Universitas Muhammadiyah Jember

nikmatur rohmah <nikmaturrohmah@unmuhjember.ac.id>

BMC Research Notes: Invitation from Dr Eslami to review a manuscript

1 pesan

BMC Research Notes <do-not-reply@springernature.com> 14 November 2022 pukul 16.37
Kepada: nikmaturrohmah@unmuhjember.ac.id

The contents of this email are confidential.

Ref: Submission ID 90c91e1b-7ed3-4e57-ae05-149f5d215adc

Dear Dr Rohmah,

BMC Research Notes has received a manuscript that I'd like to invite you to review, as you have published related work yourself. You'll find the details appended underneath this email.

Please accept or decline the manuscript using the link below. Should you choose to decline, you'll be given the option to recommend alternative reviewers, which would be greatly appreciated.

Kind regards,

Omid Eslami
Editorial Board Member
BMC Research Notes

To accept or decline the manuscript, please use this link:
https://reviewer-feedback.nature.com/review-invitation/0a1a184c-1cb6-47b1-9830-520a6c801c25

If you wish to contact us about the manuscript, please email bmcresearchnotes@biomedcentral.com.

Submission details

Authors:
Isaac Osei, Bernice Agyemang-Pambour, Estella Antoinette Boateng-Osei, Alexander Kwarteng, Veronica Dzomeku

Title:
"Prevalence and risk factors of hypertension among Public Servants in Ejisu-Juaben Municipality, Ghana"

Abstract:
Objectives: We determined the prevalence and risk factors of hypertension among public servants of Ejisu Juaben municipality.
Results: The overall prevalence of hypertension was 29.3% (95%CI:22.5 - 36.1%) and only 8.6% of the participants were aware of their hypertensive status. Respondents who were > 40 years were twice as likely to develop hypertension compared to those who were ≤40 years [adjusted odds ratio (AOR) =2.21, 95% confidence interval (CI) 1.01 - 4.89]. Those who were married were three times more likely to be hypertensive compared with those unmarried [AOR = 2.94, 95%CI:1.22 - 7.14]. Compared to health workers, Judicial and Security service workers were six times more likely to be hypertensive [AOR = 5.80, 95%CI: 1.61 - 20.89]. Public servants who were classified as obese were five times [AOR = 5.25, 95%CI: 1.92 - 14.39] more likely to be hypertensive as compared to those with normal body mass index (BMI). The prevalence of hypertension among the participants in this study is high. Public servants are the main driving workforce of the country, and this finding presents a public health concern. Employee wellness programs are needed at workplaces and the Ghana Health Service must adopt targeted intervention programs aimed at public servants.

To accept or decline the manuscript, please use this link:
https://reviewer-feedback.nature.com/review-invitation/0a1a184c-1cb6-47b1-9830-520a6c801c25

Reviewing for BMC Research Notes

BMC Research Notes is committed to providing a rapid and fair review process. So, if you decide to accept the

manuscript, we would hope to receive your report within 10 days.

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The editorial board and publishing team of BMC Research Notes are not able to anticipate all potential competing interests, so we ask you to draw our attention to anything that might affect your review, and to decline submissions where it may be hard to remain objective.

If you review this manuscript you will be eligible for a 15% discount on one article processing charge for a manuscript submitted to one of the subject-specific journals in the BMC series (http://www.biomedcentral.com/p/the-bmc-series-journals#journallist) or BMC Research Notes. This must be claimed on submission of the manuscript and is available for one year from completion of your review. Only one discount can be claimed on a submitted manuscript and cannot be combined with any other discounts.

If you would prefer us not to contact you in the future, please let us know by emailing bmcresearchnotes@biomedcentral.com.

Universitas Muhammadiyah Jember

nikmatur rohmah <nikmaturrohmah@unmuhjember.ac.id>

BMC Research Notes: Thank you for your review on "Prevalence and risk factors of hypertension among Public Servants in Ejisu-Juaben Municipality, Ghana"

1 pesan

BMC Research Notes <bmcresearchnotes@biomedcentral.com> 19 November 2022 pukul 18.17
Kepada: nikmaturrohmah@unmuhjember.ac.id

Ref: "Prevalence and risk factors of hypertension among Public Servants in Ejisu-Juaben Municipality, Ghana"

Dear Dr Nikmatur Rohmah,

Thank you for submitting your report to BMC Research Notes. We greatly value the time and effort you put into reviewing the manuscript.

We've attached a copy of the report for your reference. You can also use this email to verify your review activity with third party websites, such as Publons.

Thanks again for your review; we'll email you the decision on the manuscript as soon as it is made. Meanwhile, we hope that we can continue to benefit from your expertise in the future.

Kind regards,

Peer Review Advisors
BMC Research Notes

Your review report for BMC Research Notes.pdf
66K

BMC Research Notes

Your review report

Manuscript

Prevalence and risk factors of hypertension among Public Servants in Ejisu-Juaben Municipality, Ghana

Feedback for the author(s)

Review file(s)

No files added.

Comments to the author(s)

Prevalence and risk factors of hypertension among Public Servants in Ejisu-Juaben Municipality, Ghana

Abstract
The gap has not been described.
The research method has not been described.
The results and recommendations are clear.

Introduction.
In paragraph 3, it is necessary to add an explanation of how lifestyle can cause civil servants to be included in the high risk group for hypertension.
Likewise, it is necessary to add an explanation of the sources of work stress on civil servants which causes this group to be at risk of hypertension.

Sample size.
I tried to calculate with the application provided https://id.foxcalculators.com/math/18232.html, Population 3200 CI 95% and accuracy 5%, get a sample size of 343.

Operational definition.

Need to check the calculation of BMI again. Researchers need to recalculate BMI in the right way.

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Researchers need to add to previous comparative studies of hypertension specifically in civil servant populations. Likewise, differences in the prevalence of hypertension remain consistent in the hypertensive population.

The discussion about marital status associated with hypertension should be placed in a different paragraph.

Conclusion.
Researchers need to answer all research objectives. This conclusion does not answer the goal of identifying risk factors for hypertension.

Abbreviations
In the list of writing abbreviations, it is better if the abbreviations start with a capital letter. For example LBW = Low Birth Weight.

Reference
As many as 50% of referrals are more than 10 years old. Researchers need to support the results of this study with references (study results) for a maximum of 5 years.
1. Reference no 2 (2005)
2. Reference no 4 (2009)
3. Reference no 10 (2006)
4. Reference no 11 (2009)
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6. Reference no 13 (1979)
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14. Reference no 29 (2010)
15. Reference no 31 (2009)
16. Reference no 32 (2004)
17. Reference no 34 (2011)

Confidential feedback for the Editor

Your recommendation	• ***Revise***

Is the study design appropriate to answer the research question (including the use of appropriate controls), and are the conclusions supported by the evidence presented?	• ***Yes***
Are the methods sufficiently described to allow the study to be repeated?	• ***Yes***
Is the use of statistics and treatment of uncertainties appropriate?	• ***Yes***
Is the presentation of the work clear?	• ***No, it's not suitable for publication unless extensively edited***
Comments	***Need correction on the part: 1. Abstract. 2.Introduction. 3. Operational definition. 4. Discussion. 5. Conclusion. 6. Abbreviations. 7. References***
Are the images in this manuscript (including electrophoretic gels and blots) free from apparent manipulation?	• ***Yes***

Confidential comments to the Editor

This manuscript requires correction in:
1. Abstract.
2.Introduction.
3. Operational definition.
4. Discussion.
5. Conclusion.
6. Abbreviations.
7. References.

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Universitas Muhammadiyah Jember

nikmatur rohmah <nikmaturrohmah@unmuhjember.ac.id>

BMC Research Notes: Decision on "Prevalence and risk factors of hypertension among Public Servants in Ejisu-Juaben Municipality, Ghana"

1 pesan

BMC Research Notes <do-not-reply@springernature.com> 27 November 2022 pukul 03.05
Kepada: nikmaturrohmah@unmuhjember.ac.id

Dear Dr Rohmah,

Thank you for your help with the manuscript, "Prevalence and risk factors of hypertension among Public Servants in Ejisu-Juaben Municipality, Ghana", which you recently reviewed for BMC Research Notes.

For your records, the decision on this manuscript, based partly on your input, was: Revise. Any comments to authors have been appended below.

We greatly appreciate your assistance and participation in the review process for BMC Research Notes and hope that we can continue to benefit from your expertise on future submissions.

Kind regards,
Peer Review Advisors
BMC Research Notes

Reviewer 1
Prevalence and risk factors of hypertension among Public Servants in Ejisu-Juaben Municipality, Ghana

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17. Reference no 34 (2011)

Reviewer 2
Prevalence and risk factors of hypertension among Public Servants in Ejisu-Juaben Municipality, Ghana
Comments to the Authors:
Abstract:
In the result subsection the following sentence is unnecessary as it is a repetition and general idea which looks like a background sentence:
“The prevalence of hypertension among the participants in this study is high. Public servants are the main driving workforce of the country, and this finding presents a public health concern”.
Keywords: the following keywords are outside of your title: Obesity, Non-communicable diseases
Introduction:
The following sentence needs reference citation:
“Due to a sedentary lifestyle and stress at the workplace, public servants are a plausible high-risk group for developing hypertension”.

Methods:
Could you cite a reference for the following sentence by including the source document that you talk about it?
“A public servant in this study refers to an individual whom the state or any government establishment has contracted by Section 4 of the Civil Service Act: 1993 (PNDCL 327) of Ghana and who is on the government of Ghana payroll within the Ejisu-Juaben Municipality”.
Look the following:
Using probability proportionate by size, the number of respondents selected from each of the departments was estimated. Then how did you select the number of respondents from each department? Did use systematic or simple random sampling? Or what type??
Data Collection Technique and tool
Were the data collection tools validated in your country?
Statistical Analysis
Have you checked the assumptions for multivariable logistic regression? Using what? This should be clearly indicated.
Results:
Why did you talk about the factors associated with the outcome variable in the sociodemographic result subsection? Even the results for the indicated variables are not presented in Table 1, rather it is in Table 2. Look the following sentence:
Age, marital status, occupation type, and BMI were found to be associated with hypertension (Table 1).
In addition, do not write all the results in paragraph form which were presented In the Table 1. Just only indicate the major findings and refer to the table.
In Table 2, there should be figures in each cell. You should put the frequencies in each cell of the independent variables cross tabulated with the outcome variable. With this, we can check at least the crude odds ratios, otherwise it will be difficult to judge your statistical analysis. So, it is a must to present these frequencies in this table. In addition, it would be also good to add P-values in addition to the 95% CI’s. to see the strength of association. The 95% Ci’s can only show the statistical significance and precision of the association but not the strength of association.
Conclusion:
So, what is the implication of your findings should be indicated here.
Please drive your conclusions based on the main findings of your study, specifically the factors which were found to be independently associated with the outcome variable.

Attachments:
• https://reviewer-feedback.springernature.com/download/attachment/93a8c856-e316-410f-b19a-7c80f60a387b

Reviewer 3

I congratulate the authors for the initiative of analyzing such an important issue, especially data for non-transmissible diseases in a developing country such as Ghana.

Since English is not my first language, I cannot assess the text's language quality. I apologize in advance for any mistakes you may find in this review.

A major review is required for the paper, based on the following remarks.

I. Abstract
Is describing methods a part of the abstract? You should then include it.
As pointed out below, I was unable to find information on the following information: “and only 8.6% of the participants were aware of their hypertensive status.”

II. Introduction
Although several hypertension studies have been conducted in Ghana, most have been conducted among the general population [9-11] whiles the few which specifically targeted public servants were conducted over a decade ago [12, 13].
The benefit of studying the prevalence of a disease in the general population is more significant than studying a particular group of people. The main source of preventive measures is population-based studies, while studies with occupational groups can show measures relevant to these groups (such as mitigating occupational risks).
This section of the article would be a suitable place to explain why you decided to study hypertension among civil servants. It might be appropriate to transfer to this section the discussion on Ghana's working-class percentage.
I suggest providing some data to support your statement that "public servants are the main driving workforce of the country" (lines 206-7)

III. Methods
1- Study setting
The study was conducted in the Ejisu-Juaben Municipality … among the 30 administrative and political districts in the Ashanti Region of Ghana…. The Municipality was selected due to its many public service departments compared to surrounding districts (Fig. 1).
As mentioned in the text, I suggest disclaiming the number of service departments in the Figure.
2- Sample size
A recent study estimated a national hypertension prevalence of 13.1% in the Ghanaian population [8].
In the introduction, it was disclosed that 13.1% of adults aged 15-49 years had hypertension based on the 2014 Ghana Demographic and Health Survey [8].
Do you use this low prevalence when calculating the sample size? Wouldn't this small figure result in an incorrectly small sample size? In this national study, the low prevalence may be related to the young age range of study participants.
The age range of civil servants is expected to be higher. If you use the prevalence of hypertension for adults (>30 years) from this same paper, please let us know.
3- Sampling method
The list and total staff strength of 8 public service departments in the Municipality namely…Using probability proportionate by size, the number of respondents selected from each of the departments was estimated. On entering a department, those who were present were given a questionnaire to respond to after informed consent was sought.
Even though you calculated the sample size, isn't a convenience sample likely to compromise the study's representativeness? Study participants' characteristics should be compared with the total population of each department (e.g. sex, age, level of education).
Furthermore, it is important to disclaim the questionnaire items.
4- Definition of the dependent variable
We defined hypertension based on the classification by the 7th Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure’s report of 2003. A mean systolic blood pressure of ≥140 mmHg systolic and/or ≥90 mmHg diastolic was considered hypertensive [18].
Do study participants use blood pressure-lowering drugs?
Is there a question about the use of these drugs in the above-mentioned questionnaire?
If you did not include this question, I am afraid some participants with normal blood pressure due to drug use be classified erroneously as non-hypertensive.
5- Physical measurements
Blood pressure (BP) measurements were performed on the left arm of respondents in a sitting position using the Omron digital BP monitor (Omron Healthcare Co. Kyoto, Japan) with a suitable adult cuff. Two BP measurements were taken on each respondent at 5 minutes intervals and the mean of the two measurements was assigned as the final BP of the respondents

Have the blood pressure measurements been conducted in a quiet place, after 5 minutes of rest, and at least 30 minutes after smoking?

6- Statistical analysis

We determined a statistical significance at a 95% confidence interval and a p-value of ≤ 0.05. In the final logistic regression model, we adjusted for age and hypertension status.

Please explain what "hypertensive status" means and why it should be used in your logistic model.

III- Results

1- All the respondents were non-smokers

How was this variable investigated? Are all participants never smokers? What methods were used to obtain this variable? Do you use a standardized question? Can the questionnaire identify the respondent?

Even though Ghana has a low prevalence of smoking (https://tobaccocontrol.bmj.com/content/18/3/206), could it be that respondents denied being smokers because it might be perceived as a workplace problem?

2- None of the lifestyle behavior factors assessed in our study were associated with hypertension.

Please specify how the lifestyle risk factors were investigated.

The duration of engagement in risk behaviors is key for the presence of hypertension or any event. Is it possible that this lack of association is due by having a sample of mostly young adults?

3- only 8.6% were aware of their hypertensive status

How did you investigate this variable? How did you define hypertensive status.

4- Table 1: you should mention how you obtained the characteristics (questionnaire?)

4.2 Known Hypertensive (n=174)

Don't you think knowledge of hypertension should be investigated only on hypertensive participants? It is impossible for a non-hypertensive participant being aware of a disease they don't present. I suggest dropping this line.

4.3 Smoking (n=170)

I suggest dropping this line, there is no sense in comparing a non-existent characteristic.

4.4 Vigorous physical Activities at least 30 min (No of days per week) (n=170)

Why did you decide to analyze only vigorous activities? Does the WHO tool investigates other levels of physical activity?

5- Those who were married were three times more likely to be hypertensive compared with those unmarried [AOR = 2.94, 95%CI:1.22 - 7.14].

Is it possible the married servers being more obese than the unmarried one? Why didn't you do a logistic regression adjustment by all variables with p>0.20 in the univariate analysis?

6- Table 2, comparison by age groups

Is it possible to compare age groups in a model adjusted by age? Please drop the parenthesis in (≤40).

IV- Discussion

I suggest a major review of this section.

1- The prevalence of hypertension is consistent with studies conducted in similar populations in Accra (27.4%) [12], Ethiopia (27.3%) [19], Nigeria (27.1%) [20], and Kenya (30.1%) [21]. However, our finding is higher than comparative studies conducted in Nadowli (20%) [22], Northern Ethiopia (16%) [23], Angola (23%) [24], and Senegal (24.1%) [25].

When considering similar populations, what factors did you consider? Do these references relate to cross-sectional studies of civil servants? Is the age range of these participants the same as that of this study?

2- Judicial and Security service workers were found to be six times more likely to be hypertensive as compared to healthcare workers.

Providing you can demonstrate that there were no biases in the selection process, the data is indeed relevant. Study participants should be compared with the general population of their department (e.g., gender, age, education level). This is the only way to determine whether interviewees in the Judicial and Security services are not mainly masculine or older than healthcare workers, for instance. Sex and age adjustment will not be sufficient/appropriate to correct bias selection problems.

The paper you cited shows health workers are healthier. On the other hand, had you investigated whether Judicial and Security service workers are more prone to unhealthy risk factors, mainly in countries where violence should be an important issue?

VI-CONCLUSION

Employee wellness programs are needed at workplaces and the Ghana Health Service must adopt targeted intervention programs to curtail this menace among this at-risk group.

I suggest including a better discussion on what preventive measures would be helpful to this specific occupational group.

Transparent Peer Review

As part of our transparent peer review process, we will publish the reviewer reports with papers that are accepted for publication. Your report will be published anonymously unless you opted to include your name when you submitted it.

BMC Research Notes

Your review report

Manuscript

Prevalence and risk factors of hypertension among Public Servants in Ejisu-Juaben Municipality, Ghana

Feedback for the author(s)

Review file(s)

comment pasca revision.docx

Comments to the author(s)

Comment:
1. The researcher's review of the abstract is acceptable.
2. Support empirical data on a logical and relevant background.
3. The determination of the number of samples by the researcher is described using: 95% CI, 5% accuracy, and a sample proportion of 13%. However, in the manuscript, the researcher has not added a sample proportion of 13%.
4. BMI determination has been revised and cleared.
5. Some of the studies that have been added to the discussion are appropriate and relevant to the results.
6. Transferring the discussion of marital status to the next paragraph is more appropriate.
7. Conclusions have been revised and address all research objectives.
8. The list of abbreviations has been properly and correctly revised
9. The researcher has replaced 5 out of 17 supporting citations with more up-to-date citations.

Confidential feedback for the Editor

Your recommendation	• ***Accept***
Is the study design appropriate to answer the research question (including the use of appropriate controls), and are the conclusions supported by the evidence presented?	• ***Yes***
Are the methods sufficiently described to allow the study to be repeated?	• ***Yes***
Is the use of statistics and treatment of uncertainties appropriate?	• ***Yes***
Is the presentation of the work clear?	• ***Yes***
Are the images in this manuscript (including electrophoretic gels and blots) free from apparent manipulation?	• ***Yes***

Confidential comments to the Editor

This manuscript is acceptable.
The results of the review are as follows:

1. The researcher's review of the abstract is acceptable.
2. Support empirical data on a logical and relevant background.
3. The determination of the number of samples by the researcher is described using: 95% CI, 5% accuracy, and a sample proportion of 13%. However, in the manuscript, the researcher has not added a sample proportion of 13%.
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BMC Research Notes

RESEARCH NOTE Open Access

Prevalence and risk factors of hypertension among public servants in Ejisu-Juaben municipality, Ghana

Bernice Agyemang-Pambour[1], Isaac Osei[2,3*], Estella Antoinette Boateng-Osei[1], Alexander Kwarteng[4] and Veronica Dzomeku[1]

Abstract

Objectives We determined the prevalence and risk factors of hypertension among public servants of Ejisu Juaben municipality.

Results The overall prevalence of hypertension was 29.3% (95%CI:22.5–36.1%) and only 8.6% of the participants were aware of their hypertensive status. Respondents who were > 40 years were twice as likely to develop hypertension compared to those who were ≤ 40 years [adjusted odds ratio (AOR) = 2.37, 95% confidence interval (CI) 1.05–5.32]. Those who were married were 2.54 times more likely to be hypertensive compared with those unmarried [AOR = 2.54, 95%CI: 1.06–6.08]. Compared to health workers, Judicial and Security service workers were almost five times more likely to be hypertensive [AOR = 4.77, 95%CI: 1.20–18.96]. Being overweight [AOR = 2.25, 95%CI: 1.06–6.41] and obese [AOR = 4.80, 95%CI: 1.82–12.91] was associated with increased odds of hypertension. The prevalence of hypertension among the participants in this study is high. Employee wellness programs are needed at workplaces and the Ghana Health Service must adopt targeted intervention programs such as regular screening for non-communicable diseases and promotion of physical activities at the workplace.

Keywords Hypertension, Blood pressure, Public servants, Ghana, Risk factors

Introduction

Hypertension is one of the primary causes of premature death worldwide. It accounted for about 10.4 million deaths worldwide in 2017 [1]. Globally, an estimated 1.13 billion people are known to have hypertension, which is projected to affect 20% of the world population by 2025 [1, 2]. It is the most significant risk factor for cardiovascular-related deaths and morbidity worldwide. Most (70%) of the affected populations reside in lower-middle-income countries (LMICs)[3].

In people less than 60 years of age, while hypertension accounts for 7% of mortality in developed countries, in Sub-Saharan Africa, it is responsible for 25% of deaths [4]. The prevalence of hypertension in sub-Saharan Africa

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Isaac Osei
iosei@mrc.gm
[1]Department of Nursing, Faculty of Allied Health Sciences, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana
[2]Medical Research Council Unit The Gambia at London School of Hygiene & Tropical Medicine, PO Box 273, Banjul, West Africa, The Gambia
[3]Faculty of Infectious and Tropical Diseases, London School of Hygiene & Tropical Medicine, London, UK
[4]Department of Biochemistry and Biotechnology, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

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has been increasing over the past decades. Findings from a systematic review among adults in sub-Saharan Africa showed a pooled prevalence of 57.0% ranging from 22.3 to 90.0% [5]. Over the past decades, there has been a paradigm shift in disease burden from communicable to non-communicable in most developing countries. Sub-Saharan Africa is now confronted with a double burden of both communicable and non-communicable diseases [6]. The rapid increase in non-communicable diseases in most African countries including Ghana has been attributed to globalization, rapid urbanization, and unhealthy lifestyles such as unhealthy diets, lack of physical activity, alcohol consumption, and tobacco use [7].

The 2014 Ghana Demographic and Health Survey indicated that 13.1% of adults aged 15–49 years had hypertension [8]. Due to sedentary work that requires sitting for long hours, heavy workload demands, lack of support at work, and other work-related stress factors, public servants are a plausible high-risk group for developing hypertension [9, 10]. Although several hypertension studies have been conducted in Ghana, most have been conducted among the general population [11–13] whiles the few which specifically targeted public servants were conducted over a decade ago [14, 15]. This study aimed to determine the prevalence and risk factors of hypertension among public servants of Ejisu-Juaben Municipality, Ghana.

Materials and methods

Study setting

The study was conducted in the Ejisu-Juaben Municipality in the Ashanti Region. The Municipality is among the 30 administrative and political districts in the Ashanti Region of Ghana. The Municipality is positioned within the central part of the Ashanti Region and shares borders with six other districts in the region with Ejisu as its capital. The Municipality was selected due to its many public service departments compared to surrounding districts (Fig. 1).

Study design

A cross-sectional study was conducted among public servants in the Ejisu-Juaben Municipality. A public servant in this study refers to an individual whom the state or any government establishment has contracted by Sect. 4 of the Civil Service Act: 1993 (PNDCL 327) of Ghana and who is on the government of Ghana payroll within the Ejisu-Juaben Municipality [17].

Sample size

A recent study estimated a national hypertension prevalence of 13.1% [8]. Based on the study area's estimated public servant population size of 3200, considering a confidence level of 95% with a precision of 0.05, a sample size of 165 was derived. Consequently, to adjust for non-responses, a final sample size of 174 participants was determined. We used the software provided by Select Statistical Services (https://select-statistics.co.uk/) to calculate the sample size.

Inclusion and exclusion criteria

Participants who were on the government payroll and in active service within the Ejisu Juaben Municipality were included in the study. Public Servants who were pregnant at the time of the survey and those who did not consent to participate in the study were excluded.

Sampling method

The list of total employees of 8 public service departments in the Municipality namely: the Local Government, Forestry Commission, Judicial Service, Police Service, Fire Service, Immigration Service, Education, and Health Services were obtained from the Ejisu-Juaben Municipal Assembly. Using probability proportionate by size, the number of respondents selected from each of the departments was estimated. We used convenience sampling to select the participants.

Data collection technique and tool

We used a modified WHO STEPS instrument and global physical activity questionnaire (GPAQ) to collect data from the respondents [18, 19]. The questionnaire was piloted on a small number of selected public servants in the study area. The modified tool was structured into three parts: socio-demographic characteristics; lifestyle habits and physical activity; and anthropometric and blood pressure measurements. Data were collected from July 18, 2018, to August 15, 2018.

Operational definitions

Body Mass Index (BMI) We classified BMI using the World Health Organization standard definitions: underweight was classified as a BMI < 18.5 kg/m^2, normal weight 18.5–24.9 kg/m^2, overweight 25.0–29.9 kg/m^2, and obese ≥ 30.0 kg/m^2 [20]. We calculated the BMI as weight in kilograms divided by height in meters squared.

Hypertension We defined hypertension based on the classification by the 7th Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure's report of 2003. A mean systolic blood pressure of ≥ 140 mmHg systolic and/or ≥ 90 mmHg diastolic was considered hypertensive [21].

Physical measurements

Blood pressure

Blood pressure (BP) measurements were performed on the left arm of respondents in a sitting position using

Fig. 1 Map of Ejisu-Juaben Municipality.Source: Ghana Statistical Service, [16]

the Omron digital BP monitor (Omron Healthcare Co. Kyoto, Japan) with a suitable adult cuff. Two BP measurements were taken on each respondent at 5 min intervals and the mean of the two measurements was assigned as the final BP of the respondents.

Body weight and height

Respondents' weight and height were measured using a standard stadiometer fixed to a calibrated weighing scale. Weights and heights were measured with respondents in an upright position, back and heels against the

stadiometer, facing forward with hands hanging loosely by the sides, and wearing light clothes with no footwear. Weight and height readings were expressed in kilograms (kg) and to the nearest centimeter (cm), respectively. These procedures were carried out by the manufacturer's instructions.

Statistical analysis

Data were entered into Microsoft Excel and exported to STATA version 17 (STATA Corp., Texas, USA) for analyses. A summary of the data was examined using descriptive statistics involving frequencies and percentages. Binary logistic regression was performed to identify risk factors for hypertension. Variables with p values < 0.2 were entered into a multivariable logistic regression model to determine the risk factors associated with hypertension adjusting for other covariates in the model. Normality and multi-collinearity assumptions were assessed. We presented both crude and adjusted odds ratios and determined a statistical significance at a 95% confidence interval and a p-value of < 0.05.

Table 1 Sociodemographic characteristics and lifestyle factors of study participants

Characteristics	Categories	Number (n)*	Percent (%)
Age, years (n = 153)	Younger (≤ 40)	115	75.2
	Older (> 40)	38	24.8
Sex (n = 174)	Male	74	42.5
	Female	100	57.5
Religion (n = 173)	Christians	153	88.4
	Muslim	20	11.6
Marital Status (n = 174)	Married	107	61.5
	Unmarried	67	38.5
Highest Education Level (n = 174)	Pre-Tertiary	31	17.8
	Tertiary	143	82.2
Previously diagnosed as hypertensive (n = 174)	Yes	15	8.6
	No	159	91.4
Occupation (n = 174)	Local government†	16	9.2
	Judicial and Security services$^{\lambda}$	16	9.2
	Health workers	56	32.2
	Education service	86	49.4
Current cigarette smoker (n = 170)	Yes	0	0
	No	170	100
Alcohol consumption (n = 170)	Yes	23	13.5
	No	147	86.5
Vigorous physical Activities at least 30 min (No of days per week) (n = 170)	None	28	16.5
	1- 2	63	37.0
	3- 4	41	24.1
	≥ 5	38	22.4
BMI** (kg/m^2) (n = 173)	Normal weight	78	45.1
	Overweight	58	33.5
	Obesity	37	21.4

*Due to missing values not all n values equal 174 i.e., Age (21), Religion (1), Alcohol consumption (4), smoking (4), physical exercise (4), BMI (1)

**BMI was redefined into 3 categories due to low numbers of underweights (normal weight < 25.0 kg/m^2, overweight 25.0–29.9 kg/m^2, and obese ≥ 30.0 kg/m^2)

†Local government includes workers from Forestry Commission

λ security services include Police, Fire service, Immigration

Results

A total of 174 participants from eight public service departments were enrolled. The mean (+/-SD) age of the participants was 34.7(+/-7.6) years, with 75.2% below 40 years of age. There were more females (57.5%), 88% of the participants were Christians and 61.5% were married. The majority (82.2%) had completed tertiary education and 49.4% worked in the Education service. Fifteen (8.6%) participants had previously been diagnosed as hypertensive by a health worker. There were no current cigarette smokers and 13.5% reported consuming alcohol in the last 7 days before the survey. Twenty-eight (16.5%) of the participants were not involved in any physical activities (Table 1).

Physical measurements

The prevalence of hypertension among the respondents was 29.3% (95%CI:22.5–36.1%). The mean (+/-SD) systolic blood pressure was 124.83 (±16.68) mmHg, and the mean (+/-SD) diastolic blood pressure was 81.55 (±14.63) mmHg. The mean (+/-SD) BMI of the study respondents was 26.4 (+/- 5.1). A third (33.5%) and a fifth (21.4%) of the participants were classified as overweight and obese respectively (Table 1).

Factors associated with hypertension

In the bivariate analysis, age, sex, marital status, occupation, vigorous physical exercise, and BMI were found to have p-value < 0.2 and were included in the multivariable logistic model. In the final multivariable logistic model, age, marital status, type of occupation, and BMI remained significantly associated with hypertension. Respondents who were > 40 years were twice as likely to develop hypertension compared to those who were ≤ 40 years [AOR = 2.37, 95%CI:1.05–5.32]. The odds of hypertension were 2.54 times higher in those who were married compared to unmarried participants [AOR = 2.54, 95%CI: 1.06–6.08]. Compared to health workers, the odds of hypertension were 4.77 times higher among Judicial and Security service participants [AOR = 4.77, 95%CI: 1.20–18.96]. Being overweight [AOR = 2.25, 95%CI: 1.06–6.41] and obese [AOR = 4.80, 95%CI: 1.82–12.91] was associated with increased odds of hypertension (Table 2).

Table 2 Bivariate and multivariable logistic regression analysis of factors associated with hypertension among public servants at Ejisu-Juaben Municipality

Characteristics	Hypertension		Bivariate COR (95% CI)	Multivariable AOR (95% CI)	P-value
	Yes	No			
Age, years					
≤ 40	28	87	1	1	1
> 40	17	21	2.51 (1.17–5.42)	2.37 (1.05–5.32)	0.04
Sex					
Male	26	48	1.63 (0.84–3.14)	1.57 (0.70–3.52)	0.27
Female	25	75	1	1	1
Marital Status					
Married	40	67	3.04 (1.43–6.47)	2.54 (1.06–6.08)	0.04
Unmarried	11	56	1	1	1
Occupation					
Health workers	8	48	1	1	1
Local government	4	12	2 (0.52–7.77)	1.64 (0.35–7.61)	0.53
Judicial and Security services	9	7	7.71 (2.23–26.64)	4.77 (1.20–18.96)	0.03
Education service	30	56	3.21 (1.35–7.67)	2.55 (1.00–6.40)	0.05
Vigorous physical Activities at least 30 min (No of days per week)					
None	8	20	1	1	1
1–2	25	38	1.64 (0.63–4.31)	1.06 (0.35–3.22)	0.92
3–4	9	32	0.70 (0.23–2.12)	0.80 (0.24–2.74)	0.73
≥ 5	7	31	0.56 (0.18–1.80)	0.45 (0.12–1.73)	0.24
BMI (kg/m^2)					
Normal weight	12	66	1	1	1
Overweight	20	38	2.89 (1.28–6.57)	2.60 (1.06–6.41)	0.04
Obesity	18	19	5.21 (2.14–12.70)	4.80 (1.82–12.91)	0.002

COR = Crude Odds Ratio, AOR = Adjusted Odds Ratio

Discussion

The overall prevalence of hypertension was 29.3% among respondents. Age, marital status, occupation, and BMI were risk factors found to be significantly associated with hypertension. The prevalence of hypertension is consistent with similar studies conducted among Public servants in Addis Ababa (27.3%) [22], Nigeria (27.8%) [23], and workers in Kenya (30.1%) [24]. However, our finding is higher than comparative studies conducted among public servants in Ghana (20%) [25], Northern Ethiopia (16%) [26], and Southern Ethiopia (24.5%) [27]. The reason for the differences in hypertension prevalence may be due to the setting and other sociodemographic factors such as age differences among the study participants. The studies with higher hypertension prevalence, including this study were conducted mainly among urban dwellers and most of the participants were 30 years and above, while those with low prevalence were mainly conducted in rural areas and participants 18 years and above. Urbanization has been recognized as a major driving force for the increase in chronic conditions such as hypertension [28].

In this study, increased age was significantly associated with hypertension. This finding is comparable to published studies [11, 22, 26]. Increasing age has been established to be associated with hypertension. A study among federal ministry civil servants in Addis Ababa, Ethiopia, showed that civil servants who were 48 years and above were six times more likely to be hypertensive compared to those aged 18–27 years [26]. The stiffening of the arterial wall due to structural physiological changes associated with aging has been attributed to an increased risk of hypertension with age [29].

We found that being married was significantly associated with hypertension. Similar studies conducted in Ethiopia [30] and Iran [31] have reported a higher prevalence among married participants. However, other studies have also shown that being married is protective against hypertension [32, 33]. Compared to unmarried, married couples are prone to marriage-related stress conditions such as child-rearing, bills, and mortgages and these may explain the findings in our study.

Judicial and Security service workers were found to be almost five times more likely to be hypertensive as compared to healthcare workers. This finding is consistent with published literature. A recent study conducted in Israel found that healthcare workers adopted better healthy lifestyles in nutrition, physical activity, and health responsibility than workers in other professions [34]. A similar finding was reported in a study in North

America where healthcare professionals as compared to the general population reported better health behaviours in smoking and physical activity [35]. Healthcare workers are expected to be more knowledgeable than the general population concerning healthcare behaviors and consequences. Additionally, most healthcare workers might perceive themselves as role models for their patients and the general population and this encourages them to adopt a healthier lifestyle, which may explain the finding in this study.

Participants in this study who were classified as overweight and obese had higher increased odds of hypertension compared to those with normal BMI. This finding is consistent with reports from previous studies conducted among workers in Ghana [25, 36]. Our study showed that only about a fifth of the participants adhered to WHO recommendations on physical activity for health, i.e., respondents engaging in at least 30 min of physical exercise 5 or more days a week. The lack of exercise and sedentary lifestyle could explain the high blood pressure among participants classified as overweight and obese.

Conclusion

The prevalence of hypertension among the participants in this study is high. This study showed that age, marital status, occupation, and BMI were the risk factors for hypertension among public servants. Public servants are one of the main driving workforces of the country [37], and this finding presents a public health concern. Employee wellness programs are needed at workplaces and the Ghana Health Service must adopt targeted intervention programs such as regular screening for non-communicable diseases and promotion of physical activities at the workplace.

Limitation

This study has some limitations. The sample size was small, a history of anti-hypertensive was not collected, there were missing data on age, and convenience sampling was used which might introduce bias. This is a cross-sectional study, and the findings should be interpreted with caution as causal inference and temporality cannot be established.

Abbreviations

LMIC	Lower-middle-income countries
BMI	Body Mass Index
BP	Blood Pressure
COR	Crude Odds Ratio
AOR	Adjusted Odds Ratio
GPAQ	Global physical activity questionnaire
STEPS	STEPwise approach to NCD risk factor surveillance
WHO	World Health Organization
PNDCL	Provisional National Defense Council Law

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Authors' contributions

B.A.P and I.O. conceived and designed the study. B.A.P. developed the proposal and data collection tool. E.A.BO. and A.K. supervised data collection. I.O. and V.D. reviewed and edited the proposal. I.O. and B.A.P. wrote the main manuscript. All authors reviewed the final version of the manuscript.

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Data availability

Data will be made available by the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

Ethical approval (ref: CHRPE/AP/421/18) was obtained from the Committee on Human Research, Publication, and Ethics (CHRPE), of the Kwame Nkrumah University of Science and Technology (KNUST). Institutional approval was sought from the various public service institutions in the Ejisu Juaben municipality. Written informed consent was obtained from the respondents before the administration of the questionnaires. This study was carried out in accordance with the declaration of Helsinki.

Consent for publication

Not applicable.

Competing interest

The authors declare that they have no competing interests.

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