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Urban-rural differences in preferences for traditional Chinese medicine services among chronic disease patients: a discrete choice experiment

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Abstract

Background With the increasing prevalence of chronic diseases, the demand for medical services from chronic disease patients has become diversified and personalized. The advantages and role of traditional Chinese medicine in the prevention and treatment of chronic diseases gradually emerging. The preferences and willingness to pay for traditional Chinese medicine services (TCMS) among patients with chronic diseases, as well as any disparities between urban and rural patients, have not been examined in past studies.

Objective This study aimed to investigate the preferences of chronic disease patients for TCMS, explore the value/ importance that patients place on different treatment attributes, and evaluate whether there are urban-rural differences in their preferences and willingness to pay for TCMS.

Methods A total of 317 patients from Jiangsu Province, China participated in a discrete choice experiment that elicited the preferences for TCMS. The choice questions were constructed by six attributes: out-of-pocket (OOP) cost, institution, medical provider, treatment method, treatment duration, treatment efficacy. Mixed logit models were used to estimate the stated preference and marginal willingness to pay for each attribute.

Results The choice preferences of chronic disease patients for TCMS in this study were influenced by the four attributes: institution, treatment method, and treatment efficacy, and OOP cost. Improvements in treatment efficacy were the most concerning, followed by being treated in traditional Chinese medicine (TCM) hospital. Patients were willing to pay more to get better treatment outcomes. Compared with primary care institutions, patients were willing to pay more for treatment in TCM hospitals. The preferences for economic attribute (OOP cost) varied between urban and rural areas, and rural patients tended to favor scenarios that imposed a lower economic burden on them.

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Conclusion The chronic disease patients' preferences for TCMS were determined mainly by treatment efficacy but also by institution, treatment method and OOP cost. The urban-rural difference in preference identified in this study highlights that effective policy interventions should consider the characteristics of patients' demand in different regions.

Keywords Chronic diseases, Traditional Chinese medicine services, Patient preferences, Urban-rural disparities, Integrative medicine, Discrete choice experiment

Introduction

Noncommunicable disease is a significant public health issue that has received significant recognition and global attention [1]. World Health Organization reported that a significant portion of global deaths were attributed to chronic diseases, with this proportion reaching as high as 74% by 2019, which caused the highest disease burden worldwide [2]. Meanwhile, chronic diseases have grown increasingly prevalent in China, with a concerning lack of awareness, treatment, and control, leading to increased health risks and financial burdens on families [3]. Previous studies have shown that the demand and utilization of healthcare services by chronic disease patients are gradually increasing, especially for those who have multiple chronic diseases [4, 5].

China has recently given traditional Chinese medicine (TCM) more attention and recognized its effectiveness in the prevention and treatment of chronic diseases. According to the Opinions on Promoting the Inheritance, Innovation and Development of Traditional Chinese Medicine issued in 2019 [6], a variety of TCM rehabilitation programs have been developed for chronic diseases such as diabetes, cardiovascular and cerebrovascular diseases. Additionally, the necessity of fully utilizing the benefits and role of TCM in the prevention and treatment of chronic diseases is specifically stated in Medium- and Long-Term Plan for the Prevention and Treatment of Chronic Diseases in China (2017–2025) [7]. Meanwhile, the efficacy of TCM in the prevention and treatment of chronic diseases has also been the focus of many research studies [8]. Previous researcher compared Chinese and Western treatments and determined that TCM possesses a distinctive advantage in treating certain chronic disease [9]. TCM employs a personalized approach to health management based on the individual's physiologic system [10]. Nevertheless, some studies have shown that although most chronic disease patients were familiar with and trusted TCM prevention and health care services, their willingness to pay was not strong [11, 12]. Compared with western medicine, the development of TCMS is probably restricted by lower medical service costs and the shortage of service providers, which may lead to a gap between the existing TCMS and the actual demand and preferences of patients.

Better understanding chronic disease patients' preferences for TCMS can bridge the gap between patients' choices and policy implementation. Previous studies have explored patients' preferences for healthcare service and chronic disease management, suggesting that medical institution, waiting time, type of healthcare professional and distance to practice, were key drivers of preferences [13–17]. The accumulating body of evidence indicated that individuals actively engage in decision-making processes when seeking medical care [18], underscoring the imperative to comprehend patients' preferences in selecting healthcare services to enhance their quality. Gaining insight into the requirements of patients is also crucial for facilitating the advancement of TCM's quality. However, to our knowledge, no prior studies have evaluated preferences of patients with chronic disease for TCMS. That is, the way in which patients evaluate the various factors that potentially impact their choice of TCMS, as well as their decision-making processes and trade-off considerations, remains ambiguous. Furthermore, disparities in the distribution of TCM resources existed between urban and rural areas in China [19]. However, it remains uncertain whether there are differences between urban and rural patients' preferences and willingness to pay for TCMS, which requires more investigation.

Thus, to address the above research gap, the objectives of this study were to elicit chronic disease patients' preferences and willingness to pay for TCMS, and to explore the potential urban-rural disparities. The findings of this research may provide optimization directions for TCMS providers, illustrate how to provide appropriate and effective TCMS to chronic disease patients in multiple ways, and serve as decision-making support for the advancement of TCM health management and the prevention and control of chronic diseases.

Methods

Overview

We performed a discrete choice experiment (DCE) among a sample of chronic disease patients in Jiangsu, China, to elicit their preferences for TCMS in chronic disease management. DCE is a quantitative research method based on random utility theory [20], as a means of identifying and assessing the relative importance of decision-making aspects related to health outcomes and health care services and is considered a stated preference technique for quantifying patients' priorities [21, 22]. A DCE choice task presents respondents with a series of

choice sets described by several characteristics (called attributes and levels) [23], which requires respondents to consider trade-offs between ≥2 alternatives options in hypothetical scenarios. Based on the participants' choices, endpoint-based utility scores for certain alternatives could be derived [24].

Identifying attributes and levels

The central question in this study was: On which features do rural and urban patients with chronic diseases base their assessment of TCMS and which features are most useful in the process of evaluating and selecting TCMS?

First, an initial list of attributes was obtained by conducting a review of the published literature [25–31].The present list delineates the characteristics associated with institutions, outcomes, methodologies, and other pertinent factors related to the diagnosis and treatment of patients afflicted with chronic illnesses. This procedure yielded 13 attributes, including institution, cost, efficacy, reimbursement rate, distance to seek medical treatment, waiting time, type of doctor, adverse reactions, etc. Second, three specialists on chronic disease management were invited to assess and evaluate the list of possible attributes and levels. All attributes needed to be measurable, actionable, and realistic to ensure that policy implementation avoids subjective or personalized attributes [32]. Subsequently, two rounds of focus group consultations were conducted. The first group consisted of two

experts in chronic disease management, two TCM practitioners, and three primary healthcare workers. The second group was composed of ten chronic disease patients from outpatient clinics. Before the workshop, all participants provided verbal informed consent. This led to the selection of six attributes for the final experiment by gathering their opinions on the factors previously identified from the literature: OOP cost, institution, medical provider, treatment method, treatment duration, treatment efficacy (Table 1).

Experimental design

This study utilized the Statistical Software for Data Science (STATA) 17.0 to implement the D-efficiency design method, resulting in the generation of 18 sets of choice scenarios. To further reduce the cognitive burden of respondents and ensure their compliance, the 18 sets of choice scenarios were divided into three blocks, with each block consisting of 6 sets of choice scenarios, and each choice set was designed to include two options (A and B). To examine internal consistency, we utilized a random number method to select the second set of choices to test the consistency of respondents' selections. In the end, each questionnaire version consisted of 7 sets of choices (An example choice set is presented in Table 2). The retest choice set was excluded from the model's estimation. Respondents were randomly assigned to one of these versions for answering, ensuring that

Table 1 Attributes and levels in the discrete choice experiment survey

Attributes	Levels	Explanation
Institution	Primary care institution	Community health service centers/township health centers
	General hospital	General hospitals capable of dealing with a wide range of diseases and injuries and providing a full range of health care services
	TCM hospital	Clinical departments featuring TCM specialties, which can use Chinese medicine to prevent and treat diseases and meet the people's demand for TCMS.
Medical provider	General practitioner	Those who have obtained a license to practice general medicine and provide primary health care services
	Clinician	Licensed clinical practitioner or assistant practitioner providing clinical health care
	Chinese medicine practitioner	Those who have obtained the qualification of Chinese medicine practitioner or assistant practitioner and provide Chinese medicine consultation and treatment services
Out-of-pocket cost	200CNY	Cost per course of treatment
	500CNY	
	1000CNY	
Treatment method	Internal treat	Internal Chinese medicines/proprietary Chinese medicines, soups, powders, plasters, pills, etc.
	External treat	Tuina, acupuncture, moxibustion, gua sha, cupping, fumigation, foot bath, etc.
	Combined internal and external treatment	Combining both above treatments
Treatment duration	Long	7–12 months
	Medium	4–6 months
	Short	1–3 months
Treatment efficacy	Poor	Failure to improve and alleviate or worsening of disease symptoms
	Middle	Partial improvement and relief of disease symptoms
	Good	Significant improvement and relief of disease symptoms

Note TCM, traditional Chinese medicine; TCMS, traditional Chinese medicine service; CNY, Chinese Yuan

Table 2 An example of a choice set from the Discrete Choice Experiment

Attributes	Service A	Service B
Institution	General hospital	Primary care institution
Medical provider	General provider	Chinese medicine provider
Out-of-pocket cost	1000CNY	200CNY
Treatment method	Internal treat	External treat
Treatment duration	Medium	Short
Treatment efficacy	Middle	Good
Which service do you prefer?	☐	☐

the numbers of participants using three versions were balanced.

The questionnaire was developed for this study and consisted of two main parts (See the supplementary file). The first part collected sociodemographic information, health status, chronic disease experience, and current treatment status of patients. The second part an included the explanation of the DCE task and all the attributes with levels, DCE choice tasks wherein respondents were asked to express which of the presented TCMS options they preferred.

Data collection

According to the Orme minimum sample size calculation formula: $N > 500c/(t \times a)$, where c is the maximum number of levels in the attribute, t is the number of choice sets, and a is the number of options per choice task [33, 34]. In the context of this research experiment, c is 3, t is 7, and a is 2. Therefore, the sample size should be greater than 108 people.

A stratified random sampling method was used in this study. Patients were recruited on consecutive weeks from 12 counties and cities of Jiangsu Province from July to August 2022. Participants aged 18 years old and above who have been diagnosed with any chronic disease by a healthcare professional were eligible to complete the survey. Finally, a total of 317 valid responses were collected, which meets the requirement for the experimental sample size.

The survey was carried out by the research assistants who had received proper training in administering the questionnaires according to the study protocol to ensure the provision of consistent information. The research assistants conducted the questionnaires through face-to-face, one-on-one interviews to guarantee the accuracy of the responses. Prior to conducting the surveys, the research assistants introduced the study to every participant, clarified the significance of each attribute, and aided the respondents in completing the questionnaires. The patients completed the questionnaire themselves

anonymously after they provided informed written consent.

Statistical analysis

Responses to demographic and history of chronic disease questions were summarized using descriptive statistics. Data were analyzed in STATA 17.0 (Stata Corp LP) using a mixed logit model. The random utility theory provided the theoretical underpinning for the analysis of the DCE data [35], which assumes that respondents behave as rational economic individuals and chose a certain alternative that yielded a higher utility to them over the other one. The Utility was calculated using the following formula:

$$U_{njt} = V_{njt} + \epsilon_{njt} = \beta_n X_{njt} + \epsilon_{njt}$$

Where U_{njt} represents the utility respondent n obtained from the alternative j on choice set t, which was composed of an observable component (V_{njt}) and a random component (ϵ_{njt}); X_{njt} represents the explanatory vector of the attribute; and β is a vector of coefficients that represent the corresponding strength of preference to be estimated. The magnitude of the coefficient is linked to participants are to select a particular attribute level that indicates the relative strength of preferences for each attribute level [36]. For all analyses $p<0.05$ (two-sided) were judged to be statistically significant.

Monetary equivalents measure the value of changes in attribute levels, also known as willingness to pay (WTP). The cost attribute was assumed to be continuous. The calculation of WTP estimates involves dividing the attribute coefficients by the cost coefficient for each model. This allows us to understand respondents' preferences for a specific attribute level in terms of monetary value compared to the reference level. The WTP calculation formula in this study is as follows:

$$WTP_X = -\frac{\beta(X)}{\beta(OOP\ cost)}$$

Results
Respondent characteristics

A total of 317 respondents completed the dominant choice task and were included in the main analyses. Table 3 summarizes respondents' demographic characteristics and health status. Of all respondents, with a mean age of 58.9±17.3 years, 63.1% lived in urban area. More than half of the participants were female (55.5%). About two-thirds of participants have an annual household income of 60,000 CNY or more. Most participants have been diagnosed with a chronic disease (57.1%), and 42.9% of participants suffered from two or more chronic

Table 3 Demographic characteristics of the study sample

Characteristics	Total $N=317(\%)$	Urban $N=200(63.1\%)$	Rural $N=117(36.9\%)$	χ^2	*P* value
Gender				1.349	0.245
Male	141 (44.5)	84 (42.0)	57 (48.7)		
Female	176 (55.5)	116 (58.0)	60 (51.3)		
Age(years)				19.949	<0.001
18–45	62 (19.7)	51 (19.6)	11 (9.4)		
46–59	74 (23.3)	53 (23.3)	21 (17.9)		
≥60	181 (57.1)	96 (57.1)	85 (72.6)		
Education				34.604	<0.001
Elementary school and below	154 (48.6)	76 (38.0)	78 (66.7)		
Middle school	58 (18.3)	39 (19.5)	19 (16.2)		
High school	49 (15.4)	33 (16.5)	16 (13.7)		
Bachelor degree and above	56 (17.7)	52 (26.0)	4 (3.4)		
Occupation				30.038	<0.001
Employed	94 (29.6)	64 (32.0)	30 (25.6)		
Retired	116 (36.6)	90 (45.0)	26 (22.2)		
Unemployed	107 (33.8)	46 (23.0)	61 (52.1)		
Household income yearly (CNY)				29.322	<0.001
≤50,000	103 (32.5)	44 (22.0)	59 (50.4)		
50,001~140,000	129 (40.7)	89 (44.5)	40 (34.2)		
>140,000	85 (26.8)	67 (33.5)	18 (15.4)		
Self-rated health				35.439	<0.001
Good	155(48.9)	122 (61.0)	33 (28.2)		
Middle	109(34.4)	58 (29.0)	51 (43.6)		
Poor	53(16.7)	20 (10.0)	33 (28.2)		
Number of chronic diseases				21.690	<0.001
1	181 (57.1)	134 (67.0)	47 (40.2)		
≥2	136 (42.9)	66 (33.0)	70 (59.8)		
Course of chronic disease (year)				15.827	<0.001
<3	84 (26.5)	68 (34.0)	16 (13.7)		
3~10	151 (47.6)	87 (43.5)	64 (54.7)		
>10	82 (25.9)	45 (22.5)	37 (31.6)		
Chronic disease treatment modalities				12.098	0.007
Traditional Chinese medicine	27 (8.5)	24 (12.0)	3 (2.6)		
Western medicine	165 (52.0)	93 (46.5)	72 (61.5)		
Integrative medicine	96 (30.3)	62 (31.0)	34 (29.1)		
None	29 (9.2)	21 (10.5)	8 (6.8)		

diseases. Nearly half of the participants had 3–10 years of disease duration. Among all respondents, more than half used western medicine therapy (52%), and 30.3% used integrative medicine therapy, only 8.5% opted for TCM. Regarding to urban-rural differences, rural participants tended to have lower levels of education and income compared with urban participants. In general, the number and duration of chronic diseases in rural patients were significantly higher than those in urban patients. Urban participants had better self-reported health status (all differences were statistically significant at $\mathrm{P}<0.001$).

Mixed logit estimates

The estimates of the mixed logit model are summarized in Table 4. Three attributes have at least one significant difference between levels indicating that institution, treatment method, and treatment efficacy played an important part in decision-making. The participants particularly cared about the treatment efficacy, strongly favoring a good treatment efficacy ($\beta_{urban}= 5.246$, $\beta_{rural} = 3.517$). They also exhibited strong preferences for treatment in TCM hospitals ($\beta_{urban}= 1.409$, $\beta_{rural}= 0.904$) over primary care institutions. Treatment method had less influence on participants' choice than did the two attributes above. The coefficients for all the treatment method options demonstrated a negative association, indicating that the internal and external treatment

Table 4 Mixed logit model for preferences of the total sample, urban and rural respondents

Attributes/levels	Total		Urban		Rural	
	Coefficient (SE)	95%CI	Coefficient (SE)	95%CI	Coefficient (SE)	95%CI
Out-of-pocket cost	-0.001(0.000)	(-0.002,-0.001)***	-0.001 (0.001)	(-0.002 0.000)*	-0.002 (0.001)	(-0.004,-0.001)***
Institution						
Primary care institution(ref.)						
General hospital	0.117(0.192)	(-0.260,0.495)	0.475 (0.329)	(-0.171,1.121)	-0.155 (0.334)	(-0.809,0.499)
TCM hospital	1.093(0.312)	(0.481,1.705)***	1.409 (0.460)	(0.506,2.311)***	0.904 (0.410)	(0.101,1.708)*
Medical provider						
General provider(ref.)						
Clinician	-0.065(0.192)	(-0.442,0.312)	0.161 (0.384)	(-0.592,0.914)	-0.065 (0.336)	(-0.723,0.593)
Chinese medicine provider	-0.221(0.205)	(-0.624,0.181)	-0.116 (0.343)	(-0.789,0.556)	-0.308 (0.334)	(-0.963,0.348)
Treatment method						
Combined internal and external treatment(ref.)						
Internal treat	-0.299(0.183)	(-0.657,0.060)	-0.828 (0.389)	(-1.590,-0.065)**	-0.06 (0.305)	(-0.538,0.658)
External treat	-0.598(0.229)	(-1.046,-0.015)**	-0.495 (0.405)	(-1.290,0.300)	-0.822 (0.381)	(-1.568,-0.075)*
Treatment duration						
Long(ref.)						
Medium	-0.135(0.227)	(-0.580,0.309)	0.168 (0.344)	(-0.506,0.842)	-0.323 (0.370)	(-1.048,0.402)
Short	-0.534(0.359)	(-1.237,0.169)	-0.274 (0.489)	(-1.232,0.684)	-0.251 (0.458)	(-1.150,0.648)
Treatment efficacy						
Poor(ref.)						
Middle	7.462(1.205)	(5.100,9.825)***	11.121 (3.024)	(5.193,17.049)***	7.035 (1.655)	(3.792,10.279)***
Good	3.520(0.517)	(2.507,4.533)***	5.246 (1.499)	(2.309,8.183)***	3.517 (0.735)	(2.77,4.957)***
AIC	621.017		388.019		223.018	
BIC	2600.305		1544.663		836.926	
Log likelihood	-659.427		-399.705		-242.549	
Respondents, n	317		200		117	
Observations, n	3804		2400		1404	

Note *P<0.05;**P<0.01;***P<0.001

combination (which served as the reference category) was the preferred option compared to other alternatives, although for both patient categories only one treatment was statistically significant. There exist notable disparities in the preferences for OOP costs between participants residing in urban and rural areas. The coefficient for it was negative and significant indicating (β $_{rural}$= -0.002), suggesting that rural participants in the study tended to favor scenarios that imposed a lower financial burden on them, while the urban respondents' choice was not influenced by OOP costs.

WTP for TCMS

The WTP equivalence measures are presented in Table 5. The WTP analysis demonstrated that the treatment efficacy of the choice of TCMS was the most valued attribute. We found that patients had a significant WTP for outcomes with better efficacy. Patients would be willing to pay 2805.12 CNY for TCMS to improve the efficacy from poor to good, while their WTP to increase the efficacy from poor to moderate was 5946.54 CNY. Patients were willing to pay 870.88 CNY to change from being treated in a primary care institution to the TCM hospital. All else being equal, compensation of about 476.25

CNY was needed to enable patients to choose external treatment. According to the results from the subgroup analysis, rural patients were willing to pay relatively lower costs. They were only willing to pay 1407.12 CNY for good treatment efficacy, and 2814.96 CNY for a moderate one. Rural patients were only willing to pay 361.86 CNY to change from being treated in a primary care institution to the TCM hospital. They were willing to accept external treatment when compensated with 328.88 CNY.

Discussion
Principal findings

To the best of our knowledge, this paper is the first quantitative study of the disparities in preferences for TCMS and trade-offs among urban and rural patients with chronic disease. Our research has provided compelling evidence for clinical practitioners and policymakers, demonstrating the significance of preferences among chronic disease patients in terms of OOP costs, healthcare institution, treatment modalities, and treatment efficacy. Overall, both urban and rural patients exhibited a strong inclination towards better therapeutic efficacy and treatment in TCM hospital when choosing TCMS. It is worth noting that there was a significant difference

Table 5 Marginal WTP of TCMS between full and rural respondents

Attributes/levels	Full Analysis			Rural Analysis		
	WTP (CNY)	95%CI (CNY)	*P* value	WTP (CNY)	95%CI (CNY)	*P* value
Institution						
Primary care institution(ref.)						
General hospital	93.67	(-210.17, 397.51)	0.546	-61.86	(-322.10, 198.37)	0.641
TCM hospital	870.88	(260.42, 1481.35)	0.005	361.86	(29.30, 694.42)	0.033
Medical provider						
General provider(ref.)						
Clinician	-51.84	(-355.66, 251.96)	0.738	-26.02	(-292.03, 239.99)	0.848
Chinese medicine provider	-176.15	(-509.55, 157.26)	0.300	-123.05	(-385.66, 139.56)	0.358
Treatment method						
Combined internal and external treatment(ref.)						
Internal treat	-238.16	(-539.87, 63.56)	0.122	23.99	(-214.42, 262.40)	0.844
External treat	-476.25	(-899.83, -52.66)	0.028	-328.88	(-651.47, -6.30)	0.046
Treatment duration						
Long(ref.)						
Medium	-107.88	(-459.80, 244.04)	0.548	-129.23	(-406.87, 148.42)	0.362
Short	-425.48	(-1049.42, 198.47)	0.181	-100.42	(-468.33, 267.50)	0.593
Treatment efficacy						
Poor(ref.)						
Middle	5946.54	(3015.10, 8877.98)	<0.001	2814.96	(1708.81, 3921.11)	<0.001
Good	2805.12	(1457.11, 4153.12)	<0.001	1407.12	(851.79, 1962.45)	<0.001

in preferences for OOP costs between urban and rural patients. Specifically, rural patients were willing to pay a specific amount in order to receive an enhancement of a particular aspect of TCMS.

Patients weighted the treatment efficacy as more important than other attributes defining patients' preferences. The result was in line with previous systematic studies, where the factor that patients were most concerned about when they visit a doctor was the level of medical technology [37–39], which was expressed to a certain extent by the effectiveness of the treatment. It's worth mentioning that complementary and alternative medicine (CAM), including Chinese medicine, has been widely used globally and been recognized for both preventive and curative effects that enhance overall health outcomes. As the study from Iran showed, the utilization of herbal therapy and acupuncture to treat chronic illnesses has become increasingly popular among patients with cardiovascular disease [40]. More importantly, existing studies have validated the unique clinical benefits of CAM, including safety, affordability, and effectiveness [41–43]. This may be why patients with chronic disease in this study were willing to pay more for improved TCM treatment outcomes. Notably, syndrome differentiation treatment is the basic principle of the rational use of TCM to treat chronic diseases [44]. The medical provider should choose the most suitable TCMS according to the physique differentiation of each patient, as quality, safe and effective services are directly related to the sustainable development of TCM in overall medical services.

Our findings demonstrated that medical institution was the second most important attribute. Previous studies have revealed that as chronic diseases require long-term monitoring and management, patients preferred to receive services from healthcare providers that are closer to them [45]. Some people in China agreed, however, that there was a shortage of TCM expertise in primary healthcare facilities and that the price and service structure for TCM diagnosis and treatment projects was not sufficiently standardized. Additionally, there was a dearth of TCM medical supplies, which restricted locals' access to primary care [46]. As a result, patients were willing to pay more for treatment in TCM hospitals than at primary healthcare facilities in order to receive higher-quality care.

Treatment method was also an important attribute that influenced patients' TCMS decisions, and a combination of internal and external treatment was preferred to a single treatment approach. This result has practical implications for the clinical treatment model of TCMS providers. In the realm of clinical practice, it is imperative to comprehend the preferences and willingness of patients pertaining to various attributes associated with treatments for chronic diseases, as this knowledge is crucial for effectively addressing their treatment objectives and priorities [47, 48]. The combination of internal and external treatment method was used to target the essence of the disease at a certain stage of its development. By flexibly applying different treatment methods such as acupuncture and medication, the advantages of internal and external treatment were combined and

complemented [49]. Thus, these goals and priorities may include improved efficacy, improved level of TCMS in primary health care, and offered multiple treatment modalities. Decision makers incorporate patient-related measures into the process of making treatment decisions may, in turn, enhance adherence to the treatment plan and improve patient health outcomes.

Furthermore, we found that there was a significant difference in preferences for OOP costs between urban and rural patients. Rural patients are more cost-sensitive than urban patients, showing a strong preference for TCMS with lower OOP costs. This may be related to the fact that there is still existing gap in the economic levels between urban and rural areas in China. Previous research has indicated that individuals with lower socioeconomic status tend to be more inclined to utilize lower-cost services that may be particularly influenced by financial factors, such as costs [50]. Moreover, due to the long treatment duration and numerous complications associated with chronic diseases, the medical expenses required often make up a significant proportion of an individual's disposable income, which may cause heavy economic burden on rural patients. Meanwhile, we also found that they would avoid spending too much to pursue best treatment outcomes, as they weighed the combined benefits of different attributes and concluded that doing so may sacrifice preferred institutions, treatment duration, and treatment methods. On the other hand, although the prepayment model for medical insurance policy reform is currently being implemented in China, there were fewer types of appropriate technologies of TCM included in the scope of health insurance [51]. Rural patients with chronic diseases may be constrained by the cost of consultation and treatment when choosing TCMS. Thus, rural patients may avoid sacrificing excessive costs to further improve treatment outcomes after obtaining partial improvement and relief of disease symptoms. These phenomena also enlighten us that health policy makers should pay more attention to the disease economic burden and health management of rural chronic disease patients.

Limitations

This study has several limitations. First, given the constraints imposed by the limited sample size, it is imperative to interpret the findings within the specific context of the sampled population. It is crucial to acknowledge that this sample may not comprehensively represent the entire Chinese population afflicted with chronic ailments, thereby introducing certain constraints on the applicability of the survey outcomes. Second, the results may be subject to information bias and selection bias resulting from the practical difficulties of random sampling and study design. Third, due to the inherent limitations of the

DCE methodology, the study considered a limited number of attributes for TCMS, potentially overlooking other important factors (such as reimbursement rate, waiting time, etc.) that could influence respondents' preferences. Lastly, this study was conducted as an experiment, and it is important to note that the choices made by the participants may not accurately reflect how individuals would behave in real-life situations. Further research is necessary to determine the impact of temporal, personal, and social distance on preference elicitation at the behavioral level.

Conclusion

This study investigated the stated preferences of chronic disease patients for TCMS. Patients generally considered factors concerned with medical institution, treatment methods, treatment efficacy and OOP costs. Our findings also provide new knowledge about important urban-rural difference in patient preferences, with rural patients being more strongly influenced by OOP cost of TCMS. This information could facilitate the implementation of targeted interventions to improve the overall quality of TCM healthcare and increase the affordability of TCMS among patients with chronic diseases.

Supplementary Information

The online version contains supplementary material available at https://doi. org/10.1186/s12906-024-04659-z.

Supplementary Material 1

Data availability
The datasets used in the current study are not publicly available due to the confidential policy but are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate
This study was reviewed and approved by the Ethics Committee of Nanjing Hospital of Chinese Medicine affiliated to Nanjing University of Chinese Medicine (No.KY2024069). All procedures were in accordance with the ethical

standards of the Helsinki Declaration. Participants provided informed consent prior to data collection.

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