PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	The impact of the 2017 ACC/AHA guideline on the prevalence of elevated blood pressure and hypertension: a cross-sectional analysis of 10799 individuals.
AUTHORS	Alyabsi, Mesnad; Gaid, Reham; Alqunaibet, Ada; Alaskar, Ahmed; Mahmud, Azra; Alghamdi, Jahad

VERSION 1 – REVIEW

REVIEWER	Sandra J. Taler MD Mayo Clinic 200 First Street SW Rochester, MN 55905 United States of America
REVIEW RETURNED	01-Aug-2020

| GENERAL COMMENTS | The concept is great. The authors utilize a national resource, The Saudi Biobank, to evaluate the prevalence of elevated blood pressure and hypertension in the country. Correlation with various risk factors is explored. There are some flaws in their conceptual framework but these could be addressed.

JNC 7 was published in 2003. It defined hypertension at the time it was published and that set of definitions served as the official United States definitions until the 2017 ACC/AHA guideline was released in late 2017. It is important to understand that each of the 7 JNC documents (the first was in 1977) redefined hypertension to bring it to the current era, with attention to new knowledge on the risks and benefits of treatment to various thresholds. JNC 7 used the term prehypertension to define blood pressure of 120-139 systolic and/or 80-89 diastolic with the implication that this had a high chance of progressing to higher levels of 140/90 or above where it would be defined as hypertension, if not addressed earlier.

In 2014, the United States National Heart Lung and Blood Institute (NHLBI) assigned future JNC type hypertension guidelines over to the American College of Cardiology and the American Heart Association and a writing committee was assembled. This then is the current official U.S. guideline. There will be objectors to any guideline as there were with the JNC documents but this is still the official guideline and holds greater weight than others endorsed by other societies. Because the term prehypertension did not catch on very well to motivate the needed lifestyle changes, the ACC/AHA writing committee decided to modify the wording for the next guideline to use elevated blood pressure for 120-129 systolic with diastolic values less than 80 and they moved stage 1 hypertension to systolic 130-139 and/or diastolic 80-89 based on evidence for |
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benefit of treating these levels in high risk individuals, supported by clinical trials.

So in 2020, prehypertension does not exist. It is therefore misleading and out of date for the authors to use prehypertension as the basis for their discussions in this paper. And this is my primary objection and conflict when reading and trying to decipher the results presented.

To make this work, I suggest the authors use the current terminology and then go backwards to look at prior and current prevalence. Instead of using prehypertension, use elevated blood pressure and stage 1 hypertension and compare to the prior prevalence of prehypertension, for hypertension compare the current stage 2 to the prior stage 1. Then they can discuss in terms of who would be advised to start lifestyle versus lifestyle and medication for therapy. I think it can be done and the discussion will be more cohensive with current thought processes and terminologies. The changes in distribution based on the 2 classifications will make more sense too.
The authors may want to refer to a U.S. paper which did something like this: Muntner P et al for guidance (Circulation. 2018;137:109–118. DOI: 10.1161/CIRCULATIONAHA.117.032582).

Under this rationale, most of the results section would need to be rewritten to look at prevalence and relationship to risk factors using the current classification system. I did not critique this part in detail because in the present state, it is not relevant. Similarly in the Discussion, the relationships of various factors to risk that differed between guidelines are not important to know, they are simply correlations with different groupings of the patients that are not particularly relevant to compare so this should also be rewritten. Public health efforts should be based on risk factors using the current guideline.

I was impressed by the relatively young age of the population presented here. The highest age category was ≥60 and the mean population age was 30 years, with 94% under age 40 years. Is this reflective of the country as a whole or is the Saudi Biobank directed to a younger population and is there an upper age threshold that would restrict enrollment of older individuals?

Also disturbing is the poor control rates for the small subgroup with hypertension by both definitions, so stage 2 by the current guideline. This is a true public health problem. The rationale of working on lowering blood pressure prior to reaching greater levels of severity is laudable but much work is also needed for those who truly need treatment.

Specific comments:
The ACC/AHA document is a hypertension guideline (singular) and should be referred to as such.
Abstract, page 3, lines 23-24: One cannot report on the prevalence of prehypertension by the 2017 ACC/AHA guideline because the term is not used. Terms such as "reduction of 33.45%" should be termed a "difference of 33.45%" because it is not being actively changed by an action, rather it is a prevalence rate using a different definition.
Abstract, page 3, lines 32-35: It is important to make clear how you decided who was receiving recommended treatment by the

ACC/AHA guideline. There would be more people diagnosed with hypertension because the threshold was lower but did you also use the calculation of 10-year CVD risk to determine who should be treated with medication? Since your underlying premise is that more people need to be treated, it is important to present this data very clearly. Is the problem the misclassification by outdated terms or a problem with provider recognition or therapeutic inertia?

Page 4, Introduction, lines 31-33: Using a prediction for the future that encompasses 2000-2025 is outdated when we are already at 2020. This should be updated with a more current reference than this one from 2005.

Page 5, Introduction, lines 25-44: I would remove this discussion of prevalence rates and risk factors based on the outdated JNC 7 definitions and move to the modern era using the 2017 guideline definitions. Otherwise it just offers too many numbers and confuses the message. As shown in the Muntner paper, the prevalence of people with the diagnosis of hypertension increases with the current definition but the increase in the number who would be advised to start medication is much smaller.

Page 8, Methods, lines 47-52: Why would never married and divorced be combined, and separated and widowed combined? I would think divorced and separated are more similar. Similarly, the way employment was classified is confusing – why would retired and housewife be grouped together, and never employed with previously employed?

Page 9, Methods, prescription data, lines 32-46: The prescription of 1 antihypertensive agent on one occasion would not be a convincing marker that the person was actually taking the medication. Perhaps going with the first refill would be a stronger data point.

Page 10, Methods, lines 10-22: I would expect prevalence to be the number with the condition divided by the total N, not divided by those without the condition. Why are you using a different definition? This would present highly misleading data.

Page 11, lines 38-43: A statement on the prevalence of prehypertension based on the ACC/AHA guideline makes no sense because the term does not exist and is actually stage 1 hypertension. Furthermore these are different numbers (percentage rates) here than those in the abstract.

There are too many tables which are too complex. While much data was collected from the Biobank, it was not needed or used for this analysis and does not needed to be shown here. I would limit the data to significant factors or those that are relevant even if not significant.

Figure 5: The rationale behind the groups depicted in Figure 5 is unclear. What is the difference between "on the recommended medications" and "individuals actually prescribed the medications"?

REVIEWER	zahra Mohtasham-Amiri
	Guian University of Medical Sciences, Rasht, Iran
REVIEW RETURNED	06-Aug-2020

GENERAL COMMENTS	This study is trying to address an important public health problem and provided useful data for policymakers. But it is not suitable for publishing without major revision.
	1- In the data section, each of the variables and their classification is defined, which is not necessary and makes the article longer.
	2- The definition of hypertension and its classification based on each of the guidelines has been repeated many times in the article.

	3- The prevalence of a disease is calculated by dividing the total number of patients by the total number of all people under study. Therefore this sentence "The prevalence of hypertension was calculated by dividing the total number of hypertensive individuals by the total of the normotensive and prehypertensive individuals. The prevalence of prehypertension was measured by dividing the total number of prehypertensive by normotensive individuals." are not correct. 4- Many explanations are not needed in the data analysis section. 5- It is necessary to mention the unit of measurement in the table after every variable, for example, age, income, BP in Table 1. 6- In Table 3, it was better to use the percent of patients in each category instead of the Mean and SD. 7- In Table 4, line 1, overall HTN based on two guidelines was shown in percent. What are the numbers in parentheses? 8- P values should be shown in Tables 4 and 5. Which variable is significant and in which category? 9- It seems that there is a misunderstanding of the levels of prevention in the discussion section. 10- The discussion should be derived from the results. Further explanation is needed to interpret the findings.

VERSION 1 – AUTHOR RESPONSE

Reviewer Comments:
Reviewer 1

Please leave your comments for the authors below.
The concept is great. The authors utilize a national resource, The Saudi Biobank, to evaluate the prevalence of elevated blood pressure and hypertension in the country. Correlation with various risk factors is explored. There are some flaws in their conceptual framework but these could
be addressed.
JNC 7 was published in 2003. It defined hypertension at the time it was published and that set of definitions served as the official United States definitions until the 2017 ACC/AHA guideline was released in late 2017. It is important to understand that each of the 7 JNC documents (the first was in 1977) redefined hypertension to bring it to the current era, with attention to new knowledge on the risks and benefits of treatment to various thresholds. JNC 7 used the term prehypertension to define blood pressure of 120-139 systolic and/or 80-89 diastolic with the implication that this had a high chance of progressing to higher levels of 140/90 or above where it would be defined as hypertension, if not addressed earlier.
In 2014, the United States National Heart Lung and Blood Institute (NHLBI) assigned future JNC type hypertension guidelines over to the American College of Cardiology and the American Heart Association and a writing committee was assembled. This then is the current official U.S. guideline. There will be objectors to any guideline as there were with the JNC documents but this is still the official guideline and holds greater weight than others endorsed by other societies. Because the term prehypertension did not catch on very well to motivate the needed lifestyle changes, the ACC/AHA writing committee decided to modify the wording for the next guideline to use elevated blood pressure for 120-129 systolic with diastolic values less than 80 and they moved stage 1 hypertension to systolic 130-139 and/or diastolic 80-89 based on evidence for benefit of treating these levels in high risk individuals, supported by clinical trials.

So in 2020, prehypertension does not exist. It is therefore misleading and out of date for the authors to use prehypertension as the basis for their discussions in this paper. And this is my primary objection and conflict when reading and trying to decipher the results presented.

To make this work, I suggest the authors use the current terminology and then go backwards to look at prior and current prevalence. Instead of using prehypertension, use elevated blood pressure and stage 1 hypertension and compare to the prior prevalence of prehypertension, for hypertension compare the current stage 2 to the prior stage 1. Then they can discuss in terms of who would be advised to start lifestyle versus lifestyle and medication for therapy. I think it can be done and the discussion will be more cohensive with current thought processes and terminologies. The changes in distribution based on the 2 classifications will make more sense too.

The authors may want to refer to a U.S. paper which did something like this: Muntner P et al for guidance (Circulation. 2018;137:109–118 PubMed . DOI: 10.1161/CIRCULATIONAHA.117.032582). Thank you for the insightful comments and suggestions. We have updated the result section to reflect the reviewer's kind comments, and we also have consulted the suggested article. First, we have replaced the word "prehypertension" with "elevated blood pressure." Second, we have rewritten the result section to reflect the suggested new comparisons. Third, we have updated and revised the discussion section to be directly relevant to the comparisons made in the result section. Fourth, we have added the implications of our findings based on the new comparisons and stated when lifestyle or medication interventions should be initiated.

Under this rationale, most of the results section would need to be rewritten to look at prevalence and relationship to risk factors using the current classification system. I did not critique this part in detail because in the present state, it is not relevant.
According to the reviewer's kind suggestion, we have rewritten the result section to reflect the current classification system. The main focus is on the prevalence of HTN, elevated BP, the percentage of the participants recommended antihypertensive medication according to the two guidelines, and the percentage recommended for lifestyle modifications. We also determined the percentage of patients prescribed antihypertensive medication but presented with BP above the treatment goal.

Similarly in the Discussion, the relationships of various factors to risk that differed between guidelines are not important to know, they are simply correlations with different groupings of the patients that are not particularly relevant to compare so this should also be rewritten. Public health efforts should be based on risk factors using the current guideline.
Thank you for the comment. Given the reviewer's kind suggestion, we have removed the differences in risk factors according to the guidelines. Additionally, we have rewritten the discussion section of the public health efforts according to the current guideline.

I was impressed by the relatively young age of the population presented here. The highest age category was ≥60 and the mean population age was 30 years, with 94% under age 40 years. Is this reflective of the country as a whole or is the Saudi Biobank directed to a younger population and is there an upper age threshold that would restrict enrollment of older individuals?
Also disturbing is the poor control rates for the small subgroup with hypertension by both definitions, so stage 2 by the current guideline. This is a true public health problem. The rationale of working on lowering blood pressure prior to reaching greater levels of severity is laudable but much work is also needed for those who truly need treatment.
Thank you for the insightful feedback and question. We agree with the reviewer that much work is needed to lower blood pressure and offer treatment among those in need. Concerning age, this is a reflection of the age distribution in Saudi Arabia. The Saudi population is young, with nearly half of the population are younger than 25 years old, and 35% between the ages of 20 and 39 [1].

Specific comments:

The ACC/AHA document is a hypertension guideline (singular) and should be referred to as such.
Thank you for the clarification. We agree with the reviewer, and accordingly, we have updated the entire manuscript to reflect the suggestion. The hypertension guideline has been used as a singular throughout the manuscript.

Abstract, page 3, lines 23-24: One cannot report on the prevalence of prehypertension by the 2017 ACC/AHA guideline because the term is not used. Terms such as "reduction of 33.45%" should be termed a "difference of 33.45%" because it is not being actively changed by an action, rather it is a prevalence rate using a different definition.
Thank you for the comment. We have updated the abstract section to reflect the reviewer's kind suggestion. The result section now reads, "The prevalence of hypertension, according to the JNC-7 guideline, was 14.49% (95% CI: 14.37, 14.61), and the 2017 ACC/AHA, 40.77% (95% CI: 40.60, 40.94), a difference of 26.28 %."

Abstract, page 3, lines 32-35: It is important to make clear how you decided who was receiving recommended treatment by the ACC/AHA guideline. There would be more people diagnosed with hypertension because the threshold was lower but did you also use the calculation of 10-year CVD risk to determine who should be treated with medication? Since your underlying premise is that more people need to be treated, it is important to present this data very clearly. Is the problem the misclassification by outdated terms or a problem with provider recognition or therapeutic inertia?
Thank you for the question. Since we have rewritten the abstract, we decided to provide more detail about the definition of recommended treatment in the methods section. We updated the "Prescription data" section to give the definition. The relevant section now reads, "We used the medical records and pharmacy data to identify participants with an antihypertensive medication prescription. Based on the 2017 ACC/AHA guideline, we defined guideline-recommended antihypertensive medication use as patients with SBP/DBP of ≥140/90 mm Hg; for high-risk patients (i.e., DM, CVD, age ≥ 65), the cut off was 130/80 mm Hg. The same applied to the JNC-7 guideline except that DM was the only designation of high risk."

Page 4, Introduction, lines 31-33: Using a prediction for the future that encompasses 2000-2025 is outdated when we are already at 2020. This should be updated with a more current reference than this one from 2005.
Thank you for the suggestion. We agree with the reviewer's kind suggestion that the reference should be recent, and accordingly, we added a recent one. The sentence now reads, "The global number of patients with hypertension is expected to increase by 319.7 million individuals between 2015 and 2050."

Page 5, Introduction, lines 25-44: I would remove this discussion of prevalence rates and risk factors based on the outdated JNC 7 definitions and move to the modern era using the 2017 guideline definitions. Otherwise, it just offers too many numbers and confuses the message. As shown in the Muntner paper, the prevalence of people with the diagnosis of hypertension increases with the current definition but the increase in the number who would be advised to start medication is much smaller.
We agree with the reviewer that this part of the introduction section should discuss the current 2017 guidelines. Therefore, we have updated the paragraph and consulted the Muntner paper. Accordingly, we have removed the suggested section.

Page 8, Methods, lines 47-52: Why would never married and divorced be combined, and separated and widowed combined? I would think divorced and separated are more similar. Similarly, the way employment was classified is confusing – why would retired and housewife be grouped together, and never employed with previously employed?

Thank you for the comment. This sentence is mistyped. In our codebook, marital status was coded as follows: Single, engaged, married, divorced, and widowed. During data analysis, the variable was coded as follows: Never married (single), married (married, engaged), divorced (divorced, widowed). Likewise, in our data codebook, employment status was coded as follows: employed, student, businessperson, housewife, unemployed (was employed), unemployed (never employed), retired, and others. During data analysis, the variable was coded as follows: employed
(employed, businessperson), unemployed (was employed, never employed), student (student), retired/others (retired, housewife). Due to small numbers of the last category, they were group together. Please also note that these details have been removed according to the second reviewer.

Page 9, Methods, prescription data, lines 32-46: The prescription of 1 antihypertensive agent on one occasion would not be a convincing marker that the person was actually taking the medication. Perhaps going with the first refill would be a stronger data point.
Thank you for the question. We agree with the reviewer that finding a prescription refill would be more compelling. Nonetheless, we relied on both prescription records as well as self-reported hypertension. Accordingly, we added the following to the Prescription data section "We identified patients with a diagnosis of hypertension in their medical file along with self-reported hypertension and at least one prescription of antihypertensive medication were also identified."

Page 10, Methods, lines 10-22: I would expect prevalence to be the number with the condition divided by the total N, not divided by those without the condition. Why are you using a different definition? This would present highly misleading data.
We agree that the definition as written is inaccurate. While we defined hypertension incorrectly, we compute it correctly, as described in the sentences below. So, the results for hypertension, as depicted on the table, is correct. On the other hand, we had to correct the results of the elevated blood pressure according to the definition below. The sentence has been corrected accordingly, and it reads, "The prevalence of hypertension was calculated by dividing the total number of hypertensive individuals by the total number of the study population. The prevalence of elevated blood pressure was measured by dividing the total number of prehypertensive by the total number of the study population. "

Page 11, lines 38-43: A statement on the prevalence of prehypertension based on the ACC/AHA guideline makes no sense because the term does not exist and is actually stage 1 hypertension. Furthermore these are different numbers (percentage rates) here than those in the abstract.
Thank you for the question. We have limited the results pertinent to elevated BP to the 2017 ACC/AHA guideline only.

There are too many tables which are too complex. While much data was collected from the Biobank, it was not needed or used for this analysis and does not needed to be shown here. I would limit the data to significant factors or those that are relevant even if not significant.
Thank you for the suggestion. We have limited the number of tables in the main document and the number of factors per the reviewer's kind request.

Figure 5: The rationale behind the groups depicted in Figure 5 is unclear. What is the difference between "on the recommended medications" and "individuals actually prescribed the medications"?
Thank you for the question. This should be irrelevant now since we have decided to
move the relevant table to the supplementary materials.

Reviewer#2

Please leave your comments for the authors below

This study is trying to address an important public health problem and provided useful data for policymakers. But it is not suitable for publishing without major revision.

1- In the data section, each of the variables and their classification is defined, which is not necessary and makes the article longer.
Thank you for the suggestion. We agree with the reviewer that the definitions are long and, therefore, should be shortened. Accordingly, we have removed the unnecessary information, as suggested by the kind reviewer. For instance, detailed information about variables has been removed. Additionally, repeated definitions have been omitted.

2- The definition of hypertension and its classification based on each of the guidelines has been repeated many times in the article.
Thank you for the comment. We have updated the entire manuscript and ensured no repetitions.

3- The prevalence of a disease is calculated by dividing the total number of patients by the total number of all people under study. Therefore this sentence "The prevalence of hypertension was calculated by dividing the total number of hypertensive individuals by the total of the normotensive and prehypertensive individuals. The prevalence of prehypertension was measured by dividing the total number of prehypertensive by normotensive individuals." are not correct.
We agree that the definition as written is inaccurate. While we defined hypertension incorrectly, we compute it correctly, as described in the sentences below. So, the results for hypertension, as depicted on the table, is correct. On the other hand, we had to correct the results of the elevated blood pressure according to the definition below. The sentence has been corrected accordingly, and it reads, "The prevalence of hypertension was calculated by dividing the total number of hypertensive individuals by the total number of the study population. The prevalence of elevated blood pressure was measured by dividing the total number of prehypertensive by the total number of the study population. "

4- Many explanations are not needed in the data analysis section.
Thank you for the suggestion. We agree with the reviewer that many explanations are not needed. Accordingly, we have trimmed the extra information, as suggested by the kind reviewer.

5- It is necessary to mention the unit of measurement in the table after every variable, for example, age, income, BP in Table 1.
Thank you for the comment. We have added the suggested modifications.

6- In Table 3, it was better to use the percent of patients in each category instead of the Mean and SD.
Thank you for the suggestion. We have added percentage to table 1 according to the categories used.

7- In Table 4, line 1, overall HTN based on two guidelines was shown in percent. What are the numbers in parentheses?
Thank you for the question. These are 95% CI. We have updated all tables to reflect these values.

8- P values should be shown in Tables 4 and 5. Which variable is significant and in which category?
Thank you for the question. We have added the p values for the analyses to the mentioned tables.

9- It seems that there is a misunderstanding of the levels of prevention in the discussion section.
Thank you for the comment. We have updated the entire discussion section to reflect the level of prevention based on our findings.

10- The discussion should be derived from the results. Further explanation is needed to interpret the findings.
Thank you for the comment. We have updated the entire discussion section to reflect the level of prevention based on our findings.

VERSION 2 – REVIEW

REVIEWER	Sandra J. Taler MD Mayo Clinic Rochester, MN U.S.A.
REVIEW RETURNED	09-Nov-2020

| GENERAL COMMENTS | The manuscript is much improved and makes sense with regard to current hypertension definitions and terminology.

In the Discussion, paragraph 3 on page 14, another reason for the failure to reach current BP targets may be related to providers' failure to recognize the current BP targets due to lack of information or acceptance of current targets.

There are significant grammatic issues including in the abstract such as using "antihypertensive" without the second word of "medication." There are also incomplete sentences. These errors can be addressed by a careful editor.

Specific comments:
Page 10, Data analysis, paragraph 1, lines 25-29: The sentence starting with "The prevalence of elevated blood pressure was measured by dividing the total number of prehypertensive … " should say "The prevalence of elevated blood pressure was measured by dividing the total number of those with elevated blood pressure by the total number of the study population." The terms prehypertensive and elevated blood pressure are NOT the same.

Grammar needs some work. Discussion, page 13, lines 26-31: While there will be a substantial increase in the prevalence of hypertension, THIS TRANSLATES INTO ONLY a small increase in the percentage of adults recommended antihypertensive medication according to the 2017 ACC/AHA guideline. |

REVIEWER	Zahra Mohtasham-Amiri Guilan University of Medical Sciences, Rasht, Iran
REVIEW RETURNED	18-Nov-2020

| GENERAL COMMENTS | 1- The correct title seems to be "Prevalence of hypertension and hypertension in adults based on two guidelines.
2- This study was based on biobank data so there was no participant .Therefore, the participants of abstract should be corrected.
3- The tables are too long without any analysis in different categories. The purpose of these tables and their interpretation is not entirely clear.
4- There is not any description in text about 2017 AC in table 2.
5- P values should be shown in Tables 4 and 5. Which variables are significant and in which categories?
The text and table are expected to be structured in response to the questions posed in the introduction. |

Reviewer Comments:

Reviewer 1

Comments to the Author
The manuscript is much improved and makes sense with regard to current hypertension definitions and terminology.

Thank you for the comment.

In the Discussion, paragraph 3 on page 14, another reason for the failure to reach current BP targets may be related to providers' failure to recognize the current BP targets due to lack of information or acceptance of current targets.

Thank you for the suggestion. Per the reviewer's kind recommendation, we added the recommended sentence to the discussion section. The sentence now reads, "Nonetheless, it is unclear whether uncontrolled hypertension is due to patient factors such as lack of medication adherence or the providers' inability to titrate antihypertensive treatment when the BP is suboptimal. It is also possible that providers' lack of information or acceptance of current BP had contributed to the failure to recognize the current BP targets."

There are significant grammatic issues including in the abstract such as using "antihypertensive" without the second word of "medication." There are also incomplete sentences. These errors can be addressed by a careful editor.

Thank you for the comment. The sentence now reads, "A large percentage of patients with antihypertensive medication have BP above the targeted goal." Additionally, the manuscript was checked by a scientific editor to correct for errors. Kindly see the attached certificate.

Specific comments:
Page 10, Data analysis, paragraph 1, lines 25-29: The sentence starting with "The prevalence of elevated blood pressure was measured by dividing the total number of prehypertensive … " should say "The prevalence of elevated blood pressure was measured by dividing the total number of those with elevated blood pressure by the total number of the study population." The terms prehypertensive and elevated blood pressure are NOT the same.

Thank you for the insightful clarification. We have updated the sentence according to the reviewer's kind request. The sentence now reads, "The prevalence of elevated blood pressure was measured by dividing the total number of those with elevated blood pressure by the total number of the study population."

Grammar needs some work. Discussion, page 13, lines 26-31: While there will be a substantial increase in the prevalence of hypertension, THIS TRANSLATES INTO ONLY a small increase in the percentage of adults recommended antihypertensive medication according to the 2017 ACC/AHA guideline.

Thank you for the comment. We have updated the sentence according to the reviewer's kind request. The sentence now reads, "Based on the 2017 ACC/AHA guideline, there was a substantial increase in the prevalence of hypertension (26.28%), but only a small increase (2.83%) in the proportion of adults who were recommended for antihypertensive medication.

Reviewer#2

Comments to the Author

1- The correct title seems to be "Prevalence of hypertension and hypertension in adults based on two guidelines.

Thank you for the suggestion. While the suggested title seems appropriate, it does not adhere to the Submission Guidelines issued by BMJ Open. According to the guidelines, "The article title should include the research question and the study design. Titles should not declare the results of the study." We followed examples of titles from the same journal, as shown below:

Dong, Yuanyuan, et al. "Potential epidemiological impact of the 2017 American College of Cardiology/American Heart Association high blood pressure guideline on the Chinese population: a cross-sectional study in rural areas of Liaoning Province." BMJ Open 10.9 (2020): e035900.

Zhao, Bin, et al. "Hypertension prevalence alteration in 92 815 nurses based on the new standard by 2017 ACC/AHA hypertension guideline: observational cross-sectional study from China." BMJ Open 9.8 (2019): e027201.

Gupta, Rajat Das, et al. "Factors associated with hypertension among adults in Nepal as per the Joint National Committee 7 and 2017 American College of Cardiology/American Heart Association hypertension guidelines: a cross-sectional analysis of the demographic and health survey 2016." BMJ Open 9.8 (2019): e030206.

Khanam, Rasheda, et al. "Prevalence and factors associated with hypertension among adults in rural Sylhet district of Bangladesh: a cross-sectional study." BMJ Open 9.10 (2019).

2- This study was based on biobank data, so there was no participant. Therefore, the participants of abstract should be corrected.

Thank you for the suggestion. Kindly note that we have used a survey as part of the Biobank project for the current study. The following part of the method section detailed the Data Source "The project explores the fundamental mechanisms of diseases by combining bio-specimens and survey data, sociodemographic, and medical history information. The current study only used the survey data available from the survey part of the SBB."

Moreover, according to the Submission Guidelines issued by BMJ Open, the structured abstract should include subsection named Participants. According to the guideline, "participants: numbers entering and completing the study; sex and ethnic group if appropriate. Clear definitions of selection, entry and exclusion criteria". We also consulted other published articles in this journal (examples of similarly structured abstracts are shown in references above-- question#1).

3- The tables are too long without any analysis in different categories. The purpose of these tables and their interpretation is not entirely clear.

Thank you for the comment. We agree with the reviewer that some tables are long. Per the reviewer's suggestion, we decided to shorten Table 2 in the main document without affecting the study's findings and interpretation. We also agreed to remove Table 3 in the supplementary materials (we were thinking by including Table 3 that interested readers would have access to more information about our population).

While we agree that the tables' purpose should be clear, we respectfully disagree with the reviewer that the purpose and interpretations of the tables are not clear. We believe that each included table has a purpose.

Table 1 shows the characteristics of our population according to the antihypertensive medication use, stratified by BP's level for those not taking medications. The reader will determine the population's characteristics by medication use and BP level, as reported in the 2017 ACC/AHA guideline. For instance, the reader will see that most individuals not taking antihypertensive medications with BP≥140/90 are male. The reader will also see the distribution of DM, CVD, SBP, and DBP according to strata of BP level and the use of antihypertensive medications.

Table 2 describes the prevalence of HTN and the recommended antihypertensive medication according to the two guidelines. Additionally, this table characterizes patients that have been impacted by the new 2017 ACC/AHA guidelines (those who met the 2017 ACC/AHA guideline and not the JNC-7 guideline). Accordingly, a clinician will determine patients who are more likely to get impacted by the 2017 ACC/AHA guideline. Please note that this table has been shortened per the reviewer's kind recommendations. Likewise, table 3 is very informative for clinicians since it provides HTN patients' characteristics who meet the definition of HTN and are recommended for treatment but not taking medications. Lastly, Table 4 shows patients with uncontrolled BP according to the two guidelines and those uncontrolled according to the 2017 ACC/AHA only guideline.

4- There is not any description in text about 2017 AC in table 2.

Thank you for the comment. The following paragraph describes results pertinent to table 2: "As shown in Table 2, the prevalence of hypertension, based on the 2017 ACC/AHA, was 40.77%, and the JNC-7, 27.57%. The overall prevalence of hypertension, and in terms of all patient characteristics, were higher using the 2017 ACC/AHA guidelines compared to the JNC-7 guidelines. The difference in the prevalence was highest in the oldest age group. Based on the JNC-7 guideline, only 24.84% of the patients were recommended to receive antihypertensive medication, compared to 27.67%, according to the 2017 ACC/AHA guideline. With the exception of males, there was an increase in the suggested use of antihypertensive medication for all patient characteristics using the 2017 ACC/AHA guideline. A small proportion, 13.10% of the hypertensive patients were recommended lifestyle modification, based on the 2017 ACC/AHA guideline. Finally, an additional 2.83% of the hypertensive patients were recommended for an antihypertensive intervention, based on the 2017 ACC/AHA guideline."

5- P values should be shown in Tables 4 and 5. Which variables are significant and in which categories?
The text and table are expected to be structured in response to the questions posed in the introduction.

Thank you for the suggestion. While we had tables 4 and 5 in our previous submission, the two tables were moved to the supplementary material and were renamed supplementary table 1 and supplementary table 2, respectively. We have added the P-value per the reviewer's kind suggestions. Both text and table are organized according to the questions posed in the introduction. The following paragraph clearly stated this fact (in the introduction section): "We designed the current study to investigate the effect of the 2017 ACC/AHA guideline on the prevalence of hypertension and to assess the proportion of hypertensive patients recommended for lifestyle modification or antihypertensive medication, according to the 2017 ACC/AHA guideline. We also aimed to determine the proportion of patients with prescribed antihypertensive medication who have a BP above the target recommended by the 2017 ACC/AHA guideline. As a secondary analysis, we aimed to evaluate the determinants of elevated BP and hypertension in the Saudi Biobank (SBB) data."