

Impact of patient-perceived quality of primary health care on the patients' bypass behaviour in China

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Abstract

Background

Patient bypass often occurs under the loose gatekeeper system. Additionally, patients' perceived quality of primary health care (PHC) is one of the important factors affecting bypass behaviour. Objective to explore individuals' bypass behaviour in China and the associations between patients' perceived quality of PHC and their bypass behaviour.

Method

In 2019, this study investigated Chinese bypass behaviour and the potential influencing factors. The questionnaire that was used assessed the following: the perceived quality of primary care using the Primary Care Assessment Tool; bypass experience; age; health insurance; and other factors. A logit regression model was used to analyse the impact of perceived quality of PHC on bypass behaviour.

Results

The data of 2070 residents in 706 health care facilities in China were collected. The results show that perceived quality of PHC is significantly associated with bypass behaviour in China. After adjustments were made for patients' sociodemographic and other characteristics, an increase of one standard deviation (SD; odds ratio (OR) per 1-SD increase) in the PCAT scores led to a 2% decrease in bypass behaviour (OR 0.98, $p < 0.05$). Gender, hukou and cold fee for PHC were negatively associated with bypass behaviour.

Conclusion

Patients' perceptions of PHC service quality play an active role in reducing their bypass behaviour, which may provide a new perspective for the design of PHC health policies.

Introduction

Primary health care (PHC), as the core of the health system, is provided by primary health care institutions. Each primary health care institution supplies comprehensive, coordinated and integrated health care to individuals, families, and communities living in its service areas(1). PHC is an effective way to expand the coverage of health services in countries with limited medical resources. In countries with a national hierarchical medical system (NHMS), PHC can address the common diseases of residents at a lower cost and improve their welfare, which is cost effective. Therefore, most countries around the world have invested massive resources to build primary health care institutions and strengthen PHC service delivery. As an NHMS country, the Chinese health care system is a 3-level hierarchical network. Primary health care institutions serve as "gatekeepers" to take care of patients with common and frequently occurring diseases; secondary hospitals are regional hospitals that provide comprehensive health care to multiple communities and undertake certain teaching and scientific research tasks; and tertiary hospitals,

which are usually composed of provincial and municipal general hospitals, teaching hospitals, and specialized hospitals, implement teaching and scientific research tasks and conduct the diagnosis and treatment of difficult, miscellaneous and critical diseases(2).

However, it does not seem easy to achieve the benefits of PHC investment. Due to the lack of funds and equipment and the inadequate training of medical staff during the early development of primary health care systems, many countries (such as India, Saudi Arabia, and China) have poor PHC services(3), and the quantity and quality of medical resources in PHC facilities are generally lower than those in advanced hospitals. In addition to the asymmetry of medical information, patients have little choice but to bypass the PHC institutions and go to advanced hospitals for better medical care.

Bypass is generally defined as the behaviour of patients visiting an advanced medical institution instead of one with an acceptable quality of care that is closer to them, which reflects the patients' preference for better health care(4–8). In developing countries where the PHC system is imperfect, it is more common for patients to bypass their nearest primary care facility and travel to higher-level medical institutions. With the development of the primary health care system, this traditional concept and behaviour, which is often referred to as “bypass behaviour”, is still preserved. For example, the data show that the total number of medical practitioners in various medical and health institutions in China in 2017 was 818,311 (10,000 person-times), while the primary health care institutions accounted for only 442,892 (54.12%, 10,000 person-times), which indicates that patients bypass the PHC institutions to a large extent.

In developing countries such as China, where the PHC system is imperfect, it is more common for patients to bypass their nearest primary care facility and go to higher-level medical institutions. The prevalence of patient bypass has negative impacts on society, medical institutions and individuals. For society, bypass behaviour hinders the operational efficiency of the medical system(9), which is not conducive to the overall operation and development of society and affects the government's strategy on the input of PHC resources. For medical institutions, bypass behaviour limits the scope of services of PHC institutions to a certain extent, reduces the number of PHC providers, and may even lead to the closure of PHC institutions(10). Meanwhile, bypass behaviour will increase visits to higher-level hospitals, resulting in a decrease in the efficiency of the health system. For individuals, circumventing the nearest medical centre to seek further treatment will cost more time and money, which may be cost ineffective. Therefore, reducing bypass behaviour, which is of practical significance, contributes to the greater well-being of society and individuals.

Many scholars have tried to explain the cause of bypass behaviour to reduce these behaviours. Studies have shown that socioeconomic conditions (such as income), demographic factors (such as gender), the health status of patients (such as disease severity)(11, 12), geographic factors, medical expenses(8), and the quality of medical institutions(13) can affect patients' bypass behaviour. Among these factors, the quality of medical institutions is the fundamental cause of patients' bypass behaviour. Rao, K. D., et al. (2018)(11) explored the effects of the structural quality of health centres on the bypass behaviour of Indian patients, and the results suggest that improvements in structural quality have a positive impact on

the reduction in bypass behaviour. Akin et al. (1999) (8) studied the bypass behaviour of Sri Lankan residents and the characteristics of bypassed medical institutions. The results show that the quality and price of medical services are important factors influencing bypass behaviour. Leonard et al (2003) (9), Kruk et al (2009) (14), and Gauthier et al (2011) (7) studied the bypass behaviour and its influencing factors among African residents. The focus of these studies is on the quality of health care services. Among these studies, Gauthier analysed the influence of subjective quality perception and objective quality on bypass behaviour, but the measurement indicators of subjective quality perception are controversial. Aoki, T. et al (2018) (4) studied the influence of subjective quality perception (medical experience indicators) on the bypass behaviour of Japanese residents. The results indicate that the better patients' experience of primary care institutions is, the fewer times they bypass gatekeepers. It is obvious that the objective quality of the medical institution and patients' subjective perception of the quality of PHC services may have varying degrees of impact on their bypass behaviour.

A literature review indicates that subjective quality perception can explain patients' bypass behaviour on a broader level, which is irreplaceable by the objective quality of primary care institutions. For example, practical experience has shown that patients sometimes bypass PHC institutions (perceived lower quality) and instead seek medical care in higher-level medical institutions (perceived higher quality) whose objective quality of service is not always higher than that of the bypassed institution(9). This phenomenon can be explained by the patient's subjective quality perception—to a large extent, the patient's bypass decision depends on his or her own perceived quality of the care delivered by the medical institution instead of the true structural quality of the medical institution.

However, current research on the impact of patients' subjective quality perception on bypass behaviour is limited. To our knowledge, only Japan has conducted similar research(4), and there is no such systematic study in developing countries. At present, China has conducted some studies related to patient bypass behaviour(15–19). However, on the one hand, these studies do not rigorously define bypass behaviour. On the other hand, the selection of quality measurement indicators for medical institutions is often incomprehensive and mostly limited to objective conditions, such as the number of beds in medical institutions(20–22). The changes in the medical model and in health services require the expansion of the connotation of the quality of medical and health services, including comprehensive factors such as work efficiency, cost, service attitude, service availability and service fairness. Therefore, the above studies are not a good representation of the actual quality of medical services and patients' medical experiences. In addition, due to differences in medical systems and socio-cultural factors, the results of other countries' research cannot be directly applied to China. Therefore, this study conducted an in-depth exploration of this issue in China, a country that is representative of developing countries.

In summary, this study aims to explore how Chinese patients' perceived quality of PHC institutions affects their bypass behaviour. Specifically, this study focuses on whether a patient's perceived quality of PHC affects his or her bypass behaviour and the degree and direction of this effect. At present, most of China's policies on primary health care systems are aimed at improving basic medical service hardware, management systems and professional configurations, but the government has not taken action against

the problem of low-quality perceptions of primary medical institutions in China. If it can be proven that improvement in the perception of medical service quality can effectively curb the bypass behaviour of Chinese patients, this information will serve as an important reference for the development of China's PHC system. The results and conclusions of this study will serve as a reference for the construction of primary health care services and the improvement of PHC utilization in China and other developing countries.

Materials And Methods

Participants

For extended sample coverage reflecting the overall working status of Chinese clinical pharmacists, this study adopts a multi-stage sampling strategy to extract samples. The steps are as follows: (1) a total of 31 provinces (autonomous regions)/municipalities in mainland China were included, and in each province (autonomous region)/municipality, all cities were divided into three urban groups according to their GDP per capita in 2018, with a total of 93 urban groups included; (2) based on the hospital administrators' willingness, convenience sampling was adopted to select specific hospitals, and at least 2 secondary hospitals and 2 tertiary hospitals were selected in each urban group; and (3) in each hospital, at least 2 outpatients and 2 inpatients were selected according to whether they agreed to participate and met the following criteria.

Respondents participating in the study were required to meet the following conditions: (1) the patient was at least 18 years of age; (2) the disease could be treated in primary health care facilities or secondary and tertiary hospitals (emergency and surgical patients were excluded); (3) the patient was not referred from a PHC institution; and (4) respondents had sought medical care in primary care institutions and secondary and tertiary hospitals. Each eligible respondent was provided with informed consent. To ensure the confidentiality of the information provided by respondents, the researchers began their investigation after obtaining the consent of the respondent.

Independent variables

This study used the method of Gauthier (2011) (7) to measure the respondents' bypass behaviour based on the patients' knowledge and judgement of available medical institutions. Only patients who indicated that a PHC institution was closest to their home were included in our study. These respondents were then asked if they had bypassed their nearest PHC institutions in the past 12 months and went to secondary and tertiary hospitals. If the answer was "yes", it was defined as bypass behaviour, which was to be assigned a value "1" and "0" otherwise. The method has been proven to be more complete and accurate. Patients who suffered from serious diseases and who were referred to secondary and tertiary hospitals from PHC institutions were not defined as bypassers.

Dependent variables

This study uses the patients' medical experiences to reflect their perception of the quality of PHC services, and this method is increasingly used to assess the quality of primary and advanced care(4). The Primary Care Assessment Tool (PCAT) instruments developed by the Johns Hopkins Primary Care Policy Center for Underserved Populations were adopted to measure patients' perception of PHC services(23). The PCAT has been used and validated in multiple countries and is perhaps one of the most widely studied and applied tools for measuring the quality of primary care across the globe.

The study used the adapted Primary Care Assessment Tool-Chinese version (PCAT-C) (24). The answer is based on a 4-point Likert scale (definitely = 5 points; most likely, = 3 points; possibly = 2 points; definitely not = 1 point; not sure/do not know = 9). In keeping with the methods used in PCAT studies in other countries, this study assigns a value of 2.5 for 'not sure/do not remember' answers and uses the average score for the missing data(25). The responses are multiplied by 25. The total score is the mean of the six domain scores and reflects an overall measure of patients' experiences of primary care attributes. Thus, the domain scores range from 0 to 100 points, with higher scores indicating better perception of primary health care.

Covariates

Based on past empirical studies and literature, this study included relevant covariates to control for other factors that may influence patient bypass behaviour. The study included demographic characteristics, disease characteristics, and medical institution characteristics as control covariates, such as gender, age, household registration, education, income, occupation, marital status, self-perceived health, basic medical insurance, and distance to PHC institutions, which has been proven in previous literature to affect patients' bypass behaviour(4, 7, 9, 10, 13). Among these covariates, basic medical insurance is divided into Urban Employee Basic Medical Insurance (UEBMI), Urban Resident Basic Medical Insurance (URBMI) and New Cooperative Medical Scheme (NCMS). The classification criteria for other variables are detailed in the results section. From the perspective of patients, the facility information in the enriched dataset, such as the charges for medical care, is exogenous. That is, each individual is linked to the characteristics of available services, not the services that were actually used. Thus, the endogeneity problem that arises when this information is collected from respondents is avoided.

Pre-test of questionnaire

Data from a total of 106 patients were collected in the secondary and tertiary hospitals of Hangzhou, Zhejiang Province, China, according to their willingness to participate in the survey by convenience sampling. The study verified the rationality, comprehensibility and readability of the entire questionnaire and tested the reliability and validity of the PCAT scale. The results showed that the questionnaire was reasonable, understandable and readable. All indicators (standardized Cronbach's alpha = 0.688, Kaiser-Meyer-Olkin measure of sampling adequacy = 0.673, significance of Bartlett's test of sphericity = 0.000) indicated acceptable levels of reliability and validity for the PCAT.

Data collection

We organized and conducted this survey nationwide. Postgraduate students majoring in public health were recruited as candidate senior investigators, and undergraduates majoring in public health were recruited as candidate junior investigators. The researchers provided training and testing of survey skills for all candidate investigators, and 10 candidate senior investigators and 500 candidate junior investigators passed the test and were formally recruited as investigators. The junior investigators conducted the survey in sampled secondary and tertiary hospitals, and the senior investigators randomly checked 5% of the collected questionnaires at the end of the survey. The data were entered by two different persons in a double-blind manner.

All of the research data were collected by team-designed software (for Android: <http://117.78.41.192:8088/bistone/framework/app/mianFangMaster.apk>) and for iOS: <https://itunes.apple.com/us/app/%E9%9D%A2%E8%AE%BF%E5%A4%A7%E5%B8%88/id1063924434?mt=8>) and were processed into identifiable electronic data.

Statistical analysis

This study used descriptive statistics to report whether respondents had bypass behaviour (with yes = 1, no = 0) in the past year, as well as patients' scores in six core domains of the PCAT scale: first contact, longitudinal/ongoing care, coordination, comprehensiveness (services provided), family-centeredness and community orientation. In addition, we report the means and standard deviations of the continuous data for the covariates and the frequencies and percentages for the categorical data. Student's t-tests were used to analyse continuous data, and chi-square tests were used to analyse the categorical data. Because bypass measurements are binary categorical variables, this study adopted logit regression models to analyse the effect of patient PCAT scores on bypass behaviour. The means and Bayesian 95% confidence intervals (CIs) were estimated and expressed as odds ratios (ORs) for presentation. All statistical analyses were performed in SPSS 24 and STATA 14 software.

Results

Table 1 presents the descriptive statistics of the final sample. The total number of questionnaires collected from 31 provinces was 2070, and the effective response rate of the questionnaire was 67.44%. The data involved 706 hospitals of different levels, 52.85% of which were secondary hospitals and 46.47% of which were tertiary hospitals. In the valid questionnaire, the mean age of the respondents was 38.79 years, and the ratio of male to female respondents was approximately 1:1.60. This study included participants in both urban and rural areas, with a ratio of rural to urban respondents of approximately 1:1.52. Most of the urban respondents were insured by the UEBMI or the URBMI, most rural respondents were insured by the NCMS (30%); only a small proportion of the respondents (4%) reported that they did not have any form of health insurance. The results also showed that more than half of the respondents (76.72%) indicated that they engaged in bypass behaviour in the past year (1–5 times for most respondents).

Table 1
 Characteristics of Patients With or Without Bypass Behaviour (N = 1396)

Variable	Frequency/Mean	Proportion/SD
Age	38.97	16.88
PCAT scores (mean and SD of total score)	67.26	6.90
First contact	66.67	9.92
Continuity	70.01	8.42
Coordination	70.356	13.61
Comprehensiveness	67.62	12.81
Family centeredness	70.80	15.86
Community orientation	58.13	17.02
Bypass behaviour		
No	325.00	0.23
Yes	1071.00	0.77
Number of annual bypass behaviours		
0	313.00	0.22
1–5	996.00	0.71
6–10	46.00	0.03
11–15	13.00	0.01
16–20	1.00	0.00
>20	4.00	0.00
Data missing	23.00	0.02
Gender		
Male	536.00	0.38
Female	860.00	0.62
Hukou		
Rural	553.00	0.40
Urban	843.00	0.60
Medical treatment type		

Variable	Frequency/Mean	Proportion/SD
Outpatient	878.00	0.63
Hospitalization	518.00	0.37
Marriage		
Single	467.00	0.33
Married	897.00	0.64
Other (divorce or separation)	32.00	0.02
Number of kids		
0	520.00	0.37
1-3	831.00	0.59
> 3	45.00	0.03
Education		
Elementary school or lower	149.00	0.11
Junior high school	208.00	0.15
High school	282.00	0.20
Junior college	223.00	0.16
Undergraduate	498.00	0.36
Graduate student or higher	36.00	0.03
Income		
< 5529	561.00	0.40
5529-12,899	229.00	0.16
12,899 - 20,924	127.00	0.09
20,924 - 31,990	101.00	0.07
31,990 - 59,259	184.00	0.13
> 59,259	194.00	0.14
Occupation		
Student	272.00	0.19
Teacher	100.00	0.07
Public servant	59.00	0.04

Variable	Frequency/Mean	Proportion/SD
Worker	250.00	0.18
Individual household	213.00	0.15
Farmer	142.00	0.10
Retired	140.00	0.10
Temporary unemployment	16.00	0.01
Long-term unemployment	35.00	0.03
Medical staff	25.00	0.02
Others	144.00	0.10
Insurance		
None	53.00	0.04
UEBMI	405.00	0.29
URBMI	421.00	0.30
NCMS	421.00	0.30
Other	96.00	0.07
CMI		
No	958.00	0.69
Yes	438.00	0.31
Self-health grade		
Very poor	27.00	0.02
Poor	151.00	0.11
Fair	627.00	0.45
Good	432.00	0.31
Very good	159.00	0.11
Chronic		
No	1049.00	0.75
Yes	347.00	0.25

Table 2 shows the medical institutions in the vicinity of the respondents' residence. The results indicated that there were 2 hospitals around most respondents' residence. Only a small number of respondents

indicated that there were no hospitals near their residences. Respondents spent an average of 10.57 CNY (Chinese yuan) on PHC institution transportation expenses. Meanwhile, approximately 43.05% of respondents reported that a PHC institution was closest to their residence, and 39.69% of respondents indicated that secondary and tertiary hospitals were closest to their residence. In addition, the distance and time travelled by the respondents to the PHC institution and the waiting time at the PHC institution were lower than those of the secondary and tertiary hospitals (see Table 2).

Table 2
Patient-reported Characteristics of Medical Institutions Nearby

Variables	Mean/Frequency	Range/Proportion
Cold cost in PHC	152.21	0-3500
Distance from home to the nearest PHC	2.83	0-60
Time from home to the nearest PHC	19.65	0-120
Distance from home to the nearest TH	23.00	0-400
Time from home to the nearest TH	34.56	0-480
Waiting time in PHC	17.81	0-240
Waiting time in TH	40.80	0-300
Transportation fee to PHC	10.57	0-300
Number of hospitals available		
0	37	0.03
1	322	0.23
2	634	0.45
≥3	403	0.29
Type of nearest hospital		
General hospital	491	0.35
Special hospital	63	0.05
Clinic	231	0.17
Community health service centre (station)	354	0.25
Township health centre	148	0.11
Village clinic	99	0.07
Other	10	0.01

We present the results of the logit regression analysis of factors associated with bypass behaviour for the overall population in Table 3. The results showed that compared with men, women had a 61% increase in the incidence of bypass behaviour in the past year ($p < 0.01$). The occurrence of bypass behaviour among urban residents was 85% higher than that of rural residents. The farther the respondent's residence was from the PHC, the higher the incidence of bypass behaviour. The longer it took to travel to a higher-level medical institution, the lower the incidence of bypass behaviour among respondents. In addition, as age increased, the incidence of respondents' bypass behaviour tended to increase. For each additional point in patients' PCAT scores, the incidence of bypass behaviour in the past year was reduced by 2% ($p < 0.05$).

Table 3
Regression Analysis of Factors Associated with Bypass Behaviour

Independent Variables	Odds Ratio	95% Conf. Interval	
PCAT	0.98*	0.95	1.00
Female (Ref: Male)	1.61**	1.19	2.18
Age	1.01	0.99	1.04
Hospitalized (Ref: Outpatient)	1.23	0.89	1.69
Urban (Ref: Rural)	1.85**	1.20	2.84
Marriage (Ref: Single)			
Married	1.93	0.81	4.61
Other (divorced or separated)	3.66	0.86	15.68
Number of kids (Ref: 0)			
1	0.46	0.18	1.14
2	0.51	0.19	1.37
3	0.66	0.18	2.40
> 3	0.75	0.18	3.16
Education (Ref: Elementary school or lower)			
Junior high school	1.24	0.64	2.43
High school	1.57	0.76	3.22
Junior college	1.13	0.51	2.50
Undergraduate	1.49	0.66	3.34
Graduate student or higher	1.53	0.47	4.99
Income (Ref: <5529)			
5529-12,899	0.78	0.49	1.24
12,899 – 20,924	0.69	0.40	1.18
20,924 – 31,990	1.34	0.71	2.54
31,990 – 59,259	0.9	0.53	1.52
> 59,259	0.8	0.46	1.37
Occupation (Ref: <5529)			

Independent Variables	Odds Ratio	95% Conf. Interval	
Teacher	1.29	0.58	2.88
Public servant	0.7	0.27	1.84
Worker	0.84	0.44	1.60
Individual household	0.88	0.46	1.67
Farmer	0.62	0.27	1.42
Retired	0.68	0.25	1.86
Temporary unemployment	0.94	0.20	4.36
Long-term unemployment	0.94	0.28	3.12
Medical staff	0.84	0.44	1.62
Others	0.8	0.20	3.20
Insurance (Ref: none)			
UEBMI	2.11	0.98	4.53
URBMI	1.47	0.71	3.04
NCMS	1.39	0.67	2.88
UREBMI	2.1	0.78	5.69
Resident medical insurance	2.12	0.70	6.35
Business insurance (Ref: None)	1.01	0.72	1.41
Self-health grade (Ref: Very poor)			
Poor	1.83	0.49	6.80
Fair	0.93	0.28	3.11
Good	0.65	0.19	2.26
Very good	0.62	0.17	2.25
Chronic disease (Ref: None)	1.04	0.65	1.66
Number of hospitals nearby	1.16	0.95	1.40
Cold fee for PHC	1.00*	1.00	1.00
Distance to PHC	1.09**	1.03	1.16
Time to PHC	1.00	0.99	1.01

Independent Variables	Odds Ratio	95% Conf. Interval	
Distance to TH	1.00	1.00	1.01
Time to TH	0.99*	0.99	1.00
Wait time for PHC	1.00	0.99	1.01
Wait time for TH	1.00	0.99	1.00
Fare to PHC	1.00	0.99	1.01
_cons	2.83	0.26	30.55

Discussion

This study analysed the relationship between the bypass behaviour of Chinese residents and their perception of primary health care services. The results showed that better perceptions of the quality of services in primary medical institutions can effectively reduce patients' bypass behaviour. Additionally, the influence of gender, hukou, distance from PHC and time to tertiary hospitals on bypass behaviour cannot be ignored. Overall, our findings demonstrated the value of perceptions of the quality of primary health care services to patients' care-seeking behaviour under the loose gatekeeper system. This study provides a new perspective for the investigation of patients' bypass behaviour in the context of China's National Hierarchical Medical System, which also supports the following discussion.

Our results showed that when patients perceived that primary care institutions were of higher quality, their unreasonable bypass behaviour was reduced; thus, the improvement of service quality is very important for reducing bypass behaviour and even achieving the goal of the National Hierarchical Medical System. In China, the primary health care institution, which undertakes the diagnosis and treatment of chronic diseases and frequently occurring diseases, effectively ensures people's health and maintains the orderly operation of the medical system, is a core component of the NHMS. However, due to historical factors and health care systems(26), Chinese residents tend to go to higher-level hospitals when they suffer from diseases, resulting in unreasonable bypass behaviour. This may be because most patients perceive that primary health care institutions cannot provide medical services to treat their diseases or because their previous experiences of diagnosis and treatment in primary care institutions were unpleasant. Previous studies have shown that better service quality in primary care institutions can allow patients to have a more comfortable experience, enhance patients' trust in primary health care institutions, and help patients perceive a high quality of medical services, similar to those provided by secondary and tertiary hospitals. In turn, they change their concept and preference for medical care-seeking. Ultimately, the patient's tendency to go to secondary and tertiary hospitals is transferred to the primary medical institutions. Therefore, we suggest that primary health care institutions strive to improve the quality of the services they provide, including the following elements: perfecting patients' experience of their first contact;

ensuring continuous health care; respecting patients; communicating effectively with patients; and focusing on patients, families and communities(20, 21, 27–29).

In addition, age, hukou, health insurance, and income have a significant impact on the patient's bypass behaviour. Our results suggest that older patients have a lower probability of bypass behaviour, which may be because they live longer in their communities, resulting in deeper community attachment and more trust in the primary health care institutions near their communities. Additionally, PHCs may be more accessible to older patients due to the greater convenience of these facilities and the high incidence of chronic diseases and the limited economic capacity in this age group.

Medical insurance will greatly affect residents' bypass behaviour. The results of this study indicate that the incidence of bypass behaviour for UEBMI participants was the highest, followed by that of URBMI participants; the incidence of bypass behaviour was the lowest for NCMS participants. It is possible that medical insurance has an endogenous relationship with urban and rural household registration. The incidence of bypass among urban residents was higher than that among rural residents because in China, the types of insurance for urban residents are UEBMI and URBMI, while rural residents are generally involved in the NCMS. This finding may be explained by the following factors. First, the proportion of reimbursement for each type of medical insurance of bypass behaviour is different. In general, the lower the reimbursement rate of medical insurance is when patients bypass, the lower the probability of bypass behaviour, which must exclude patients who are not sensitive to price factors. On the other hand, people with UEBMI and URBMI living in cities have more choices for hospitals, and as our research shows, they have at least two hospitals to choose from. Therefore, they will choose a tertiary hospital with more advanced medical technology within their capabilities.

Another factor worthy of discussing is income. Although our regression results show that the impact of income on bypass behaviour is not significant, in reality, income is an important factor affecting bypass behaviour. Previous studies have shown that those with higher income have a higher incidence of bypass behaviour(11). This can be explained by the fact that people with higher incomes have more social capital and are more likely to choose doctors they are familiar with when seeking medical treatment and thus bypass primary care facilities. When their social capital is situated in the primary hospital, it reduces bypass behaviour. This uncertainty also explains why our regression results are not significant. In addition, higher-income groups may also purchase commercial medical insurance, which may only be reimbursed in secondary and tertiary hospitals or other private hospitals, thus making it unnecessary for these patients to go to primary health care institutions.

In summary, this study suggests that the perceived quality of primary health care institutions may play a more important role than other factors in reducing bypass behaviour. We also need further research to confirm the mechanism for patients' perceptions of quality reducing bypass behaviour. If patients' perceptions contribute to the more efficient utilization of primary health care services, the question is whether and how to manipulate these perceptions to improve the use of primary health care services, which requires further research.

Limitations

This is the first empirical study of the relationship between patient-perceived PHC quality and bypass behaviour in China. Although our results are the best approximation of the relationships investigated, some limitations must be considered.

The study did not consider the impact of provincial-level factors, including the regional culture and the policies of the provinces. For example, in the context of China's National Hierarchical Medical System, health policies vary among different provinces, which may contribute to differences in residents' bypass behaviour. One strength of this study is that the survey data were collected nationwide, but the variables available for analysis were limited, because in order to retain a relatively large sample and to control the quality of the data, our survey did not cover all potential control variables. We only included significant variables based on pre-survey results, which may ignore the effects of potential factors. In addition, the study did not consider the stock characteristics of PHC quality perceptions. We did not measure the relationship between PHC quality perceptions and bypass behaviour over a period of time, so there might be bias caused by time-related factors. We were unable to determine the causality between bypass behaviour and perceived quality of primary health care services over time.

Conclusions

This study suggests that patients' perceptions of the quality of primary health care services may play an active role in reducing patient bypass behaviour. Chinese residents had the highest score for family centeredness on the PCAT scale and the lowest score for community orientation. As our research shows, the quality perception of primary care institutions plays a major role in patient bypass behaviour and may produce significant spillover effects in China. We recommend that government departments improve and invest in the quality of primary health care institutions and focus on rectification in areas with low PCAT scores to improve patients' trust in and preferences for primary health care institutions by improving their visit experiences.

Declarations

Ethics approval and consent to participate

The ethical approval to conduct the pilot survey and main survey was granted by the Ethics Committee of China Pharmaceutical University (Project Number: CPU2019015).

Written consent to participate was obtained from each participant before data collecting.

Consent for publication

No sensitive and personal data were recorded, while confidentiality of data was assured during data analysis and reporting.

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests

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Authors' contributions

WZ, YH and XX contributed to conception and design of the work; WZ, GL and HZ contributed to the acquisition and analysis of the data; WZ, YH and XX contributed to the interpretation of data; WZ, YH and GL contributed to drafting of the work; WZ and YH contributed to revision of the work. All authors read and approved the final manuscript.

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Abbreviations

NHMS= national hierarchical medical system

PHC=primary health care

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