PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (**http://bmjopen.bmj.com/site/about/resources/checklist.pdf**) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

ARTICLE DETAILS

TITLE (PROVISIONAL)	Prevalence and service assessment of cataract in Tibetan areas of Sichuan Province, China: a population based study
AUTHORS	Jiachu, Danba; Jin, Ling; Jiang, Feng; Luo, Li; Zheng, Hong; Ji, Duo; Yang, Jing; Yongcuo, Nima; Huang, Wenyong; Yi, Jinglin; Bright, Tess; Yip, Jennifer; Xiao, Baixiang

VERSION 1 – REVIEW

REVIEWER	Varshini Varadaraj Johns Hopkins Wilmer Eye Institute, USA
REVIEW RETURNED	02-Jun-2019

GENERAL COMMENTS	General comments: Authors describe a population-based study describing the prevalence of cataract and barriers to catract services in a Tibetan area of the Sichuan province in China. Authors report a relatively low prevalence of cataract blindness and high cataract surgical coverage in the study area. Please see specific comments below- • Page 3, line 7- please use a more scientific and less subjective word than “harsh” here and elsewhere. Unclear what harsh means. • Page 3, line 15- Mention the actual cut offs used for blindness and VIs • Page 3, line 15- “35.7% found in the nine-province eye study in China.”- remove this from the abstract as reference can’t be cited and this is not discussed elsewhere in the abstract. • Page 4, line 15- Unclear what this refers to- “Kappa agreement was high between the ophthalmologists in eye examination and diagnosis.” • Page 5, line 40- Specify abbreviation for CSC at first use. • Page 5, line 40- “In China, CSC at blind eyes..” do you mean “for” blind eyes? • Page 6, lines 1-26- Not all these details are needed on the area or the hospital are needed- can be abbreviated substantially. • Page 9, 23-27- were there differences in post-cataract surgery VA (surrogate for quality) by surgery site, i.e. camp vs hospital • Unclear if clustering between right and left eyes was performed in analysis to account for inter-eye correlation among persons in whom data from both eyes were used? • Authors state that “cannot access treatment” and “cost” were less common in TAPK possibly implying that out-reach services have been successful. However, if out-reach services have been successful, couldn’t we expect people in the area to know that

	cataract is treatable? It is surprising that such a large proportion reported being “unaware treatment is possible”. • Please comment on the fact that couching is still being performed in the discussion and comment on why • How did you determine if they were suffering from other ocular disease? Did all patients have a slit lamp and fundus exam performed? • Please note that the manuscript has some grammatical and language errors. It will benefit from a copy editor who can improve the clarity of exposition and technical correctness.

REVIEWER	Priya Adhisesha Reddy Centre for Public Health, Queen's University Belfast, UK
REVIEW RETURNED	11-Jun-2019

GENERAL COMMENTS	Page no:8 Prevalence of cataract: This paragraph looks too crowded with numbers. It is better to simplify this as the data is already shown in the tables. Is the trial got registered? If, so please give details.

REVIEWER	Solange R Salomao Departamento de Oftalmologia e Ciências Visuais Escola Paulista de Medicina Universidade Federal de São Paulo-UNIFESP São Paulo, SP, Brasil
REVIEW RETURNED	17-Jul-2019

GENERAL COMMENTS	Abstract: Page 3, lines 14-16: A definition of cataract blindness is needed. What was the criterium to define cataract blindness in terms of visual acuity (uncorrected, presenting or best-corrected) cut-off (better-vision eye with <20/400)? Page 3, lines 26-27: Define early visual impairment since this nomenclature is not used worldwide. Page 3, lines 42-45: Conclusions should correspond to the aim of the study in terms of surgical outcomes. The comparison with the nine province does not add valuable information. BACKGROUND Page 5, lines 6-7: “The estimated 253 million people worldwide with visual impairment and blidness”. The term MODERATE/SEVERE must be added before visual impairment, since the mild vision impairment is not considered in this calculation. Page 5, lines 45-48: None of the 4 references (#12-15) are from studies on South America. Please remove it from the sentence and add North America and Australia. Page 6, line 6: Reference #22 is not related to the population of TAPK. A correct reference is needed. Page 6, lines 21-22: Reference #23 is not related with the information on CSR in China. A correct reference is needed. The next sentence needs grammar correction. Page 6, line 32: A reference for the study performed in 2017 is needed. METHODS Page 6, lines 40-41: Data of this study could not be found at www.raabdata.info/repository, accessed on July 15, 2019. SAMPLE SIZE CALCULATION

	Page 6, lines 45-49: Using the formula to calculate sample size with the provided data, a sample size of 4200 was required. A better clarification of the 5,000 people required is needed. SAMPLING Page 6, line 59: Reference #25 could not be accessed. Please correct the writing to www.cejhjournal.org/resources/raab DATA COLLECTION Page 7, lines 14-16: Explain how the causes of VI were determined and which causes were considered besides uncorrected refractive error and cataract. Page 7, lines 14-16: Which were considered cataract surgery complications and how were they assessed? What was the difference between complications and late complications? Page 7, lines 16-17: Define how was determined the presence of IOL and the surgical technique for post-operative cases. Page 7, lines 20-21: Replace early visual impairment by mild visual impairment. Page 7, lines 22-23: Clarify a list of reasons that were asked for not having cataract surgery and if the participant could list more than one reason or if there was any limit of reasons. Page 7, lines 25-28: Explain what was the visual acuity cut-off used for cataract surgical coverage calculation, as established in reference #26. Also it is needed to explain how it was calculated per person (better-vision eye???). DATA ANALYSIS Page 7, lines 36-57: how were counted and analyzed participants with visually impaired or blind due to cataract in one eye only? RESULTS Page 8, lines 15-18: a table describing the distribution of age categories, sex, ethnicity, region, distance from hospital and altitude for enumerated and examined participants with response rate for each variable is needed. PREVALENCE OF CATARACT The title of this section should be PREVALENCE OF VISUAL IMPAIRMENT AND BLINDNESS DUE TO CATARACT Table 1 shows only gender adjusted prevalence instead of age and gender adjusted. Page 8, lines 46-48: lower prevalence (include the actual prevalence in parenthesis) was found in arable areas compared to pastoral areas (include the actual prevalence in parenthesis). BARRIERS TO CATARACT SURGERY Page 8, line 57: it is not clear how many participants were included in this analysis and their demographics is also missing. Page 8, line 58: Table 3 just lists the barriers but does not provide a total number of people interviewed. In this table, the barriers should be listed in order of importance instead of mixed as they are shown. CATARACT SURGICAL COVERAGE Page 9, line 16: “...if the results were consider..” correct to “ if the results were considered” Table 5: Remove the first two age categories from this table since there were no participants operated before 40 years of age. CATARACT SURGICAL OUTCOMES

	The title for this section should be CATARACT SURGERY VISUAL OUTCOMES AND COMPLICATIONS Page 9 – On tables 6 and 7 avoid the classification as very good, good etc. Use the above definitions of MVI, SVI and BL, since visual outcomes are being provided. DISCUSSION Page 9, lines 45-46: it is not clear how this extrapolation was done. Please clarify. Page 9, lines 51-53: For each of this studies (references 28,29, 30, 7, 10 and 31) provide the exact time point. For instance, Pakistan (2005). Page 10, lines 32-33: Again the time point of these studies in China (reference 7, 17 and 18) is needed. Page 11, lines 19-20: instead of “in the population” use “in this population”. CONCLUSION Page 11, lines 34-35: This was not a study on the prevalence of cataract.

VERSION 1 – AUTHOR RESPONSE

Reviewer(s)' Comments to Author:

Reviewer: 1

Reviewer Name: Varshini Varadaraj

Institution and Country: Johns Hopkins Wilmer Eye Institute, USA

Please state any competing interests or state ‘None declared’: None declared

Please leave your comments for the authors below

General comments:

Authors describe a population-based study describing the prevalence of cataract and barriers to catract services in a Tibetan area of the Sichuan province in China. Authors report a relatively low prevalence of cataract blindness and high cataract surgical coverage in the study area.

Please see specific comments below-

- Page 3, line 7- please use a more scientific and less subjective word than “harsh” here and elsewhere. Unclear what harsh means.

These have now been changed as “dispersed and high altitude”

- Page 3, line 15- Mention the actual cut offs used for blindness and Vis

These are now added.

- Page 3, line 15- “35.7% found in the nine-province eye study in China.”- remove this from the abstract as reference can’t be cited and this is not discussed elsewhere in the abstract.

Done

- Page 4, line 15- Unclear what this refers to- “Kappa agreement was high between the ophthalmologists in eye examination and diagnosis.”

This was measured/assessed in the interobserver variation study. – suggesting the results across teams in the study were consistent. The content is now added.

- Page 5, line 40- Specify abbreviation for CSC at first use.

Done

- Page 5, line 40- “In China, CSC at blind eyes..” do you mean “for” blind eyes?

Yes. Modified.

- Page 6, lines 1-26- Not all these details are needed on the area or the hospital are needed- can be abbreviated substantially.

It is now shortened.

- Page 9, 23-27- were there differences in post-cataract surgery VA (surrogate for quality) by surgery site, i.e. camp vs hospital

Yes. Presented at Table 7.

- Unclear if clustering between right and left eyes was performed in analysis to account for inter-eye correlation among persons in whom data from both eyes were used?

No. for prevalence, we analyzed by person (better eye used), for surgical outcomes, we used eyes.

- Authors state that “cannot access treatment” and “cost” were less common in TAPK possibly implying that out-reach services have been successful. However, if out-reach services have been successful, couldn’t we expect people in the area to know that cataract is treatable? It is surprising that such a large proportion reported being “unaware treatment is possible”.

That is right. So we now stated that the outreach should have health education included in the future service delivery at the 4th paragraph under discussion.

- Please comment on the fact that couching is still being performed in the discussion and comment on why

It’s done at the end of paragraph 5 under discussion.

- How did you determine if they were suffering from other ocular disease? Did all patients have a slit lamp and fundus exam performed?

Torch was used to detect anterior segment for all the participants. Unless with case history or request for detection, fundus examination were only for those with VA <6/12. More detailed study method described at first paragraph of “Data Collection”

- Please note that the manuscript has some grammatical and language errors. It will benefit from a copy editor who can improve the clarity of exposition and technical correctness.

Thanks noted and improved.

Reviewer: 2

Reviewer Name: Priya Adhisesha Reddy

Institution and Country: Centre for Public Health, Queen's University Belfast, UK

Please state any competing interests or state ‘None declared’:None declared

Thanks. This is done.

Please leave your comments for the authors below

Page no:8

Prevalence of cataract: This paragraph looks too crowded with numbers. It is better to simplify this as the data is already shown in the tables.

Thanks. This is now improved.

Is the trial got registered? If, so please give details.

It is a cross-sectional study.

Reviewer: 3

Reviewer Name: Solange R Salomao

Institution and Country: Departamento de Oftalmologia e Ciências Visuais

Escola Paulista de Medicina

Universidade Federal de São Paulo-UNIFESP

São Paulo, SP, Brasil

Please state any competing interests or state ‘None declared’: None declared

Please leave your comments for the authors below

Abstract:

Page 3, lines 14-16: A definition of cataract blindness is needed. What was the criterium to define cataract blindness in terms of visual acuity (uncorrected, presenting or best-corrected) cut-off (better-vision eye with <20/400)?

It is now added as requested. Thanks.

Page 3, lines 26-27: Define early visual impairment since this nomenclature is not used worldwide.

They are now defined at “methods”

Page 3, lines 42-45: Conclusions should correspond to the aim of the study in terms of surgical outcomes. The comparison with the nine province does not add valuable information.

This is now deleted.

BACKGROUND

Page 5, lines 6-7: “The estimated 253 million people worldwide with visual impairment and blidness”. The term MODERATE/SEVERE must be added before visual impairment, since the mild vision impairment is not considered in this calculation.

They are now added.

Page 5, lines 45-48: None of the 4 references (#12-15) are from studies on South America. Please remove it from the sentence and add North America and Australia.

They are now corrected.

Page 6, line 6: Reference #22 is not related to the population of TAPK. A correct reference is needed.

It is now adjusted. Thanks.

Page 6, lines 21-22: Reference #23 is not related with the information on CSR in China. A correct reference is needed. The next sentence needs grammar correction.

The order of references is now adjusted. Thanks.

Page 6, line 32: A reference for the study performed in 2017 is needed.

This referred to the study in this paper.

METHODS

Page 6, lines 40-41: Data of this study could not be found at www.raabdata.info/repository, accessed on July 15, 2019.

Will contact again and ensure being uploaded once this is published.

SAMPLE SIZE CALCULATION

Page 6, lines 45-49: Using the formula to calculate sample size with the provided data, a sample size of 4200 was required. A better clarification of the 5,000 people required is needed.

We calculated with RAAB software and sample size is right.

SAMPLING

Page 6, line 59: Reference #25 could not be accessed. Please correct the writing to www.cejhjournal.org/resources/raab

Noted and corrected. Thanks.

DATA COLLECTION

Page 7, lines 14-16: Explain how the causes of VI were determined and which causes were considered besides uncorrected refractive error and cataract.

Thanks for the good point. More detailed description on examination is now added to “data collection”.

Page 7, lines 14-16: Which were considered cataract surgery complications and how were they assessed? What was the difference between complications and late complications?

Definition of these concepts are now added to the “data collection”.

Page 7, lines 16-17: Define how was determined the presence of IOL and the surgical technique for post-operative cases.

These are now defined at “data collection”

Page 7, lines 20-21: Replace early visual impairment by mild visual impairment.

We think these should be remained because they are defined at the RAAB manual and the convenience of the abbreviation being differed from moderated of VI (MVI).

Page 7, lines 22-23: Clarify a list of reasons that were asked for not having cataract surgery and if the participant could list more than one reason or if there was any limit of reasons.

The list is now added to the “methods”

Page 7, lines 25-28: Explain what was the visual acuity cut-off used for cataract surgical coverage calculation, as established in reference #26. Also it is needed to explain how it was calculated per person (better-vision eye???).

Cataract surgical coverage were presented at all levels both at the tables and narrative at the results. Method of the calculation is referred.

DATA ANALYSIS

Page 7, lines 36-57: how were counted and analyzed participants with visually impaired or blind due to cataract in one eye only?

These are all reported separately at tables/narratives, by eyes and by persons at the method section. Thanks

RESULTS

Page 8, lines 15-18: a table describing the distribution of age categories, sex, ethnicity, region, distance from hospital and altitude for enumerated and examined participants with response rate for each variable is needed.

The table is now added as table 1. Thanks.

PREVALENCE OF CATARACT

The title of this section should be PREVALENCE OF VISUAL IMPAIRMENT AND BLINDNESS DUE TO CATARACT

It is now corrected.

Table 1 shows only gender adjusted prevalence instead of age and gender adjusted.

Yes. Thanks. Corrected.

Page 8, lines 46-48: lower prevalence (include the actual prevalence in parenthesis) was found in arable areas compared to pastoral areas (include the actual prevalence in parenthesis).

Yes. Figures in parenthesis are confidence interval and prevalence is added.

BARRIERS TO CATARACT SURGERY

Page 8, line 57: it is not clear how many participants were included in this analysis and their demographics is also missing.

Of the 171 subjects with un-operated cataract, 133 expressed that barrier to cataract surgery was “unaware treatment is possible”. This is now added to the paragraph.

Page 8, line 58: Table 3 just lists the barriers but does not provide a total number of people interviewed. In this table, the barriers should be listed in order of importance instead of mixed as they are shown.

There is a total number of 171 interviewed but listed at the first line. It is now moved to the last line for the common understanding. Footnotes explained how the barriers listed and percentage calculation.

CATARACT SURGICAL COVERAGE

Page 9, line 16: "...if the results were consider.." correct to " if the results were considered"

Thanks. It is now corrected.

Table 5: Remove the first two age categories from this table since there were no participants operated before 40 years of age.

Done

CATARACT SURGICAL OUTCOMES

The title for this section should be CATARACT SURGERY VISUAL OUTCOMES AND COMPLICATIONS

Thanks. Modified.

Page 9 – On tables 6 and 7 avoid the classification as very good, good etc. Use the above definitions of MVI, SVI and BL, since visual outcomes are being provided.

As recommended by RAAB manual and WHO, we will keep the categories for better understanding.

DISCUSSION

Page 9, lines 45-46: it is not clear how this extrapolation was done. Please clarify.

Extrapolation by the local population and it's now explained.

Page 9, lines 51-53: For each of this studies (references 28,29, 30, 7, 10 and 31) provide the exact time point. For instance, Pakistan (2005).

Thanks for the good suggestions. They are now added.

Page 10, lines 32-33: Again the time point of these studies in China (reference 7, 17 and 18) is needed.

Added. Thanks.

Page 11, lines 19-20: instead of “in the population” use “in this population”.

Changed. Thanks

CONCLUSION

Page 11, lines 34-35: This was not a study on the prevalence of cataract.

Changed as suggested above.

VERSION 2 – REVIEW

REVIEWER	Varshini Varadaraj Johns Hopkins, USA
REVIEW RETURNED	01-Sep-2019

GENERAL COMMENTS	The authors have addressed my previous comments. A few more minor edits below- Page 3- Article Summary- some text in grey and some in black Page 4, line 48- “However, results are not inconclusive in Tibetan areas”- I think authors mean ARE inconclusive? Page 10, Table 2, Line 14- “Age adjusted with local population”- please provide more detail on the age structure used and which year’s census population. Table 4. Provide foot note explaining “Local reasons”. Tables should be self-explanatory

REVIEWER	Solange R Salomao Departamento de Oftalmologia e Ciencias Visuais Escola Paulista de Medicina Universidade Federal de São Paulo - UNIFESP São Paulo, SP, Brasil
REVIEW RETURNED	16-Aug-2019

GENERAL COMMENTS	The revised version of the manuscript has improved compared to the original one. However some issues still need clarification ABSTRACT Conclusions are limited. Poor outcomes for cataract surgery and future actions to improve them should be added. METHODS

	First paragraph: The last phrase must be modfied by Full data for this study will be available on www.raabdata.info/respository in the near future, since it is not available yet. The fact that you have used the RAAB software to calculate sample size is not sufficient to make it replicable for other studies. A detailed explanation including the formula for this calculation is needed. The fact that the estimated sample size of 5000 individuals 50 and older is exactly the same number of eligible individuals is also concerning. Usually during field work things do not work as exact numbers. Some individuals might have moved from the study area. Early visual impairment is not a consensual term in the literature. Mild vision impairment should be used and abbreviated as MiVI. RESULTS Remove the second phrase from the first paragraph stating that there were no differences in age and sex distribution between the study population and the total population. Table 1 – Replace People selected by Enumerated and People Examined by Examined. Altitude is shown in km. Please correct to meters. Table 4 – To make it easier for the reader, please list the barriers in numerical order from the most common (unaware treatment is possible) to the least one.

VERSION 2 – AUTHOR RESPONSE

Reviewer(s)' Comments to Author:

Reviewer: 3

Reviewer Name: Solange R Salomao

Institution and Country:

Departamento de Oftalmologia e Ciencias Visuais

Escola Paulista de Medicina

Universidade Federal de São Paulo - UNIFESP

São Paulo, SP, Brasil

Please state any competing interests or state ‘None declared’: None

Please leave your comments for the authors below

The revised version of the manuscript has improved compared to the original one. However some issues still need clarification

ABSTRACT

Conclusions are limited. Poor outcomes for cataract surgery and future actions to improve them should be added. Added

METHODS

First paragraph: The last phrase must be modfied by Full data for this study will be available on www.raabdata.info/respository in the near future, since it is not available yet. Thanks corrected

The fact that you have used the RAAB software to calculate sample size is not sufficient to make it replicable for other studies. A detailed explanation including the formula for this calculation is needed. The fact that the estimated sample size of 5000 individuals 50 and older is exactly the same number of eligible individuals is also concerning. Usually during field work things do not work as exact numbers. Some individuals might have moved from the study area. Yes these had been referred to the RAAB methods.

Early visual impairment is not a consensual term in the literature. Mild vision impairment should be used and abbreviated as MiVI. We will follow up the RAAB method still.

RESULTS

Remove the second phrase from the first paragraph stating that there were no differences in age and sex distribution between the study population and the total population. Thanks. This is done.

Table 1 – Replace People selected by Enumerated and People Examined by Examined. Altitude is shown in km. Please correct to meters. Thanks. All corrected now.

Table 4 – To make it easier for the reader, please list the barriers in numerical order from the most common (unaware treatment is possible) to the least one. Thanks. Revised as suggested.

Reviewer: 1

Reviewer Name: Varshini Varadaraj

Institution and Country: Johns Hopkins, USA

Please state any competing interests or state ‘None declared’: None declared

Please leave your comments for the authors below

The authors have addressed my previous comments. A few more minor edits below-

Page 3- Article Summary- some text in grey and some in black Format changed now. Thanks

Page 4, line 48- “However, results are not inconclusive in Tibetan areas”- I think authors mean ARE inconclusive? Thanks. Corrected now

Page 10, Table 2, Line 14- “Age adjusted with local population”- please provide more detail on the age structure used and which year’s census population. Thanks. Supplied now.

Table 4. Provide foot note explaining “Local reasons”. Tables should be self-explanatory Thanks. Provided now.

VERSION 3 – REVIEW

REVIEWER	Solange Rios Salomão Universidade Federal de São Paulo - UNIFESP, Brazil
REVIEW RETURNED	12-Sep-2019

GENERAL COMMENTS	I insist that the sample size calculation is not clearly described in this second revised version. The usage of RAAB software is not sufficient to replicate the study by other researchers. A detailed description of sample size calculation must be included. This revised version is exactly the same as the previous one regarding this issue.

VERSION 3 – AUTHOR RESPONSE

Thanks for sending back the further comments from the reviewer.

I have now added the formula for simple sample size calculation and explained for how did the sample size of 5000 come from for cluster random sampling in the manuscript.

The authorship contribution is also revised as their actual contribution and requirement.

I have now uploaded both the version with tracked changes and version cleaned online for your consideration to publish on your journal.

Please do let me know if these are alright.