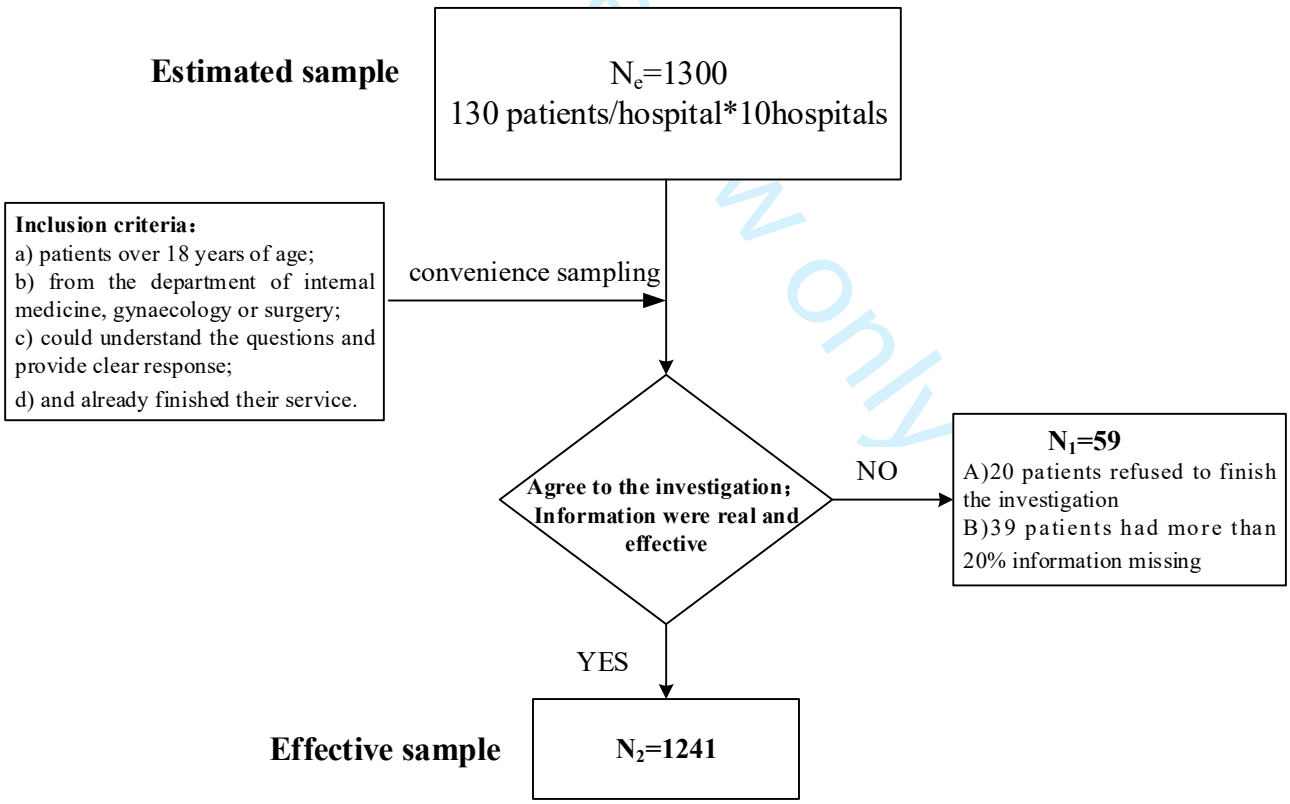
Appendix III: Formula for calculating the sample size

$$n=\frac{Z_{\alpha/2}^2 p(1-p)N}{\delta^2(N-1)+Z_{\alpha/2}^2 p(1-p)}$$

$$\alpha=0.05, \delta=0.05, N=163.08\times10^6, p=0.9$$

Note: According to the national report, there are 815.4 million rural residents in 2017. The two-week prevalence rate was 20.2%. In this study, the patient population (N) was estimated 163.08 million. Meanwhile, the response rate of previous question survey was 90% -95%. The total sample was 73-139. With the export group discussion and based on the basic service situation for county-level hospitals, we choose 130 patients for each hospital (50 outpatients and 80 inpatients).

Appendix IV: Effective sample size



Appendix V: Patient experience questionnaire (PPE-15+overall feelings)

Basic information

1. Gender: *male/female*
2. Age:_____
3. Educational level:
   Middle school and below/High school/Undergraduate/Master & Doctor
4. Marriage situation:
   Single/Married/inconvenient to disclose
5. Employment situation:
   Employed/Retired/Student/Unemployed
6. Which kind of basic health insurance do you have?
   UEMI/URMI/NCMS/none
7. What is your reason to visit hospital this time?
   Sickness/recovery & second visit/public health & health examination

PPE-15 questions and response categories

1. When you had important questions to ask a doctor, did you get answers that you could understand?
   Yes, always/Yes, sometimes/No/I have no need to ask
2. When you had important questions to ask nurse, did you get answers that you could understand?
   Yes, always/Yes, sometimes/No/I have no need to ask
3. Sometimes in a hospital, one doctor or nurse will say one thing and another will say something quite different. Did this happen to you?
   Yes, always/Yes, sometimes/No
4. Did doctors talk in front of you as if you weren't there?
   Yes, always/Yes, sometimes/No
5. If you had any anxieties or fears about your condition or treatment, did a doctor discuss them with you?
   Yes, completely/Yes, to some extent/No/I didn't have any anxieties or fears
6. If you had any anxieties or fears about your condition or treatment, did a nurse discuss them with you?
   Yes, completely/Yes, to some extent/No/I didn't have any anxieties or fears
7. Did you want to be more involved in decisions made about your care and treatment?
   Yes, definitely/Yes, to some extent/No
8. Overall, did you feel that you were treated with respect and dignity while you were in hospital?
   Yes, always/Yes, sometimes/No
9. Did you talk about your concerns with the hospital staff?
   Yes, definitely/Yes, to some extent/No/I had no concern
10. Were you ever in pain during your stay in the hospital?
    Yes/No
    If yes, do you think the hospital staff did everything they could to help control your pain?
    Yes, definitely/Yes, to some extent/No

11. If your family or someone else close to you wanted to talk to a doctor, did they have enough opportunity to do so?
Yes, definitely/Yes, to some extent/No/No family member or friend was involved/
My family or friends didn't want or need information/
I didn't want my family or friends to talk to a doctor
12. Did the doctors or nurses give your family or someone close to you all the information they needed to help you recover?
Yes, definitely/Yes, to some extent/No/No family member or friend was involved/
My family or friends didn't want or need information
13. Did any staff member of the hospital explain the purpose of the medicines you had to take at home in a way that you could understand?
Yes, completely/Yes, to some extent/No/I didn't need an explanation/
I had no medicine (go to Q15)/
Don't know, as it was taken by other person (go to Q15)
14. Did any staff member of the hospital tell you about medication side effects to watch for when you went home?
Yes, completely/Yes, to some extent/No/I didn't need an explanation
15. Did any staff member of the hospital tell you about danger signals regarding your illness or treatment to watch for after you went home?
Yes, completely/Yes, to some extent/No/I didn't need an explanation

Overall feelings (overall satisfaction and visiting willing)

1. How do you feeling about the health service in the hospital this time?
Very Satisfied/ Satisfied/ dissatisfied /very dissatisfied
2. If you can choose again, will you take this hospital as the first choice?
Never/may not /maybe/definitely yes

患者体验调查问卷

尊敬的先生/女士:

您好!非常感谢您填写本调查表，本调查问卷采取不记名填写方式，只作学术研究，所有个人信息都将得到严格保密，敬请放心。谢谢您的合作与支持!

敬祝健康快乐!

华中科技大学同济医学院

2017 年 2 月

A 个人基本资料

(特别声明：以下属于您的个人资料，不记姓名，内容绝对保密，敬请放心作答。)

A1. 性别: (1)男 (2)女

A2. 年龄: _____岁

A3. 文化程度: (1)初中及以下 (2)高中或中专 (3)大专或本科 (4)硕士及以上

A4. 婚姻状况: (1)未婚 (2)已婚 (3)离婚 (4)丧偶 (5)其他

A5. 就业状况: (1)在业 (2)离退休 (3)在校学生 (4)无业或失业

A6. 职业类型:

(1)机关、企事业单位管理人员 (2)专业技术人员 (3)一般办事人员

(4)商业/服务业员工 (5)个体工商户 (6)非农户产业工人

(7)从事非农劳动的农民 (8)农业劳动者（从事农林牧渔工作）

(9)其他_____

A7. 您参加了一下哪种医疗保险**（可多选）**:

(1)城镇职工医疗保险 (2)城镇居民医疗保险 (3)新型农村合作医疗

(4)公费医疗 (5)商业医疗保险 (6)其他医疗保险 (7)未参加任何保险

A8. 本次接受何种医疗服务? (1)看病 (2)康复 (3)咨询 (4)预防保健

(5)体检 (6)购药 (7)其他____

B 就诊体验情况

请您就本次就诊情况回答以下问题,在合适的答案处打“√”。

B1. 您有问题问医生时，医生给您的答复您明白吗?

(1) 明白 (2) 部分明白 (3) 不明白 (4) 我未曾提问

B2. 您有问题问护士时，护士给您的答复您明白吗?

(1) 明白 (2) 部分明白 (3) 不明白 (4) 我未曾提问

B3. 当不同医护人员解答您同一问题时，是否遇到过回答不一致的情况?

(1) 总是如此 (2) 有时如此 (3) 从未遇到

B4. 在诊疗过程或交谈中，医生是否表现的过于冷漠或忽视您的存在?

（1）总是如此（2）有时如此（3）从未遇到

B5. 当您对您的状况或治疗产生顾虑或担忧，医生是否会与您交流？

（1）总是如此（2）有时如此（3）从未遇到（4）没有顾虑或担心

B6. 当您对您的状况或治疗产生顾虑或担忧，护士是否会与您交流？

（1）总是如此（2）有时如此（3）从未遇到（4）没有顾虑或担心

B7. 您是否愿意更多参与制定诊疗方案？（检查、护理方案、用药计划、手术等）

（1）当然愿意 （2）在一定程度上愿意 （3）不想参与

B8. 在就诊过程中，您是否感受到医生/护士对您的尊重？

（1）总是如此（2）有时如此（3）从未遇到

B9. 若您有顾虑时，会和医务人员沟通吗？

（1）当然（2）在一定程度上会 （3）不会 （4）没有顾虑

B10. 您在就诊期间是否有过疼痛？ （1）是 （2）否

如果有过疼痛，医务人员是否采取有效措施帮您止痛？

(1)是的，每次都会 （2）有时候会采取 （3）没有

B11. 您的亲朋好友是否有充足的机会同医生了解您的情况？

（1）当然 （2）一定程度是 （3）没有机会

（4）他们不知道我病了 （5）他们不想/不需要咨询 （6）我不希望他们了解

B12. 医护人员是否向您的亲朋好友告知了有助于您康复的事项、信息？

（1）告知了所需要的所有信息 （2）告知了一部分 （3）没有告知

（4）他们不知道我病了 （5）他们不想/不需要这些信息

B13. 医务人员是否向您明确解释了离院回家后所用药物的适应症/使用目的？

（1）明确告知了所有 （2）告知了一部分 （3）没有告知 （4）不需要告知

（5）没有开药**（跳至 B15）** （6）不知道，药是别人帮忙拿的**（跳至 B15）**

B14. 就诊结束/出院前，医护人员是否告知了您所用药物需要注意的副作用？

（1）明确告知了所有 （2）告知了一部分 （3）没有告知 （4）不需要告知

B15. 就诊结束/出院前，医护人员是否告知了您需注意的不适症状？

（1）明确告知了所有 （2）告知了一部分 （3）没有告知 （4）不需要告知

C 就诊意向及影响因素

C1. 您对本次医院的总体服务是否满意？

（1）十分满意 （2）满意 （3）不满意 （4）十分不满意

C2. 如果可以再次选择，您是否还会选择本医院就诊？

（1）绝对不会 （2）也许不会 （3）可能会 （4）绝对会

Appendix VI: Ethics approval

RESEARCH ETHICS COMMITTEE APPROVAL FORM

The Ethics Committee of Tongji Medical College, Huazhong University of Science and Technology (IORG No: IORG0003571) gave a final APPROVAL on 11/07/2018 for the study Evaluation of the Service Quality of Public Hospitals in China's Country Level: An Experimental Study Based on Service Capability Evaluation of Hubei, Shandong, and Guizhou Provinces which is conducted by Prof. Fang Pengqian at School of Medicine and Health Management, Tongji Medical College, Huazhong University of Science and Technology.

This Ethics Committee is constituted and functioned in accordance with ICH-GCP, GCP in China and Declaration of Helsinki (2013).

Hui Chen		11/07/2018
Printed Name	Signature	Date

IEC Chairperson/Designee

Appendix VII explanations of the Picker Patient Experience-15 (PPE-15)

A）Examples of questions from the Picker Patient Experience-15 (PPE-15) questionnaire showing the derivation of problem scores

Items	Response*
When you had important questions to ask a doctor, did you get answers that you could understand?	
1) Yes, always	
2) Yes, sometimes	☑
3) No	☑
4) I have no need to ask	
Sometimes in a hospital, one doctor or nurse will say one thing and another will say something quite different. Did this happen to you?	
1) Yes, often	☑
2) Yes, sometimes	☑
3) No	
Did doctors talk in front of you as if you weren't there?	
1) Yes, always	☑
2) Yes, sometimes	☑
3) No	
Did you talk about your concerns with the hospital staff?	
1) Yes, definitely	
2) Yes, to some extent	☑
3) No	☑
4) I had no concern	

Note: * The chosen boxes indicate responses coded as a 'problem'.

B）Classified dimensions of items and problems identified in the Picker Patient Experience (PPE-15) questionnaire

Items	Problems#	Dimensions
1	**Doctors could not answer my questions clearly**	Information transmission and patient education (S1)
2	**Nurses could not answer my questions clearly**	Information transmission and patient education (S1)
3	**Staff gave conflicting information**	Information transmission and patient education (S1)
4	**I felt neglected when talking to doctors**	Respect for patient preference (S2)
5	**Doctors didn't care about my anxieties or fears**	Emotional support (S3)
6	**Nurses didn't care about my anxieties or fears**	Emotional support (S3)
7	**Not sufficiently involved in decisions about my treatment and care**	Respect for patient preference (S2)
8	**I couldn't feel respect and dignity when treated**	Respect for patient preference (S2)
9	**Not easy to find staff to talk about my concerns**	Emotional support (S3)
10	**Not enough work in pain control**	Physical comfort (S4)
11	**Family or friends didn't get opportunity to talk to doctors**	Involvement of family or friends (S5)
12	**Family or friends didn't get information to help to my recovery**	Involvement of family or friends (S5)
13	**Purpose of medicines wasn't explained**	Continuity of medical service (S6)
14	**Side effects of medicines weren't explained**	Continuity of medical service (S6)
15	**Danger signals I needed to look for weren't explained**	Continuity of medical service (S6)

#Reference 14: ***Jenkinson C, Coulter A, Bruster S. The Picker Patient Experience Questionnaire: development and validation using data from in-patient surveys in five countries. Int J Qual Health Care. 2002;14(5):353-3582002-10-01].***

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

	Item No	Recommendation	Page No
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1-2
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	5-7
Objectives	3	State specific objectives, including any prespecified hypotheses	7
Methods			
Study design	4	Present key elements of study design early in the paper	7-8
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	7-8
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	8
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	9-10
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	
Bias	9	Describe any efforts to address potential sources of bias	
Study size	10	Explain how the study size was arrived at	
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	11
		(*b*) Describe any methods used to examine subgroups and interactions	
		(*c*) Explain how missing data were addressed	
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	
		(*e*) Describe any sensitivity analyses	
Results			**12-16**
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	12
		(b) Give reasons for non-participation at each stage	
		(c) Consider use of a flow diagram	
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	12
		(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	13-16

		which confounders were adjusted for and why they were included	
		(*b*) Report category boundaries when continuous variables were categorized	
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	
Discussion			**16-19**
Key results	18	Summarise key results with reference to study objectives	16
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	17
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	17-19
Generalisability	21	Discuss the generalisability (external validity) of the study results	
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	title page

*Give information separately for exposed and unexposed groups.

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

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Evaluation of Patient Experience in County-level Public Hospitals in China: A Multi-Centre, Cross-sectional Study

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Title Page

Title: Evaluation of Patient Experience in County-level Public Hospitals in China: A Multi-Centre, Cross-sectional Study

Brief title: Patient Experience in County Hospitals of China

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Abstract

Objectives: Patient experience is being widely considered in the evaluation of healthcare service quality, which is a key target for public hospitals under China's New Healthcare Reform. This study aimed to illustrate patients' experiences in county-level public hospitals, and identify aspects that need to be improved.

***Setting & participants*:** Between 2016 and 2018, a cross-sectional study with 500 outpatients and 800 inpatients was conducted in 10 county-level public hospitals from Shandong Province, Hubei Province, and Chongqing Municipality.

Method: A three-part questionnaire was used to evaluate patients' experiences during their visits to hospitals. It comprised a questionnaire for basic information, the Picker Patient Experience questionnaire (PPE-15), and the overall evaluation (a 3-point Likert scale to express patients' satisfaction and patient loyalty). Patients' experiences were classified according to six dimensions (information transmission and patient education, respect for patient preference, emotional support, physical comfort, involvement of family or friends, and continuity of medical service). Both univariate and multivariate analyses were performed to evaluate patient experience.

***Results*:** A total of 1,241 valid questionnaires were analysed. The mean PPE-15 score was 41.33 (range, 23–56). The better the patient experience and satisfaction, the higher the patient loyalty ($P<0.001$). Except for hospital disparities, patients' age and occupation status had a significant impact on patient experience ($P<0.05$). Of the six dimensions, the physical comfort score was the highest, while the respect for patient preference score was the lowest. Additionally, a strong correlation was found between the respect for patient preference dimension and patients' overall satisfaction with their treatment experience.

***Conclusions*:** Hospital managers and staff members should pay close attention to the preferences of patients and their families to improve patient experience.

Keywords: Health services management, Health service safety, Quality in health care, Patient experiences

Article summary

Strengths and limitations of this study

1. The Picker Patients Experience questionnaire was first used to reflect patients experience during visiting time in China's county-level hospitals.
2. This was a cross-sectional study comprising a large sample size of 1300 patients from three different provinces.
3. The experiences of both inpatients and outpatients were evaluated with the same mature scale without considering the visit type.
4. Both unitary analysis and multivariate analysis were used to examine the present status and obtain a better understanding of patients' negative experiences in China's county-level hospitals.
5. As this is a real-time survey, the findings may not reflect the changes in patients' experiences.

MAIN TEXT

INTRODUCTION

Healthcare service quality is the essence of hospital development and a key factor influencing patient loyalty[1-3]. Traditionally, from a healthcare supplier's perspective, professional service skills and advanced technology were regarded as key factors to improve healthcare service quality[4]. However, from a healthcare user's perspective, one important and obvious factor influencing patients' choice of hospital is their experience or thoughts when receiving medical services[1, 5, 6], including the opportunity to express any concern, anxiety, fear, or pain that they may experience[7].

Patients are the receivers of healthcare services, and patients' experiences are one of the most common indicators used to evaluate the quality of healthcare services[2, 6, 8-10]. As an integral component of healthcare quality, patient experience includes several aspects of healthcare delivery that patients value highly when they seek and receive care; for example, timely appointments, easy access to information, and good communication with healthcare providers[1, 11, 12]. Regardless of the development of medications and technology, patient experience of illness and medical care is always at the heart of clinical services[2, 13-15]. Among the various aspects of patient experience, one can assess the extent to which patients receive care that is respectful of and responsive to individual patient preferences, needs, and values [1, 16, 17]. Patient experience and patient satisfaction appear to be synonymous but are entirely different [8, 12]. Patient satisfaction surveys tend to ask patients subjective questions about their satisfaction with their care (e.g., outcome measure: satisfaction with health status following treatment)[8, 9, 18], while patient experience evaluations focus on patients' actual objective experiences during their visit to healthcare institutions and aim to avoid value judgments that influence existing expectations[1, 19, 20].

County-level hospitals play an important role in providing basic healthcare in China[21]. Accounting

for 94% of the geographical area, counties are the most important and fundamental administrative units in China [22]. Over 900 million residents live in the county area, comprising 60% of the population. County-level hospitals are the main providers of health services in rural areas[22, 23]. Based on the functional orientation of the three-tiered healthcare system, tertiary general hospitals are the topmost healthcare service providers in China, whereas county-level hospitals are the main providers of secondary care, providing comprehensive medical services for rural residents, who normally present with common diseases. A total of 13,640 typical county-level hospitals with a capacity of 2.33 million beds and 2.40 million healthcare workers are mainly responsible for healthcare delivery in rural areas[23]. Compared with urban tertiary hospitals with highly qualified medical staff and high-quality facilities, county-level hospitals are associated with limited health resources, leading the public to distrust their healthcare quality. A comprehensive reform of county-level hospitals focusing on quality improvement initiated by the state council was launched in pilot counties from 2011 to 2015 and in all counties thereafter. With a great financial subsidy [24], county hospitals have demonstrated a tremendous improvement in the quantity and quality of healthcare service delivery after the reform (**Appendix Ⅰ**).

As a slogan and target of the national 'Further Improvement of Healthcare Services' action plan, understanding patient experience is a key step in moving towards patient-centred care, which has been widely advocated at home and abroad[7, 11, 24, 25]. At the same time, as a guidance on orderly medical service in the new healthcare reform, the development of a hierarchical medical system aimed to treat 90% of diseases in county-level hospitals[26, 27]. Moreover, when implementing the project of hierarchical diagnosis and treatment, the most important issue in improving the quantity of healthcare services in county-level hospitals is to increase the trust and loyalty of rural citizens. A great amount of work has been conducted to evaluate the reform effects, such as operating efficiency evaluation, assessment of diagnosis and treatment level, and

calculation and prediction of hospital scale[28-30]. Meanwhile, most patient experience studies have focused on urban tertiary hospitals[4, 17], and established scales and self-developed questionnaires have both been used after verifying its validity and reliability to evaluate patient satisfaction and experience[31, 32]. However, reports on patients' experiences using international scales in county-level hospitals are lacking[17, 21]; thus, performing a horizontal comparison of patient experience with other areas is difficult. Moreover, the lack of uniform standards could hinder the improvement of patient experience in rural patient-centred healthcare systems in China.

Patient experience during hospital visits is an effective indicator that can directly reflect the progress and results of the comprehensive reform of county-level hospitals[1, 3, 20]. To better understand the improvement of healthcare service quality in county-level hospitals, the present study aimed to analyse the current situation of patient experience in these hospitals focusing on the whole visit process, and to identify the main problems affecting patient experience.

METHOD

Study design and setting

A multicentre, cross-sectional, questionnaire-based survey was conducted from August 2016 to March 2018 with patients in 10 county-level public hospitals from different areas to evaluate patient experience. Data were obtained from the patient questionnaires and official statistical reports.

Under the proposal of China Statistical Bureau, all provinces were divided into three areas, namely eastern, central, and western, based on their economic development and geographical position at the time of the study. Data from the special administrative regions and Taiwan Province were excluded from this study. The eastern area refers to developed areas[22], including 11 provinces or municipalities (i.e. Beijing, Tianjin, Hebei, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, and Hainan). The central area

refers to developing areas, including eight provinces (i.e. Shanxi, Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei, and Hunan). The western area refers to underdeveloped areas, including 11 provinces or autonomous regions (i.e. Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Inner Mongolia, Ningxia, Qinghai, and Xinjiang). A pilot study was conducted in a county-level hospital in Hubei Province to ensure that the questionnaire was intuitive, understandable, and flexible. Subsequently, the main field research was conducted by randomly selecting one province from the different areas: Shandong Province (Eastern China), Hubei Province (Central China), and Chongqing Municipality (Western China). Three counties from each of the three provinces were then chosen by convenience sampling. In each county, the public hospital with the largest healthcare delivery system was selected, and the questionnaire-based investigation of patients was conducted.

Participant selection and procedure

A total of 1300 patients (50 outpatients and 80 inpatients per hospital) who visited the county-level hospitals from 2016 to 2018 were recruited into the study (**Appendix II**). Supplementary Appendix Ⅲ provides the sample size formula.

The inclusion criteria were as follows: a) patients over 18 years of age; b) received treatment at the department of internal medicine, gynaecology, or surgery; c) able to understand the questions and provide clear responses; and d) having already received the medical service.

The two exclusion criteria were a) not completing the questionnaire; and b) more than 20% missing information in the questionnaire. The effective sample size and selection is provided in **Appendix Ⅳ.**

A convenience sampling method was used to select interviewees for the patient questionnaire. Two teams, each with two interviewers conducted the survey in the outpatient and inpatient department, respectively. To avoid influencing the medical service process and the intervention of the medical staff, all

interviews were conducted after the patients received treatment. The interviewers randomly selected patients that they encountered and assessed the inclusion criteria, and ended the survey when the number of interviewees met the required sample size (80 inpatients/50 outpatients). The present study excluded some participants during the analysis process because of missing information. Participants' concerns, such as privacy protection, refusal to answer, and responsibility to answer questions based on their true experiences were explained in both oral and written form. All participants provided verbal consent for their information to be used. Trained team members from our college who had professional interviewing skills conducted the investigation in each province to ensure quality control and reliability of the data.

The Patient experience questionnaire

The Picker Patient Experience (PPE) questionnaire is a valid and reliable tool assessing inpatient experience that has been used to evaluate hospital service quality in many countries[7, 13, 14, 33, 34]. The present study used the PPE-15, which is a short version and is considered to represent a universal set of items applicable for most patients[33]. After an expert consultation and two rounds of group discussions, we used the PPE-15 to assess both inpatient and outpatient experience and to compare the different service types. The PPE-15 questionnaire was translated into Chinese based on Brislin's translation model[35]. Orthogonal translation, synthesis, back translation, and group discussions were performed by one professor and four students with extensive experience in medical service research and proficient English translation skills (**Appendix V**).

Overall satisfaction and patient loyalty (i.e. possibility of re-visiting) were also assessed for comparison with other studies conducted in China. Patient satisfaction directly reflects the thoughts and the pleasure level of patients regarding the healthcare service, whereas the possibility of re-visiting the hospital indicates patients' loyalty and trust toward the hospital.

Overall, the questionnaire survey contained 25 items divided in three parts: basic information of patients

(gender, age, education level, marital status, occupation status, basic health insurance type, and service type), specific aspects of patient experience (PPE-15), and overall evaluation. The PPE-15 comprised 15 items divided into six dimensions (S1: information transmission and patient education, S2: respect for patient preference, S3: emotional support, S4: physical comfort, S5: involvement of family or friends, and S6: continuity of medical service). The third part contained the overall evaluation of visit satisfaction and patient loyalty (i.e. possibility of re-visiting). Both the PPE-15 and overall evaluation mainly included closed questions and used a 3/4-point Likert scale (e.g. graded as 1–4 corresponding to 'often', 'sometimes', 'never', and 'I don't need to ask', respectively). The higher the score, the better the patient experience (**Appendix VI**)[7, 13, 25].

Patient and Public Involvement

Health is a basic human right, and people seek help from medical staff not only for themselves but also for their family or friends, which means that not only patients but other individuals also have their opinions and experiences regarding hospitals. Patients and public were involved in the questionnaire translation stage of the study to make the questionnaire easy to understand. Meanwhile, five volunteers who had hospital visiting experience and three hospital managers helped in designing the questionnaire and training the investigators. After translation of the original questionnaire to Chinese, a pilot study with 100 patients was conducted in a county-level hospital in Hubei Province. Patients with different diseases, educational backgrounds, occupations, and visit experiences were involved in the pilot study after providing verbal consent. The patient experience questionnaire was disseminated to all research partners, managers at sample hospitals, and anyone interested in patient experience. All evaluation results were shared with relevant hospitals as evidence of feedback for the improvement of healthcare service quality. **Statistical analysis**

EpiData3.0 (The EpiData Association, Odense, Denmark) was used for data entry, and SPSS13.0 (SPSS Inc., Chicago, IL, USA) was used for statistical analysis. All of the data from the pilot study hospital and nine formal survey hospitals were analysed. The content validity index (CVI) was used to determine content validity, while Cronbach's α and Kaiser-Meyer-Olkin (KMO) were used to verify the reliability of the questionnaires. Univariate and bivariate statistical models were adopted to evaluate the data. Continuous variables (age, evaluation scores) were described using mean and standard deviation. Categorical variables (gender, age group, education level, marital status, occupation status, basic health insurance type, service type, and problems identified in each item of PPE-15) were reported as counts and percentages. The six dimensions of the PPE-15 scale were specified as six separate criterion variables. Furthermore, the t-test, ANOVA test, and Student–Newman–Keuls (SNK) test were used to compare mean scores of patient experiences of different subgroups. The gamma grade correlation coefficient was used to analyse the association between patient experience items (the independent variables) and overall evaluation (the dependent variable). Demographic and other basic information were analysed using Pearson correlation analysis and multiple regression analysis to determine the factors affecting patient experience during visiting time: the dependent variable of linear regression analysis was PPE-15 score, while the dependent variable of the order regression analysis was overall satisfaction. Statistical significance was set at $P < 0.05$ for a two-sided test.

Ethical considerations

The study was granted approval from the ethics committee of our college (IORG No: IORG0003571, **Appendix Ⅶ**). Personal identifying information was removed and participants remained anonymous during the entire study process. All the paper questionnaires and electronic data were maintained by the research team.

RESULTS

Sample

The CVI for the questionnaire was 0.9 and the item- CVI was [0.85, 1.00], while the validity test results of the questionnaire's reliability (Cronbach's α = 0.82, Kaiser-Meyer-Olkin (KMO) = 0.77) showed good internal consistency, and the correlation coefficient test (P<0.001) showed good structural validity amongst different dimensions and the overall score.

A total of 1241 questionnaires were analysed (effective response rate of 95.46%, **Appendix Ⅳ**). Amongst all participants, 54% were female and their mean age was 43.54 years; 55% of patients were employed, while 51.7% were covered by the New Rural Cooperative Medical System. Those aged 25-44 years accounted for 43.7% of the study population (**Table 1).**

Table 1. Participants' demographic information and PPE-15 scores

	Basic information		PPE-15 score	
	Obs.	**(%)**	**Mean**	***P*-value§**
Total	**1241**	**100.0**	41.33	
Gender				
Male	569	45.9	41.33	0.985
Female	672	54.1	41.33	
Age group (years)				
-24	135	10.9	41.18	0.003*
25-44	542	43.7	40.82	
45-64	416	33.5	41.73	
65-	148	11.9	42.19	
Education level				
- Middle school	552	44.5	41.64	0.014*
High school	355	28.6	40.92	
Undergraduate	314	25.3	41.33	
Master/doctorate	20	1.6	37.38	
Marital status				
Single	165	13.3	40.74	0.011*
Married	1005	81.0	41.51	
Other	71	5.7	40.15	
Occupation status				
Employed	681	55.0	40.95	0.001*
Retired	142	11.4	41.46	
Student	65	5.2	40.44	
Unemployed	353	28.4	42.11	
Basic health insurance type#				

Employee Medical Insurance	331	26.7	41.60	0.230
Residence Medical Insurance	218	17.6	41.57	
New Rural Cooperative Medical System	641	51.7	41.09	
Service type				
Sickness	934	75.3	41.21	0.187
Recovery & second visit	111	8.9	41.36	
Public health & health examination	196	15.8	41.89	

Note: Obs. is short for objectives; PPE-15= Picker Patient Experience; #: the coverage rate of Basic health insurance was 95.9% in the present study; § : T-test and ANOVA test was used to compare scores of different subgroups. *: significant at the 95% level;

Patient experiences evaluation

The maximum and minimum PPE-15 scores were 56 and 15, respectively. The mean PPE-15 score was 41.33±4.749 (range, 23 to 56); a total of 628 patients (50.4%) thought that they received a very satisfactory healthcare service. Meanwhile, 767 patients (61.8%) provided a positive answer to the possibility of choosing the same hospital again if they have other healthcare demands (**Table 2, Figure 1**).

Table 2. Scores of patient experience in sample hospitals

Section	Mean	Minimum	Maximum	S.D.
A) Score of PPE-15				
total score of PPE-15	41.33	23.00	56.00	4.75
: S1	8.17	3.00	11.00	1.15
S2	7.99	2.00	10.00	1.25
S3	8.34	3.00	12.00	1.71
S4	2.97	1.00	4.00	0.83
S5	5.41	2.00	8.00	1.11
S6	8.45	3.00	13.00	1.17
B) Score of overall evaluation				
overall satisfaction	3.45	1.00	4.00	0.61
patient loyalty (re-visiting possibility)	3.48	1.00	4.00	0.78

Note: objectives=1241; PPE-15= Picker Patient Experience; S.D.= Std. Deviation; S1: information transmission and patient education, S2: respect for patient preference, S3: emotional support, S4: physical comfort, S5: involvement of family or friends, and S6: continuity of medical service;

For the convenience of comparison, an adjusted score of the 6 dimensions is showed in **Figure 2**. Amongst the six dimensions, the physical comfort dimension (S4, Score=2.97) score was the highest, whereas respect for patient preference dimension score (S2, Score=2.67) was the lowest. Patients from the study hospitals reported 'staff providing conflicting information' to be the most common problem (39.24%; **Figure 3, Appendix Ⅵ**). Moreover, the total scores of PPE-15 in the 10 participating hospitals showed a significant difference (ANOVA test, F=15.361, P<0.01).

Patient Satisfaction, loyalty, and experience

Pearson's correlation results showed a positive relationship between patient experience (PPE-15)-satisfaction (P<0.05), and experience (PPE-15)-loyalty(P<0.05). The higher the patient experience score, the higher the patient satisfaction, and higher the possibility for patients with health demands to visit the hospital again. Pearson's correlation coefficients of experience-satisfaction and experience-loyalty were 0.366 and 0.474, respectively.

Associations between different factors and patient experience

The t-test and ANOVA test showed that patients in different subgroups (age group, education level, marital status, occupation status) showed significant different patient experience (**Table 1**); the score of outpatients (41.39) and inpatients (41.29) did not differ significantly (P=0.73), except in the dimension of respect for patient preferences (t=-2.933, P =0.003<0.05) and physical comfort (t=2.849, P=0.004<0.05). (**Table 3)**

Table 3. Patient experience (PPE-15) scores of outpatients and inpatients

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig.	Mean Difference	Std. Error Difference	95% C.I. of the Difference Lower	Upper
Total	Equal variances assumed	4.30	0.04	0.34	1239.00	0.73	0.09	0.27	-0.44	0.63
	Equal variances not assumed			0.34	1154.72	0.73	0.09	0.27	-0.44	0.62
S1	Equal variances assumed	3.38	0.07	1.59	1239.00	0.11	0.11	0.07	-0.02	0.24
	Equal variances not assumed			1.61	1158.74	0.11	0.11	0.07	-0.02	0.23
S2	Equal variances assumed	4.38	0.04	-2.93	1239.00	0.00*	-0.21	0.07	-0.35	-0.07
	Equal variances not assumed			-2.90	1069.58	0.00	-0.21	0.07	-0.35	-0.07
S3	Equal variances assumed	2.18	0.14	0.10	1239.00	0.92	0.01	0.10	-0.18	0.20
	Equal variances not assumed			0.10	1136.96	0.92	0.01	0.10	-0.18	0.20
S4	Equal variances assumed	14.72	0.00	2.85	1239.00	0.00*	0.14	0.05	0.04	0.23
	Equal variances not assumed			2.76	984.79	0.01	0.14	0.05	0.04	0.23
S5	Equal variances assumed	5.85	0.02	0.22	1239.00	0.83	0.01	0.06	-0.11	0.14
	Equal variances not assumed			0.21	1031.37	0.83	0.01	0.07	-0.11	0.14

S6	Equal variances assumed	0.47	0.49	0.57	1239.00	0.57	0.04	0.07	-0.09	0.17
	Equal variances not assumed			0.56	1074.63	0.58	0.04	0.07	-0.10	0.17

Note: PPE-15= Picker Patient Experience; § : Independent Samples Test was used to compare scores of outpatients and inpatients. *: significant at the 95% level; C.I.= Confidence Interval .

The gamma correlation coefficients indicated that six items were significantly correlated with overall satisfaction (G≥0.5, P <0.05): respect for patient preference (S2) and continuity of medical service (S6) were strongly correlated with overall satisfaction (**Table 4**).

Table 4. Gamma grade correlation coefficient between different items of the Picker Patient Experience (PPE-15) questionnaire and overall satisfaction

Correlation with Overall Patient Satisfaction	Items*	Dimension**	*G*#
Strong correlation (G≥0.5)	I8	S2	0.663
	I1	S1	0.627
	I14	S6	0.554
	I7	S2	0.521
	I5	S3	0.514
	I15	S6	0.507
	I11	S5	0.495
Medium correlation (0.4≤G<0.5)	I9	S3	0.485
	I6	S3	0.432
	I4	S2	0.415
	I13	S6	0.363
Weak correlation (G<0.4)	I12	S5	0.352
	I2	S1	0.325
	I10	S4	0.322
	I3	S1	0.283

Note: Gamma grade correlation analysis was used.

* I1 to I15 are the 15 items of PPE-15 scale; **S1: information transmission and patient education, S2: respect for patient preference, S3: emotional support, S4: physical comfort, S5: involvement of family or friends, and S6: continuity of medical service; #G=gamma coefficient.

Table 5 shows the multiple correlations between different factors and patient experience. The linear regression analysis showed that except for hospital difference, age and occupation status had a strong influence on patient experience. Moreover, respect for patient preference(S2) was the most important predictor of overall satisfaction.

Table 5 A). Results of the linear regression analysis between different factors and patient experience (PPE-15)

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% C. I for B	
	B	Std. Error	Beta			Lower	Upper
(Constant)	**41.09**	**1.11**		**36.89**	**0.00 ***	**38.90**	**43.27**

hospital	-0.13	0.04	-0.09	-2.99	0.00 *	-0.21	-0.04
patient type	-0.31	0.28	-0.03	-1.11	0.27	-0.86	0.24
gender	0.11	0.27	0.01	0.41	0.68	-0.42	0.65
age	0.59	0.19	0.10	3.09	0.00 *	0.22	0.97
education level	0.02	0.19	0.00	0.09	0.93	-0.35	0.38
marital status	-0.42	0.25	-0.05	-1.70	0.09	-0.90	0.06
occupation status	0.30	0.11	0.09	2.74	0.01 *	0.09	0.52
insurance type	-0.18	0.14	-0.04	-1.34	0.18	-0.45	0.08
service type	0.31	0.18	0.05	1.72	0.09	-0.04	0.66

Note: a. Dependent Variable: total score of PPE-15; adjusted R^2=0.022; *: significant at the 95% level; C.I.= Confidence Interval

Table 5 B). Results of the order regression analysis between different dimensions of PPE-15 and overall satisfaction

	Estimate	Std. Error	Wald	df	Sig.	95% C. I.	
						Lower	Upper
Dependent Variable: overall satisfaction (very dissatisfied as reference category)							
[Very satisfied]	5.63	0.65	74.02	1.00	0.00*	4.34	6.91
[Satisfied]	6.90	0.63	121.27	1.00	0.00*	5.67	8.13
[Dissatisfied]	11.07	0.71	246.18	1.00	0.00*	9.69	12.46
[Very dissatisfied] #	-	-	-	-	-	-	-
Independent Variables: dimensions of PPE-15							
S1	0.20	0.06	11.01	1.00	0.00*	0.08	0.32
S2	0.30	0.06	25.44	1.00	0.00*	0.18	0.41
S3	0.27	0.04	40.00	1.00	0.00*	0.19	0.36
S4	0.28	0.08	13.27	1.00	0.00*	0.13	0.43
S5	0.26	0.06	17.70	1.00	0.00*	0.14	0.39
S6	0.29	0.06	22.07	1.00	0.00*	0.17	0.41

Note: a. #: very dissatisfied as reference category; Link function: logistic regression; Pseudo R2=0.317; *: significant at the 95% level; C.I.= Confidence Interval; S1: information transmission and patient education, S2: respect for patient preference, S3: emotional support, S4: physical comfort, S5: involvement of family or friends, and S6: continuity of medical service; #G=gamma coefficient.

DISCUSSION

Principle findings

After the new healthcare reform in China, the quality of healthcare services in county-level hospitals gradually improved, especially in terms of patient experience and satisfaction[21, 24]. The mean PPE-15 score in the 10 sample hospitals was 41.33. Moreover, 61.8% patients thought that they received a very satisfactory healthcare service, and 50.6% responded positively to the possibility of visiting the hospital again in case of a need. In general, patients visiting county-level hospitals during the study period had a good experience and were satisfied, and the better the patient experience, the higher the satisfaction and also the

patient loyalty [36, 37]. Our findings also showed that outpatients and inpatients had a similar experience during their visits.

Strengths and weakness

As a universally used scale to evaluate patients' experiences in hospitals, the PPE-15 focuses more on inpatient experience [7, 34]. Nevertheless, in China, hospitals play a key role in providing both inpatient and outpatient services. This study evaluated both outpatient and inpatient experience of county-level hospitals with a well-established scale. The translated PPE-15 questionnaire showed good validity and reliability in the pilot study. The research was conducted in only 10 hospitals from three provinces, which might not be enough to reflect the national status of patient experience in county-level hospitals. As a cross-sectional study, this work might not reflect the changes in patient experience during the reform. In future, we aim to expand the sample size and continue to focus on the improvement of healthcare services in the sample hospitals. Additionally, measures of patient experience vary widely, with different tools using complex or ambiguous concepts. Thus, the evaluation of inpatient and outpatient experience with the PPE-15 may yield different findings from those obtained using other evaluation scales or tools. Last but not the least, there are many different kinds of factors that influence experience during visiting time, and we would like to consider other influencing factors of patient experience in a subsequent study to improve the quality of healthcare services in China's county-level hospitals.

Interesting findings on patient experience in China's county-level hospitals

In general, improving inpatient experience and overall satisfaction is an effective way to increase patients' loyalty to a hospital, which is a crucial issue to improve the quality of healthcare services in county-level hospitals. Other research groups also reported similar findings[36, 37]. Our findings also showed that outpatients and inpatients had a similar experience during their visiting time. Using a well-established scale,

our findings thus suggest that the service improvement program led to a balanced ability of fulfilling different health demands of various kinds of patients. Reducing the pain that patients experience is more feasible for improving patient experience[8].

China's new healthcare reform has improved the services of county hospitals; however, patient experience still needs to be improved[29, 37, 38]. Different subgroups of patients had different experiences during their visit. Patients of different age groups and occupation status showed significant differences in patient experience, whereas gender, education level, marital status, service type, and insurance type had no significant effect on PPE-15 scores; these findings partly differed from the results of previous research conducted in other areas in China[7, 29, 36, 38], India[5], and Southeast Norway[11]. Regardless of the differences in results, these finding cannot be used as an excuse for medical staff to deal with selected patients but need to guide professionals to manage different kinds of patients more effectively.

Analysing the details of patient experience, we identified several problems that need to be addressed. Even though overall patient experience was good, there were obvious problems that needed to be handled. The lowest score of PPE-15 was respect for patient preference in the present study. In the correlations between different patient experience items and overall satisfaction, the items with strong correlations suggest that county-level hospitals in core areas could improve patients' satisfaction by showing more respect for patient preference, which was similar to findings in other countries[25, 34]. However, items with weak correlations cannot be considered unimportant factors, and they should be given more attention in future studies. Information transmission and patient education are not only essential steps for medical staff to improve the health literacy of rural citizens[21, 26], but are also goals of the 'Healthy China' strategy[24].

Furthermore, the most common problem was receiving answers from different medical staff. More than one-third of the participants reported that 'staff provided conflicting information' (39.24%). Conflicting

information may confuse patients about their condition and diminish their trust in doctors. Once patients fail to trust the medical staff, their loyalty to the hospital will decrease[39, 40]. About 38.44% of patients thought 'family or friends did not get the opportunity to talk to doctors'. The present study showed that doctors, patients, their family and friends were all considered important in terms of communication. With the rapid development of treatment skills, patients are more concerned about the comfort of the service than the quality of the treatment and diagnosis they receive[4, 10, 41]. The longer the communication time with medical staff, the better the experience of patients during their visit[1, 10, 25, 42]. Compared with urban tertiary hospitals, having fewer patients allows medical staff in county-level hospitals to spend more time taking care of patients' demands, and this aspect should be developed into a strength for county-level hospitals. These results suggest that the need for more effective communication, which involves more talking time with patients and those close to them, and more consistent information are core problems of patient experience improvement in China's county-level hospitals.

Conclusion

Among the elaborate goals of the hospital reform, improving patient experience can enhance the quality of care, governance, public accountability, and patient choice[20]. The results of this study can lay the foundation for further comparisons with international reports and enrich multi-centre research on patients' experiences in county-level hospitals. The results from patient experience surveys can be added to the hospital performance evaluation scale for continuous quality improvement and for identifying the main problems from the patients' perspectives. In the development of modern county-level hospitals, managers and health service providers in county-level hospitals should listen closely and properly address the demands of patients and their families by meeting patients' needs, improving the consistency of information, and respecting patient preferences.

Declarations

Availability of data and materials

The national data collected from China statistical yearbook can be accessed from the website of National Bureau of Statistics of China (http://www.stats.gov.cn/tjsj/ndsj/2016/indexeh.htm.). The national annual data collected from China health statistical yearbook can be accessed from the publication of China National Health Commission (NHC), or can be bought from the publisher (www.pumcp.com). Patient data are available from the corresponding author upon reasonable request.

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Authors' contributions

P.F. planned the study. P.F. and B.W ccontributed to study design and contacted with sample hospitals. P.F., R.M., C.Z. and C.T. performed the research in the sample hospitals. R.M., L.L., and C.Z cleaned and analysed the data and drafted the manuscript. All the authors contributed substantially to the interpretation of the results and the writing of the manuscript. All the authors have read and approved the final version of the manuscript.

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Role of the Sponsor

The sponsors played no role in the design and implementation of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and the decision to submit the manuscript for publication.

Competing Interests

The authors declare no competing interests for this study.

Supplementary information files

Appendix Ⅰ Data related to patient safety in county-level hospitals

Appendix Ⅱ Field study samples

Appendix Ⅲ Formula for calculating the sample size

Appendix Ⅳ Effective sample size

Appendix Ⅴ Patient experience questionnaire

Appendix Ⅵ Ethics approval

Appendix Ⅶ Explanations of the Picker Patient Experience-15 (PPE-15)

Figure legends

Figure 1. Pie charts of patients' overall evaluation

Figure 2. Score for each dimension of patient experience in the 10 sample hospitals

Figure 3. Problems identified by the Picker Patient Experience (PPE-15) questionnaire

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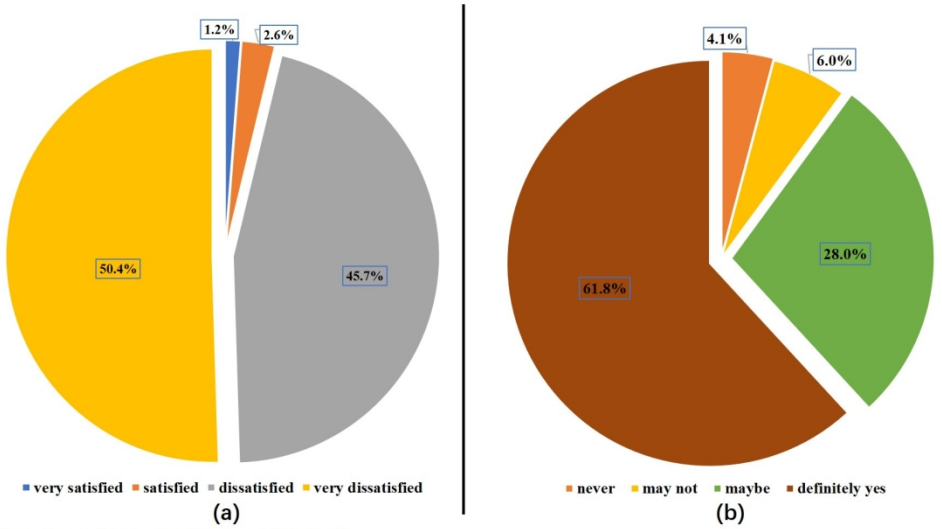

Figure 1. pie charts of patient overall evaluation
a) pie chart of patient overall satisfaction (4-level); b) pie chart of patient re-visiting possibility/ patient loyalty(4-level)

Figure 1. Pie charts of patients' overall evaluation

310x179mm (150 x 150 DPI)

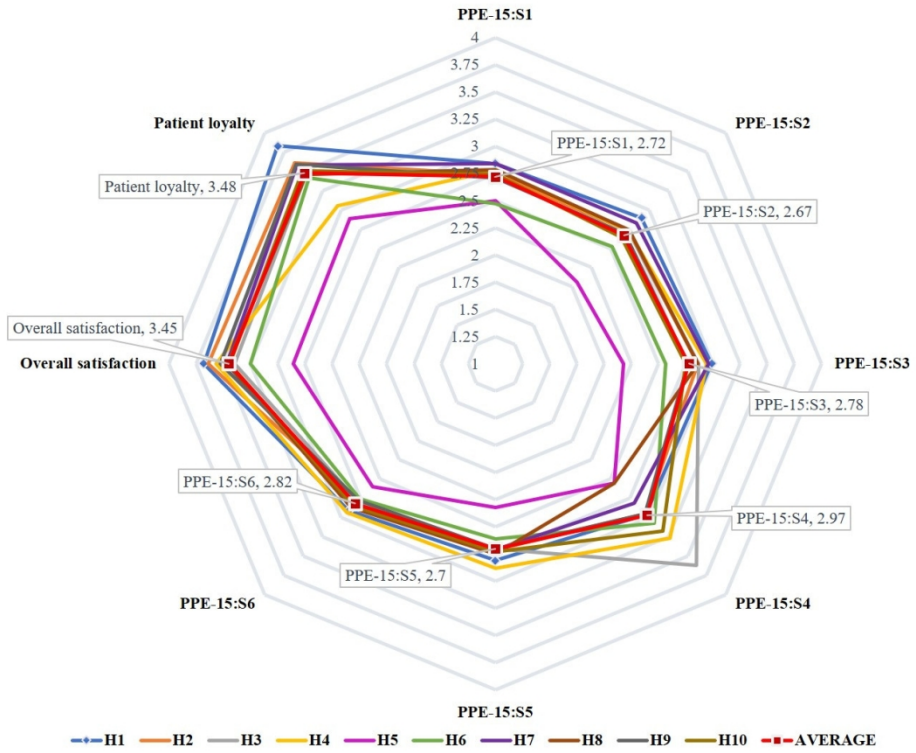

Figure 2. Score for each dimension of patient experience in the 10 sample hospitals
Note: PPE-15= Picker Patient Experience; S1: information transmission and patient education, S2: respect for patient preference, S3: emotional support, S4: physical comfort, S5: involvement of family or friends, and S6: continuity of medical service.

Figure 2. Score for each dimension of patient experience in the 10 sample hospitals

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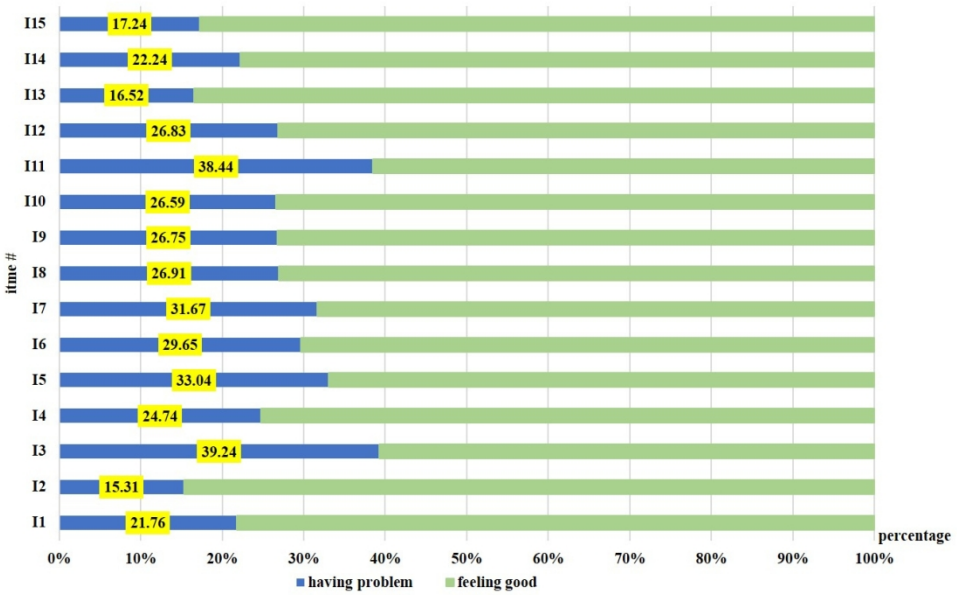


Figure 3. Problems identified in the Picker Patient Experience (PPE-15) questionnaire

Figure 3. Problems identified by the Picker Patient Experience (PPE-15) questionnaire

237x159mm (150 x 150 DPI)

Appendix I

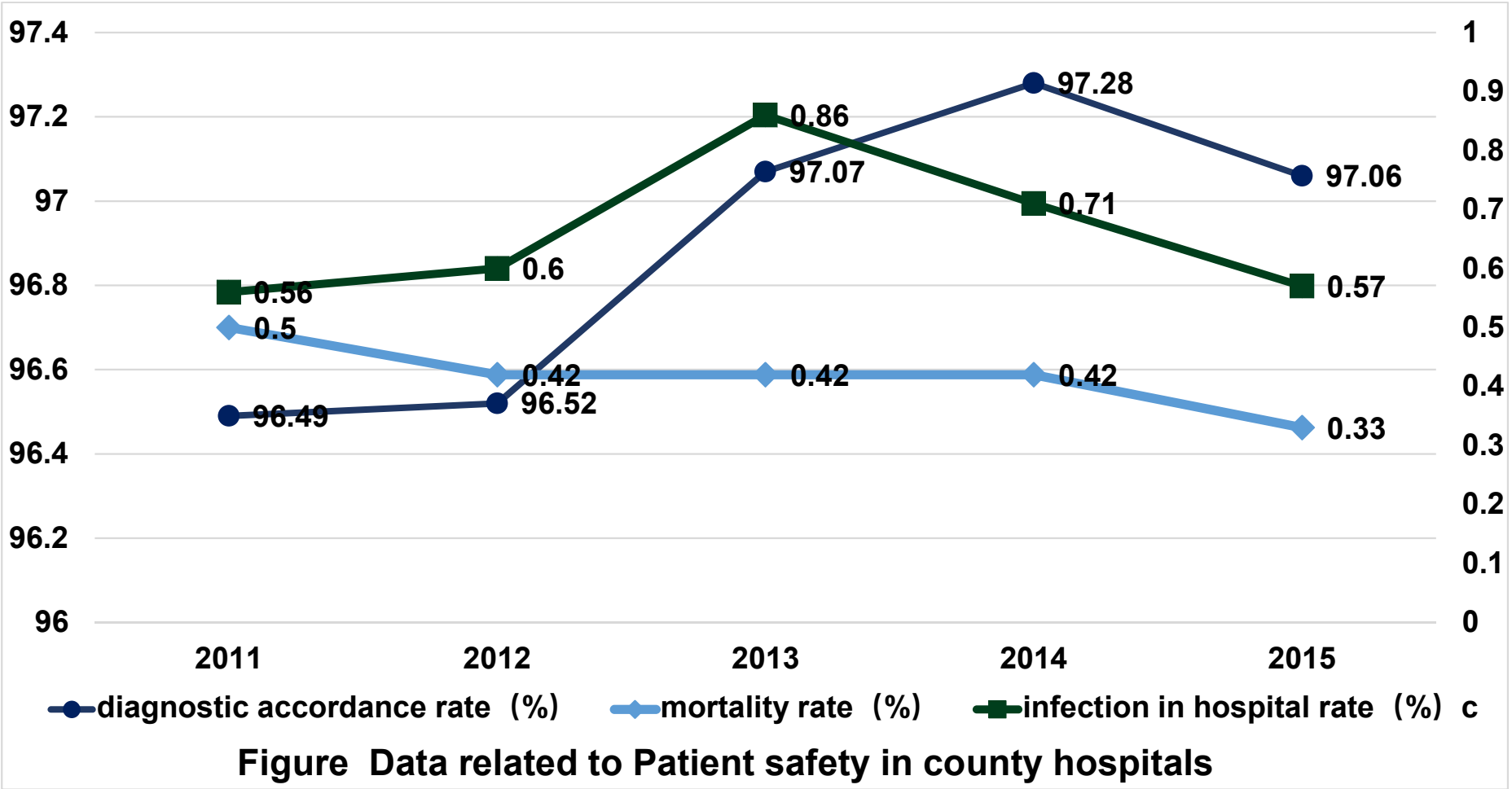
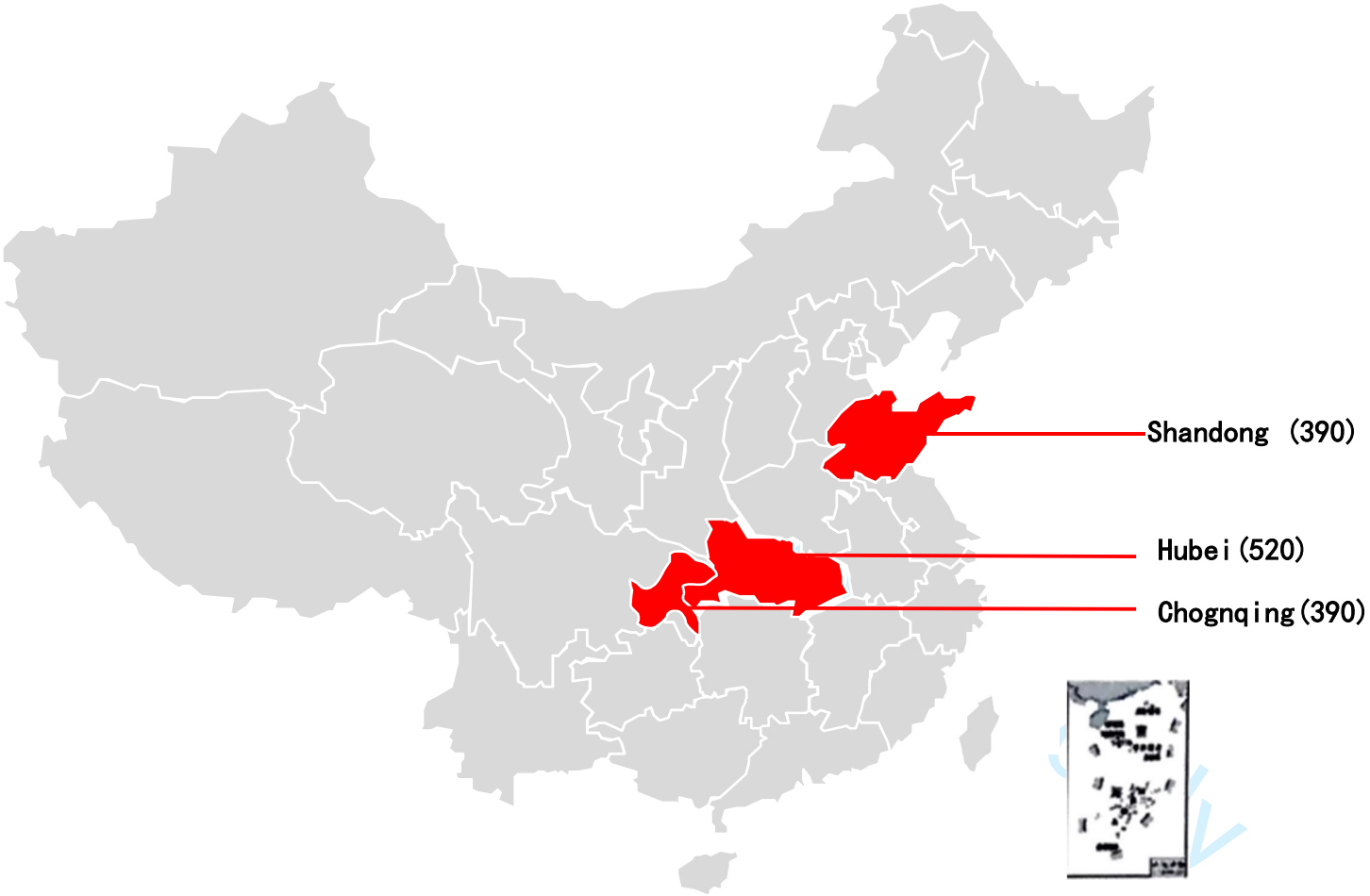


Figure Data related to Patient safety in county hospitals

Data source: data from 10 sample county hospitals from 2011-2015

Appendix II Field study samples



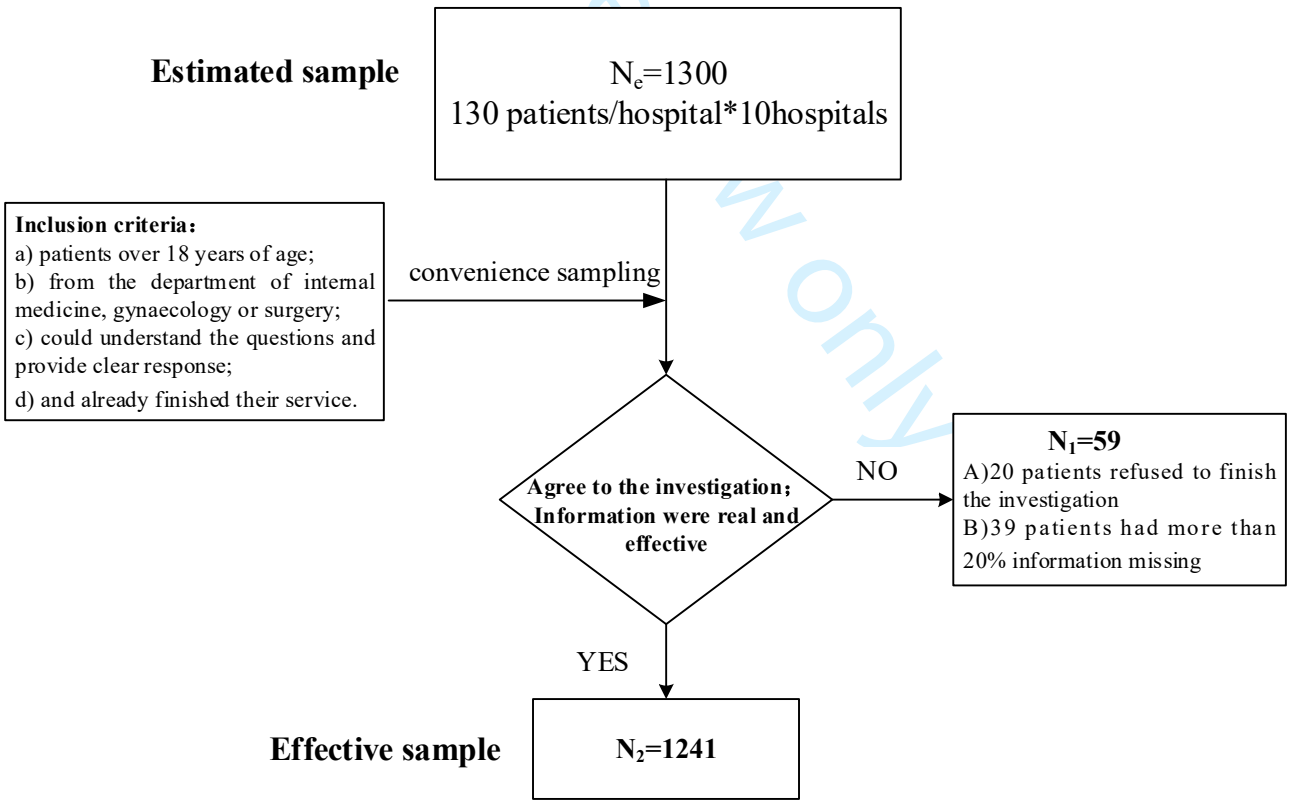
Appendix III: Formula for calculating the sample size

$$n=\frac{Z_{\alpha/2}^2 p(1-p)N}{\delta^2(N-1)+Z_{\alpha/2}^2 p(1-p)}$$

$$\alpha=0.05, \delta=0.05, N=163.08\times10^6, p=0.9$$

Note: According to the national report, there are 815.4 million rural residents in 2017. The two-week prevalence rate was 20.2%. In this study, the patient population (N) was estimated 163.08 million. Meanwhile, the response rate of previous question survey was 90% -95%. The total sample was 73-139. With the export group discussion and based on the basic service situation for county-level hospitals, we choose 130 patients for each hospital (50 outpatients and 80 inpatients).

Appendix IV: Effective sample size



Appendix V: Patient experience questionnaire (PPE-15+overall feelings)

Basic information

1. Gender: *male/female*
2. Age:_____
3. Educational level:
   Middle school and below/High school/Undergraduate/Master & Doctor
4. Marriage situation:
   Single/Married/inconvenient to disclose
5. Employment situation:
   Employed/Retired/Student/Unemployed
6. Which kind of basic health insurance do you have?
   UEMI/URMI/NCMS/none
7. What is your reason to visit hospital this time?
   Sickness/recovery & second visit/public health & health examination

PPE-15 questions and response categories

1. When you had important questions to ask a doctor, did you get answers that you could understand?
   Yes, always/Yes, sometimes/No/I have no need to ask
2. When you had important questions to ask nurse, did you get answers that you could understand?
   Yes, always/Yes, sometimes/No/I have no need to ask
3. Sometimes in a hospital, one doctor or nurse will say one thing and another will say something quite different. Did this happen to you?
   Yes, always/Yes, sometimes/No
4. Did doctors talk in front of you as if you weren't there?
   Yes, always/Yes, sometimes/No
5. If you had any anxieties or fears about your condition or treatment, did a doctor discuss them with you?
   Yes, completely/Yes, to some extent/No/I didn't have any anxieties or fears
6. If you had any anxieties or fears about your condition or treatment, did a nurse discuss them with you?
   Yes, completely/Yes, to some extent/No/I didn't have any anxieties or fears
7. Did you want to be more involved in decisions made about your care and treatment?
   Yes, definitely/Yes, to some extent/No
8. Overall, did you feel that you were treated with respect and dignity while you were in hospital?
   Yes, always/Yes, sometimes/No
9. Did you talk about your concerns with the hospital staff?
   Yes, definitely/Yes, to some extent/No/I had no concern
10. Were you ever in pain during your stay in the hospital?
    Yes/No
    If yes, do you think the hospital staff did everything they could to help control your pain?
    Yes, definitely/Yes, to some extent/No

11. If your family or someone else close to you wanted to talk to a doctor, did they have enough opportunity to do so?
Yes, definitely/Yes, to some extent/No/No family member or friend was involved/
My family or friends didn't want or need information/
I didn't want my family or friends to talk to a doctor
12. Did the doctors or nurses give your family or someone close to you all the information they needed to help you recover?
Yes, definitely/Yes, to some extent/No/No family member or friend was involved/
My family or friends didn't want or need information
13. Did any staff member of the hospital explain the purpose of the medicines you had to take at home in a way that you could understand?
Yes, completely/Yes, to some extent/No/I didn't need an explanation/
I had no medicine (go to Q15)/
Don't know, as it was taken by other person (go to Q15)
14. Did any staff member of the hospital tell you about medication side effects to watch for when you went home?
Yes, completely/Yes, to some extent/No/I didn't need an explanation
15. Did any staff member of the hospital tell you about danger signals regarding your illness or treatment to watch for after you went home?
Yes, completely/Yes, to some extent/No/I didn't need an explanation

Overall feelings (overall satisfaction and visiting willing)

1. How do you feeling about the health service in the hospital this time?
Very Satisfied/ Satisfied/ dissatisfied /very dissatisfied
2. If you can choose again, will you take this hospital as the first choice?
Never/may not /maybe/definitely yes

患者体验调查问卷

尊敬的先生/女士:

您好!非常感谢您填写本调查表，本调查问卷采取不记名填写方式，只作学术研究，所有个人信息都将得到严格保密，敬请放心。谢谢您的合作与支持!

敬祝健康快乐!

华中科技大学同济医学院

2017 年 2 月

A 个人基本资料

(特别声明：以下属于您的个人资料，不记姓名，内容绝对保密，敬请放心作答。)

A1. 性别: (1)男 (2)女

A2. 年龄: _____岁

A3. 文化程度: (1)初中及以下 (2)高中或中专 (3)大专或本科 (4)硕士及以上

A4. 婚姻状况: (1)未婚 (2)已婚 (3)离婚 (4)丧偶 (5)其他

A5. 就业状况: (1)在业 (2)离退休 (3)在校学生 (4)无业或失业

A6. 职业类型:

(1)机关、企事业单位管理人员 (2)专业技术人员 (3)一般办事人员

(4)商业/服务业员工 (5)个体工商户 (6)非农户产业工人

(7)从事非农劳动的农民 (8)农业劳动者（从事农林牧渔工作）

(9)其他_____

A7. 您参加了一下哪种医疗保险**（可多选）**:

(1)城镇职工医疗保险 (2)城镇居民医疗保险 (3)新型农村合作医疗

(4)公费医疗 (5)商业医疗保险 (6)其他医疗保险 (7)未参加任何保险

A8. 本次接受何种医疗服务? (1)看病 (2)康复 (3)咨询 (4)预防保健

(5)体检 (6)购药 (7)其他____

B 就诊体验情况

请您就本次就诊情况回答以下问题,在合适的答案处打“√”。

B1. 您有问题问医生时，医生给您的答复您明白吗?

(1) 明白 (2) 部分明白 (3) 不明白 (4) 我未曾提问

B2. 您有问题问护士时，护士给您的答复您明白吗?

(1) 明白 (2) 部分明白 (3) 不明白 (4) 我未曾提问

B3. 当不同医护人员解答您同一问题时，是否遇到过回答不一致的情况?

(1) 总是如此 (2) 有时如此 (3) 从未遇到

B4. 在诊疗过程或交谈中，医生是否表现的过于冷漠或忽视您的存在?

（1）总是如此（2）有时如此（3）从未遇到

B5. 当您对您的状况或治疗产生顾虑或担忧，医生是否会与您交流？

（1）总是如此（2）有时如此（3）从未遇到（4）没有顾虑或担心

B6. 当您对您的状况或治疗产生顾虑或担忧，护士是否会与您交流？

（1）总是如此（2）有时如此（3）从未遇到（4）没有顾虑或担心

B7. 您是否愿意更多参与制定诊疗方案？（检查、护理方案、用药计划、手术等）

（1）当然愿意 （2）在一定程度上愿意 （3）不想参与

B8. 在就诊过程中，您是否感受到医生/护士对您的尊重？

（1）总是如此（2）有时如此（3）从未遇到

B9. 若您有顾虑时，会和医务人员沟通吗？

（1）当然（2）在一定程度上会 （3）不会 （4）没有顾虑

B10. 您在就诊期间是否有过疼痛？ （1）是 （2）否

如果有过疼痛，医务人员是否采取有效措施帮您止痛？

(1)是的，每次都会 （2）有时候会采取 （3）没有

B11. 您的亲朋好友是否有充足的机会同医生了解您的情况？

（1）当然 （2）一定程度是 （3）没有机会

（4）他们不知道我病了 （5）他们不想/不需要咨询 （6）我不希望他们了解

B12. 医护人员是否向您的亲朋好友告知了有助于您康复的事项、信息？

（1）告知了所需要的所有信息 （2）告知了一部分 （3）没有告知

（4）他们不知道我病了 （5）他们不想/不需要这些信息

B13. 医务人员是否向您明确解释了离院回家后所用药物的适应症/使用目的？

（1）明确告知了所有 （2）告知了一部分 （3）没有告知 （4）不需要告知

（5）没有开药**（跳至 B15）** （6）不知道，药是别人帮忙拿的**（跳至 B15）**

B14. 就诊结束/出院前，医护人员是否告知了您所用药物需要注意的副作用？

（1）明确告知了所有 （2）告知了一部分 （3）没有告知 （4）不需要告知

B15. 就诊结束/出院前，医护人员是否告知了您需注意的不适症状？

（1）明确告知了所有 （2）告知了一部分 （3）没有告知 （4）不需要告知

C 就诊意向及影响因素

C1. 您对本次医院的总体服务是否满意？

（1）十分满意 （2）满意 （3）不满意 （4）十分不满意

C2. 如果可以再次选择，您是否还会选择本医院就诊？

（1）绝对不会 （2）也许不会 （3）可能会 （4）绝对会

Appendix VI: Ethics approval

RESEARCH ETHICS COMMITTEE APPROVAL FORM

The Ethics Committee of Tongji Medical College, Huazhong University of Science and Technology (IORG No: IORG0003571) gave a final APPROVAL on 11/07/2018 for the study Evaluation of the Service Quality of Public Hospitals in China's Country Level: An Experimental Study Based on Service Capability Evaluation of Hubei, Shandong, and Guizhou Provinces which is conducted by Prof. Fang Pengqian at School of Medicine and Health Management, Tongji Medical College, Huazhong University of Science and Technology.

This Ethics Committee is constituted and functioned in accordance with ICH-GCP, GCP in China and Declaration of Helsinki (2013).

Hui Chen		11/07/2018
Printed Name	Signature	Date

IEC Chairperson/Designee

Appendix VII explanations of the Picker Patient Experience-15 (PPE-15)

A）Examples of questions from the Picker Patient Experience-15 (PPE-15) questionnaire showing the derivation of problem scores

Items	Response*
When you had important questions to ask a doctor, did you get answers that you could understand?	
1) Yes, always	
2) Yes, sometimes	☑
3) No	☑
4) I have no need to ask	
Sometimes in a hospital, one doctor or nurse will say one thing and another will say something quite different. Did this happen to you?	
1) Yes, often	☑
2) Yes, sometimes	☑
3) No	
Did doctors talk in front of you as if you weren't there?	
1) Yes, always	☑
2) Yes, sometimes	☑
3) No	
Did you talk about your concerns with the hospital staff?	
1) Yes, definitely	
2) Yes, to some extent	☑
3) No	☑
4) I had no concern	

Note: * The chosen boxes indicate responses coded as a 'problem'.

B）Classified dimensions of items and problems identified in the Picker Patient Experience (PPE-15) questionnaire

Items	Problems#	Dimensions
1	**Doctors could not answer my questions clearly**	Information transmission and patient education (S1)
2	**Nurses could not answer my questions clearly**	Information transmission and patient education (S1)
3	**Staff gave conflicting information**	Information transmission and patient education (S1)
4	**I felt neglected when talking to doctors**	Respect for patient preference (S2)
5	**Doctors didn't care about my anxieties or fears**	Emotional support (S3)
6	**Nurses didn't care about my anxieties or fears**	Emotional support (S3)
7	**Not sufficiently involved in decisions about my treatment and care**	Respect for patient preference (S2)
8	**I couldn't feel respect and dignity when treated**	Respect for patient preference (S2)
9	**Not easy to find staff to talk about my concerns**	Emotional support (S3)
10	**Not enough work in pain control**	Physical comfort (S4)
11	**Family or friends didn't get opportunity to talk to doctors**	Involvement of family or friends (S5)
12	**Family or friends didn't get information to help to my recovery**	Involvement of family or friends (S5)
13	**Purpose of medicines wasn't explained**	Continuity of medical service (S6)
14	**Side effects of medicines weren't explained**	Continuity of medical service (S6)
15	**Danger signals I needed to look for weren't explained**	Continuity of medical service (S6)

#Reference 14: ***Jenkinson C, Coulter A, Bruster S. The Picker Patient Experience Questionnaire: development and validation using data from in-patient surveys in five countries. Int J Qual Health Care. 2002;14(5):353-3582002-10-01].***

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

	Item No	Recommendation	Page No
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1-2
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	5-7
Objectives	3	State specific objectives, including any prespecified hypotheses	7
Methods			
Study design	4	Present key elements of study design early in the paper	7-8
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	7-8
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	8
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	9-10
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	
Bias	9	Describe any efforts to address potential sources of bias	
Study size	10	Explain how the study size was arrived at	
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	11
		(*b*) Describe any methods used to examine subgroups and interactions	
		(*c*) Explain how missing data were addressed	
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	
		(*e*) Describe any sensitivity analyses	
Results			**12-16**
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	12
		(b) Give reasons for non-participation at each stage	
		(c) Consider use of a flow diagram	
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	12
		(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	13-16

		which confounders were adjusted for and why they were included	
		(*b*) Report category boundaries when continuous variables were categorized	
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	
Discussion			**16-19**
Key results	18	Summarise key results with reference to study objectives	16
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	17
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	17-19
Generalisability	21	Discuss the generalisability (external validity) of the study results	
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	title page

*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.