

# Comparative study of patients' satisfaction in different levels of hospitals in Beijing: Why do patients prefer high-level hospitals?

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## Research article

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# Abstract

**Background:** In order to promote the vertical flow and integration of medical resources, Beijing built medical alliances since 2012, but this practice did not change the disordered state of medical treatment. Patients are still willing to go to high-level hospitals for medical treatment. What causes patients to prefer high-level hospitals? Through previous research, patients' choice of medical treatment was affected by patients' satisfaction. Therefore, we compared the patients' satisfaction in different level hospitals under the background of the medical resource integration.

**Methods:** This study conducted a 48-person interview and a questionnaire survey among 1,250 patients who were treated in 18 medical alliances in Beijing from October to December 2016. The patients' satisfaction was the main outcome, descriptive analysis, a chi-square test, a nonparametric test and binary logistic regression analysis were used. The level of statistical significance was set at  $p < 0.05$ .

**Results:** The total satisfaction score of the medical alliances is 3.375, and the satisfaction score of core hospitals and cooperative hospitals is 2.77 and 3.07 respectively. The overall patient satisfaction rate is 44.62%, among which the satisfaction rate of core hospitals is 34.34% and that of the cooperative hospitals is 50.43%. The type of hospital and understanding of medical alliance policy are the influencing factors of the patients' satisfaction with the medical alliance.

**Conclusions:** Patients are more satisfied with the core hospitals. However, because core hospitals have obtained the most subsidies with limited financial compensation, the gap between core hospitals and cooperative hospitals is growing. The phenomenon of disorderly medical treatment in China seems more intense. Therefore, it is necessary to explore the establishment of closed medical alliances so that provide integrated medical services for patients.

## Introduction

The "Chinese model" of health care reform has achieved remarkable effect in the past decade. The accessibility of medical services and the health indicators of residents have been greatly improved. The experience and practice of reform deserve to be used for reference by many developing countries [1]. Whether such reform is effective requires not only the evaluation of objective indicators, but also the subjective evaluation of patient satisfaction.

Hospitals in China are divided into three levels according to their functions and tasks. The first-level hospital is a primary medical institution that provides basic medical care, prevention, rehabilitation, and health care services to a community. The second-level hospital is responsible for providing diagnosis and treatment of common diseases and frequently occurring diseases to a number of communities, receiving referral patients from primary medical institutions and the tertiary hospitals and undertakes some teaching, training and scientific research tasks. The tertiary hospital is a regional medical institution that provides specialized medical services to a number of regions. This hospital provides prevention, health care and rehabilitation service and undertakes clinical teaching, training and scientific research tasks.

The hospital is also a provincial and national high-level medical institution and technology center. In addition, there are many community health service centers in China; their main functions are the initial diagnosis of common diseases, health guidance for chronic diseases, disease screening, monitoring and management of high-risk groups, prevention of infectious diseases and control and health education. These hospitals are primary medical institutions, as well [2].

However, due to the low level of per capita medical resources in China, the total amount of high-quality medical resources is insufficient and unevenly distributed, mainly concentrated in “big cities” and “high-level hospitals”. In addition, with the lacks of Chinese medical insurance system constraints and other factors, disorderly medical services are common, which leads to the phenomenon of “inadequate and overly expensive medical services”[3]. According to the statistical bulletin of China’s health development in 2009, the total number of outpatients and emergency visits reached 5.49 billion, including 1.92 billion (35.0%) in hospitals and 380 million (6.9%) in primary medical institutions. From an international perspective, because some developing countries such as India do not have a compulsory primary consultation, patients can seek the medical treatment with the high-level hospitals in the region or in their own country freely, which may also lead to the phenomenon of disorderly medical treatment, resulting in the low efficiency of the health service system and a higher national health accounts, even reducing the patients’ satisfaction[4].

The Chinese government proposed a hierarchical diagnosis and treatment system in the new health care reform of 2009 for the first time in hopes that patients can be guided to seek medical treatment by nonmandatory means. Patients whose disease cannot be diagnosed and treated by the primary medical institutions will be referred to a higher-level hospital for treatment. Patients with a severe disease will be referred to the primary care institutions for long-term treatment or rehabilitation after entering the recovery and rehabilitation periods. The importance of the policy has been evaluated as “the day of the hierarchical-diagnosis-and-treatment-system success is the day of the Chinese-medical-reform success” by the minister of the National Health Commission of the People’s Republic of China [5].

The essence of the hierarchical diagnosis and treatment system is to promote the vertical flow and integration of medical resources. Countries around the world are also taking various measures to promote the integration of medical resources to meet the requirements of patients’ medical services. Patients’ disease treatment will be delayed if there is no integration and effective communication between these doctors [6]. An accountable care organization (ACO) in the United States is a medical alliance composed of primary care doctors, specialists and rehabilitation doctors. A series of measures is required to improve the quality and control of medical costs [7]. In Germany, the cost of medical care is expensive because there is a serious break between the specialists and the primary care physicians, resulting in the patients’ information not being shared and repeated examinations. Most patients go without further rehabilitation therapy after discharge because they do not know which doctor to contact[8]. In 2004, Germany implemented medical resource integration with the “Medical Care Centers” program, also known as “Multidisciplinary Clinic,” composed of specialists and general practitioners. In Canada, the health care system established in the 1970s has encountered such problems as increased

costs, poor coordination of medical institutions, and difficulty in obtaining doctors' resources. Therefore, Canada has integrated medical resources. For example, Ontario established a network of multidisciplinary physicians with a primary care physician as the core. This network is conducive to improving quality and reducing medical costs, especially for patients with chronic diseases.

In China, it was proposed for the first time in 2012 to encourage the establishment of "medical alliances" (In this study, the medical alliance refers to the loose medical alliance.) among hospitals. A medical alliance, as a push power for the implementation of hierarchical diagnosis and treatment systems, strengthens the vertical integration of medical resources of different levels. Medical alliances are dominated by the government. The medical institutions with the highest medical technologies in the region are regarded as core hospitals (generally tertiary hospitals), and a certain number of other medical institutions in the region are cooperative hospitals (including second-level general hospitals, first-level general hospitals and community health service centers), that is, joint organizations of unincorporated individuals. The core hospitals within a medical alliance are responsible for such efforts as the diagnosis and treatment of difficult diseases, doctors' training, teaching, and research. The cooperative hospitals are responsible for, for instance, multiple diseases, common disease diagnosis and treatment, rehabilitation of referral patients and public health tasks. In a medical alliance, a series of measures are implemented, such as total prepaid medical insurance and other payment methods. Doctors do not need to apply for a change of practice location, and the filing procedure of the practicing organization in the practice of other hospitals in the medical alliance. The continuous recording of electronic health records and electronic medical records, information sharing and mutual recognition of inspection results are promoted among hospitals[9]. Beijing began to explore the establishment of medical alliances in 2012. By March 2018, 58 medical alliances had been built with regional boundaries, including 55 core hospitals and 528 cooperative hospitals, covering all 16 districts in Beijing.

Medical alliances have been established in Beijing for over 7 years. The service capacity of cooperative hospitals has improved through the integration of medical resources and a variety of measures, but the situation of disorderly medical treatment has not been greatly improved. The data showed that the number of outpatients and emergency visits in tertiary hospitals of Beijing in 2012 was 80.723 million and reached 99.774 million at the end of 2017 with a 23.60% increase. While the number in primary medical institutions in 2012 was 36.268 million and was 37.01 million in 2017, only increasing 3.12%. The policy has intensified, to a certain extent, efforts of tertiary general hospitals to attract patients, while the crucial reason for patients to prefer high-level hospitals for medical treatment should be discussed.

Through the previous research on medical alliances in Beijing, the patients' choice of medical treatment and the willingness to first visit primary care institutions were affected by the patients' satisfaction, and the higher the satisfaction is, the higher the willingness is to first visit primary medical institutions[10]. In other studies, similar conclusions have been found. In addition to the patients' satisfaction, the influence of external factors such as medical insurance and hospital geographic location are guiding effects on medical treatment choices[11]. According to customer satisfaction theory, the higher the customer satisfaction the higher customer loyalty and the possibility of repeated purchases and recommendations

to others. This theory means that the more satisfied patients are in the health care system, the more likely it is that they are willing to choose this hospital [12]. According to the above data (the number of outpatients and emergency visits in tertiary hospitals and primary medical institutions of Beijing), patients in Beijing prefer to visit core hospitals with higher hospital levels. Does this mean that compared with cooperative hospitals, core hospitals are more reassuring and satisfying to Chinese patients? An existing study found that the overall satisfaction of respondents increased with the rise of the level of medical institutions in Ningxia and Shenzhen in China[13]; however, in another study of patients' satisfaction in the Zhejiang province, the satisfaction of the patients in primary medical institutions was significantly higher than that of the high-level hospitals[14]. With the two completely different results, under the background of the integration of medical resources in Beijing, which has the preferable patient satisfaction, core hospitals or cooperative hospitals? In this study, a cross-sectional survey was conducted in 16 districts of Beijing to compare the differences in patients' satisfaction between the core hospitals and the cooperative hospitals within a medical alliance.

## Materials And Methods

### 2.1 Survey respondents

This study conducted a questionnaire survey among 1,250 patients who were treated in 18 medical alliances in Beijing from October to December 2016.

### 2.2 Investigation method

First, this study conducted a 48-person interview with doctors and patients using the qualitative interview method to understand their attitudes toward medical alliances. Then, a self-reported questionnaire was designed based on the interview results. Second, the study used a stratified random sampling method to collect patients from 18 core hospitals and 80 cooperative hospitals of 18 medical alliances in 16 districts of Beijing. Accounting the rich medical resources in C area and D area, two medical alliances were selected from C and D, and one medical alliance was randomly selected from other areas to ensure the representativeness of the survey subjects. This article adopted a convenient sampling method selecting 15 inpatients and 15 outpatients from the core hospitals of each medical alliance; a total of 457 valid questionnaires were collected, and the valid response rates was 84.63%. Selecting 6 inpatients and 6 outpatients from each cooperative hospital with a total of 793 valid questionnaires collected and a valid response rate of 82.60%. In total, 1,250 questionnaires were collected, and the valid response rate was 83.33%. The questionnaire contains 24 questions in four parts. The first is the characteristics among patients, the second is the patients' understanding of the medical alliance policy, the third is the utilization degree of the medical alliance, and the fourth is the patients' satisfaction with the medical alliance.

### 2.3 Patients' satisfaction calculation method

Patients' satisfaction score = (number of very dissatisfied patients \* 1 + number of quite dissatisfied patients \* 2 + number of neither satisfied nor dissatisfied patients \* 3 + number of quite satisfied patients \* 4 + number of very satisfied patients \* 5)/total number of participants in the evaluation[15–16].

## 2.4 Statistical analysis

The data was double entered using the Epidate 3.1 software to establish a database, and SPSS 20.0 was used for statistical analysis. Descriptive analysis, a chi-square test, a nonparametric test and binary logistic regression analysis were used.  $P < 0.05$  was considered statistically significant.

## 2.5 Variable definitions

In logistic regression analysis, this study took the patients' satisfaction evaluation of the medical alliance services as the dependent variable and reduced the dimensionality of the ordered dependent variable as a binary variable (very dissatisfied, quite dissatisfied, neither satisfied nor dissatisfied were classified as dissatisfied; quite satisfied and very satisfied were classified as satisfied). The independent variables included the type of hospitals the patients visited, the basic information of the patients (gender, age, household registration, current address, residence time, chronic diseases status, patient type, medical insurance type, and average monthly medical expenses), and the patients' cognition of medical alliances (understanding levels of policy and method of understanding) (see Table 1).

# Results

## 3.1 Characteristics among patients

A total of 1,250 patients participated in the survey, including 731 females (58.48%), of which 474 (37.92%) were aged between 41 and 60. Nearly half of the patients were from an urban area of Beijing with 588 patients (47.04%), and 409 patients (32.72%) living in the new area of urban development. The majority of respondents, 1110 patients (88.80%), lived in the city for more than two years. In terms of the average monthly medical expenses, the number of patients under 300 yuan is the most with 452 patients (36.16%). Almost half of all patients (46.50%) participated in Urban Employee Basic Medical Insurance. In terms of chronic diseases status, the number of people suffering from hypertension was the highest with 501 patients (31.59%). (In the "Beijing Main Functional Area Plan" published by the Beijing government on September 17, 2012, the 18 districts in Beijing were divided into four different functional areas. A and B districts were classified as the "Capital functional core area." The C, D, E, and F districts are classified as the "Urban functional development area." The G, H, I, J, and K districts are classified as "New area of urban development," and the L, M, N, O, and P districts are classified as the "Ecological conservation development area.")

## 3.2 Single-factor analysis of patients' satisfaction

To explore the factors affecting the patients' satisfaction with medical alliances, all variables were included in the analysis as independent variables. Using the chi-square test and nonparametric test of

analysis, the results showed that the type of hospital, the type of patient, understanding level of medical alliance policy and method of understanding are statistically significant ( $P < 0.05$ ). These variables are influencing factors of patients' satisfaction (see Table 2).

### 3.3 Comparison of satisfaction between core hospitals and cooperative hospitals

The satisfaction score of the medical alliances is 3.375, and the satisfaction score of core hospitals and cooperative hospitals is 2.77 and 3.07. The overall patient satisfaction rate is 44.62%, and the satisfaction rate of core hospitals and cooperative hospitals is 34.34% and 50.43%. The evaluation of core hospitals is better than that of cooperative hospitals. Through single-factor analysis, the hospital type is an important factor affecting the satisfaction of patients with medical alliances. Therefore, to compare the patients' satisfaction between core hospitals and cooperative hospitals more directly, a nonparametric test is conducted on the satisfaction scores of core hospitals and cooperative hospitals. According to the nonparametric test  $P = 0.009$ ; there is a difference in the satisfaction score between the core hospitals and cooperative hospitals.

### 3.4 Logistic analysis of influencing factors of patients' satisfaction

To further explore the impact of hospital type on patients' satisfaction, all variables were included in a binary logistic regression analysis. Model 1 included in the hospital type, Model 2 included the type of hospital and patients' basic information (gender, age, household registration, current address, residence time, Chronic diseases status, patient type, medical insurance type, and average monthly medical expenses), and Model 3 included the type of hospital, patients' basic information, and patient's cognition of medical alliance (understanding level of policy and method of understanding). The results showed that the type of hospital is always the influencing factor of the patients' satisfaction with the medical alliance. In Model 3, understanding level of medical alliance policy is included as an influencing factor of satisfaction (see Table 3).

### 3.5 Analysis of the reasons for patient

Among the reasons for choosing cooperative hospitals for treatment, the top three are convenience (32.90%), the high proportion of medical insurance reimbursement (19.39%) and the short waiting time (11.83%). Among the reasons why people think it is difficult to seek medical treatment in core hospitals are "long wait time for medical treatment," "difficulty in finding reliable doctors" and "less time to communicate with doctors," at 23.69%, 15.31% and 12.11%, respectively.

## Discussion

From the above research results, hospital type is the influencing factor of patients' satisfaction with the medical alliance, and cooperative hospitals have higher satisfaction than core hospitals. From an international perspective, previous studies have found differences in patients' satisfaction among hospitals of different levels and types. For example, compared with urban hospitals, rural hospitals have

higher satisfaction. Compared with large hospitals, small hospitals have higher satisfaction [17]. From this point of view, the results of this study seem similar to the measurement of patients' satisfaction in other countries, but China has a Chinese characteristics health care system. Developed countries such as the United Kingdom and the United States all use compensation models based mainly on primary medical institutions and public medical institutions. The demand of high-level medical services needs to be borne by the public [18]. The Chinese government's financial investment in cooperative hospitals is nowhere near that of core hospitals, and the medical income of core hospitals far exceeds that of cooperative hospitals. Therefore, core hospitals with funds, technology and personnel advantages should provide more satisfying services. However, the results of this study are inconsistent with the medical choices in general and even the public's perception[19–20]. Through literature review in the preliminary study, most of the patients' satisfaction studies focused on satisfaction with a certain treatment method and the influencing factors of outpatient and inpatients' satisfaction, but there were few studies on satisfaction with the medical alliance, especially comparative studies on satisfaction with the core hospitals and the cooperative hospitals. The survey of patients' satisfaction can truly reflect the problems in the Chinese health care system. Especially in recent years, with doctor-patient conflicts increasing and medical incidents occurring frequently in China, this study has a practical significance to explore the patients' satisfaction under the background of medical resource integration.

Through this study, the patients' satisfaction with cooperative hospitals in the medical alliance is higher than that of core hospitals. First, different functions and tasks are undertaken by the two kinds of hospitals. In the cooperative hospital, the treatment effects are better with a lower disease complexity, so the satisfaction may be higher. Second, the main reasons that lead patients to choose cooperative hospitals are convenience, short waiting time, detailed communication, etc. Although the medical technology level of cooperative hospitals is inferior to that of core hospitals, the service attitude is relatively good. A doctor has more time to diagnose a disease and answer the doubts of a patient. At the same time, the cooperative hospital has undertaken many public health tasks and maintained a good doctor-patient relationship with local patients. Studies have shown that the "patient-oriented" new medical service model is more conducive to establishing a strong and intimate long-term relationship with patients, which is conducive to the patients' autonomy and good satisfaction [21]. Moreover, the medical technology of the cooperative hospitals has been greatly improved due to the construction of medical alliances, which is also one of the reasons for the higher satisfaction with cooperative hospitals. According to the disease spectrum, key disease diagnosis and treatment needs, core hospitals will send their doctors to cooperative hospitals in the area under their jurisdiction, to promote the integration of medical resources through various ways, such as joint construction of specialties, clinical teaching, medical technology teaching, teaching rounds and scientific research cooperation[22]. In the interview, specialists from the core hospitals said that "*as a core hospital, we have done much work after the establishment of the medical alliance. We have organized different assistance work every week, such as clinical rounds, academic lectures, and advanced doctors' training, etc.; these are open to cooperative hospitals, and the content is also aimed at them, which is very practical.*"

The most important reason why the satisfaction with core hospitals is less than the cooperative hospitals is that the number of emergency visits, inpatients and outpatients, leads to a decline in core hospitals' service quality. Meanwhile, the diseases undertaken by the core hospitals are far worse than those in the cooperative hospitals; therefore, the complexity of the disease treatment is higher, and the treatment effects are not always satisfactory likewise. When the treatment results of the diseases fail to meet the expectations of the patients, the patients will have great negative emotions that may lead to medical incidents. In the patients' satisfaction aspect, the reasons for complying with medical treatment in the cooperative hospitals are in stark contrast to those in the core hospitals, in terms of long waiting time for the medical treatment and inpatient beds, difficulty scheduling appointments, and less time to communicate with doctors. Poor medical experiences lead to decline in satisfaction naturally. Studies have shown that patients' concerns most during medical treatments are the related medical condition, diagnosis and treatment plan, surgical risk and medications. Patients have a strong willingness to communicate with doctors, and the lack of communication will affect the evaluation of the hospital and even lead to disputes between doctors and patients[23]. Although core hospitals have high-quality medical equipment and excellent doctors, software construction seems to be more important if they want to improve satisfaction. Core hospitals should focus on improving medical services, strengthen patient-oriented communication between doctors and patients, simplify the admission procedure and shorten the waiting time so that patients can obtain a better medical experience.

Although the above findings indicate that Chinese patients are more satisfied with the cooperative hospitals than the core hospitals, most patients are still willing to choose the core hospitals for medical treatment, which is in contradiction with the customer satisfaction theory. This phenomenon is caused by a variety of factors, even after the publication of hierarchical diagnosis and treatment and the medical alliance policy. Due to the insufficient compensation of public hospitals in China, hospitals are forced to boost the medical market, resulting in profit-driven competition among hospitals[24]. Under the background of resource allocation dominated by market forces, the overcrowded tertiary hospitals have sufficient reasons to ask the government for more subsidies to finance their facility improvements and improve service capabilities, which causes the tertiary hospitals to develop in a better direction. At their high administrative level, tertiary hospitals are also more influential in the Chinese administrative system. As tertiary hospitals improve their capacity, they become more competitive, attract more patients, and justify further government subsidies or investment. Other hospitals are arduous to attract patients and develop capacity, resulting in the inadequacy of the service capacity of primary medical institutions, which has a negative impact on the fairness of the access to primary health care services but also drives most patients to flock to high-level hospitals, resulting in the waste of medical resources [25–26]. In addition, there is no requirement for patients to make the first visit to a primary care institution; with the higher medical expectations of Chinese patients, this may lead to disorderly medical treatment as well. Second, the leverage effect of medical insurance in various regions of China is not satisfactory. The proportion of medical insurance reimbursement in different levels of hospitals is not large enough to play a role in guiding the hierarchical diagnosis and treatment. The third is that the medicine types of core hospitals and cooperative hospitals vary greatly. Since primary health care institutions implement a basic

medicine system, medicine types are more comprehensive in core hospitals. Once the patient is referred to the primary health care institutions, it is difficult to ensure the supply of a drug and the continuity of treatment[27].

In an international aspect, the way to alleviate the pressure of high-level hospitals is to use medical insurance leverage or medical resource integration to promote patients' graded visits or to integrate medical resources. After the establishment of the medical alliance in china, however, core hospitals and cooperative hospitals compete for patients as much as possible; there is no reasonable mechanism for the distribution of benefits among hospitals. During the interview, a hospital manager mentioned, "*Why should we refer patients to other hospitals, and what benefits can I obtain from it? Our leader has often said not to work to promote other hospitals.*" Therefore, the loose medical alliances formed by technical support cannot completely change the state of competition among hospitals. It is necessary to explore the establishment of the closed medical alliances under the unified management of human and financial resources, to promote medical alliances to become a community of common interests and provide integrated medical services for patients.

## Conclusion

Through the interview and questionnaire survey of 18 medical alliances in Beijing, we found that the patients' satisfaction with cooperative hospitals was higher than that of core hospitals. The main reason for this phenomenon was that cooperative hospitals had simpler disease complexity and better treatment effects. The second is that the cooperative hospitals received help from the core hospitals, which improved the medical technology level. The third reason is the increasing number of emergency visits, inpatients and outpatients, led to a decline in core hospital service quality. However, because core hospitals have obtained the most subsidies with limited financial compensation, the gap between core hospitals and cooperative hospitals is growing. With the small gap in the proportion of medical insurance reimbursement between different levels of medical institutions and a large difference in medicine varieties between core hospitals and cooperative hospitals, the phenomenon of disorderly medical treatment in China seems more intense. Although the Chinese government has proposed the hierarchical diagnosis and treatment system and encouraged the establishment of medical alliances, most of the loose medical alliances are unable to change the state of competition between hospitals and cannot reverse the phenomenon of disorderly medical treatment. Therefore, it is necessary to explore the establishment of closed medical alliances so that provide integrated medical services for patients.

## Limitations Of The Study

Due to the concentration of medical resources in Beijing, the core hospitals in Beijing are not only serving local patients but also national patients, and some specialist hospitals have reached 70% foreign patients (Zhang and Xu, et al 2017). Thus, the investigation of the satisfaction with Beijing medical alliances may magnify the findings or contradictions. However, the number of cooperative hospitals in

this study was far more than that of core hospitals, and 87.36% of the 1,250 respondents were Beijing patients, so the limitations of this study have little effect on the results.

## **Declarations**

## **Abbreviations**

This article does not contain any abbreviations.

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## **Authors' contributions**

Each author complies with the Health Policy standards for authorship. CSC, XZ and HYS contributed to the investigation; CSC contributed to data curation, software, formal analysis, resources, writing original draft; YJW and JYS made recommendations for the revision of the original draft; KM contributed to conceptualization, methodology, writing—review & editing, supervision, project administration, funding acquisition. All authors read and approved the final manuscript.

## **Declarations**

### **Ethics approval and consent to participate**

The study was approved by the Ethical Review Committee of the Capital Medical University (No. 2018SY92). Participation in the survey was completely voluntary and written consents were obtained from participants.

### **Consent for publication**

Not applicable.

### **Availability of data and materials**

The datasets generated and/or analysed during the current study are available from the corresponding author on reasonable request. E-mail: [mengkai@ccmu.edu.cn](mailto:mengkai@ccmu.edu.cn).

## Competing interest

The authors declare that there is no competing interest.

## No Duplicate Submission Declaration

I promise that the study has not duplicate submission, and has not been published in other journals previously.

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## Tables

**Table 1** Variable assignment

Characteristics	Variable	Assignment
Patients' satisfaction	Y	1=Dissatisfied; 2=Satisfied
Type of hospital	X1	0=Core hospital; 1=Cooperative hospital
Gender	X2	0=Male; 1=Female
Age (years)	X3	1=0-20; 2=21-40; 3=41-60; 4=61-80; 5=81-100
Household registration		
Urban area	X4	0=No; 1=Yes
Suburbs	X5	0=No; 1=Yes
Non-native	X6	0=No; 1=Yes
Residence time	X7	1=Within half a year; 2=Half a year to one year; 3=One to two years; 4=More than two years
Current address		
Capital functional core area	X8	0=No; 1=Yes
Urban functional development area	X9	0=No; 1=Yes
New area of urban development	X10	0=No; 1=Yes
Ecological conservation development area	X11	0=No; 1=Yes
Non-native	X12	0=No; 1=Yes
Chronic diseases statu	X13	0= No chronic diseases; 1= Any chronic diseases
Patient type	X14	0= Inpatient; 1= Outpatient
Medical insurance type		
UEBMI (Urban employee-based medical insurance)	X15	0=No; 1=Yes
URBMI (Urban resident-based medical insurance)	X16	0=No; 1=Yes
NMI (National medical insurance)	X17	0=No; 1=Yes
NRCMS (New rural cooperative medical scheme)	X18	0=No; 1=Yes
CI (Commercial insurance)	X19	0=No; 1=Yes
Out of pocket	X20	0=No; 1=Yes
Average monthly medical expenses (yuan)	X21	1=Less than 300; 2=301-500; 3=501-800; 4=801-1000; 5=More than 1001
Understanding level of medical alliance policy	X22	1= Do not understand very much; 2= Not very understanding; 3= General understanding; 4= More understanding; 5= Very much understanding
Method of understanding		
Media reports	X23	0=No; 1=Yes
Community promotion	X24	0=No; 1=Yes
Hospital promotion	X25	0=No; 1=Yes
Relatives and friends recommend	X26	0=No; 1=Yes
Others	X27	0=No; 1=Yes

**Table 2 Single-factor analysis of patients' satisfaction**

Characteristics	Options	Satisfied N(%)	Dissatisfied N(%)	$\chi^2$	<i>P</i>
The type of hospital	Core hospitals	136(12.41)	260(23.72)	26.48	<0.001
	Cooperative hospitals	353(32.21)	347(31.66)		
	Total	489(44.62)	607(55.38)		
Gender	Male	192(18.06)	226(21.26)	0.50	0.48
	Female	282(26.53)	363(34.15)		
	Total	474(44.59)	589(55.41)		
Age (years)*	0-20	4(0.37)	2(0.18)	-1.34	0.18
	21-40	135(12.43)	182(16.76)		
	41-60	177(16.30)	241(22.19)		
	61-80	151(13.90)	153(14.09)		
	81-100	17(1.57)	24(2.21)		
	Total	484(44.57)	602(55.43)		
Household registration	Urban area	234(21.71)	286(26.53)	1.68	0.43
	Suburbs	200(18.55)	242(22.45)		
	Non-native	45(4.17)	71(6.59)		
	Total	479(44.43)	599(55.57)		
Residence time	Within two years	19(1.84)	37(3.59)	3.01	0.10
	More than two years	446(43.30)	528(51.26)		
	Total	465(45.14)	565(54.85)		
Current address	Capital functional core area	51(4.83)	46(4.36)	3.61	0.46
	Urban functional development area	116(10.98)	144(13.64)		
	New area of urban development	164(15.53)	202(19.13)		
	Ecological conservation development area	138(13.07)	188(17.80)		
	Non-native	4(0.38)	3(0.28)		
	Total	473	583		
Patient type	Inpatient	137(12.95)	221(20.89)	8.05	0.01
	Outpatient	332(31.38)	368(34.78)		
	Total	469	589(55.67)		
Medical insurance type	UEBMI	218(19.95)	276(25.25)	3.96	0.56
	URBMI	122(11.16)	150(13.72)		
	NMI	35(3.20)	40(3.66)		
	NRCMS	98(8.97)	100(9.15)		
	CI	6(0.55)	11(1.01)		
	Out of pocket	13(1.19)	24(2.20)		
Total	492	601			
Chronic diseases statu	Any chronic diseases	436(32.37)	508(37.71)	1.21	0.28

	No chronic diseases	173(12.84)	230(17.07)		
	Total	609	738		
Average monthly medical expenses *	Less than 300	176(16.45)	216(20.19)	-0.07	0.95
	301-500	108(10.09)	145(13.55)		
	501-800	74(6.92)	89(8.32)		
	801-1000	50(4.67)	60(5.61)		
	More than 1001	68(6.36)	84(7.85)		
	Total	476	594		
Understanding level of policy	Do not understand	373(35.02)	570(53.52)	59.04	<0.001
	Understand	93(8.73)	29(2.72)		
	Total	466	599		
Method of understanding	Media reports	88(8.76)	143(14.24)	11.43	0.02
	Community promotion	128(12.75)	122(12.15)		
	Hospital promotion	153(15.24)	176(17.53)		
	Relatives and friends recommend	35(3.49)	46(4.58)		
	Others	42(4.18)	71(7.07)		
	Total	446	558		

Note: Nonparametric test is used for the age and the average monthly medical expenses, the test statistic is Z.

**Table 3 Logistic analysis of influencing factors of patients' satisfaction (OR, 95% CI; n=1250)**

Variables	Model 1	Model 2	Model 3
The type of hospital	1.945 <sup>1.507-</sup>	1.675 <sup>1.238-</sup>	1.609 <sup>1.154-</sup>
Cooperative hospitals	2.509 <sup>*</sup>	2.268 <sup>*</sup>	2.243 <sup>*</sup>
Gender		0.849 <sup>0.644-</sup>	0.810 <sup>0.601-</sup>
Female		1.118 <sup>0</sup>	1.091 <sup>0</sup>
Age		0.931 <sup>0.775-</sup>	0.831 <sup>0.678-</sup>
		1.119 <sup>0</sup>	1.019 <sup>0</sup>
Household registration			
Suburbs		1.108 <sup>0.788-</sup>	0.979 <sup>0.676-</sup>
		1.558 <sup>0</sup>	1.417 <sup>0</sup>
Non-native		0.983 <sup>0.588-</sup>	1.140 <sup>0.648-</sup>
		1.644 <sup>0</sup>	2.006 <sup>0</sup>
Residence time		1.254 <sup>0.925-</sup>	1.170 <sup>0.854-</sup>
More than two years		1.700 <sup>0</sup>	1.603 <sup>0</sup>
Current address			
Urban functional development area		0.880 <sup>0.530-</sup>	0.669 <sup>0.385-</sup>
		1.462 <sup>0</sup>	1.161 <sup>0</sup>
New area of urban development		0.787 <sup>0.461-</sup>	0.719 <sup>0.403-</sup>
		1.344 <sup>0</sup>	1.283 <sup>0</sup>
Ecological conservation development area		0.649 <sup>0.373-</sup>	0.704 <sup>0.386-</sup>
		1.128 <sup>0</sup>	1.284 <sup>0</sup>
Non-native		2.089 <sup>0.333-</sup>	1.087 <sup>0.162-</sup>
		13.126 <sup>0</sup>	7.286 <sup>0</sup>
Chronic diseases statu		1.039 <sup>0.741-</sup>	0.996 <sup>0.689-</sup>
Any chronic diseases		1.455 <sup>0</sup>	1.441 <sup>0</sup>
Patient type		1.298 <sup>0.949-</sup>	1.103 <sup>0.782-</sup>
Outpatient		1.773 <sup>0</sup>	1.556 <sup>0</sup>
Medical insurance type			
URBMI		0.954 <sup>0.681-</sup>	0.995 <sup>0.690-</sup>
		1.337 <sup>0</sup>	1.435 <sup>0</sup>
NMI		0.859 <sup>0.499-</sup>	0.782 <sup>0.424-</sup>
		1.479 <sup>0</sup>	1.440 <sup>0</sup>
NRCMS		1.115 <sup>0.751-</sup>	1.181 <sup>0.769-</sup>
		1.655 <sup>0</sup>	1.813 <sup>0</sup>
CI		0.645 <sup>0.186-</sup>	0.590 <sup>0.143-</sup>
		2.232 <sup>0</sup>	2.435 <sup>0</sup>
Out of pocket		0.399 <sup>0.149-</sup>	0.391 <sup>0.118-</sup>
		1.069 <sup>0</sup>	1.293 <sup>0</sup>
Average monthly medical expenses		1.044 <sup>0.942-</sup>	0.987 <sup>0.881-</sup>
More than 300 yuan		1.159 <sup>0</sup>	1.106 <sup>0</sup>
Understanding level of policy			2.544 <sup>1.993-</sup>
			3.247 <sup>*</sup>
Method of understanding			
Community promotion			1.418 <sup>0.932-</sup>
			2.158 <sup>0</sup>
Hospital promotion			1.174 <sup>0.787-</sup>
			1.752 <sup>0</sup>
Relatives and friends recommend			1.089 <sup>0.576-</sup>
			2.056 <sup>0</sup>
Others			1.545 <sup>0.897-</sup>
			2.661 <sup>0</sup>
Constants	0.523	-1.19	-2.022

Note: \*P<0.05

