PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Prevalence of health services utilization and associated factors in the Amazon Region of Brazil: a population-based cross-sectional study
AUTHORS	Araujo, Maria Elizete; Silva, Marcus; Galvao, Tais; Pereira, Mauricio

VERSION 1 – REVIEW

REVIEWER	Ana Paula Santana Coelho Almeida Federal University of Espirito Santo - Brazil
REVIEW RETURNED	19-Jul-2017

GENERAL COMMENTS	1. Abstract: The abstract does not include the main information on the description of the reasons behind the health services and lack of Access. In the objective item, write directly (the objective of this study ..). I suggest the following wording: The aim of this study is to estimate the prevalence of health care use and its associated factors in the Manaus Metropolitan Region, and to describe the reasons behind the demand for health services and lack of access. Enter the main results of the description of the reasons behind the health services and lack of access in the results item. 2. Introduction: The introduction is adequate, in spite of that it should include the aspects related to reasons behind the demand for health services and lack of access and the objective should be adjusted. 3. Methods: Outcomes are not well described in the methodology. The authors presented the forms of measurement and possible answers ("in the last 12 months", "from 2 to less than 1 year", "from 2 to less than 3 years", "3 years or more", "never went to The doctor "), however did not present how the outcome was treated. Specify that the outcome "use" was treated dichotomously (health services utilization in 12 months - yes or no) and explain which categories were added. The variables titled as variables used to explain the outcome are actually secondary outcomes. The methodology should be adjusted. In the description of the adjusted analysis, describe the way of selecting the variables, step by step. It was stepwise? It is suggested that socioeconomic and demographic variables be at the same level. The research ethics (e.g. participant consent, ethics approval) are not addressed. 4. Results: The methodology mentions a quality control to minimize the risk of information bias. Nevertheless in the results section it was not presented what the quality control showed. If you do not want to

	present, you should remove from methodology. The authors reported a 24% refusal rate. It was a differential loss? A selection bias may have been introduced. If it is not possible to describe non-participants (losses) minimally, the high loss rate should be considered as a limitation of the study. I suggest taking the note from table 2 and explaining the adjustments made in the regression in the methodology. In lines 57 (p.7) and 9 (p.8) the number of medical records is described with outcome. E.g. ("Access to health insurance (PR=1.14, 95%CI: 1.10 to 1.19) and lower perceptions in the health status were factors associated with more visits to physician in the last block"). It should be corrected. ("Access to health insurance (PR=1.14, 95%CI: 1.10 to 1.19) and lower perceptions in the health status were factors associated with higher prevalence of Physician visit in the last block"). In table 2 the p-value of the variable should be presented, and not p-value of the category. The confidence interval already shows in which category is the difference. By presenting the p-value of the category, we do not know the level of significance of the variable. The question "What was the reason for not receiving care on the last 2 weeks?" is about the first try? It's not clear. 5. Discussion: The discussion was centered on prevalence. Discussion on factors associated with the health services utilization should be made, making comparisons with other national and international studies. Discussion about reasons behind the demand for health services and lack of access also should be made.

REVIEWER	Rornald Muhumuza Kananura Makerere University School of Public Health, Department of Health Policy Planning and Management, Uganda No Competing Interest
REVIEW RETURNED	21-Jul-2017

GENERAL COMMENTS	Introduction Change Introduction to Background In the last several decades, special attention has been directed towards utilization and access to health services in Brazil and in rest of the world, with the aim of identifying inequality and proposing measures to reduce it. This statement is not clear. How has attention toward access utilization helps to identify inequality?? The whole section does not relate to the study outcomes and why this study is important. Authors need to revise this section. Methods Are the authors using secondary data for a larger national survey? If yes, they need indicate the reference for this report and make sure the methods are consistent. Variables Let authors describe what economic classifications mean in comparison with the global classifications Statistics analysis Model building/specification strategies not mentioned. For instance, how did the authors decide on the variables for multivariate analysis, how did the authors address the issues of collinearity, why did the

	authors decided to use Poisson not logistic, what about the model goodness of fit? Why didn't the author consider clustering under multivariate regression? Table Suggest to use something to represent the P –value and magnitude such as ***-P<0.001 and remove the p-value columns to create space Under physician Separated/divorced P-value indicates significance but the CI indicates otherwise. Reasons behind the demand for health services and lack of access This should be integrated into each of the hospital utilization service outcomes. For example, what were the reasons for seeing the dentist and why not Under hospitalization What is the definition of hospitalization? Do the authors mean admission (In patient)? If yes, what were the reasons Table on page 10/11 should be modified and should not be generalized. Reasons for physician visits are different from reasons for hospitalization and seeking dental services. We should also know reasons for not accessing the services Discussion Let the authors have subsections based on the study outcomes The authors are only repeating the results and what is already done in other studies without making an argument on the reasons for the results and recommendations Let the authors also have a subsection on study limitation and strengths General comments Authors need to define some country specific terms like economic classification. For instance, what does C mean? Poorest?

VERSION 1 – AUTHOR RESPONSE

Reviewer 1

REVIEWER COMMENT: 1. Abstract: The abstract does not include the main information on the description of the reasons behind the health services and lack of Access.

OUR RESPONSE: According to the BMJ Open instructions for authors, the abstract does not include a background or introduction.

REVIEWER COMMENT: In the objective item, write directly (the objective of this study ..). I suggest the following wording: The aim of this study is to estimate the prevalence of health care use and its associated factors in the Manaus Metropolitan Region, and to describe the reasons behind the demand for health services and lack of access.

OUR RESPONSE: We changed the objective for a more direct sentence, as suggested: “Objective: To estimate the prevalence of health care use and associated factors in the Manaus Metropolitan Region, and to describe the reasons lack of access.”

REVIEWER COMMENT: Enter the main results of the description of the reasons behind the health services and lack of access in the results item.

OUR RESPONSE: We accept and appreciate the suggestion: “Among the individuals who did not receive medical attention in the previous two weeks, 58% reported lack of facilities or appointment unavailable, and 14% reported lack of doctors.”

REVIEWER COMMENT: 2. Introduction: The introduction is adequate, in spite of that it should include the aspects related to reasons behind the demand for health services and lack of access and the objective should be adjusted.

OUR RESPONSE: We added a sentence about disparities in health services’ utilization the region and complemented the objective as suggested: “A systematic review of population-based studies observed an increase in medical and dental consultations from 1998 to 2013 in Brazil countrywide. In the Northern – and less developed region – the utilization of such health services reduced in this period. Discrepancies in the health services utilization in this region may affect the population’s wellbeing and should be investigated.”
“The aim of this study is to estimate the prevalence of health care use and its associated factors in the Manaus Metropolitan Region, and to describe the reasons lack of access.”

REVIEWER COMMENT: 3. Methods: Outcomes are not well described in the methodology. The authors presented the forms of measurement and possible answers ("in the last 12 months", "from 2 to less than 1 year", "from 2 to less than 3 years", "3 years or more", "never went to The doctor "), however did not present how the outcome was treated. Specify that the outcome "use" was treated dichotomously (health services utilization in 12 months - yes or no) and explain which categories were added.

OUR RESPONSE: We have improved the outcomes description of our research in this context: “We analyzed three dependent variables: (i) visit to physician in last year, measured by the question “When did you last see a doctor?” with the options “in the last 12 months”, “from 2 to less than 1 year”, “from 2 to less than 3 years”, “3 years or more”, “never went to the doctor”; (ii) visit to dentist in the last year, measured by the question “When did you last see a dentist?; and (iii) admission to hospital in the last year, measured by the question “In the last 12 months, how many times have you been admitted to a hospital for 24 hours or more?”, respondents informed the number of times. All dependent variables were dichotomized to yes (visit last year) or no (no visit last year).”

REVIEWER COMMENT: The variables titled as variables used to explain the outcome are actually secondary outcomes. The methodology should be adjusted.

OUR RESPONSE: We accept the suggestion. For clarity, we also moved primary outcomes for “Variables” topic and clarified the secondary outcomes: “Secondary outcomes, assessed descriptively were: service or professional […]”

REVIEWER COMMENT: In the description of the adjusted analysis, describe the way of selecting the variables, step by step. It was stepwise? It is suggested that socioeconomic and demographic variables be at the same level.

OUR RESPONSE: An hierarchical model was performed, following a rationale that demographic and socioeconomic are distal variables and health situation as proximal. A stepwise analysis was not employed.

REVIEWER COMMENT: The research ethics (e.g. participant consent, ethics approval) are not addressed.

OUR RESPONSE: The research ethics was included at the end of the article. We also entered for the last paragraph of the method in this revised version.

REVIEWER COMMENT: 4. Results: The methodology mentions a quality control to minimize the risk of information bias. Nevertheless in the results section it was not presented what the quality control showed. If you do not want to present, you should remove from methodology.

OUR RESPONSE: This quality control was a basic procedure to assure that the interviews were performed properly. As we followed STROBE statement, control of bias is one item that should be reported in the Methods section only.

REVIEWER COMMENT: The authors reported a 24% refusal rate. It was a differential loss? A selection bias may have been introduced. If it is not possible to describe non-participants (losses) minimally, the high loss rate should be considered as a limitation of the study.

OUR RESPONSE: We added this limitation in the discussion section:
“The response rate was above 70%, however, systematic differences in people who accepted and refused to participate is possible and weakens our results. To mitigate distortions in representativeness, inclusion of participants was bases in predefined quotas of sex and age, based on official estimates.”

REVIEWER COMMENT: I suggest taking the note from table 2 and explaining the adjustments made in the regression in the methodology.

OUR RESPONSE: Despite the adjusted analysis is described in the methods section, the variables that remained significant for the next block was different for each outcome. We shorten the text to keep the essential information.

REVIEWER COMMENT: In lines 57 (p.7) and 9 (p.8) the number of medical records is described with outcome. E.g. ("Access to health insurance (PR=1.14, 95%CI: 1.10 to 1.19) and lower perceptions in the health status were factors associated with more visits to physician in the last block"). It should be corrected. ("Access to health insurance (PR=1.14, 95%CI: 1.10 to 1.19) and lower perceptions in the health status were factors associated with higher prevalence of Physician visit in the last block").

OUR RESPONSE: Suggestion accepted, the text is now: "[…] factors associated with higher prevalence of visits to physician in the last block"

REVIEWER COMMENT: In table 2 the p-value of the variable should be presented, and not p-value of the category. The confidence interval already shows in which category is the difference. By presenting the p-value of the category, we do not know the level of significance of the variable.

OUR RESPONSE: The p-value presented is of each variable.

REVIEWER COMMENT: The question "What was the reason for not receiving care on the last 2 weeks?" is about the first try? It's not clear.

OUR RESPONSE: We completed this information in Table 3.

REVIEWER COMMENT: 5. Discussion: The discussion was centered on prevalence. Discussion on factors associated with the health services utilization should be made, making comparisons with other national and international studies. Discussion about reasons behind the demand for health services and lack of access also should be made

OUR RESPONSE: We accept the suggestion and improved the statement of our research in this context:
"Regarding the access issues, among people that failed to use health service in the last fortnight the unavailability of vacancy in the health services was the main reason. Such proportion was superior to those found in a study carried out in 2012 in the Southern Region.41 A Canadian national survey with 30,222 individuals analyzed barriers for health care access.42 They reported that 23% was related to waiting time and 16% was attributable to unavailable services. Other study performed in four African countries in 2010-2014 shows other issues perceived for lack of access. 43 Their interviewed claimed to poor transport, unavailable services, inadequate drugs or supplies and the cost of the visit."

Reviewer: 2
REVIEWER COMMENT: Introduction Change Introduction to Background

OUR RESPONSE: Suggestion accepted.
REVIEWER COMMENT: In the last several decades, special attention has been directed towards utilization and access to health services in Brazil and in rest of the world, with the aim of identifying inequality and proposing measures to reduce it. This statement is not clear. How has attention toward access utilization helps to identify inequality? The whole section does not relate to the study outcomes and why this study is important. Authors need to revise this section.
OUR RESPONSE: We have improved the statement of our research in this context:"In the last several decades, special attention has been directed to the study of the utilization and access to health services in Brazil and in rest of the world, with the aim of identifying inequality and proposing measures to reduce it.1"

REVIEWER COMMENT: Methods. Are the authors using secondary data for a larger national survey? If yes, they need indicate the reference for this report and make sure the methods are consistent.
OUR RESPONSE: The analysis is based in a local survey, we added the main reference of the study, which details the study protocol.
REVIEWER COMMENT: Variables. Let authors describe what economic classifications mean in comparison with the global classifications
OUR RESPONSE: We improved the explanation in the methods section and added the family income in the results as needed: “This economic classification considers the amount of household appliances and the educational attainment of the family head to classify into A, B, C, D, and E, where A signifies wealthier and E, the poorest. The household monthly income in Brazilian real can be estimated from each stratum, which was converted to United States dollars (USD) based on the currency of the Central Bank of Brazil on July 1, 2015: 1 dollar = 3.1185 real.”
REVIEWER COMMENT: Statistics analysis. Model building/specification strategies not mentioned. For instance, how did the authors decide on the variables for multivariate analysis, how did the authors address the issues of collinearity, why did the authors decided to use Poisson not logistic, what about the model goodness of fit?
OUR RESPONSE: We expanded the explanation of statistical analysis in the Methods section:
“To identify the factors associated with the use of these services, PRs were adjusted in a hierarchical model16 and calculated together with a 95% confidence interval (95% CI) using Poisson regression with robust variance. The calculation of PRs by this method is brigs more accurate estimates, avoiding overestimations. 17 18
A hierarchical model consisting of three blocks was constructed of most distal determinant for outcome proximate: (1) demographic variables (sex, age, race, marital status); (2) socioeconomic variables (education, economic classification, occupation); and (3) health variables (private health insurance, health status, place of attendance, multiple attempts to seek same health service). From the first block, the variables for the next step were maintained if they presented a significance with p ≤0.05. The multicollinearity between the independent variables was investigated through variance inflation factors.19”
REVIEWER COMMENT: Why didn’t the author consider clustering under multivariate regression?
OUR RESPONSE: The complex design was considered in the analysis as stated in the Methods section: “the complex sampling design was weighted by incorporation of sample weights (svy command).”
REVIEWER COMMENT: Table. Suggest to use something to represent the P –value and magnitude such as ***-P<0.001 and remove the p-value columns to create space
OUR RESPONSE: The exact p-value was presented to improve transparency in the reporting.
REVIEWER COMMENT: Under physician Separated/divorced P-value indicates significance but the CI indicates otherwise.
OUR RESPONSE: We checked the rounding of the values and corrected as needed:
0.92 (0.84-0.99) 0.046

REVIEWER COMMENT: Reasons behind the demand for health services and lack of access. This should be integrated into each of the hospital utilization service outcomes. For example, what were the reasons for seeing the dentist and why not
OUR RESPONSE: We thank the suggestion and agree that this information would be valuable. However, primary outcomes were assessed in the last year while lack of access was based on the fortnight.
REVIEWER COMMENT: Under hospitalization. What is the definition of hospitalization? Do the authors mean admission (In patient)? If yes, what were the reasons
OUR RESPONSE: Yes, hospitalization meant admission in hospital. We changed some of the “hospitalization” in the manuscripts for “hospital admission” for clarity.

REVIEWER COMMENT: Table on page 10/11 should be modified and should not be generalized. Reasons for physician visits are different from reasons for hospitalization and seeking dental services. We should also know reasons for not accessing the services

OUR RESPONSE: We fully revised Table 3: We collapsed some categories with few observations, changed the name of some variables and changed the title for better understanding.

REVIEWER COMMENT: Discussion. Let the authors have subsections based on the study outcomes. The authors are only repeating the results and what is already done in other studies without making an argument on the reasons for the results and recommendations. Let the authors also have a subsection on study limitation and strengths

OUR RESPONSE: We fully reviewed the discussion to improve as needed. We followed the STROBE checklist and authors' instructions and chose not to insert subsections.

REVIEWER COMMENT: General comments. Authors need to define some country specific terms like economic classification. For instance, what does C mean? Poorest?

OUR RESPONSE: We converted the monthly income to dollars and explained what C class mean "lower middle class".

VERSION 2 – REVIEW

REVIEWER	Ana Paula Santana Coelho Almeida Federal University of Espírito Santo/ Brasil
REVIEW RETURNED	30-Aug-2017

GENERAL COMMENTS	Congratulations for the improvements in the manuscript. For improve the manuscript, I suggest that the p-value of the variable be presented (The p-value of Wald Test). Table 2 shows the p-value of the category. By presenting the p-value of the category, we do not know the level of significance of the variable. The discussion was centered on prevalence. Discussion on factors associated with the health services utilization should be made, just as it was done for the dentist visit.

VERSION 2 – AUTHOR RESPONSE

We greatly appreciated the reviewer's comments, and we accept her suggestions. We have made revisions based on the comments/suggestions of the reviewer and performed a full review of the manuscript for clarity and brevity. We have copied the reviewer's suggestion and described how we addressed it. In the manuscript, our revisions are highlighted using tracked changes. We have also submitted a clean version, with all changes accepted.

Neither this manuscript nor any significant part of it has been published or accepted for publication or is under editorial review for publication elsewhere. We attest that each named author meets the criteria for authorship and agree to be accountable for all aspects of the work. All authors assure that questions related to the accuracy or integrity of any part of the work will be appropriately investigated and resolved. We declare no conflicts of interest.

Once again, we thank the opportunity to improve our manuscript during the peer review process of BMJ Open.

VERSION 3 – REVIEW

REVIEWER	Ana Paula Santana Coelho Almeida Federal University of Espírito Santo
REVIEW RETURNED	24-Oct-2017

GENERAL COMMENTS	Congratulations on work.