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Preferences for healthcare services among hypertension patients in China: a discrete choice experiment

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ABSTRACT

Objectives Our study aimed to support evidence-informed policy-making on patient-centred care by investigating preferences for healthcare services among hypertension patients.

Design We identified six attributes of healthcare services for a discrete choice experiment (DCE), and applied Bayesian-efficient design with blocking techniques to generate choice sets. After conducting the DCE, we used a mixed logit regression model to investigate patients' preferences for each attribute and analysed the heterogeneities in preferences. Estimates of willingness to pay were derived from regression coefficients.

Setting The DCE was conducted in Jiangsu province and Shanghai municipality in China.

Participants Patients aged 18 years or older with a history of hypertension for at least 2 years and who took medications regularly were recruited.

Results Patients highly valued healthcare services that produced good treatment effects (β=4.502, p<0.001), followed by travel time to healthcare facilities within 1 hour (β=1.285, p<0.001), and the effective physician–patient communication (β=0.771, p<0.001). Continuity of care and minimal waiting time were also positive predictors (p<0.001). However, the out-of-pocket cost was a negative predictor of patients' choice (β=−0.168, p<0.001). Older adults, patients with good health-related quality of life, had comorbidities, and who were likely to visit secondary and tertiary hospitals cared more about favourable effects (p<0.05). Patients were willing to pay ¥2489 (95% CI ¥2013 to ¥2965) as long as the clinical benefits gained were substantial.

Conclusions Our findings highlight the importance of effective, convenient, efficient, coordinated and patient-centred care for chronic diseases like hypertension. Policy-makers and healthcare providers are suggested to work on aligning the service provision with patients' preferences.

Strengths and limitations of this study

- The discrete choice experiment is a rigorous method that enables us to measure preferences for healthcare services among hypertension patients.
- Bayesian-efficient design with a blocking technique was applied to improve statistical efficiency as well as response efficiency.
- Comorbidities, past healthcare experience and health-related quality of life were used as variables to observe preference heterogeneity and address evidence gaps.
- While this study explored the preferences among hypertension patients, future studies need to examine other types of chronic diseases.

INTRODUCTION

Hypertension, also known as high blood pressure, is a condition in which the blood vessels have raised pressure persistently. Hypertension can damage the brain, heart, kidney and arterial blood vessels. It is ranked as the leading cause of premature death and the most important modifiable risk factor for cardiovascular disease.[1] The prevalence of hypertension is high and continues to be rising in China in recent years. Among Chinese adults aged over 15 years, 18.14% have hypertension.[2] Despite huge efforts, the awareness, treatment and control rate of hypertension remained extremely low, which were associated with substantial unnecessary disease burden and significant excess mortality.[3–5] Moreover, many hypertension patients have multiple comorbidities, which is associated with increased utilisation of healthcare services and great financial burden to individuals and the health system.[6 7]

To optimise the allocation of healthcare resources and reach the goal of delivering high-standard healthcare services, since 2009, the Chinese government has vigorously promoted the implementation of the hierarchical medical system. Primary healthcare facilities like community health service centres are expected to offer affordable first-contact care, while secondary and tertiary hospitals provide specialist referral services. In the past decade, advances have been made by the Chinese government in achieving universal health coverage and providing financial protection for its

citizens.[8] However, primary healthcare was underused, and the referral system was still practised with poor effectiveness.[9]

Patients were more favourable to healthcare services in hospitals than primary healthcare facilities in China.[10] Individuals with better socioeconomic status and greater healthcare needs seemed to be less likely to use primary healthcare.[11] As a result, hospitals were overloaded, and the long waiting time became the major source of dissatisfaction.[12] On the contrary, an integrated delivery system based on primary healthcare is helpful to meet the needs of China's ageing population that are facing an increased chronic disease burden.[13] Nevertheless, patients' preferences for hospital-based services for first-contact care place a huge obstacle to promoting community-based primary healthcare service.[14]

Understanding patients' preferences are particularly worthwhile when patient decisions are preference-sensitive, like the choice in healthcare services. Eliciting patients' preferences is a key element of patient-centred care. The discrete choice experiment (DCE) is a well-established quantitative approach to elicit stated preferences. Despite several DCEs being carried out to investigate patients' preferences for healthcare services, none of them involved patients with hypertension in China, one of the most common types of chronic diseases.[15–19]

Although patient-reported outcomes, such as health-related quality of life (HRQoL) are essential measures of health status, whether patients' preferences on healthcare services differ from HRQoL remain unclear. Furthermore, preferences contain a learnt component, and past experience might influence an individual's present choice.[20 21] We remain unclear about whether the healthcare facilities that patients usually visited in the past could have an impact on their current preferences for healthcare services.

Due to the high prevalence, serious complications and heavy burden, hypertension has become an important public health challenge. Effective and efficient healthcare services for hypertension patients are essential to successful disease control. Meanwhile, patients' demand for healthcare services varies according to the severity of the disease.[22 23] Therefore, we aim to fill the gap by measuring preferences of healthcare services for first-contact care among hypertension patients, thus supporting evidence-informed policy-making to address the problems of inappropriate healthcare service utilisation. Specifically, we conducted a DCE to test the following hypotheses: (1) attributes regarding health benefits are more important than other attributes for patients' preferences of healthcare services for first-contact care; (2) patients' preferences differ by sociodemographic characteristics, feelings of health status (ie, HRQoL), the severity of disease (ie, comorbidities) and the prior experience of healthcare services.

METHODS

Identification of attributes and levels

Our DCE design, implementation and analysis followed the user guide jointly developed by the World Bank, WHO and the US Agency for International Development.[24] First, a literature search on February 10th, 2020, was conducted to identify attributes that were used in DCEs regarding preferences of healthcare services among patients with chronic diseases or chronic conditions. Twenty-seven studies were identified, with one DCE[25] conducted in the UK aimed to explore patients' preferences for the management of hypertension (online supplementa appendix 1). We found that the most commonly mentioned domains were the service provision capabilities (skills and attitudes of medical staff, accessibility of medicines and medical equipment, clinical benefits, environment, continuity of the care/coordination and continuity), service efficiency (waiting time for the appointment or treatment), affordability (costs or out-of-pocket costs for healthcare services), and convenience (travel time or distance from home to healthcare facilities) (online supplemental appendix 2). While in the DCE for preferences of hypertension patients,[25] there were four attributes including service provision capabilities (frequency of blood pressure measurement), clinical benefits (reduction in 5-year cardiovascular risk), affordability (at the macro level as measured by the annual cost to National Health Service in the UK), and model of care (as defined by types of personnel who was responsible for disease management).

Second, focus group discussions with physicians and hospital managers were carried out to determine the attributes and levels. According to their suggestions, although the expertise of healthcare professionals was found to be an important attribute for patients' preferences, benefit from healthcare was also indispensable. Effectiveness is one of the important domains in quality assessment measures.[26 27] The effectiveness of healthcare has been considered as the ultimate validator of the quality of care.[28] Furthermore, improvement in the effectiveness of healthcare service would be helpful to achieve population health improvement and health system sustainability.[29] Healthcare services that could bring health benefits usually had strong recommendations from experts.[30–32] As shown in guidelines on management and control of hypertension, getting blood pressure under control and reducing the risk of complications are the goals for hypertension treatment.[33 34] Therefore, we classified the levels of treatment effects according to the control of blood pressure and complications.

Continuity of care is a necessary part of the framework on integrated people-centred health services proposed by WHO.[35] Continuity of care was correlated with increased patient satisfaction, and effective physician–patient communication was regarded as a central clinical function.[36 37] Traditionally, a continuous caring relationship with the same healthcare professionals was found in previous DCEs.[38–42] However, for providers in vertically

Table 1 Attributes and levels of healthcare services in the DCE

Domains	Attributes	Levels	Variables coding
Capabilities	Treatment effects	Good; moderate; poor	Categorical
	Physician–patient communication	Good; moderate; poor	Categorical
	Continuity of care	Yes; no	Categorical
Efficiency	Waiting time	Within 0.5 hour; 2 hours; 4 hours or longer	Categorical
Affordability	Out-of-pocket costs per visit (if reimbursed)	¥150–¥600	Continuous
Convenience	Travel time	Within 1 hour; 3 hours; 6 hours or longer	Categorical

The average exchange rate of US Dollars to CNY in 2020 was about 6.90. Therefore, ¥150 was approximately US$21.7 and ¥600 was about US$87.0.
CNY, Chinese Yuan; DCE, discrete choice experiment.

integrated healthcare systems, the contrasting ideal is the delivery of a 'seamless service'.[43] Similarly, multidisciplinary care became an attribute in a DCE that measured preferences for urban integrated primary care among type 2 diabetes patients.[44] As a result, we defined continuity of care as the healthcare facility operating in a well-functioning care delivery system, which could provide coordinated healthcare services for patients.[43]

Attributes and levels of healthcare services that were used in our DCE were shown in table 1. Details of the explanation of attributes and levels were listed in online supplemental appendix 3. Our research objective was to identify the healthcare service attributes and levels that were preferred by hypertension patients, not the grade of hospitals (ie, primary, secondary, tertiary). Hence, the scenarios in our DCE were not restricted to a specific grade of hospitals.

Experimental design and development of the questionnaire

We used Ngene V.1.2 software (Choice-Metrics, Sydney, Australia) to conduct the D-efficiency experimental design. After obtaining priors of the attributes and levels from the pilot, the Bayesian-efficient design was used to create the formal choice sets, which comprised 48 pairs of scenarios and were divided into six blocks, with eight pairs in each block. Blocking design boosted response efficiency by reducing the cognitive burden on respondents.[45]

We applied unlabelled DCE, which had been widely used to investigate public preferences for healthcare.[16–18 46–48] Respondents in unlabelled DCEs found that they were not subject to the psychological cues of the labels, thus reflecting the real-life choice.[49 50] Also, in our research, we did not investigate patients' preferences for specific types of healthcare facilities. Therefore, the unlabelled DCE was considered appropriate. When no option had a definitive advantage, it was assumed that an opt-out option could raise the probability of neutral responses, increasing the number of individuals that might choose the opt-out scenario.[51–53] While the forced-choice sets under preference uncertainty would favour options that were easier to justify and contributed to a lower likelihood of regret and error.[54] Consequently, forced-choice sets were used in our DCE. Examples of choice scenarios were shown in online supplemental appendix 4.

The questionnaire included four parts. The first part consisted of patients' socio-demographic characteristics, medical history, comorbidities and healthcare experience (ie, types of frequently visited healthcare facilities). The second part contained the DCE tasks. The third part was the items of EQ-5D-5L developed by the EuroQol Group. The EQ-5D-5L is a generic preference-based instrument that measures individuals' HRQoL. It used a health-state classification system defining health in five dimensions, mobility, self-care, usual activities, pain/discomfort and anxiety/depression.[55] Each of the five dimensions was classified into five levels of perceived problems, no problem, mild problems, moderate problems, severe problems and unable to/extreme problems. The final part was the level of understanding and confidence when making the DCE choices. The score ranged from 0 (worst case) to 10 (best case) (online supplemental appendix 5). We excluded the DCE questionnaires with an average score of less than eight to ensure the validity of the data.

Sample size

There was no universal standard for the ideal sample size for DCEs.[56] A less efficient design might require a larger sample size, leading to increased costs.[57] We followed a rule-of-thumb[58] when determining sample size:

$$\frac{nta}{c} \geq 500$$

where n was the number of respondents, t was the number of tasks, a was the number of alternatives, and c was the largest number of levels for any attributes. We had six blocks of choice sets; as a result, the minimum sample size was 564.

DCE implementation and data collection

Our formal DCE was carried out from 1 November 2020 to 31 December 2020, in Jiangsu province and Shanghai municipality. Both Jiangsu province and Shanghai belong to the Yangtze River Delta region, which is the largest urban agglomeration in China. In recent years, the integration of healthcare resources and services in the region has been listed in the Chinese government's agenda.

Inclusion criteria were patients aged 18 years or older, with a history of hypertension for at least 2 years, and who took medications regularly. Hypertension patients during pregnancy were excluded. Patients were recruited consecutively from nine healthcare facilities.

To ensure the validity and reliability of the survey, the DCE questionnaires were administrated through one-to-one, face-to-face interviews. Our interviewers consisted of eight medical interns and nine physicians. For quality assurance, we compiled a survey training manual and trained the interviewers before the experiment. The interviewers were required to check the completeness of each questionnaire immediately after it was completed. As long as any missing information, they had to ask patients to provide additional information. For patients who were illiterate or had blurred vision, the interviewers explained the meaning of the questionnaire item by item until the patients fully understood each item.

We proposed a hypothetical situation of poor blood pressure control and severely uncomfortable symptoms. Patients were asked to think carefully and make a trade-off between two types of services for their first-contact care. The duration of the survey ranged from 20 min to 1 hour. Patients were informed that participation in the survey was anonymous and voluntary, and their verbal and informed consent was obtained prior to the survey. We gave each patient a wrapped cotton towel as a gift (¥10 or US$1.4).

Patient and public involvement

One hundred and eight patients participated in the pilot survey to provide feedback on the intelligibility and acceptability of the questionnaire. Responses from the patients contributed to a more apprehensible and concise description of the DCE questions. The patients engaged in the pilot were not involved in the formal survey. No patients took part in the recruitment of study participants or the carry out of the study.

Statistical analysis

Our DCE data analysis was based on the random-effects model.[59] In the random utility theory, the conventional utility function U consists of two parts: one is the determinism V containing the observable component, and the other is the random component ε representing the random error term with standard statistical properties.[60] Therefore, the utility of the individual i of alternative n is:

$$U_{in} = V_{in} + \varepsilon_{in} \quad (1)$$

According to equation (1), the probability of the respondent choosing designated healthcare services was simulated. The probability of choice was determined by the indirect utility function of the respondent i who choose j in the selection set s. It was assumed to be a linear and additive form, and its form was:

$$V_{ijs} = X_{ijs}\beta + \varepsilon_{ijs} \quad (2)$$

Where V_{ijs} represented the utility derived from a choice, $X_{ijs}\beta$ was the utility component, and ε was the random component. The $X_{ijs}\beta$ was specified below, where $\beta_{1\text{-}6}$ represented reference scores of attributes and β_0 was the constant:

$$\begin{aligned} X_{ijs}\beta_j = \; & \beta_0 + \beta_1 Treatment\ effects_j + \\ & \beta_2 Physician - patient\ communication_j + \\ & \beta_3 Continuity\ of\ care_j + \\ & \beta_4 Waiting\ time_j + \\ & \beta_5 Travel\ time_j + \\ & \beta_6 Out - of - pocket\ costs_j \end{aligned} \quad (3)$$

We implemented the above equation by mixed logit regression using STATA V.14.2 SE (STATA) and was specified with 500 Halton draws. The mixed logit model allows for unknown heterogeneity in individual preferences. We assumed that all variables of the attributes had a random component and that the weights of preference were normally distributed.[61] The choice of patients was the dependent variable, and the selected attributes were independent variables.

Respondents' characteristics are likely to influence their decisions, but they are neither part of the choice alternatives nor a direct source of utility. One way to investigate how respondents' characteristics affect their choices is to include interaction terms between attributes and individuals' characteristics, allowing weights of the attributes to vary with characteristics.[62] Therefore, we extended the main effects model with interaction terms between attribute levels and the factors likely to influence patients' choices. The interaction terms were specified as random parameters to keep suitable computation times. To assess whether preferences varied, we performed χ^2 tests for joint significance. SEs were clustered at the respondent level during the analysis.

Effects coding was used for categorical variables in DCE data. For effects coding, the mean effect for each attribute was normalised at zero, rather than all the reference categories being set to zero.[63] Each coefficient was estimated relative to the mean attribute effect.[63] The marginal rate of substitution between attributes could be obtained by calculating the ratio of the partial derivatives of each attribute, where β was the coefficient of the attribute.

$$MRS = -\frac{\beta_a}{\beta_b} \quad (4)$$

Since our DCE attributes included costs, it could be used to generate an estimate of willingness to pay (WTP) of attributes expressed as in the unit of cost by replacing the denominator with the β estimate for the cost attribute. According to the estimated preference scores for each attribute level, WTP for changing attribute A from level 1 to level 2 could be calculated as follows:

$$\mathrm{WTP} = -\frac{\beta_{A2} - \beta_{A1}}{\beta_{cost}} \quad (5)$$

where β_{cost} was the preference score of out-of-pocket costs, and β_{A1} and β_{A2} were preference scores of level 1 and level 2 for the attribute A, respectively.

RESULTS

Patients' characteristics

A total of 722 hypertension patients were consented to participate in our DCE survey. Nineteen patients were excluded from the analysis due to non-compliance with the inclusion criteria, incomplete data, lack of understanding and confidence in making the DCE choices. As a result, data from 703 patients were available for analysis. Two hundred and seven patients (29.45%) were enrolled from primary healthcare facilities, 247 (35.13%) from secondary hospitals and 249 (35.42%) from tertiary hospitals. For details about the number of patients in each sampled hospital, please refer to online supplemental appendix 6. On average, patients found it easy to understand the scenarios (8.23, 95% CI 8.18 to 8.27), and confident in their choice (8.99, 95% CI 8.92 to 9.05).

Table 2 summarises the sociodemographic and clinical characteristics of patients. The sample had more males than females (56.90% vs 43.10%). The average age was 64.66 years old (ranging from 24 to 96 years old). 38.26% of the monthly household income was less than ¥4000. A total of 416 patients (59.17%) had comorbidities, and cardiovascular disease (191 patients) was the most common type (online supplemental appendix 7). Only 47.80% of patients considered primary healthcare facilities as their first choice, and only 26.17% of patients had contract service with general practitioners.

Model estimation of preferences

We found that patients valued healthcare services that generated good treatment effects (β=4.502, p<0.001), followed by travel time to healthcare facilities within 1 hour (β=1.285, p<0.001), and the adequate physician–patient communication (β=0.771, p<0.001) (table 3). Minimal waiting time (β=0.447, p<0.001) and continuity of care (β=0.321, p<0.001) were also positive predictors of patients' choice of healthcare services. While out-of-pocket cost was a negative predictor of patients' preferences (β=−0.168, p<0.001). The SD revealed coefficient heterogeneity in the random parameters of attributes. We excluded patient data from healthcare facilities in Shanghai to do the sensitivity analysis, and the statistical significance of attributes was stable (online supplemental appendix 8).

Marginal WTP

According to the average WTP (table 4), we found that patients highly valued the magnitude of treatment effects. They would be WTP an extra ¥2489 for healthcare services to improve the effects from poor to good, while their WTP to increase the effects from poor to moderate was ¥1155. The WTPs for other attributes from high to low were as follows: travel time, satisfied physician–patient

Table 2 Characteristics of patients (N=703)

Variables	N (%)
Gender	
Male	400 (56.90)
Female	303 (43.10)
Age*	
<65	308 (43.81)
65–74	258 (36.70)
≥75	137 (19.49)
Education	
Primary school/unschooled	337 (47.94)
Junior high school/high school	279 (39.69)
Junior college or higher vocational college	54 (7.68)
Bachelor's degree or above	33 (4.69)
Employment	
Farmer	278 (39.54)
Urban employee	106 (15.08)
Freelancers	74 (10.53)
Unemployed	22 (3.13)
Retiree	223 (31.72)
Type of public health insurance	
UEBMI	272 (38.69)
URRBMI	431 (61.31)
Monthly household income (CNY)	
≤¥2000	126 (17.92)
¥2001–¥4000	143 (20.34)
¥4001–¥6000	130 (18.49)
¥6001–¥8000	91 (12.95)
¥8001–¥10 000	72 (10.24)
¥10001–¥12 000	54 (7.68)
>¥12 000	87 (12.38)
Duration after diagnosis of hypertension (years)	
≤10	474 (67.43)
>10	229 (32.57)
Comorbidities	
No	287 (40.83)
Yes	416 (59.17)
The most frequently visited healthcare facilities	
Primary healthcare facilities	336 (47.80)
Secondary hospitals	228 (32.43)
Tertiary hospitals	139 (19.77)
Contract service with general practitioners	
No	519 (73.83)
Yes	184 (26.17)
EQ-5D-5L index value†	
≤0.85	423 (60.17)
>0.85	280 (39.83)

Continued

Table 2 Continued

Variables	N (%)

*Patients were divided into three groups: young and middle-aged (younger than 65 years old), young-old elderly (aged 65–74), old-old elderly (aged 75 and older).[76]
†EQ-5D-5L represents the five-dimensional five-level instrument to measure health-related quality of life developed by the EuroQol Group. The utility index was derived from the Chinese value sets.[77]
CNY, Chinese yuan; UEBMI, Urban Employees Basic Medical Insurance; URRBMI, Urban-Rural Residents Basic Medical Insurance.

communication, minimum waiting time, moderate physician–patient communication, continuity of care, and moderate waiting time.

Preference heterogeneity

The impact of patients' characteristics on preferences for healthcare services was shown in online supplemental appendix 9. We tested for interactions of monthly household income levels with different attributes. Compared with low-income patients, those who had high income showed stronger preferences for good physician–patient communication (β=0.377, p<0.05) and minimum waiting time (β=0.396, p<0.01) (model 1). The negative interaction term between income and moderate treatment effects showed that high-income patients valued the moderate effects to be less important than did low-income patients.

Similarly, we tested for interactions of age with the attributes, with young or mid-aged patients as the reference category (model 2). Four interaction terms were statistically significant: good treatment effects (β=2.839, p<0.001), shortest travel time (β=0.533, p<0.01), good physician–patient communication (β=0.442, p<0.05) and continuity of care (β=0.232, p<0.05).

There were statistically significant interaction terms of comorbidities with three attributes. Patients who had comorbidities favoured more in healthcare services that generated good treatment effects (β=0.986, p<0.05), required minimum travel time (β=0.588, p<0.01), and ensured continuity of care (β=0.318, p<0.01) (model 3).

Compared with patients who usually visited primary healthcare facilities, those who tended to seek healthcare services from secondary or tertiary hospitals expressed a stronger preference for good treatment effects (β=0.898, p<0.05) and minimum waiting time (β=0.351, p<0.05) (model 4). Patients with higher HRQoL paid more attention to healthcare services that contributed to good treatment effects (β=1.748, p<0.01) (model 5).

Table 3 Estimates of the mixed logit model (N=703)

Attributes	Mean (SE)	SD (SE)
Treatment effects		
Poor(ref)	−4.299*** (0.348)	
Moderate	−0.204* (0.089)	0.824*** (0.160)
Good	4.502*** (0.357)	2.148*** (0.223)
Physician–patient communication		
Poor(ref)	−0.727*** (0.089)	
Moderate	−0.044 (0.061)	−0.390** (0.147)
Good	0.771*** (0.084)	0.657*** (0.119)
Continuity of care		
No(ref)	−0.321*** (0.048)	
Yes	0.321*** (0.048)	0.318** (0.121)
Waiting time		
4 hours or longer (ref)	−0.476*** (0.072)	
2 hours	0.029 (0.063)	−0.137 (0.225)
Within 0.5 hour	0.447*** (0.066)	0.351** (0.132)
Travel time		
6 hours or longer (ref)	−1.490*** (0.122)	
3 hours	0.205*** (0.061)	0.409*** (0.122)
Within 1 hour	1.285*** (0.107)	0.952*** (0.111)
Out-of-pocket costs (if reimbursed)		
Cost (per ¥50)	−0.168*** (0.020)	0.198*** (0.033)
Log likelihood	−2299.4957	
Observations	11 248	

The coefficient for the reference group was calculated as the negative sum of other coefficients.[63]
*P<0.05; **p<0.01; ***p<0.001.
HRQoL, Health-related quality of life; Ref, reference.;

Table 4 Marginal willingness to pay (WTP) for each attribute (N=703)

Attributes	WTP (95% CI)
Treatment effects	
From poor to moderate	1155*** (927 to 1383)
From poor to good	2489*** (2013 to 2965)
Physician–patient communication	
From poor to moderate	191*** (113 to 270)
From poor to good	423*** (315 to 532)
Continuity of care	
From no to yes	184*** (122 to 247)
Waiting time	
From 4 hours or longer to 0.5–2 hours	146*** (73 to 219)
From 4 hours or longer to within 0.5 hour	265*** (185 to 346)
Travel time	
From 6 hours or longer to 1–3 hours	481*** (368 to 594)
From 6 hours or longer to within 1 hour	783*** (615 to 950)

***P<0.001.

DISCUSSION

Patients' preferences for healthcare services

To the best of our knowledge, this is the first DCE that systematically investigated the attributes influencing the

choice of healthcare services for first-contact care among chronic disease patients like hypertension in China. An in-depth understanding of patients' perspectives on different healthcare service attributes is of global interest since it could inform the providing of appropriate healthcare that could improve patient satisfaction and service utilisation.

According to the estimated attribute-level coefficients, we found that the treatment effect was the most important attribute defining patients' preferences. Our results also showed that older adults, patients who had higher HRQoL, with comorbidities, and who usually visited secondary or tertiary hospitals to treat hypertension cared more about good treatment effects. The findings highlight the importance of taking effectiveness into account to improve patients' acceptance of primary healthcare services. However, the clinical experience of physicians[15 17] and types of healthcare professionals,[16] rather than treatment effects, were often used to reflect the capabilities of healthcare provision in previous studies. In fact, preferences for provider types, which involved gender, types of medical staff, job titles, and professional training experience, were complex and difficult to interpret.

Our findings demonstrated that the minimum travel time to the healthcare facility was the second most important attribute. The results were consistent with previous DCEs, as the respondents disliked travelling longer distances to the healthcare providers.[16 44] Patients who were older and those who had comorbidities might feel inconvenient to travel a long distance for the first-contact care and rated shortest travel time to be more important than the counterparts.

Continuity of care was concerned with the quality of care over time. In our study, continuity of care was defined as coordinated and patient-centred care. It is a process involving the orderly, uninterrupted movement of patients among the diverse elements of the service delivery system.[43] We found that patients desired healthcare services that were consistent and coordinated according to their health needs. In addition, the continuity of care was considered even more important for older patients and patients who had comorbidities. They needed more health resources than other groups, and their choices of first-contact care should be paid more attention to.

We found that good physician–patient communication was also an important attribute preferred by patients. In fact, effective physician–patient communication is essential in healthcare, affecting the patients' compliance with recommendations for care.[64] Physician–patient communication is a powerful indicator of healthcare quality that can determine patients' self-management behaviour and satisfaction with healthcare providers.[65 66] This is shown by greater patient involvement and decisions are reached through shared decision making.[67] Our analyses revealed that high income and older patients valued good physician–patient communication more than did lower-income and younger groups.

Longer waiting time and increased out-of-pocket costs were significant, negative predictors for the entire sample, showing that patient preferences decreased as the waiting time and out-of-pocket costs increased. Similar results were noted in DCEs eliciting public preferences for the choice of healthcare providers.[47 50] In addition, we found high-income patients and those who were likely to visit secondary or tertiary hospitals concerned more about waiting time. As shown in the previous study conducted in a Chinese public tertiary hospital, the reduced waiting time led to increased patient satisfaction.[68] Patients might have an increased WTP for services that require less waiting time for an appointment to diagnose or treat, especially in the case of severe symptoms.[69]

Implications of the study findings

In China, patients sought first-contact care in a disorderly manner, and the gate-keeping role of primary healthcare has not been fully implemented.[70] Patients' preferences should be known to guide the delivery of appropriate, effective and efficient care. Our research confirms that the ideal healthcare services that meet hypertension patients' demands for first-contact care comprise the following attributes: produce good treatment effects, closer to home, offer good physician–patient communication, need short waiting time, ensure continuity of care and require low out-of-pocket costs per visit.

The treatment effect was the most important attribute to attract patients. Patients were more likely to choose the healthcare services that led to the experience of good quality. It is worth noting that older patients, patients who had high HRQoL, patients with comorbidities, and those who tended to visit secondary or tertiary hospitals would pay special attention to treatment effects. Meanwhile, patients expect to communicate with physicians to deliberate and express their preferences and views during the clinical decision-making process. Furthermore, older patients who are emotionally vulnerable and socially isolated are particularly in need of the emotional, social and practical support that sensitive physician–patient communication can provide.[71]

Evidence of variations in the perceived utility of healthcare services among patients emphasises the importance of taking individual patient preferences into account to address the problems of inadequate primary healthcare service utilisation and the ineffectiveness of the two-way referral mechanism. Healthcare systems need to be adaptable enough to offer patients choices to account for heterogeneity in patients' preferences.

Our study highlights the importance of improved service quality, timely access, and shared decision-making for the first-contact care of chronic diseases like hypertension. The improvement of service quality, physician–patient communication, and continuity of care will contribute to patients' preference to choose primary healthcare facilities as the first-contact care. Our findings were consistent with the optimal healthcare delivery strategies to achieve universal health coverage, which involves

providing effective, safe, people-centred care that is timely, equitable, integrated and efficient.[72]

The quality of primary healthcare in China needed to be strengthened, and evidence-based monitoring and evaluation of the service quality are crucial for attaining the goals of healthcare system reform.[70] In addition to education for the general practitioners, the Chinese government could consider tailoring continuing training for the primary healthcare workforce.[73] Shared decision making is appropriate for clinical decisions involving multiple reasonable options,[74] such as the management of chronic diseases. To improve the physicians' communication skills, strictly planned, culturally competent, effectively implemented and rigorously evaluated trainings are required.[75] Care coordination approaches should also be advocated to engage patients in decision making, support effective management of comorbidities, and ensure accessibility to interventions. Furthermore, the primary healthcare-based integrated delivery system in China should be strengthened.[13]

Strengths and limitations

Our DCE provides valuable information about how patients weigh their first-contact care options and trade-off different healthcare service features. A better understanding of patients' preferences will guide the future development of the two-way referral mechanism, as policy-makers aim to bridge the gap between the optimal modes for patient-centred service delivery and patients' first-contact care needs.

The major contributions of our study are as follows. First, we used a DCE which followed good research practices, offering the advantage to explore the trade-offs between attributes of healthcare services. Second, the Bayesian-efficient design was applied to increase the statistical efficiency of the choice sets design, and a blocking technique was used to increase the response efficiency of patients. Third, we derived WTP estimates in hypothetical settings among patients with chronic diseases like hypertension. Fourth, this is the most comprehensive study that identifies preference heterogeneity according to age, income, HRQoL, comorbidities and past healthcare service experience.

Our study has several limitations. First, the DCE results are not representative of all patients with chronic diseases, because we only explored the preferences among hypertension patients to ensure the homogeneity of patients. Future studies need to enrol patients with other types of chronic diseases and identify variations in patients' preferences across different subgroups. Second, our samples were from Jiangsu and Shanghai, which stand for the most economically developed regions in China. Future studies should have a nationally representative sample by including the economically underdeveloped regions. Meanwhile, evenly distribution of sampled healthcare facilities in each region should be ensured. Third, given the limited number of attributes and levels tested in DCE, it might not represent complex real-life situations. To further understand the relationship between stated (those elicited in the DCE) and revealed preferences (actual first-contact care-seeking behaviour), studies are warranted to investigate if and how patients' preferences in healthcare services impact their long-term clinical outcomes. Finally, we only used comorbidity to represent disease progression and severity. Researches are suggested to evaluate variations of patients' preferences at different stages of the disease.

CONCLUSION

Our DCE provides evidence about how hypertension patients value the attributes of healthcare services, including the capabilities, efficiency, affordability and convenience of service provision, in the context of chaotic first-contact care-seeking behaviour in China. The findings underline the importance of effective, convenient, efficient, coordinated and patient-centred care for chronic diseases like hypertension. We also found preference heterogeneity that is correlated with patients' sociodemographic characteristics, feelings of health conditions, the severity of disease (ie, comorbidities) and the prior experience of healthcare services. Policy-makers and healthcare providers are suggested to work on aligning the service provision with patients' preferences, thus promoting the rational utilisation of healthcare resources.

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