

Study On Potential Factors Of Patient Satisfaction: Based On Exploratory Factor Analysis

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Objective: To explore the potential common factors of patient satisfaction and the influencing factor of it.

Methods: A questionnaire survey was organized and 2626 valid answers were obtained. Through correlation analysis and exploratory factor analysis, the potential factors of patient satisfaction were extracted.

Results: Potential factors of patient satisfaction include “Medical service quality factor”, “Medical expenditure factor”, and “Medical convenience factor”. Patients younger than 35 years old were more concerned about the medical expenditure, and patients aged from 36 to 50 years old were more concerned about medical service quality. Patients with high reimbursement ratio insurance paid more attention to medical quality, and patients with lower reimbursement ratio insurance were dissatisfied with medical expenses. Patients were dissatisfied with the expenditure of the high-level hospitals and the medical quality of low-level hospitals. Outpatient’s satisfaction was lower than Inpatients in all aspects. Hierarchical diagnosis system was not established, and registration channels were highly centralized in the hospital.

Conclusion: Three potential factors can well explain patients’ demands for the quality, price and convenience of medical services. According to social-demographic characteristics, people of different groups have different concerns. Medical reform departments should adjust policies according to the actual situation and promote the medical reform process.

Keywords: public policy, health care reform, hospitals, urban, patient satisfaction

Background

Patient satisfaction is the overall evaluation of the service of medical institutions, reflecting the quality of medical service.¹ As an important index to evaluate medical quality, patient satisfaction is the key index to grasp the implementation of medical reform policy.^{2,3}

In order to meet people’s growing medical and health needs, the Chinese government had been reforming the medical and health care system. China initiated new round of health care reform from 2009,⁴⁻⁶ vigorously promoting the construction of four systems: public health, medical services, medical security and pharmaceutical supply security. Among them, the pilot reform of public hospitals is the difficult and key step of the whole medical reform, including the following contents: establishing a modern hospital management system, improving the operation mechanism of the public hospital, lowering the prices of medical consumables and drugs, reducing the testing prices of large-scale equipment, and raising the the service prices of medical staff, in order to provide convenient, effective and inexpensive medical services and improve patient satisfaction.⁷

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Previous studies have shown that patient satisfaction includes many contents and there are many influencing factors. The sub-aspects of patient satisfaction include visiting environment, medical expenses, service attitude, medical technology, medical facilities and so on. The factors that influence patient satisfaction mainly come from basic demographic and sociological characteristics.⁸⁻¹⁴ For instance, Runtang Meng found that the affecting factors of patient satisfaction from most to least were: physician-patient relationship and communication, service organization and facilities, continuity and collaboration of medical care, access to relevant information and support, healthcare and related services.¹⁵ Janet H.Y. Ng found that the attributes of patient satisfaction in the healthcare context identified were provider attitude, technical competence, accessibility, and efficacy.¹⁶ Jinming Fang found that the medical staff's service attitude was the most important factor affecting patient satisfaction, followed by medical staff services technology and hospital convenience.¹⁷

However, Previous studies often directly compared sub-aspects of patient satisfaction without comprehensively considering the correlation between them. The potential factors of patients' satisfaction were not taken into account. based on the background of China's medical and health Reform, We carried out this study in Wuhan, Hubei province. This study explored the potential common factors of patient satisfaction and analyzed the influencing factors in order to provide some suggestions for the medical reform.

Methods

Sampling Method

Wuhan city in Hubei province is the most important cities in central China, which has abundant medical resources. There are 139 public hospitals in wuhan, 39 of which are tertiary public hospitals. In December 2015, the public hospital reform in Wuhan was officially launched, and all public hospitals started to reform in 2017. By the end of 2017, the reform had entered a stable period with phased results. which is a good reflection of China's health care reform policy.

This study mainly concentrated in urban public hospitals. We conducted stratified sampling according to the affiliation of the hospital. The affiliation of hospitals includes national, provincial, municipal, district, military and enterprise hospitals. Random sampling and typical sampling were used at each stratum. Finally, thirteen hospitals were selected.

We went into the outpatient hall and inpatient ward of the hospital to look for the investigation object. We investigated two hundred patients (including outpatients and inpatients) in each hospital. The patients investigated should be conscious and able to answer questions independently or with the help of their families.

For outpatients, patients who had received treatment were investigated by convenient sampling method. For inpatient, 5-7 hospitalization sections were chosen at random first, and then, with the assistance of medical personnel and investigators, all patients with a hospitalization period of more than three days were investigated (The sampling strategy could be seen in Figure 1).

We used electronic questionnaires and paper questionnaires. Patients can scan the two-dimensional code with their mobile phones to fill in online questionnaire. Patients who cannot use mobile phones will use paper questionnaires, and investigators would assist patients in completing the survey. All patients were informed, and patients willing to take part in the survey gave us oral consent, and those who were unwilling to join in the survey do not fill in the questionnaire. We distributed 2,860 questionnaires and recovered 2,719 questionnaires. The response rate of the questionnaire was 95.07%. After removing incomplete and illogical questionnaires (For example, patients chose codes not included in the options, or patients selected "very satisfied" in the "overall satisfaction" item, but selected "very dissatisfied" in all sub-aspects of satisfaction), Eventually, we got 2,626 valid questionnaires. This study has been approved by the Ethics Committee of Pu'ai hospital (No: KY 2018-027-01). The patient answered the questionnaire anonymously and their privacy was protected.

Questionnaire

Based on the literature and according to the purpose of the survey, we chose the sub-aspects of satisfaction mentioned in most literatures and the possible factors that affect satisfaction. The selection of questionnaire items was initially decided through two research group discussions. After expert consultation, some items were merged and some were deleted. We conducted a small pre-survey of 50 people to improve the questionnaire and finally refined the questionnaire items.

The questionnaire contains four dimensions: the first is the social and demographic characteristics of the patient. Secondly is the characteristics of medical institutions, including the affiliation, level and category of the hospital. Thirdly is the choice of patients seeking medical treatment,

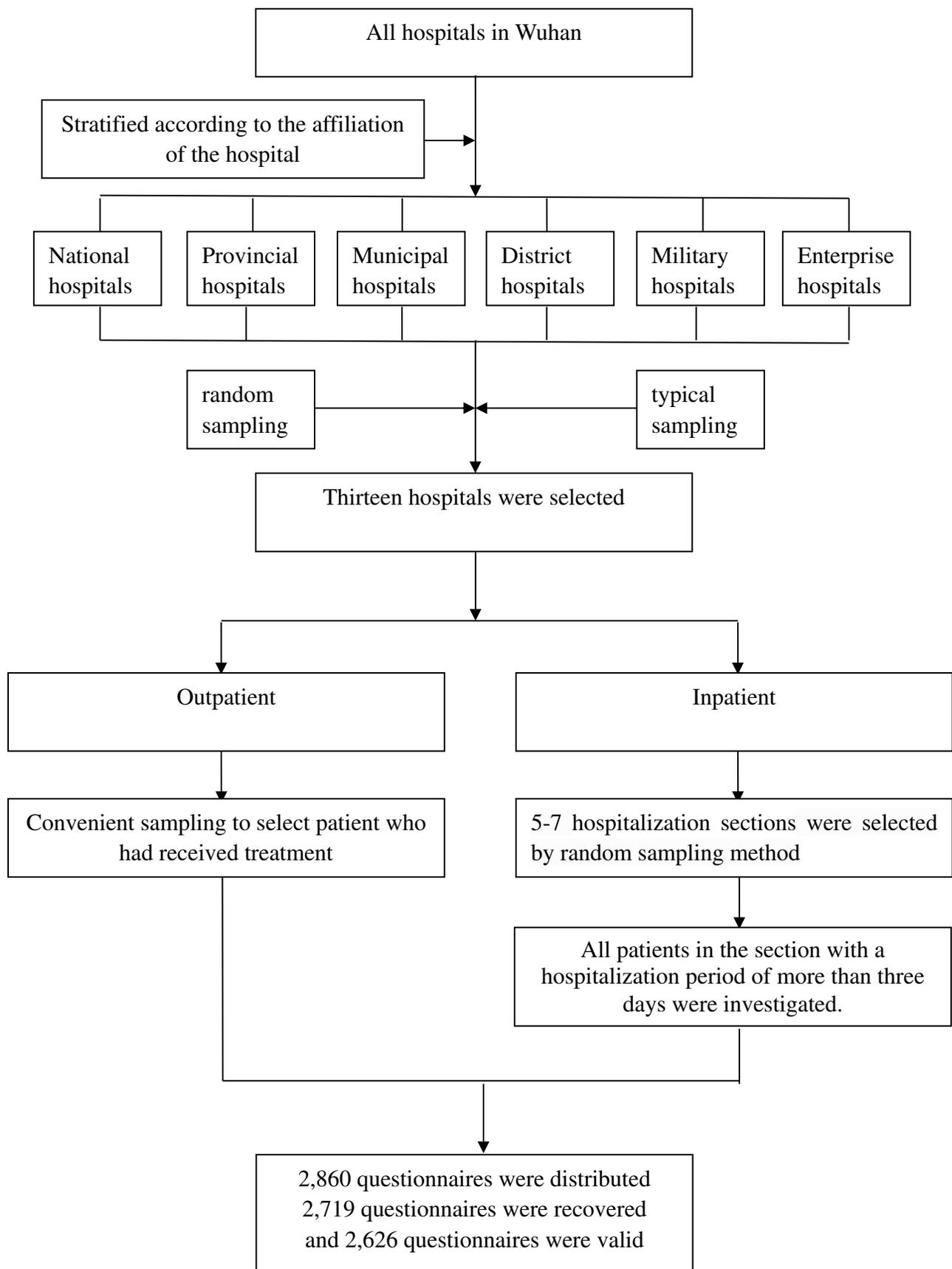


Figure 1 The sampling strategy of this study.

Including the reason for the patient's visit, whether it is outpatient or hospitalization, whether it is the first visit hospital and the registration channel. Fourthly is patient overall satisfaction and seven sub-aspects. Likert's three-point questionnaire was used, "1" means "very dissatisfied" (i.e. very bad, inconvenient, expensive), "3" is "moderate" (which means not too bad), "5" is "very satisfied" (i.e. very good, convenient, cheap).

Introduction To Methodology

Exploratory factor analysis is a statistical technique to for extracting potential factors from a group of variables. It mainly describes some basic but not directly measurable hidden variables. By exploring the correlation between variables, the original variables were classified, and a small number of potential factors were used to describe the relationship between multiple variables. Meanwhile, the scores of each factor can be obtained. Because the factor score is a continuous variable and standardized data, the average value was '0' and the standard deviation was '1'. In grouping comparison, it could be used to analyze the specific impact of certain factors on satisfaction. A positive value of the factor score indicated that the factor score of this group was higher than that of the total sample, which meant in our coding rules this group was satisfied with this factor, while a negative value indicates that the factor score of this group was lower than that of the total sample, which meant this group was dissatisfied with this factor.

Statistical Analysis

We used Excel 2007 software to input data and SPSS 24.0 software to analyze it. We used statistical description to obtain the data profile, chi-square to identify the influencing factors, correlation analysis to analyze the relationship between sub-aspects of satisfaction, and factor analysis to extract common factors. The significant level was 0.05.

Results

Descriptive Analysis And Univariate Analysis Of Patient Overall Satisfaction

The data profile and crosstab were presented in [Table 1](#). The descriptive analysis could be seen in columns 3 and 4. Possible influencing factors were selected as grouping variables and overall satisfaction as target variables. According to chi-square test, factors influencing patient

satisfaction were screened out by chi-square test. It was found that the "Age", "Type of medical insurance", "Hospital affiliation", "Hospital category", "Outpatient or inpatient", "whether this hospital is the preferred medical institution" and "Registration method" were statistically significant and will be further analyzed.

Exploratory Factor Analysis Of Patient Satisfaction

The reliability of the questionnaire was checked, and the Cronbach's Alpha value was 0.706 ([Table S1](#)). We found the correlation between overall satisfaction and sub-aspects satisfactions was significant ([Table 2](#)). We used exploratory factor analysis to extract potential factors. The KMO value was 0.778 ([Table S2](#)), therefore it was suitable for factor analysis. The value of Bartlett's sphericity test is 3123.17 ($p < 0.001$), which meant there was a correlation between variables and potential factors could be extracted. Experimental extraction of 2 to 4 potential factors was done respectively according to the Scree-plot. And the extraction method was Maximum Likelihood Analysis (ML). Finally, three potential factors were extracted because the extraction of each variable is sufficient ([Table S3](#)) and each potential factor had a clear meaning. The amount of information extracted was 64.94% ([Table S4](#)), which was relatively sufficient. The rotation correlation matrix was presented in [Table 3](#). Then we identified potential factors of patient satisfaction and obtained factor scores.

Through exploratory factor analysis, "Factor 1" was primarily relevant to "Hospital facilities and environment", "Medical staff services technology" and "Medical staff service attitude", so it can be named "Medical service quality factor". "Factor 2" was mainly relevant to "Medical expense". "Reimbursement ratio for medical" and "drug cost", so it can be called "Medical expenditure factor". "Factor 3" was mainly related to "Degree of hospital convenience", so it can be named "Medical convenience factor".

Factor Scores Of Potential Factors

[Table 4](#) was obtained by taking the influencing factor as grouping variables and the factor scores as target variables.

According to the basic socio-demographic characteristics of patients, patients younger than 35 years old were not satisfied with 'Medical expenditure factor' and "Medical convenience factor", and the patients aged from 36 to 50 years old were not satisfied with "Medical service

Table I Descriptive Analysis And Univariate Analysis Of The Patient Overall Satisfaction

Participants		n	%	Overall Satisfaction						Chi-Square/ Fisher's Precise Test	p
				Very Dissatisfied		Moderate		Very Satisfied			
				n	%	n	%	n	%		
Gender	Male	1214	46.23	14	50	161	45.48	1039	46.30	0.25	0.885
	Female	1412	53.77	14	50	193	54.52	1205	53.70		
Age(years)	≤35	1014	38.61	11	39.29	177	50	826	36.81	37.88	<0.001
	36–50	567	21.59	6	21.43	83	23.45	478	21.30		
	51–65	570	21.71	6	21.43	64	18.08	500	22.28		
	>65	475	18.09	5	17.86	30	8.47	440	19.61		
Place of Residence	In wuhan	1876	71.44	24	85.71	252	71.19	1600	71.30	3.32	0.495
	Hubei province outside of wuhan	567	21.59	4	14.29	80	22.60	483	21.52		
	Outside Hubei province	183	6.97	0	0	22	6.21	161	7.17		
Type of medical insurance	Medical insurance systems for urban workers	1154	43.95	10	35.71	130	36.72	1014	45.19	29.51	0.002
	Medical insurance for urban residents	494	18.81	5	17.86	68	19.21	421	18.76		
	New rural cooperative medical insurance	532	20.26	5	17.86	80	22.60	447	19.92		
	Free medical care	155	5.90	5	17.86	20	5.65	130	5.79		
	Commercial medical insurance	47	1.79	2	7.14	7	1.98	38	1.69		
	Other medical insurance	82	3.12	1	3.57	11	3.11	70	3.12		
	Uninsured	162	6.17	0	0	38	10.73	124	5.53		
Hospital affiliation	Hospital administered by the National Health Commission	415	15.80	5	17.86	53	14.97	357	15.91	19.32	0.026
	Provincial Hospital	600	22.85	9	32.14	89	25.14	502	22.37		
	Municipal hospital	810	30.85	11	39.29	96	27.12	703	31.33		
	District hospital	401	15.27	2	7.14	74	20.90	325	14.48		
	Military hospital	200	7.62	0	0	19	5.37	181	8.07		
	Enterprise-owned hospital	200	7.62	1	3.57	23	6.50	176	7.84		
Hospital level	Secondary hospital	200	7.62	0	0	30	8.47	170	7.58	2.38	0.273
	Tertiary hospital	2426	92.38	28	100	324	91.53	2074	92.42		
Hospital category	General Hospital	2026	77.15	17	60.71	246	69.49	1763	78.57	59.32	<0.001
	Specialized Hospital	200	7.62	8	28.57	61	17.23	131	5.84		
	Hospital of Chinese Medicine	200	7.62	2	7.14	27	7.63	171	7.62		
	Maternal and Child Health Hospital	200	7.62	1	3.57	20	5.65	179	7.98		
Outpatient or inpatient	Outpatient	867	33.02	20	71.43	222	62.71	625	27.85	186.90	<0.001
	Inpatient	1759	66.98	8	28.57	132	37.29	1619	72.15		
Reason for medical	Be sick	2290	87.20	25	89.29	303	85.59	1962	87.43	5.15	0.452
	Prescribe drugs regularly	102	3.88	0	0	19	5.37	83	3.70		
	Prescribe for others	55	2.09	1	3.57	10	2.82	44	1.96		
	Prevention and healthcare	179	6.82	2	7.14	22	6.21	155	6.91		
Whether this hospital is the preferred medical institution	Yes	2316	88.19	25	89.29	263	74.29	2028	90.37	62.69	<0.001
	No	310	11.81	3	10.71	91	25.71	216	9.63		

(Continued)

Table 1 (Continued).

Participants		n	%	Overall Satisfaction						Chi-Square/ Fisher's Precise Test	p
				Very Dissatisfied		Moderate		Very Satisfied			
				n	%	n	%	n	%		
Registration method	Register in the hospital	2105	80.16	24	85.71	290	81.92	1791	79.81	23.64	0.003
	Register online	407	15.50	2	7.14	48	13.56	357	15.91		
	Register by phone	55	2.09	0	0	4	1.13	51	2.27		
	Register by community	6	0.23	0	0	5	1.41	1	0.04		
	Other methods	53	2.02	2	7.14	7	1.98	44	1.96		

Notes: When the chi-square test condition is not satisfied, Fisher's precise test will be used. Bold font indicates statistical significance.

quality factor". Patients aged 51–65 and over 65 were satisfied with all aspects.

Patients with urban employees' medical insurance and free medical care were not satisfied with the 'Medical service quality factor'. Patients with medical insurance for urban residents were not satisfied with the "Medical expenditure factor". Patients with new rural cooperative medical insurance and patients without health insurance were not satisfied with the "Medical expenditure factor" and "Medical convenience factor". Patients with commercial medical insurance were dissatisfied with all aspects. Patients with other medical insurance (such as health insurance for railroader and maternity insurance) were dissatisfied with "Medical convenience factor".

According to hospital affiliation. Patients treated in the "Hospital administered by the National Health Commission" and "Provincial hospital" were not satisfied with the "Medical expenditure factor" and "Medical convenience factor". Patients who went to the municipal hospital were dissatisfied with "Medical service quality factor" and "Medical expenditure factor". Patients who went to the "District hospital" and "Enterprise-owned hospital" were dissatisfied with "Medical service quality factor". Patients who went to "Military hospital" were dissatisfied with "Medical convenience factor". Patients treated in "General hospitals" were satisfied with all aspects. Patients treated in "Specialized hospital" and "Maternal and Child Health Hospital" were dissatisfied with "Medical expenditure factor" and "Medical convenience factor". Patients who visited "Hospital of Chinese medicine" were dissatisfied with "Medical service quality factor" and "Medical expenditure factor".

According to the choice of patients seeking medical treatment. The outpatients were dissatisfied with all aspects. The inpatients were satisfied with all aspects.

Patients treated in the preferred medical institution were satisfied with all aspects, and Patients treated in the non-preferred medical institution was not satisfied with all aspects.

From the perspective of Registration method, Patients who register in the hospital were dissatisfied with "Medical service quality factor" and "Medical expenditure factor", Patients who register online were not satisfied with "Medical convenience factor". Patients who made register by phone were satisfied with all aspects. Patients who made the register by the community and other method were dissatisfied with all aspects.

Discussion

Health policy makers hoped to meet the medical needs of most people,¹ However, patients usually had different priorities for medical satisfaction.¹⁸ We need to seize the critical needs of patients and consider in detail to meet the needs of different groups.

The Potential Factors Of Patient Satisfaction Were "medical Service Quality Factor", "medical Expenditure Factor" and "medical Convenience Factor"

This study extracted three potential factors from factor analysis and obtained factor scores, which represented the basic reasons for patient satisfaction. In particularly, "Medical service quality factor", including the quality of medical technology and the ability of medical service, were the corecompetitiveness of the hospital and might be the leading factor influencing patient satisfaction.¹⁹ The "Medical expenditure factor" represented the economic accessibility of patients, was also a crucial factor affecting patients' medical choice. The "Medical convenience

Table 2 Correlation Of Sub-Aspects Of Patient Satisfaction

Spearman's Rho	Overall Satisfaction	Degree Of Hospital Convenience	Hospital Facilities And Environment	Medical Staff Services Technology	Medical Staff Service Attitude	Medical Expense	Reimbursement Ratio For Medical Expenses	Drug Cost
Overall satisfaction	1.000	0.414**	0.339**	0.455**	0.492**	0.192**	0.278**	0.314**
Degree of hospital convenience	0.414**	1.000	0.291**	0.269**	0.306**	0.220**	0.322**	0.297**
Hospital facilities and environment	0.339**	0.291**	1.000	0.443**	0.334**	0.075**	0.252**	0.246**
Medical staff services technology	0.455**	0.269**	0.443**	1.000	0.461**	0.106**	0.232**	0.244**
Medical staff service attitude	0.492**	0.306**	0.334**	0.461**	1.000	0.160**	0.221**	0.273**
Medical expense	0.192**	0.220**	0.075**	0.106**	0.160**	1.000	0.352**	0.271**
Reimbursement ratio for medical expenses	0.278**	0.322**	0.252**	0.232**	0.221**	0.352**	1.000	0.384**
Drug cost	0.314**	0.297**	0.246**	0.244**	0.273**	0.271**	0.384**	1.000

Note: ** Means that the correlation is significant at the 0.01 level (2-tailed).

Table 3 Rotated Component Matrix For Exploratory Factor Analysis

	Component		
	1	2	3
Medical Staff Services Technology	0.806	0.098	0.173
Hospital facilities and environment	0.795	0.163	-0.006
Medical staff service attitude	0.589	0.072	0.491
Medical expense	-0.076	0.773	0.103
Reimbursement ratio for medical expenses	0.198	0.749	0.123
Drug cost	0.255	0.646	0.131
Degree of hospital convenience	0.117	0.243	0.896

Notes: Extraction method is Maximum Likelihood Analysis. Rotation method is Varimax with Kaiser Normalization.

factor” represented the availability of medical resources, including the accessibility of services and accessibility of distance. Three potential factors represented patients’ demands for the quality, price and convenience of medical services. These three dimensions conformed to people’s evaluation criteria for general goods or services, and could well explain patient satisfaction.

According to the findings of this paper, hospitals can seize the focus of patients’ needs and find the direction of development. For example, high-level hospitals can further develop their quality and technical advantages, thus attracting patients who attach importance to quality. Low-level hospitals can lower prices and attract patients who attach importance to price. The medical consortium can improve convenience and attract patients through the development of a multi-point layout.

The Influence Of The Basic Socio-Demographic Characteristics Of Patients On Satisfaction

Patients of different ages had different expectations of treatment. According to the patients’ basic Socio-demographic characteristics, previous studies had proved that age was an important factor influencing patient satisfaction, Elderly patients were more likely to be satisfied with the medical process.²⁰⁻²³ This study noticed that patients of different ages had different emphases on medical services. For patients under the age of 35, while ensuring the quality of medical care, we must give full consideration to their economic status and avoid placing too heavy an economic burden on them. For patients aged 36-50, diseases became more complicated, and the gap between the therapeutic effect and patients’ expectation would become

Table 4 Factor Scores In Different Groups

Groups		Medical Service Quality Factor	Medical Expenditure Factor	Medical Convenience Factor
Age(years)	≤35	0.0051853	-0.1548774	-0.1818298
	36-50	-0.0886779	0.0256898	0.0125917
	51-65	0.0126208	0.0688324	0.1059938
	>65	0.0798072	0.2178167	0.2464547
Type of medical insurance	Medical insurance systems for urban workers	-0.0299155	0.0549549	0.1280445
	Medical insurance for urban residents	0.0357993	-0.0439278	0.0120216
	New rural cooperative medical insurance	0.0741289	-0.0515778	-0.1323169
	Free medical care	-0.1484481	0.3306353	0.0546125
	Commercial medical insurance	-0.2412072	-0.0674209	-0.2357191
	Other medical insurance	0.1224841	0.0149690	-0.2489350
	Uninsured	0.0109735	-0.3928205	-0.3729336
Hospital affiliation	Hospital administered by the National Health Commission	0.3769911	-0.0771360	-0.1187690
	Provincial Hospital	0.1331978	-0.0613493	-0.1448917
	Municipal hospital	-0.0379098	-0.0906600	0.0755827
	District hospital	-0.4929232	0.1158093	0.1076157
	Military hospital	0.2216255	0.1614452	-0.0804113
	Enterprise-owned hospital	-0.2597446	0.3172499	0.2390590
Hospital category	General Hospital	0.0013487	0.0898781	0.0633417
	Specialized Hospital	0.1052291	-0.6617428	-0.6638779
	Hospital of Chinese Medicine	-0.2355338	-0.0142916	0.1672345
	Maternal and Child Health Hospital	0.1166487	-0.2339808	-0.1446908
Outpatient or inpatient	Outpatient	-0.2595344	-0.2946935	-0.3022979
	Inpatient	0.1279956	0.1453352	0.1490855
Whether this hospital is the preferred medical institution	Yes	0.0317631	0.0274312	0.0530739
	No	-0.2371989	-0.2048493	-0.3963425
Registration method	Register in the hospital	-0.0474414	-0.0023267	0.0322159
	Register online	0.2314087	0.0035107	-0.1292960
	Register by phone	0.3754661	0.1232778	0.0671057
	Register by community	-1.1080680	-0.5165606	-1.2747718
	Other methods	-0.1579027	-0.0040463	-0.2113376
	Mean	0.0000000	0.0000000	0.0000000

Notes: The factor score is a continuous variable and standardized data, the average value was '0' and the standard deviation was '1'. A positive value of the factor score indicated that the factor score of this group was higher than that of the total sample, while a negative value indicates that the factor score of this group was lower than that of the total sample.

larger, and unfulfilled expectations might lead to dissatisfaction. It was suggested that healthcare professionals should focus on managing different expectations related to patient age.

People with different social medical security had different concerns. In China, patients had different social medical insurance, depending on the organization they

worked in and the domicile. Different medical insurance had different reimbursement proportion and reimbursement scope. In this study, Patients with higher reimbursement ratio (such as Medical insurance for urban workers and Free medical care) had higher requirements for quality, while patients with lower reimbursement ratio (such as medical insurance for urban residents and new rural

cooperative medical insurance) were dissatisfied with medical expenses. This is in line with Maslow's hierarchy of needs theory. After medical expenses no longer become the focus of attention, people will put forward higher demands for medical quality. Other medical insurance, such as health insurance for railroader and maternity insurance, require patients to receive treatment in designated hospitals, which is inconvenient. The fundamental reason was that different medical insurance was managed by different government departments and policies were different, resulting in social unfairness. The Chinese government had recognized these defects and was trying to integrate medical insurance. It was suggested that the pace of integration was too slow and the integration process of the medical security system should be accelerated to eliminate social inequity.

Influence Of Different Medical Institutions On Patient Satisfaction

The affiliation of the hospital determines the medical investment funds. Previous studies had shown that high-level hospitals (for example, For example, national, provincial and military hospitals) had better medical resources and scientific research support,²⁴ The education level of the medical staff was higher, and these hospitals could carry out more new technologies, but the cost was relatively high. Low-level hospitals (for example, municipal, district and enterprise hospitals) had poor facilities and equipment, the educational level of medical staff and the technical quality was low,²⁵ some examinations and treatment could not be carried out. The results of this study are similar to those of previous studies. We suggest that, for high-level hospitals, unnecessary examination and overly advanced treatment should be controlled, clinical pathway management and DRGs payment should be implemented, Stable chronic and convalescent patients should be transferred to primary hospitals as much as possible, so to reduce the burden on patients. For low-level hospitals, it should focus on enhancing the quality of medical treatment, develop investment in facilities and equipment, strengthen talent introduction and training, Improve diagnosis and treatment ability to ensure common and frequently-occurring diseases are solved. At the same time, the score of "Medical convenience factor" was low in high-level hospitals. There are two possible reasons. On the one hand, the high-level hospital is too large, the treatment process is very complicated, and the treatment

sites are very scattered, it is difficult for patients to find treatment sites, and there are queues everywhere. On the other hand, many patients who came to high-level hospitals were non-local patients accompanied by their families. They went through a long journey, but most hospitals did not consider the diet and accommodation of the patient's families. They had to spend more time and energy to find food and accommodation, which added burdens to their treatment process. This dissatisfaction will be expressed through the patient.

The relatively low score of Specialized Hospital and Maternal and Child Health Hospital in 'Medical expenditure factor' might be related to this reform. This reform not only reduced the cost of drugs and medical consumables but also increased the the medical service price of the medical staff. In pediatrics and some surgeries, the prices increased relatively obvious. It was suggested that the reformers should increase financial subsidies, and the increased prices should be included in medical insurance reimbursement instead of being paid by patients.

The Impact Of Medical Services Utilization Of Patients On Satisfaction

With the growth of China's population and the prolongation of the average life expectancy, the demand of medical services kept increasing, the supply of medical services was relatively insufficient, and the quality of medical services was affected.²⁶⁻²⁸

In terms of treatment type, Outpatient satisfaction is lower than inpatient satisfaction, which is consistent with previous studies.²⁹ During the hospitalization, patients had more opportunities to contact medical staff, so that they would better understand the hospital service process and the hard work of medical personnel. However, outpatient patients usually experienced a short medical service and a long queue at many sessions. It is more likely to have poor communication, and then dissatisfaction arised. It was suggested that hospitals should shorten patient waiting time and increased doctor-patient communication.

It was noticed that most patients took tertiary hospitals as the preferred medical institutions, reflecting that China's primary health system is still underdeveloped and the hierarchical medical system in China have not been established.²⁴ This was consistent with the previous studies.³⁰ In China, When a patient goes to see a doctor, he does not need to be referred step by step. No matter which hospital is his first visit, medical insurance can be

reimbursed. Due to the poor medical quality, inadequate medical equipment and insufficient types of drugs in primary medical institutions, patients do not want to go there but usually chose high-level hospitals as the first choice for diagnosis. The survey also reveals that patients were highly satisfied with the preferred hospital in all aspects, while the evaluation of non-preferred institutions was extremely low in all aspects. This problem should arouse the attention of the medical reform department. It reflects that the referral process has brought dissatisfaction to the patients. The common reason is that the patient's referral process is not smooth, and the patient's medical record information is not shared among hospitals, so the patient must receive the same examination again. Which means that the problem of medical fragmentation in China has not been improved. It is suggested that, while promoting the first diagnosis of patients in primary hospitals, it is necessary to strengthen the service capability of primary medical and health institutions, provide standardized medical services. Promoting the sharing of medical records and the mutual recognition of examination results is a way to provide integrated services.

Appointment of outpatient service was a supplement to hospital registration. The purpose was to alleviate the long waiting time for registration and improve the medical environment and medical experience. In this study, although most hospitals provided various booking and registration channels, they were seldom used. Most of patients still register in hospitals. This study also showed that the scores of patients registered in the hospital on "Medical service quality factor" and "Medical expenditure factor" were lower than that of online booking and telephone booking. The way of registration was focused in the hospital must arouse the management departments' attention. Utilization of different booking registration channels should be strengthened, the publicity of the booking platform should be reinforced, and the appointment rate of outpatient service should be increased.

Limitation

This study was an observational study. It could only obtain the views of patients at that time, and could not compare the situation before and after. Although the data collected by Likert's five-point or seven-point questionnaire are more accurate and detailed, our study still chose Likert's three-point questionnaire. This is because, based on traditional Chinese culture, Chinese patients were accustomed to being prudent and moderate, unwilling to

express strong feelings. When five-point or seven-point questionnaire were used, Chinese people often tended to choose "quite satisfied" and "quite dissatisfied" even when they were really "very satisfied" and "very unsatisfied". Therefore, three-point questionnaire still had a high value to improve the sensitivity of the questionnaire, although it may cause some data bias. In future study, we will try to use the Likert five-point questionnaire.

Exploratory factor analysis was an exploratory method, and the determination of all results should be carried out through confirmatory factor analysis such as structural equation model, which were not included in this research. In the sub-aspect of patient satisfaction, we only included seven common items in the questionnaire. Other aspects which were less common in the literature were not considered. Therefore, this study might only find part of the potential factors of patient satisfaction. It will be further improved in subsequent studies.

This study is just a representative sample of one city. It may be different from the situation in the whole china. We will consider conducting research in other cities in the future.

Conclusion

Through factor analysis, we found that patient satisfaction consists of three aspects. They were "Medical service quality factor", "Medical expenditure factor" and "Medical convenience factor". They well explained the underlying causes of patient satisfaction. Factors that influence patient satisfaction were "Age", "Type of medical insurance", "Hospital affiliation", "Hospital category", "Outpatient or inpatient", "whether this hospital is the preferred medical institution" and "Registration method". They affected different potential factors respectively. Patients of different ages and people with different social medical security had different concerns. High-level hospitals required to control the cost while low-level hospitals needed to improve medical quality. The reform had caused patients' dissatisfaction with the "Medical expenditure factor" of Specialized Hospital and Maternal and Child Health Hospital. Hierarchical diagnosis system was not established yet, and registration channels were highly concentrated in the hospital. The reform had not yet achieved the expected goal. Health departments should be more detailed in formulating policies and fully consider the needs of different groups of people.

Ethics Approval And Consent

The ethical review of this study was conducted by the Ethics Committee of Puai hospital, Wuhan, China (No:

KY 2018-027-01). The format of ‘informed oral consent’ was approved and no signed informed consent was requested. All patients were informed and provided oral consent. Patients who agreed to participate in the survey returned the questionnaire, while those who disagreed did not return it. The questionnaire is anonymous to ensure privacy of patients is protected.

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Author Contributions

All authors contributed to data analysis, drafting and revising the article, gave final approval of the version to be published, and agree to be accountable for all aspects of the work.

Disclosure

The authors declare that they have no competing interests in this work.

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