PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Preferences for healthcare services among hypertension patients in China: a discrete choice experiment
AUTHORS	Yu, Xiaolan; Bao, Haini; Shi, Jianwei; Yuan, Xiaoyu; Qian, Liangliang; Feng, Zhe; Geng, JinSong

VERSION 1 – REVIEW

REVIEWER	Wenbin Liu Fujian Medical University, School of Public Health
REVIEW RETURNED	28-Jun-2021

GENERAL COMMENTS	Determining patients' preference of healthcare services is of vital importance for delivering high-standard services and improving the overall performance of health system. This study took hypertension patients as an example, aimed to fill the gap by measuring preferences of healthcare services for first-contact care. The results of this study will provide evidence about how hypertensive 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 behavior in China. Generally speaking, this is a overall well-written paper. Also, there are still some drawbacks to overcome before its publication. Firstly, the scope of the research objects can be defined more clearly. Known to us, the severity of hypertension varies widely among patients. Even more, their demands for services also varies dramatically at different stages of hypertension, such as the initial of illness, the acute onset, and the period of stability after antihypertensive drug control, which will directly affect their preferences for healthcare services. As the statement in "Appendix 2: Examples of DCE choice sets" of this paper, this study required the respondents choose one type of healthcare service for their first-contact visit while having poor blood pressure control. Therefore, it is strongly recommended to define the research scope to "first-contact visit". Secondly, some more explanation are needed in the setting of levels for the attributes in this study. For example, since the hypertension is a chronic disease that requires long-term medication control but is still incurable, the symptom may be impossible to completely disappear. So, the levels or the attribute "treatment effect" is not appropriate to set "accompanying symptoms disappear". Besides, the level of "poor treatment effect" referred to "both blood pressure and accompanying symptoms are not well controlled", it is hard to believe that hypertensive patients would choose this type of services even if they could pay less, more convenient to reach the institution. Therefore, it needs to give more detailed explanation on how the attributes and levels were set for this study. Furthermore, since there

are so many sets of questions, the actual questions which the participants were asked in the DCE survey should be briefly introduced in the manuscript.

Thirdly, the distribution of the sample was uneven among the survey sites. As reported in appendix 4 "Number of patients in the sampled healthcare facilities", all the samples from tertiary hospitals were all from the Affiliated Hospital of Nantong University, Jiangsu Province. And the samples from Shanghai were all selected from 2 primary health institutions, which may greatly impact the representativeness of the samples. Therefore, it is advised to give some explanation in the limitations of this study.

Fourthly, in the section of introduction, authors depict the current situation of patient choice on the grade of health institutions to get healthcare services in the whole third paragraph. However, according to the statement in the method section that "research objective was to identify the healthcare service attributes and levels that were preferred by hypertension patients, not the grade of hospitals (i.e. primary, secondary, tertiary), Hence, the scenarios in our DCE were not restricted to a specific grade of hospitals.". Thus, it is also recommended to condense or simplify the corresponding paragraph in the introduction.

REVIEWER	Xin Wang SYSU, School of Public Health
REVIEW RETURNED	08-Oct-2021

GENERAL COMMENTS	This study elicit preferences for healthcare services among hypertension patients in China, with the aim to support evidence-informed policy making. Discrete choice experiment is an appropriate approach to address this research question. There are three major concerns: -The first and most important step in a DCE is to select the attributes and levels to be included, which determines the validity of the DCE. Attributes and their levels in this study were chosen by a literature review and focus group discussion. Moreover, the two attributes determined by focus group discussion were not identified in the literature review. -This study targeted on patients with hepertension. Please give reasons for it. -The smpling method. The DCE was carried out in Jiangsu province and Shanghai municipality. Health system background and healthcare services in Jiangsu and Shanghai might be quite different, which could have influecne on their preferences. "Patients were recruited consecutively from nine healthcare facilities." How were the nine facilities and 722 patients were sampled? Here are some minor concerns: -A short review about attributes and levels preferred by hypertension or non-hypertension patients in the Introduction part would be helpful for readers. -Introduction of healthcare services and utilization in China in the Introduction part would provide evidence for policy implication in the Discussion part. -As the authors stated in the discussion, the clinical experience of physicians and types of healthcare professionals, rather than treatment effects were often used to reflect the capability of

	healthcare provision in previous studies.
	Is there any reference for treatment effects reflecting the capability of healthcare provison? Is treatment effects in this study self-reported? From my point of view, treatment effect is influenced by both capability of healthcare and some patient related factors.
	-How did you identify the levels of out-of-pocket costs? Does it the cost of per visit or per year of a patient with hypertension?
	-Final part of the questionnaire is the level of understanding and confidence when making the DCE choices, with the score ranged from 0 to 10. What is the criteria for excluding the questionnaire with an average score of less than 8?
	-In the estimates of the mixlogt model, is there reference for "The coefficient for the reference group was calculated as the negative sum of other coefficients."? and how to interpret the coefficient?
	-Table 3, Coefficient Mean. There are two "SE".

VERSION 1 – AUTHOR RESPONSE

Reviewer: 1

Dr. Wenbin Liu, Fujian Medical University

Comments to the Author:

Determining patients' preference of healthcare services is of vital importance for delivering high-standard services and improving the overall performance of health system. This study took hypertension patients as an example, aimed to fill the gap by measuring preferences of healthcare services for first-contact care. The results of this study will provide evidence about how hypertensive 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 behavior in China. Generally speaking, this is a overall well-written paper. Also, there are still some drawbacks to overcome before its publication.

1. Firstly, the scope of the research objects can be defined more clearly. Known to us, the severity of hypertension varies widely among patients. Even more, their demands for services also varies dramatically at different stages of hypertension, such as the initial of illness, the acute onset, and the period of stability after antihypertensive drug control, which will directly affect their preferences for healthcare services. As the statement in "Appendix 2: Examples of DCE choice sets" of this paper, this study required the respondents choose one type of healthcare service for their first-contact visit while having poor blood pressure control. Therefore, it is strongly recommended to define the research scope to "first-contact visit".

Response: (1) Thank you very much for your suggestions. We agree with your opinion that patients' demand for healthcare services varies dramatically at different stages of the

disease. In our study, we used health-related quality of life to assess patients' personal perceptions of health status and used comorbidities to reflect the severity of the disease.

(2) According to your comments, we revised the last paragraph of "Introduction" to better define the research scope.

"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. 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 utilization."

(3) We also added the following sentences in the last paragraph of "Discussion: Strengths and limitations."

"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."

2. Secondly, some more explanations are needed in the setting of levels for the attributes in this study. For example, since the hypertension is a chronic disease that requires long-term medication control but is still incurable, the symptom may be impossible to completely disappear. So, the levels or the attribute "treatment effect" is not appropriate to set "accompanying symptoms disappear". Besides, the level of "poor treatment effect" referred to "both blood pressure and accompanying symptoms are not well controlled", it is hard to believe that hypertensive patients would choose this type of services even if they could pay less, more convenient to reach the institution. Therefore, it needs to give more detailed explanation on how the attributes and levels were set for this study. Furthermore, since there are so many sets of questions, the actual questions which the participants were asked in the DCE survey should be briefly

introduced in the manuscript.

Response: (1) We are grateful to you for your comments. A literature review 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. We added "Appendix 1: Characteristics of the included DCEs" to show results from the literature review. We also added "Appendix 2: Domains and attributes in the included DCEs." After the literature review, we conducted focus group discussions with physicians and hospital managers to determine the attributes and levels. Therefore, we had adequate theoretical and practical foundations for the selection of attributes and levels.

(2) According to your comments, we have revised the "Methods: Identification of attributes and levels" section to give more detailed explanations on how the attributes and levels were set for this study.

(3) In previously published DCEs, especially in the field of clinical practice, the attributes of clinical benefits like treatment effects were often mentioned.[1-6] Participants in DCEs needed to make trade-offs among different attributes, not limited to a specific attribute like effectiveness. We also analyzed the trade-offs individuals make when choosing between sets of hypothetical choices.

(4) We agree with your opinion that hypertension is still incurable, and the symptom may be impossible to completely disappear. The level of "treatment effects" was defined mainly according to clinical practice guidelines. As shown in guidelines on the management and control of hypertension, getting blood pressure under control and reducing the risk of complications are the goals for hypertension treatment.[7 8] We also proposed a hypothetical situation of poor blood pressure control and severely uncomfortable symptoms. We used the word "accompanying symptoms" to represent the translation of "complications" in Chinese. To avoid misunderstanding, we revised the term to complications.

(5) In line with your comments, we added the following sentences in the second paragraph of "Methods: Identification of attributes and levels."

"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. Therefore, we classified the levels of treatment effects according to the control of blood pressure and complications."

(6) There were 48 pairs of choice scenarios in our DCE survey. To briefly describe the sampling choice sets in our DCE, we gave an example of the actual questions in "Appendix 4: Examples of DCE choice sets."

3. Thirdly, the distribution of the sample was uneven among the survey sites. As reported in appendix 4 "Number of patients in the sampled healthcare facilities", all the samples from tertiary hospitals were all from the Affiliated Hospital of Nantong University, Jiangsu Province. And the samples from Shanghai were all selected from 2 primary health institutions, which may greatly impact the representativeness of the samples. Therefore, it is advised to give some explanation in the limitations of this study.

Response: (1) Thank you for your suggestions. We selected Jiangsu province and Shanghai as sample provinces because they both belong to the Yangtze River Delta region, which is the largest urban agglomeration in China. The integrated development of the Yangtze River Delta has important significance within national strategic plans. As an important livelihood project, the integration of healthcare resources and services in the region has been included in the Chinese government's agenda.

(2) The sample facilities covered all grades (e.g. primary, secondary, tertiary) of hospitals to ensure the representativeness of sampled patients.

(3) The interviewers of the DCE survey needed to be very nice to explain the choice scenarios to each patient. Meanwhile, the patients should have informed consent and fully understood the choice scenarios. There should have several physicians and directors in the sampled facilities who would do their best to support us to carry out the DCE survey. As a result, it was difficult to ensure the sample size in each healthcare facility was evenly distributed.

(4) We did sensitivity analysis by excluding patient data from healthcare facilities in Shanghai. The results of sensitivity analysis were shown in Appendix 8. Main findings remained unchanged after the sensitivity analysis. We also added the following sentences in the "Results: Model estimation of preferences" section.

"We excluded patient data from healthcare facilities in Shanghai to do the sensitivity analysis, and the statistical significance of attributes was stable (Appendix 8)."

(5) According to your comments, we pointed out the limitations of sampling in the last paragraph of "Discussion":

"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."

4. Fourthly, in the section of introduction, authors depict the current situation of patient choice on the grade of health institutions to get healthcare services in the whole third paragraph. However, according to the statement in the method section that "research objective was to identify the healthcare service attributes and levels that were preferred by hypertension patients, not the grade of hospitals (i.e. primary, secondary, tertiary). Hence, the scenarios in our DCE were not restricted to a specific grade of hospitals." Thus, it is also recommended to condense or simplify the corresponding paragraph in the introduction.

Response: Thank you very much for your comments. The third paragraph in "Introduction" has been revised in terms of your comments. We also added the introduction about healthcare services and utilization in China.

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

Reviewer: 2

Dr. Xin Wang, SYSU

Comments to the Author:

This study elicit preferences for healthcare services among hypertension patients in China, with the aim to support evidence-informed policy making. Discrete choice experiment is an appropriate approach to address this research question.

There are three major concerns:

-The first and most important step in a DCE is to select the attributes and levels to be included, which determines the validity of the DCE. Attributes and their levels in this study were chosen by a literature review and focus group discussion. Moreover, the two attributes determined by focus group discussion were not identified in the literature review.

Response: (1) We are very grateful to you for your comments. We firmly agree with your idea that the selection of attributes and levels is the most important step in DCE. Therefore, we conducted a literature review to identify attributes that were used in DCEs regarding preferences of healthcare services among patients with chronic diseases or chronic conditions. According to your comments, we added the results of the literature review in "Appendix 1: Characteristics of the included DCEs" and "Appendix 2: Domains and attributes in the included DCEs."

(2) Although a review of the published literatures is necessary to inform the DCE design, there were variations in the DCE designs due to different settings. As a result, we conducted the focus group discussion to ensure the applicability of the attributes.

(3) We found that several terms similar to effectiveness were included in previous DCEs (Appendix 2). For instance, clinical benefits (e.g. relieve of the symptoms[9 10]), prognosis (risk of return to the hospital[11]), and perceived service quality[12].

We use the term treatment effects as an attribute mainly due to the fact that effectiveness is one of the important domains in quality assessment.[13 14] The effectiveness of healthcare has been considered as the ultimate validator of the quality of care.[15] Furthermore, improvement in the effectiveness of healthcare service would be helpful to achieve population health improvement and health system sustainability.[16] Healthcare services that could bring health benefits usually had strong recommendations from experts.[17-19]

(4) Continuity and coordination of care could addresses the conditions and ongoing relationships needed to support seamless interactions among multiple providers within interdisciplinary teams and across healthcare settings.[20] Continuity of care is a necessary part of the framework on integrated people-centered health services (IPCHS) that was proposed by

the World Health Organization.[20] Moreover, as we have mentioned in the manuscript, continuity of healthcare was correlated with increased patient satisfaction.[21 22]

(5) The attribute "continuity of care" was included in previous published DCEs (Appendix 2). However, continuity of care was usually defined as the continuous caring relationship with the same healthcare professionals in the DCEs.[9 10 23-25] In our DCE, continuity of care was defined as the healthcare facility operating in a well-functioning care delivery system, which could provide coordinated healthcare services for patients.[26]

(6) We also added the above reasons for the identification of attributes in the second and third paragraphs of "Methods: Identification of attributes and levels."

-This study targeted on patients with hypertension. Please give reasons for it.

Response: (1) Thank you for your comments. We have listed the prevalence and burden of hypertension in the first paragraph of "Introduction." We enrolled hypertension patients in our DCE mainly due to the high prevalence, long-term complications, and heavy economic and social burden. To make the research purpose clearer, according to your comments, we added the following sentence in the last paragraph of "Introduction."

"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."

(2) We also pointed out the limitations of types of participants and provided suggestions for future studies in the last paragraph of "Discussion."

"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 enroll patients with other types of chronic diseases and identify variations in patients' preferences across different subgroups."

-The sampling method. The DCE was carried out in Jiangsu province and Shanghai municipality. Health system background and healthcare services in Jiangsu and Shanghai might be quite different, which could have influence on their preferences. "Patients were recruited consecutively from nine healthcare facilities." How were the nine facilities and 722 patients were sampled?

Response: (1) Both Jiangsu province and Shanghai belong to the Yangtze River Delta region, which is the largest urban agglomeration in China. The integrated development of the Yangtze River Delta has important significance within national strategic plans. As an important livelihood project, the integration of healthcare resources and services has been included in the government's agenda. According to your comments, we added the following sentences in the section "Methods: DCE implementation and data collection."

"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."

(2) When selecting the sampled cities, we took into account the geographical location and level of economic development. Minhang district locates in the middle of Shanghai. Yancheng and Lianyungang are located in northern Jiangsu, while Nantong is located in central Jiangsu. Generally speaking, the per capita GDP in northern regions of Jiangsu province is lower as compared with other regions. After selecting

the sampled cities, we selected the sampled facilities. The sample facilities should cover all grades of hospitals to ensure the representativeness of sampled patients. There should have several physicians and directors in the sampled facilities who would do their best to support us to carry out the DCE survey. Finally, we enrolled patients from sampled facilities by consecutive sampling and conducted the survey with their informed consent. We also pointed out the limitations of sampling in the last paragraph of "Discussion."

"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."

(3) In order to test the robustness of the DCE results, we did sensitivity analysis by excluding data from Shanghai. The results of sensitivity analysis were shown in Appendix 8. Main findings remained unchanged after the sensitivity analysis. We also added the following sentences in the "Results: Model estimation of preferences" section.

"We excluded patient data from healthcare facilities in Shanghai to do the sensitivity analysis, and the statistical significance of attributes was stable (Appendix 8)."

Here are some minor concerns:

-A short review about attributes and levels preferred by hypertension or non-hypertension patients in the Introduction part would be helpful for readers.

Response: (1) Thank you very much for your comments. According to your comments,

we added "Appendix 1: Characteristics of the included DCEs" and "Appendix 2: Domains and attributes in the included DCEs" to show the attributes of healthcare services preferred by patients with chronic diseases and chronic conditions.

We agree with your suggestions that attributes and levels preferred by hypertension or non-hypertension patients would be helpful for readers. We only found one DCE that aimed to explore patients' preferences for the management of hypertension.[27] In terms of your comments, we did a short review about attributes and levels preferred by patients including hypertension and non-hypertension. The brief review was in the first paragraph of "Methods: Identification of attributes and levels" because the literature review helped us to determine the attributes in our DCE.

-Introduction of healthcare services and utilization in China in the Introduction part would provide evidence for policy implication in the Discussion part.

Response: We are very grateful for you to your kind suggestions. According to your comments, we have added the introduction of healthcare services and utilization in China in the third paragraph of "Introduction".

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

-As the authors stated in the discussion, the clinical experience of physicians and types of healthcare professionals, rather than treatment effects were often used to reflect the capability of healthcare provision in previous studies. Is there any reference for treatment effects reflecting the capability of healthcare provision? Is treatment

effects in this study self-reported? From my point of view, treatment effect is influenced by both capability of healthcare and some patient related factors.

Response: (1) Thank you so much for your comments. Our study only took treatment effects as an attribute of DCE for the patient to choose, reflecting the patients' individual preferences. We didn't require patients to report their own treatment effects, mainly due to the fact that DCE is a quantitative method to elicit preferences from participants without directly asking them to state their preferred options. In a DCE, participants are presented with several hypothetical scenarios and required to state their preferred choice between competing scenarios, each of which consists of a combination of the attributes and levels.

(2) We agree with you that the treatment effect is influenced by both capability of healthcare and some patient-related factors. However, the objective of our study was to investigate preferences for healthcare services among hypertension patients. As a result, the treatment effect was only used as an attribute in the hypothetical choice scenarios.

(3) We have cited references for why treatment effects could reflect the capability of healthcare provision in the second paragraph of "Methods: Identification of attributes and levels."

"Effectiveness is one of the important domains in quality assessment measures.[13][14] The effectiveness of healthcare has been considered as the ultimate validator of the quality of care.[15] Furthermore, improvement in the effectiveness of healthcare service would be helpful to achieve population health improvement and health system sustainability.[16]"

-How did you identify the levels of out-of-pocket costs? Does it the cost of per visit or per year of a patient with hypertension?

Response: (1) The levels of out-of-pocket costs in our study were determined by the health insurance reimbursement scope, reimbursement ratio, and the average cost per visit, mainly including the fee for patient registration, diagnosis, and drug prescription. For the scope and proportion of health insurance reimbursement, we referred to the reimbursement policies in the sampled cities and districts. As we know, the level of cost per visit before reimbursement varies and it depends on the types of healthcare services. We used the average cost per visit and it approximately ranged from 200 CNY to 1000

CNY according to expert consultation. Therefore, we defined the out-of-pocket costs per visit from 150 CNY to 600 CNY. A manuscript that was published recently investigated the preferences of Chinese older adults for primary healthcare service in the hypothetical minor chronic disease scenario.[28] The out-of-pocket cost per visit in the DCE was 100 CNY to 300 CNY[28]. We had the hypothesis of severe syndromes like dizziness, headache, palpitation, chest pain, shortness of breath, nausea. Consequently, the out-of-pocket cost in our study was reasonable.

(2) To make it clear, we added the term "per visit" in the attribute of out-of-pocket costs in "Table 1. Attributes and levels of healthcare services in the DCE", "Table 3. Estimates of the mixed logit model", Appendix 8, and Appendix 9.

-Final part of the questionnaire is the level of understanding and confidence when making the DCE choices, with the score ranged from 0 to 10. What is the criteria for excluding the questionnaire with an average score of less than 8?

Response: Thank you for your comments. There is a lack of internationally accepted criteria for the assessment of the survey questionnaire according to the understanding and confidence scores. The DCE questionnaires in our research were administrated through one-to-one, face-to-face interviews. The interviewers explained the meaning of the questionnaire item by item until the patients fully understood each item. In this case, the results of the survey were considered to be uncertain if the average score was lower than 8. We excluded those questionnaires with lower average scores to ensure the validity of the data.

-In the estimates of the mixlogit model, is there reference for "The coefficient for the reference group was calculated as the negative sum of other coefficients."? and how to interpret the coefficient?

Response: (1) Thank you for your comments. We added the reference "Statistical

methods for the analysis of discrete choice experiments: a report of the ISPOR conjoint analysis good research practices task force"[29] to the notes of "Table 3. Estimates of the mixed logit model."

(2) The ISPOR task force report[29] we cited pointed out that "The coefficient on the omitted *level of an effects-coded variable can be recovered as the negative sum of the coefficients on the nonomitted levels of that attribute. Each effects-coded coefficient, however, is estimated relative to the mean attribute effect; therefore, statistical tests of significance for each coefficient are not direct tests of the statistical significance of*

differences between estimated coefficients on two different levels of the same attribute."

-Table 3, Coefficient Mean. There are two "SE".

Response: The first is the standard error of mean, while the second is the standard error of standard deviation. The mean of coefficient and its standard error were combined into the same column to make it clear. The standard deviation and its standard error were also integrated into the same column.

VERSION 2 – REVIEW

REVIEWER	Wenbin Liu Fujian Medical University, School of Public Health
REVIEW RETURNED	08-Nov-2021

GENERAL COMMENTS	All the concerned questions have been well addressed.