Author’s response to reviews

Title: Impact of disease screening on awareness and management of hypertension and diabetes between 2011 and 2015: results from the China Health and Retirement Longitudinal Study

Authors:

Chihua Li (cl3106@cumc.columbia.edu)
L.H. Lumey (lumey@columbia.edu)

Version: 1 Date: 21 Nov 2018

Author’s response to reviews:

We thank the referees for their suggestions and have updated our manuscript according to their comments. Our specific responses are as follows:

Fiona Bragg (Reviewer 1): The authors present data from the China Health and Retirement Longitudinal Study (CHARLS). Based on data for over 9,000 individuals who participated in the survey in both 2011 and 2015, they examine the impact of screening for hypertension and diabetes in the study on participants' awareness and the management of these two conditions. The manuscript is well-written and methodologically appropriate, and addresses an interesting, relevant and currently inadequately understood topic.

My comments on the paper are summarised below.

1. CHARLS surveys are undertaken every two years, but data are not reported from the 2013 survey. Whilst I appreciate additional data may have been collected in the 2015 survey relating to how participants were made aware of diagnoses of diabetes and hypertension, it would be of interest to know if the findings relating to awareness of diabetes and hypertension were similar in the 2013 survey.

We agree that it would be of interest to examine data in 2013. We therefore added data from CHARLS in 2013 and made changes in methods and results section as follows:
In methods section:

After 2011, study participants were re-interviewed to monitor any changes over time in their health, economic, or social conditions every two years. Participants were asked again if they had ever been diagnosed with hypertension or diabetes. Physical examinations were repeated in 2013 and 2015. In 2015, around 85% of participants who had physical examination in 2011 repeated the examination. Blood samples were collected again in 2015 but to date no assay results have been distributed for this year. Over 80% of participants interviewed in 2011 continued to participate in 2015. (Page 6)

Data collected in 2013 were also examined and presented in supplementary materials. (Page 8)

In result section:

The findings related to awareness of hypertension and diabetes were similar in 2013 and 2015, but the changes relative to the 2011 survey were not yet as pronounced in 2013 as in 2015 (Supplementary table 2). (Page 9)

2. Results: The meaning of the x-axis labels in Figure 1 (Awareness, Monitoring, Treatment, Medical Advice) are not obvious without referring back to the Methods section- it would be helpful to add an explanation of these terms, for example in the figure legend.

We added the explanation of these term in the figure legend as follows:

Awareness: being aware of this chronic condition

Monitoring: for hypertension, had blood pressure measured for at least once; for diabetes, received blood/urine glucose tests, or fundus examinations, or micro-albuminuria tests

Treatment: received medical treatment for this chronic condition

Medical advice: received medical recommendations from their doctor(s)

3. Discussion: The authors state that "The available CHARLS study protocols do not clarify what specific clarifications or medical advice was given at the time the physical examination and when the diabetes test results were reported to study participants". Understanding the nature of
the feedback provided would be very helpful in interpreting the study findings and, although there may not have been a systematic approach to providing feedback to study participants, it would be helpful if the authors could provide some description of the nature of feedback provided.

We agree with the reviewer that the nature of feedback is important to interpret the study results. We therefore further examined and collected all available documents from the CHARLS research group on this question to determine what exactly had been done. Study procedures have been described in the following documents. We added as supplementary materials in discussion section.

CHARLS documentation on the nature of the feedback provided to its participants:

Blood field work plan (Chinese version): (page 13)
在采血结束后的2周内，县CDC告知采血对象血常规检测结果。
Two weeks after the blood collection, CDC at the county level will notify the study participants of blood test results.

Consent form 2011 (English version): (page 1)
Roughly after three weeks of the blood tests we will inform you to obtain the blood routine examination results and the need for follow-up health counseling.

Consent form 2011 (Chinese version): (page 1)
大约三个星期后我们会通知您获得您的血常规化验结果和接受进一步的健康咨询。
We will inform you ... to receive further health consultation

In 2011 CHARLS questionnaire: (page 17)
AIK5. Could you give us your mailing address, so we can send you blood test result later?
Further examination of the CHARLS blood collection procedures indicates that these blood test results only included the blood cell counts: in the CHARLS Users’ Guide for the 2011-2012 National Baseline Blood Data (pages 3-4) it is stated specifically that three tubes of blood are to be collected: The first for a complete blood count (CBC). The second for glucose and lipid assays after separation of plasma and coat. And the third for HbA1c. The first tube was analyzed locally within hours at county CDC stations or town/village health centers. The other two tubes were locally processed, stored, and frozen, and shipped to the China CDC in Beijing within two weeks for deep freezing and storage until further assays at China CDC or Capital Medical University in Beijing. No mention is made of retesting of glucose or HbA1c results although this could have been part of internal laboratory control procedures.

From the description above we infer that the 3-week blood test results could only have included selected blood cell counts locally processed by CDC labs and not later analyses for glucose or HbA1c centrally processed in Beijing.

We also tried to examine which setting the health consultation took place, how many of the participants attended the health consultation, was medication prescribed during this health consultation, or were people referred to medical care. To answer these questions, we refer to the following items from the 2014 CHARLS life history wave (extra wave) questionnaire (page 120):

HS004 Did you take the blood test by our project team in 2011?

HS005 Have you ever received the blood test report?

HS006 I’m very sorry, due to some reasons, the blood test report could not be delivered to your home. Do you need us to provide the blood test report again?

The responses to these questions do not yet show up in any of the CHARLS databases. These variables are still missing from variables distributed to date. We therefore have no further information on whether blood test reports were received (or on the nature of health consultations, if any).
In view of these CHARLS documents, we added the following to the text in discussion:

“According to available CHARLS documentation (Supplementary text), the blood test results included cell counts processed by local Centers for Disease Control (CDC) units. These were mailed to addresses provided by study participants. No information is provided in CHARLS documentation on the nature of any health consultations, including what specific clarifications or medical advice might have been given at the time the physical examination and when the diabetes blood test results were reported to study participants. Further analyses including glucose and HbA1c assays were later carried out by central study laboratories in Beijing. The CHARLS documents make no mention of communication of further diabetes testing to study participants. However, based on the follow-up interviews in 2013 and 2015, we know that only a small proportion of CHARLS participants reported being made aware of their hypertension and/or diabetes status because of the screening. Future CHARLS protocols will need to clarify how a systematic and effective feedback of screening results to survey participants will be accomplished.” (Page 11-12)

4. Discussion: Can the authors reflect on the likely generalizability of the study’s findings to other health surveys and contexts?

In discussion, we previously discussed the generalizability of our findings to other Health and Retirement studies (In discussion section: ‘Since CHARLS is one of the cohort studies that follows... no studies from the HRS family to date have systematically evaluated the relation between positive disease findings in an earlier survey rounds and changes in disease awareness in subsequent examinations.’). Based on the reviewer’s suggestion, we further added (also in response to Reviewer #2):

“In CHARLS, the change in awareness was similar for hypertension and diabetes, although participants were informed of their blood pressure immediately during the interview but received blood reports later. One explanation can be that screening, in either health surveys or other contexts, is simply a process and does not lead to follow-up, treatment, or referral in China. Individuals were perhaps expected to take actions by themselves having received results of screening. This is problematic because the lack of medical knowledge among them will lead to failure in accessing health services [36]. More attention, therefore, should be paid to ensure participants can access and understand physical examination results in future waves.” (Page 14)
For education, please provide the number of years of education for readers unfamiliar with your categorization.

We appreciate the reviewer’s comments. We have added the following information in the methods section:

“and education categorized as illiterate (cannot read or write), literate (received informal education or primary school education less than 5 years), primary school (5 to 6 years education), and junior school and above (received education for over 6 years).” (Page 7)

Results:

Page 8, lines 47-50: Please include the proportion of hypertension awareness as percentage a of those with hypertension and not the total population.

Page 8, lines 57-60: Please do the same for diabetes awareness.

We made following changes in result section based on the reviewer’s suggestion:

“In 2011, 4594 (49.1%) of participants had a positive screening result for hypertension, and 53.7% (n=2466) of these were aware of their condition and 46.3% (n=2128). Hypertension patients aware of their condition were more likely to be women, older and have urban Hukou status and higher BMI compared to those not. They were less likely to be current smokers or to be consuming alcohol. For diabetes, 1703 (18.2%) of participants had a positive screening result, and only 33.4% (n=568) of these participants were aware and 66.6% (n=1135) were not.” (Page 8-9)

Page 8, line 50 mentions 2218 while line 13 on Page 9 states 2128 unaware hypertension participates. Please correct.

We have made the correction in the results section.
Based on the reviewer’s suggestion, we added following text in the results section:

“Among participants who had a positive screening result for hypertension in 2011, the proportion aware of their hypertensive condition increased from 53.7% to 62.9% (17.1% improvement), having blood pressure monitored increased from 39.9% to 42.8% (7.3% improvement), having received medication increased from 41.6% to 51.0% (22.6% improvement), and having received medical advices from doctors increased from 29.2% to 36.6% (20.2% improvement). Among participants who had a positive screening result for diabetes in 2011, the proportion aware of their diabetic conditions increased from 33.4% to 42.9% (28.4% improvement), having received tests to monitor their diabetic condition increased from 26.4% to 37.8% (43.2% improvement), having received medication increased from 23.6% to 33.6% (42.4% improvement), and having received medical advices from doctors increased from 25.0% to 31.2% (24.8% improvement).”

(Page 10)

Page 9, lines 36-38, and other pages: What do the authors mean by "...physical examinations for specific health conditions..."? Is this on presentation to a family practitioner for another ailment, etc.?

We examined available CHARLS documents and this was not clarified. We, therefore, added in the results section:

“From the CHARLS documentation, it is not clear if the physical examination for specific health conditions was prompted by a visit to medical doctors for other ailments or not.”

(Page 10)

Tables 1 and 3: I would prefer the row instead of column percentages, please.

For consistency, we followed other national studies on hypertension and diabetes in China using column percentages. Row percentages can be easily calculated where needed from the presented data.
Figure 1: The categories are vague - this needs to be standalone without the reader needing to refer to the text for clarity. Please describe what you mean by 'monitoring' (is it having a blood pressure or glucose check in the past year?), 'medical advice', etc.

Based on the reviewer's suggestion, we added the explanation of these term in the figure legend (see also response to Reviewer #1).

For completeness, what were the proportions of treatment and control among participants with hypertension/diabetes or among those who were aware of their diagnoses? Please include this data and discuss.

Interested readers can calculate the proportions from the data presented. Based on the reviewer’s comment, we added in the discussion:

“Based on treatment of hypertension and diabetes reported during the interview, the proportion of treatment and control among participants who were aware of their hypertensive status increased from 77.5% to 81.1% between 2011 and 2015; the proportion of treatment and control among participants who were aware of their diabetic status increased from 70.6% to 78.3% between 2011 and 2015. Despite the increase in proportions of treatment and control increased for both conditions, there were still many participants who did not have any treatment and control. It will be interesting to explore reasons for why those participants did not have treatment and control in future studies. ” (Page 12)

Discussion:

Please discuss in greater detail the reasons for the lack of awareness and speculate on/discuss ways to improve this drawing on how most participants were currently learning of their hypertension status i.e. "...physical examinations for specific health conditions…".

It is surprising that change in awareness was similar for hypertension and diabetes considering that participants were informed immediately about their raised blood pressures while they received postal reports of their diabetes status. This needs to be explored in greater detail. Did
doctors/healthcare professionals or community health workers (CHWs) inform participants of their hypertension status? If the latter, then you need to ensure/discuss that CHWs are well-trained to impart the appropriate medical information. Training fieldworkers to conduct a study is different from training them to impart medical information as CHWs. Was any specific training provided for imparting medical information on hypertension or diabetes?

Posting results in this study demonstrated that this is an inappropriate method for imparting information on new diabetes status, and should perhaps not be used, or needs to be followed up with a telephone call. Please discuss and provide your take/opinion on this issue.

We examined all available CHARLS documents to determine what exactly had been done for feedback and follow up. Please see our response to Reviewer #1’s comment.

In addition, we added in the discussion according to the reviewer’s suggestion:

“In CHARLS, the change in awareness was similar for hypertension and diabetes, although participants were informed of their blood pressure immediately during the interview but received blood reports later. One explanation can be that screening, in either health surveys or other contexts, is simply a process and does not lead to follow-up, treatment, or referral in China. Individuals were often expected to take actions by themselves having received results of screening [36]. More attention, therefore, should be paid to ensure participants do understand physical examination results and access health services where needed. Within these studies, it will be important to conduct pilot studies to identify effective tools for screening result communication. Several methods, including follow-up phone calls or even medical referrals, could be explored to address this problem.” (Page 14)

Page 11, lines 15-20: "This study further demonstrates through a well-conducted follow-up study that disease screening may only have limited impact on improving awareness of disease." I do not agree with this sentiment. Conducting a good follow-up study does not necessarily translate into imparting adequate or appropriate information on hypertension and diabetes status to participants, and it does not mean that screening has limited impact on improving awareness.

We agree with the sentiment that study quality and disease awareness are separate issues. Our point was to use a well-conducted follow-up study to quantify changes in disease awareness. We
do however feel that a screening study should also pay attention to communicating positive disease screening results.

A major shortcoming of this study, which you mention but do not include under study limitations, is that you do not know the exact protocol followed when a participant was diagnosed with hypertension or what instructions they were given to follow upon receipt of a postal diagnosis of diabetes. Please elaborate on this and provide suggestions on what other screening studies could do.

We examined and collected all available documents from the CHARLS research group on the nature of feedback of disease screening (See response to Reviewer #1).

For suggestions on what other studies could do, we have discussed how other HRS type studies communicated screening results to their participants. (See discussion: “Among the 18 HRS family studies worldwide, most had collected blood samples for assay [27, 28]. Some [29, 30] but not all studies reported test results back to study participants and some [18, 31-33] provided specific advice to study participants for health consultations. As an example, specific procedures for the reporting of blood test results to study participants are part of the HRS protocol. In all, 27 items were reported, including complete blood cell counts, fasting glucose, and HbA1c [29, 34, 35]. In the English Longitudinal Study of Aging (ELSA), all blood test results from study participants are reported to their primary care physicians (‘general practitioners’) [32].”)

Overall:
This is an interesting and potentially useful/valuable study that can perhaps highlight gaps/shortcomings in hypertension and diabetes screening, and suggest ways for improving awareness outcomes.

Carine Sangaleti (Reviewer 3):

I suggest including as a key words: cardiovascular disease, diabetes and hypertension

We appreciate the reviewer’s comments. We added cardiovascular disease, diabetes and hypertension as key words.
Introduction - line 47: Describe which sources have been identified. It is necessary to explain which sources were used to identify the level of awareness about the disease.

In the methods section, we clarified what study questions were used to define awareness (In methods section: “After 2011, study participants were re-interviewed every two years to monitor any changes over time in their health, economic, or social conditions. Participants were asked again if they had ever been diagnosed with hypertension or diabetes… Patients with hypertension or diabetes were defined as being aware of their condition if they reported they had ever been diagnosed.”). (Page 6)

Methods - pg 6, line 23: How many participants agreed to take a new blood sample and how many repeated the physical examination?

Based on the reviewer’s suggestion, we added in the method section:

“In 2015, around 85% of participants who had a physical examination in 2011 were re-examined.” (Page 6)

Discussion page 11, line 54: the authors cite: clinical trials, and cite only one.

We updated the discussion as: “For example, one clinical trial has shown that even a small reduction in blood pressure could largely reduce the risk of heart failure, stroke, and myocardial infarction [26].” (Page 13)