ORIGINAL RESEARCH

Quality Perceptions and Choice of Public Health Facilities: A Mediation Effect Analysis of Outpatient Experience in Rural China

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Purpose: Outpatients have choices of providers in the hierarchical health service delivery system of China. Understanding how quality perceptions and outpatient experience affect the choice of health facility would help inform decisions about priorities for action aimed at guiding the use of primary care. This study examines how quality perceptions of outpatient service affect the facility level choice in rural China.

Methods: Household surveys were conducted in 2011, 2012 and 2015 in Ningxia Hui Autonomous Region, China. We selected 968 respondents as the study sample, who had at least two outpatient visits to the public health facilities during each survey period. Prior quality perceptions of the outpatient service at the village clinics, township centers, and county hospitals were reported on an 8-item Quality Indicator questionnaire. Experienced quality perception from the first outpatient visit was also reported. The outcome of interest was outpatients' facility level choices. We used regression and mediation analysis to explore whether and how outpatient experience at a specific health facility would mediate the relationship between prior quality perceptions and the facility level choice.

Results: Overall, the quality perception was positively and significantly associated with outpatients' staying at the same or lower levels of care (β=0.265, P=0.007). This effect was fully mediated by experienced quality perception (z=2.985, P=0.003). The indirect effect was significant for three particular dimensions, including quality perceptions of the environment (β=0.075, P=0.025), doctor-patient communication (β=0.065, P=0.022), and physician ability (β=0.062, P=0.021).

Conclusion: Outpatient quality perceptions—especially positive perceptions regarding environment, doctor-patient communication, and physician ability—could contribute to minimizing upward referral via improvement in outpatient experience. Policymakers and health care providers may need to therefore optimize outpatient experience as they push to develop a more locally responsive primary care system.

Keywords: perceived quality, choice of provider, outpatient care, questionnaire, China

Plain Language Summary

What was already known?

- Quality perceptions of health care affect the patients' choice of health facility.

What does this study add?

- This study investigated whether and how outpatients' quality perceptions affect their choice of health facility.
- Outpatients' quality perceptions of the service quality predicted their staying at the same level of care or downward-referral.
- The effect of outpatients' quality perceptions on patient choice occurred indirectly via change to the quality perception of outpatient experience.

- Positive quality perceptions regarding the health facility environment, doctor-patient communication, and physician ability—could contribute to minimizing upward referral via improvement in outpatient experience.

What do the findings imply?

- The role of the betterment of outpatient experience appears to be marginal and worthy of reconsideration by policymakers and other stakeholders.
- To direct access choices towards primary care facilities, improvements in patients' subjective feeling about the environment, the doctor-patient informative communication, and the physician's ability at primary care facilities are likely to be required.

Introduction

In China, the primary health facilities are frequently bypassed by outpatients in favor of secondary or tertiary-level health facilities,[1] despite the substantial additional time and financial costs. Studies have shown that concerns about the quality of primary health facilities may be an important factor.[2,3] Patients subconsciously deem the high-tier health facilities to provide more valuable health care, and their health seeking behavior inadvertently promotes further concentration of market resources towards high-tier health facilities. For the last decade, the Chinese government has implemented a series of financial investment and related policies[4] to improve the infrastructure and quality of primary health services, especially in rural areas,[5] but the progress in encouraging the utilization of primary care has so far been limited. Clarifying the relationship between the quality perceptions of different tier health facilities and the facility-level choice in rural China therefore has significant policy implications.

Quality of health care is the criteria that measures the performance of a health care system, such as the service accessibility, level of health technology, efficiency of intersectoral cooperation and community participation.[6] Quality perception is here defined as the evaluation of health care from patients' perspective,[7] a process through which the patients' expectations are balanced with the perceptions of the care they receive.[8] The perceptions are generated by the patient's expectations and experiences, including but not limited to patient views, opinions or experiences of accessing health care services.

Studies have suggested that quality perceptions of health care exert an effect on the patients' healthcare-seeking behavior.[9–11] Perceptions of healthcare quality have been associated with patients' preference for different health care providers,[12] affecting subsequent behaviors.[13] Suppose the prior perception of a health care provider is favorable. In that case, it may enhance future health service utilization with the specific provider, adherence to the recommended treatment, and generate desired clinical outcomes. Furthermore, the choice of health facility is likely to be conditional on the initial service experience. It is important for outpatients to have favorable experience while using health care, to achieve behavioral loyalty to certain healthcare providers.[14,15] Consider, for example, the prior quality perception could be an antecedent to the perception of a certain service experience,[16–19] the effect of prior quality perception on the choice of health facility is likely to occur indirectly through making changes in perception about the service experience. Therefore, it is likely that both prior quality perception and experienced quality perception are determinants of patient choice.

By linking quality perceptions, outpatient experience to facility-level choice, a dynamic understanding of how outpatients decide upon the optional health facilities would be informed. While studies have explored how quality perceptions might matter for patients' revisiting behavior or loyalty,[9–11] the effect of quality perceptions on patient behavior as mediated by patient experience is scarce in literature.[20] Given the primary health facilities' important role in gatekeeping services from higher tier health facilities in rural China, our intended choice outcome would be the outpatients' retention at the same level of care or downward-referral. Until now, no study in China has been able to delineate whether outpatients' retention at the same level of care or downward-referral might occur due to quality perceptions.

With the growing attention on patient-centered care,[21,22] measurements of the relationship between different dimensions of quality perceptions and the choice of provider help to identify what aspects matter most to patients,[9,23–26] and are accordingly, informative in delivering patient-centered health care service by taking targeted measures to make health service responsive to the patient demands. Previous studies have helped identify the important drivers of positive

perception of service experiences, such as patient-doctor communication,[24,25] waiting time,[23] environment[26] and physician ability.[9] These results are inconsistent across study regions. This study also adds to the mixed results by identifying which aspects of outpatient experiences at public health facilities may matter most to patients and drive their reports of positive perceptions with the service, and thus contributing to the choice outcome in rural China.

This study aims to examine whether quality perceptions predict the outpatients' choice of level of care in public health facilities. We specifically investigated whether outpatients' prior quality perception directly affects their choice of health facility, or whether outpatient experience mediates this effect. If the second case is true, we would further disaggregate the mediation effect for different quality perception dimensions.

Research Framework and Hypotheses

Figure 1 shows the proposed research model. The effect of quality perception on outpatients' choice of health facility is divided into two pathways. One is the direct effect of prior quality perception on outpatients' choice of health facility, the other is the indirect pathway through the outpatient experience. We validated this model in the context of rural China by considering the hypotheses as follows:

H1: Prior quality perception of a health facility has positive effect on the probability of outpatients choosing that health facility.

H2: Prior quality perception of a health facility has positive effect on the experienced quality perception of that health facility.

H3: Experienced quality perception of a health facility has positive effect on the probability of outpatients choosing that health facility.

H4: Outpatient experience mediates the relationship between prior quality perception and the choice of health facility.

Materials and Methods
Study Setting

The context of the current study is in Ningxia Hui Autonomous Region, a northwest rural area with a population of 6.252 million. Ningxia had the third lowest level of Gross Domestic Product (GDP) per capita among all provinces in China during the study[27] so it could be seen as representative of less-developed areas of China. The Chinese government has targeted village clinics (VCs) and township centers (THCs) as primary care gatekeepers to higher tiers of health care services in the rural regions, but there have been no designated medical institutions for outpatients seeking health care.
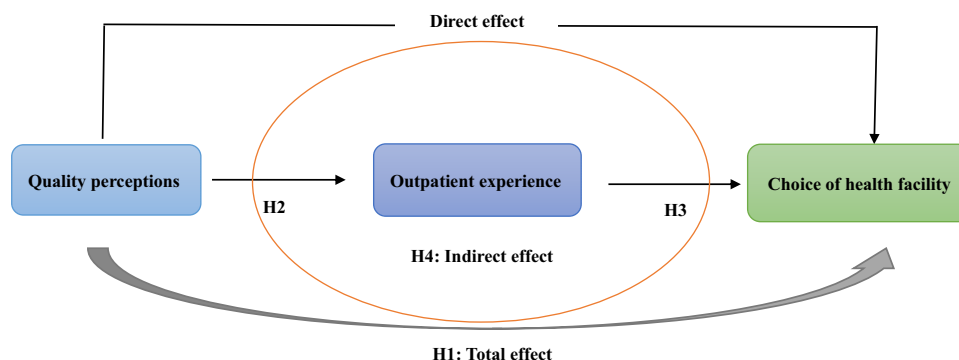
Figure 1 Proposed research model.**Notes**: The effects of quality perceptions on the choice of health facility: direct effect (the effect of the prior quality perception on outpatients' choice of health facility); indirect effect (outpatient experience mediates the relationship between the prior quality perception and outpatients' choice of health facility); total effect (the combination of direct and indirect effect).

This study considered outpatients' choice under the public health facilities setting, but it is worthy to note that there are also private clinics in the studied area, accounting for less than 10% of all the health facilities.

Questionnaire Survey

Face-to-face household surveys were conducted in 2011, 2012 and 2015 at Ningxia Hui Autonomous Region, using multistage stratified sampling from 6702 households, comprising 28,548 individuals from 78 townships and 917 villages. The household attrition rates were 18.39% and 31.61% for the 2012 and 2015 waves, respectively. We replaced households with which we could not follow up during the 2012 and 2015 waves with randomly selected households from the same village.

The household questionnaire was initially developed in Chinese. The surveys captured the respondents' demographic characteristics, health status, comorbidities, the family's economic level and household size. The surveys also included the outpatients' 8-item quality perceptions of different tier health facilities (Appendix 1), and the evaluation of each outpatient visit (Appendix 1). The internal consistency for the questionnaire using Cronbach's alpha test was 0.903 for the 8-item quality perception section. Cronbach's alpha is deemed excellent if higher than 0.9. Additionally, a pilot study was conducted in 2009 to ensure all questions were clear and reliable to the Chinese population. The results obtained in the pilot study were not included in this analysis.

Sampling Procedures

The minimum sample size required to conduct this study was calculated based on a confidence level (Cl) of 95%, a 4% margin of error, and a 50% distribution response for a population of over 20,000. As a result, the minimum required sample size was found to be 583.

The inclusion criteria of study samples were: i) patients sought outpatient care, ii) had at least two contacts, iii) at public health facilities, including village clinics, township centers and county hospitals over the past 14 days before the household surveys. The exclusion criteria of study samples was: the respondents who had exordinary higher out-of-pocket payments (higher or equal to 10,000 Yuan) for the second outpatient visit compared with other respondents. As a result, 968 respondents were enrolled in the study, as shown in the flow diagram (Figure 2).
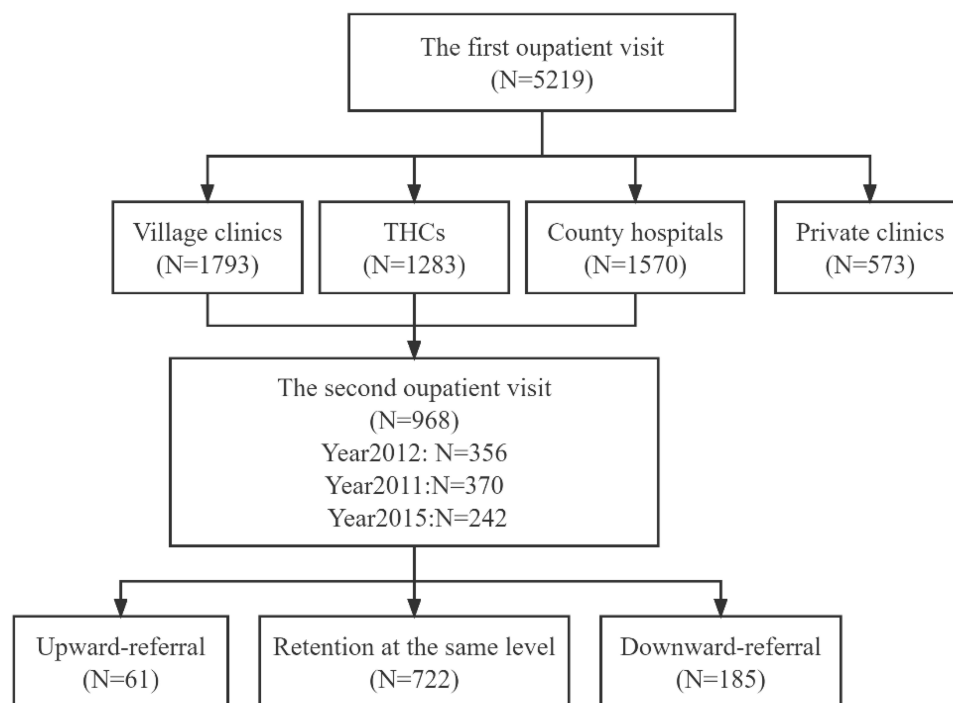
Figure 2 The enrollment of study samples.

Ethics

The study was conducted in accordance with the Declaration of Helsinki. The study received ethical approval from the University of Oxford Review Committee, Ningxia Medical University Ethical Review Board and Fudan University Ethical Review Board (IRB00002408). Respondents gave their informed consent for inclusion orally before participating in the study. As this is a non-invasive, survey-type study, the research involved no procedures for which written consent is usually required. The verbal informed consent was approved by the institutional review boards upon reviewing the study protocol. Respondents under 18-years old were approved by the ethics committees to provide informed consent either on their own behalf or by their parents.

Measurements

Outpatients' Choice of Health Facility

We assume that the health service quality of the same tier health facility is homogeneous. Considering the importance of strengthening gate-keeping role of the primary care in rural China, we specifically expected that patients retained at the same tier health facility or referred downward. The outcome variable–outpatients' choice of health facility, was a binary variable, with outpatients' retention or downward-referral denoting 1 and outpatients' upward-referral denoting 0.

Prior Quality Perceptions

The quality perceptions of outpatient care were reported on an 8-item Quality Indicator questionnaire (Appendix 1), which was developed from the patients' perspective by Hu Min, Winnie Yip, etc.[28] A five point Likert-type scale, ranking from (1) "Very poor" to (5) "Very good", was used to measure the prior quality perceptions. Apart from the overall quality perception, seven dimensions of outpatients' quality perceptions were measured using the following items: i) waiting time (WT), ii) the environment cleanliness and comfort level (ECCL), iii) physician politeness and consideration of patients (PPCP), iv) physician description of illness, causes, and treatment plan (PDICTP), drug availability (DA), vi) equipment sophistication (ES), vii) physician ability to diagnose and treat illness (PADTI).

Potential Mediator: Experienced Quality Perception

Literature has widely shown that service experience can contribute to the formation of healthcare quality perceptions.[10,12,16] Based on the two outpatient visits over the 14 days we observed, the evaluation of the first outpatient experience at a specific health facility was measured to bridge the link from prior quality perception to the choice of health facility (Appendix 1: Panel B1). In response to the evaluation of the first outpatient experience, a five-point Likert-type scale, ranking from (1) represents "Very poor" to (5) represents "Very good" was used.

Covariates

According to Anderson's framework,[29] the extent to which an individual chooses to use healthcare services depends on three types of factors: predisposing characteristics, the need for services and enabling factors. Drawing on this model, we controlled for potential confounding by assessing the following characteristics on outpatients' choice of health facility: predisposing characteristics (age, gender, educational attainment, marital status, household size); their need for services (self-reported health, chronic disease conditions and disease types); and enabling considerations (asset index, employment status). The missing data for marriage were replaced and categorized into "Divorced/Widowed/Else". Year effects and county effects were controlled in each regression model. Different insurance types were not included in the analysis, as more than 93.5% of the residents in these 5 counties were covered exclusively by the New Rural Cooperative Medical Care System.

Data Analysis

Frequency distribution and mean statistics were used to describe the patients' characteristics. The dropout analysis is shown in Figure 2.

To verify the relationships in the proposed model, the data were fit to three multiple linear regression models, which controlled for patient characteristics, year effects and county effects. These three regression models were developed using Baron and Kenny's procedure,[30] to determine whether prior quality perceptions predicted the outpatients' choice of

health facility directly or indirectly via outpatient experience. If it occurred indirectly, we could conclude that it was mediated by the outpatient experience. In the first model, outpatients' prior quality perception and the choice of health facility were entered as the independent and dependent variables, respectively. In the second model, prior quality perception and experienced quality perception of an outpatient visit were entered as the independent and dependent variables, respectively. In the third model, prior quality perception and experienced quality perception of an outpatient visit were both entered as independent variables, and outpatients' choice of health facility was entered as the dependent variable. Sobel tests[31] were further conducted to examine the mediatory effects.

If the mediation effect exists, the next step was to disaggregate the effect of prior quality perception. To remove the potential risk of mediator-outcome confounding, we further conducted a mediation analysis proposed by Karlson, Hom, and Breen[32] (KHB). The basic idea of the KHB approach was to compare the full model with a reduced model that substitutes the residuals of the mediator from a regression of the mediator on the key variables. Compared with the estimates from Baron and Kenny's procedure, in the case of binary outcomes such as the outpatients' choice in our case, the KHB method allows separation of the change in the coefficient due to either confounding or rescaling.[33,34]

All statistical analysis was performed using Stata 15.1 statistical software.

Results

Patients' Characteristics

Table 1 shows the socio-demographic characteristics of the study sample. Women accounted for more than half of the participants. Over 51.88% of the respondents' age was between 41 and 65 years. Over 61.24% attended school. More than 75.27% of respondents were married. The unemployment rate was less than 1.40%. The most common profession is farmers, which accounted for over 63.64%. The average household size was over 4. Poor or very poor health was reported by less than 47.21%.

Outpatient Care Quality Perceptions

Table 2 contains the ratings of the prior quality perception and the experienced quality perception. In the responses to the overall prior quality perception, compared to patients who retained at the same level of care ("retention") or referred downward to lower tier public hospitals ("downward referral"), patients who sought higher level care ("upward referral") rated lower score to the previously visited health care provider (*P*=0.025). Likewise, in the responses to the quality perception of the previously outpatient experience, compared to those who had retentions or downward referrals, patients who sought higher level care rated lower score to the previously visited provider (*P*<0.001).

Outpatients' Choice of Health Facility

Table 3 presents the two outpatient choices we observed. For the first outpatient visit, 35.23% of the respondents sought outpatient care at village level, followed by 35.02% of the respondents sought outpatient care at county level or above, and 29.75% of the respondents sought outpatient care at township level. For the second visit, compared to the previous visit, 74.43% of the respondents stayed at the same tier health facilities, 6.49% of the respondents referred downward towards lower-tier health facilities, while 19.07% of the respondents referred upward towards higher tier health facilities.

Testing the Hypothesis

To validate the hypothetical relationships in the proposed research model, specifically, to determine whether prior quality perception predicted outpatients' choice of public health facilities via outpatient experience, we followed Baron and Kenny's procedure. The results are presented in Table 4.

In the first step, the results indicated that the overall prior quality perception of a health facility was a positive and significant predictor of patients' retention at the same tier health facility or referral to lower-tier health facilities (*β*=0.041, *P*=0.006). In the second step, the results indicated that the prior quality perception of a health facility was positively and significantly associated with the experienced quality perception (*β*=0.205, *P*<0.001). In the third step, the results showed that, while the experienced quality perception of a health facility remained a positive and significant predictor of patients'

Table 1 Social-Demographic Characteristics of the Participants (N=968)

	2011 (N=356)	2012 (N=370)	2015 (N=242)
Female - N (%)	210 (58.99%)	211 (57.03%)	128 (52.89%)
Age in years - mean (SD)	46.50 (19.42)	43.38 (19.98)	47.15 (20.70)
Age group - N (%)			
<18	37 (10.39%)	55 (14.86%)	34 (14.05%)
18≤age≤40	75 (21.07%)	84 (22.43%)	31 (12.81%)
41<age≤65	190 (53.37%)	192 (51.89%)	132 (54.55%)
>65	54 (15.17%)	40 (10.81%)	45 (18.60%)
Asset Index - N (%)			
Low	96 (26.97%)	93 (25.14%)	56 (23.14%)
Low to medium	86 (24.16%)	100 (27.03%)	39 (39.26%)
Medium	66 (18.54%)	74 (20.00%)	50 (20.66%)
Medium to high	59 (16.57%)	51 (13.78%)	49 (20.55%)
High	49 (13.76%)	52 (14.05%)	48 (19.83%)
Educational attainment - N (%)			
Never attend school	138 (38.76%)	125 (33.78%)	74 (30.58%)
Elementary	122 (34.27%)	125 (33.78%)	107 (44.21%)
Middle school	53 (14.89%)	56 (15.14%)	23 (9.50%)
High or more	9 (2.53%)	15 (4.05%)	6 (2.48%)
Others	34 (9.56%)	49 (13.24%)	32 (13.33%)
Marital status- N (%)			
Unmarried	13 (3.65%)	23 (6.22%)	11 (4.55%)
Married	279 (78.37%)	278 (75.14%)	185 (76.45%)
Divorced/Widowed/Else	64 (17.98%)	69 (18.65%)	46 (19.17%)
Employment status - N (%)			
Unemployed	5 (1.40%)	4 (1.08%)	3 (1.24%)
Farmer	268 (75.28%)	239 (64.59%)	154 (63.64%)
Unskilled laborer	23 (6.46%)	32 (8.65%)	22 (9.09%)
Skilled laborer	45 (12.64%)	62 (16.76%)	48 (19.83%)
Student	15 (4.21%)	33 (8.92%)	15 (6.20%)
Self-reported health status - N (%)			
Fairly good	10 (2.81%)	7 (1.89%)	7 (2.89%)
Good	89 (25.0%)	111 (30.00%)	59 (24.38%)
Fine	119 (33.43%)	113 (30.54%)	62 (25.62%)
Poor	108 (30.34%)	112 (30.27%)	95 (39.26%)
Fairly poor	30 (8.43%)	27 (7.30%)	19 (7.95%)
With chronic disease - N (%)	183 (51.40%)	159 (42.97%)	148 (61.06%)
Household size - mean (SD)	4.40 (1.61)	4.65 (1.66)	4.19 (1.76)
Disease Category - N (%)			
Respiratory system disease	78 (21.91%)	125 (33.78%)	81 (33.47%)
Digestive system disease	130 (36.52%)	96 (25.95%)	55 (22.73%)
Urogenital disease	69 (19.38%)	67 (18.11%)	37 (15.29%)
Disease during pregnancy and childbirth	33 (9.27%)	61 (16.49%)	41 (16.94%)
Trauma and toxicosis	19 (5.34%)	17 (4.59%)	15 (6.20%)

Abbreviation: N, number.

retention or downward referral (β=0.056, P=0.001), the prior quality perception did not (β=0.029, P=0.055). It was observed in the Sobel test that the experienced quality perception has a strong mediation effect on the relationship between prior quality perception and the choice outcome (z=2.985, P=0.003).

These results consistently suggest that the outpatient experience was likely to be a potential mediator of the effect of prior quality perception on outpatients' choice outcome.

Table 2 Outpatient Care Quality Perceptions According to the Choice Outcome (N=968, Mean ± SD)

	By Outpatient Choice		
	Upward (N=185)	Downward or Unchanged (N=783)	*P*-value
Prior Quality Perception			
Overall	3.77±0.93	3.93±0.87	0.025
Waiting time (WT)	4.07±1.07	3.99±1.06	0.384
Environment cleanliness and comfort level (ECCL)	3.96±0.90	4.05±0.84	0.179
Physician politeness and consideration of patients (PPCP)	4.05±0.94	4.01±0.93	0.637
Physician description of illness, causes, and treatment plan (PDICTP)	3.82±0.96	3.94±0.96	0.119
Drug availability (DA)	3.41±1.09	3.53±1.10	0.186
Equipment sophistication (ES)	3.29±1.16	3.38±1.15	0.306
Physician ability to diagnose and treat illness (PADTI)	3.72±1.04	3.84±0.96	0.154
Experienced quality perception	3.45±0.80	3.68±0.75	0.000

Note: Likert 5-point scales was used.
Abbreviations: N, number; SD, standard deviations; *P, P* value of LSD-*t* test.

Table 3 The First and Second Choice of Health Facility of the Study Sample (N=968)

Choice of Health Facility		n	%
The first outpatient visit (N=968)	Village clinics	341	35.23%
	Township centers	288	29.75%
	County hospitals or above	339	35.02%
The second outpatient visit (N=968)	Upward referral	185	19.11%
	Retention	722	74.59%
	Downward referral	61	6.30%

Abbreviations: N, number; %, percentage.

Mediation Effect of Outpatient Experience

We next disaggregate the effect of prior quality perception on the outpatients' choice of health facility. The effect of the overall and the seven dimensions of prior quality perceptions was respectively disaggregated, using the KHB method. Table 5 presents the summary of the mediation analysis for the direct and indirect effect of the prior quality perceptions on outpatients' choice outcome, with experienced quality perception as the mediating variable.

As shown in Table 5, among the seven dimensions of quality perceptions, only three dimensions- ECCL, PDICATP and PADTI, have positive effect on the outpatients' choice of retention or downward referral (β=0.211, *P*=0.039; β=0.183, *P*=0.043; β=0.175, *P*=0.049). Furthermore, the above three dimensions' effect on the outpatients' choice outcome were fully mediated by the outpatient experience, in that the effect of these three dimensions were no longer significant (β=0.145, *P*=0.162; β=0.114, *P*=0.224; β=0.113, *P*=0.216) with the inclusion of experienced quality perception in the regression model. The KHB mediation analysis confirmed the existence of experienced quality perception as the mediator, the experienced quality perception explained respectively 28.55%, 31.09%, 37.96% and 35.74% of the total effect of the overall perceived quality, ECCL, PDICATP and PADTI.

Table 4 The Relationships Among the Overall Prior Quality Perception of Outpatient Service, Experienced Quality Perception and the Patient Choice (N=968)

Independent Variables	Step1: Independent Variable to Dependent Variable		Step 2: Independent Variable to Mediating Variable		Step 3: Mediating Variable to Dependent Variable	
	Dependent Variables: Patient Choice		Dependent Variables: Experienced Quality Perception		Dependent Variables: Patient Choice	
	Estimate (SE)	*P*-value	Estimate (SE)	*P*-value	Estimate (SE)	*P*-value
Prior quality perception-Overall	0.041** (0.015)	0.006	0.205*** (0.028)	0.000	0.029 (0.015)	0.055
Experienced quality perception	N/A	N/A	N/A	N/A	0.056** (0.017)	0.001
Female	0.036* (0.028)	0.198	−0.033 (0.053)	0.530	0.037 (0.028)	0.174
Age group (reference group = aged under 18)						
18≤age≤40	−0.027 (0.066)	0.683	0.216 (0.125)	0.084	−0.039 (0.065)	0.552
41<age≤65	−0.040* (0.037)	0.278	0.107 (0.070)	0.124	−0.046 (0.037)	0.210
Age>65	−0.077 (0.053)	0.148	0.095 (0.101)	0.346	−0.083 (0.053)	0.120
Asset Index						
Low	−0.030 (0.079)	0.699	0.007 (0.149)	0.961	−0.031 (0.078)	0.693
Low to medium	−0.013* (0.048)	0.779	−0.002 (0.091)	0.979	−0.013 (0.048)	0.780
Medium to high	0.042* (0.048)	0.383	−0.134 (0.092)	0.147	0.050 (0.048)	0.302
High	0.020 (0.071)	0.779	0.023 (0.135)	0.864	0.019 (0.071)	0.792
Educational attainment (reference group = never attend school)						
Elementary	−0.009* (0.032)	0.779	−0.002 (0.060)	0.975	−0.009 (0.032)	0.780
Middle school	−0.046* (0.042)	0.274	−0.012 (0.080)	0.880	−0.045 (0.042)	0.279
High or more	0.038 (0.078)	0.626	0.003 (0.149)	0.982	0.038 (0.078)	0.626
Marital status (reference group = married)						
Unmarried	−0.210** (0.066)	0.001	−0.068 (0.124)	0.585	−0.206** (0.065)	0.002
Divorced/Widowed	−0.002 (0.056)	0.967	0.065 (0.107)	0.544	−0.006 (0.056)	0.915
Employment status (reference group = unemployed)						
Farmer	−0.077 (0.117)	0.508	0.037 (0.222)	0.868	−0.079 (0.116)	0.495
Unskilled laborer	−0.016 (0.125)	0.896	0.016 (0.237)	0.947	−0.017 (0.124)	0.890
Skilled laborer	−0.082 (0.121)	0.500	−0.104 (0.230)	0.651	−0.076 (0.120)	0.529
Student	−0.078 (0.133)	0.558	−0.078 (0.253)	0.756	−0.074 (0.132)	0.578
Self-reported health status (reference group = fine)						
Fairly good	0.041 (0.084)	0.628	0.296 (0.159)	0.063	0.024 (0.084)	0.775
Good	−0.003* (0.037)	0.938	0.110 (0.070)	0.114	−0.009 (0.037)	0.804
Poor	0.025* (0.032)	0.440	−0.013 (0.062)	0.838	0.026 (0.032)	0.425
Fairly poor	0.057 (0.053)	0.282	0.020 (0.100)	0.839	0.056 (0.052)	0.290
With chronic disease	−0.024* (0.031)	0.439	0.025 (0.059)	0.667	−0.025 (0.031)	0.410
Household size	0.002** (0.008)	0.766	0.021 (0.016)	0.194	0.001 (0.008)	0.873

(*Continued*)

Table 4 (Continued).

Independent Variables	Step1: Independent Variable to Dependent Variable		Step 2: Independent Variable to Mediating Variable		Step 3: Mediating Variable to Dependent Variable	
	Dependent Variables: Patient Choice		Dependent Variables: Experienced Quality Perception		Dependent Variables: Patient Choice	
	Estimate (SE)	*P*-value	Estimate (SE)	*P*-value	Estimate (SE)	*P*-value
Respiratory system disease	0.018* (0.038)	0.638	0.110 (0.072)	0.127	0.012 (0.038)	0.757
Digestive system disease	0.017* (0.038)	0.655	0.021 (0.073)	0.776	0.016 (0.038)	0.676
Urogenital disease	0.007* (0.040)	0.855	−0.074 (0.077)	0.333	0.012 (0.040)	0.773
Disease during pregnancy and childbirth	−0.047* (0.044)	0.283	−0.024 (0.083)	0.772	−0.046 (0.043)	0.295
Trauma and toxicosis	0.007 (0.063)	0.907	0.101 (0.119)	0.399	0.002 (0.062)	0.979
Adjusted R^2	0.007		0.055		0.017	

Notes: *P <0.05, **P<0.01, ***P<0.001; Year fixed effect and county fixed effect were controlled.
Abbreviations: N, number; SE, standard errors; P, P value of LSD-t test; N/A, not applicable.

Table 5 Summary of Mediation Analysis Results for the Direct and Indirect Effect of Prior Quality Perceptions on Outpatients' Choice Outcome with Experienced Quality Perception as the Mediating Variable (N=968)

Dimensions of Prior Quality Perception	Estimate (SE)	P-value	Proportion of the Total Effect that is Mediated
Overall			
Total effect	0.265 (0.097)	0.007	28.55%
Direct effect	0.188 (0.100)	0.061	
Indirect effect	0.075 (0.025)	0.003	
Waiting time (WT)			
Total effect	−0.053 (0.085)	0.553	
Direct effect	−0.097 (0.086)	0.258	
Indirect effect	0.044 (0.015)	0.003	
Environment cleanliness and comfort level (ECCL)			
Total effect	0.211 (0.102)	0.039	
Direct effect	0.145 (0.104)	0.162	31.09%
Indirect effect	0.065 (0.022)	0.003	
Physician politeness and consideration of patients (PPCP)			
Total effect	0.011 (0.096)	0.905	
Direct effect	−0.077 (0.100)	0.441	
Indirect effect	0.088 (0.026)	0.001	
Physician description of illness, causes, and treatment plan (PDICATP)			
Total effect	0.183 (0.091)	0.043	
Direct effect	0.114 (0.093)	0.224	37.96%
Indirect effect	0.070 (0.023)	0.002	
Drug availability (DA)			
Total effect	0.151 (0.080)	0.058	
Direct effect	0.112 (0.080)	0.162	
Indirect effect	0.039 (0.014)	0.006	
Equipment sophistication (ES)			
Total effect	0.108 (0.076)	0.157	
Direct effect	0.081 (0.076)	0.286	
Indirect effect	0.026 (0.011)	0.020	
Physician ability to diagnose and treat illness (PADTI)			
Total effect	0.175 (0.089)	0.049	
Direct effect	0.113 (0.091)	0.216	35.74%
Indirect effect	0.062 (0.021)	0.002	

Note: The mediation analyses for each dimension of prior quality perceptions were conducted separately. All the models controlled for the patients' characteristics, year effects and county effects.
Abbreviations: N, number; SE, standard errors; P, P value of LSD-t test.

Discussion

The study demonstrated that quality perception of outpatient service was a determinant of the behavioral intention to use public health facilities. This finding is consistent with some studies that show service quality perception was a predictor of patient choice,[5,10] or patient satisfaction of service experience was an antecedent to behavioral intention.[35,36] This finding provides the foundation for our subsequent mediation analysis.

We further found that the effect of quality perception on outpatients' choice outcome was fully mediated by the outpatient experience, which are consistent with studies in other contexts that indicated "satisfaction of service experience" as a good

mediating variable between quality perception and behavioral intention.[11,37] This finding implies that improved quality perception could drive outpatients to stay at the same level of care or refer downward, but not without producing positive subjective feeling about the outpatient experience. In other words, the practice to improve the quality of primary care should also target the betterment of outpatient experience. If outpatients are satisfied with the quality of care received, they would be more likely to revisit the service provider or refer downward in the future. We speculate that the mediation effects under study should exist through three main mechanisms. Firstly, quality perception would affect the experience, and in return affected by the experience, so the relationship between quality perception and experience is dynamic and interactive. Secondly, the quality measures act on the health care providers could only affect patient behavior through contacting a doctor and having perceptions changed. Thirdly, service experience itself could help patients establish beliefs and attitudes towards health and disease, the beliefs and attitudes would have effect on the choice of provider.

As for the effect of different quality perception dimensions on the choice outcome, the mediation effect was significant for three particular dimensions, including the environment cleanliness and comfort level, the physician description, and the physician ability. These three quality perception dimensions affect the outpatients' choice outcome positively and significantly, and the effects were also fully mediated by quality perception of outpatient experience. These findings suggest that outpatients cared about the environment, the informative communication, and the competency of physicians when choosing from public health facilities. In order to attract outpatients to seek care at VCs or THCs, policymakers need to implement measures to improve the patients' appreciation of the environment, the doctor-patient informative communication and the physician's ability at VCs or THCs. On the other hand, information on processes of care and various other dimensions at different health facilities should be provided to facilitate more appropriate decision making.

Our analysis has a number of limitations. First, the measurement of quality perceptions was based on patient self-report which may have been subject to recall bias, although interviewers were trained in techniques to assist accurate recall to minimize this risk. Second, "prior quality perception of a health facility level" and "experienced quality perception of a particular health facility", were measured in the same survey and thus caused a measurement error. Third, we applied KHB method rather than traditional regressions to remove the potential mediator-outcome confounding and so as to more precisely disaggregate the direct and indirect effect. Still, the statistical associations found cannot be established as evidence for a causal interpretation under current study design, but as exploratory steps toward causality. Finally, the study was based largely in Ningxia, and heterogeneity across health systems and culture may preclude generalizability to other settings.

Conclusion

This research expands existing literature by providing evidence that outpatients' quality perceptions significantly predicted their facility-level choice in rural China. And more specifically, positive quality perceptions regarding the health facility environment, doctor-patient communication, and physician ability—could contribute to minimizing upward referral via improvement in outpatient experience. This research also determines the vital role of outpatient experience connecting quality perceptions and the choice of provider.

Therefore, our research has clear implications that strategies should be developed as the health care systems have engaged in active pursuit for patient-centered care and primary care facilities are increasingly dependent on. Firstly, for the public, information on various dimensions of healthcare quality at different health facilities should be provided sufficiently to facilitate more appropriate decision-making. Secondly, for primary care providers, this study emphasized the importance of guaranteeing favorable health care experiences to direct access choices towards primary care facilities. Finally, dynamic understanding of patients' quality perceptions about healthcare providers would strongly support health care quality management and policy-making.

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Disclosure

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