PEER REVIEW HISTORY

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ARTICLE DETAILS

<table>
<thead>
<tr>
<th>TITLE (PROVISIONAL)</th>
<th>Comparative Analysis of the Health Status of Military Police Officers and Firefighters: A Cross-sectional Study in the State of Paraná, Brazil</th>
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<tr>
<td>AUTHORS</td>
<td>Santos, Alexandra; Ihlenfeld, Mauro; Olandoski, Márcia; Barreto, Fellype</td>
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VERSION 1 – REVIEW

<table>
<thead>
<tr>
<th>REVIEWER</th>
<th>Brittany Hollerbach</th>
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<td>NDRI-USA, Inc., Center For Fire Rescue &amp; EMS Health Research</td>
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<td>22-Apr-2021</td>
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GENERAL COMMENTS

This is a well-written and timely manuscript. Comparisons often do not exist in the literature comparing the health outcomes of firefighters and police officers, but instead are siloed and each occupation is discussed separately. These results are interesting as they are different than I would have expected, at least for police and firefighters in the US.

There are just a few grammatical errors and I suggest review by a native English speaker before publication for clarity.

I suggest clarification of “unfitness”. The authors state that participants were considered "unfit" or "fit" based on the results of their ET. However, I am curious if this is a designation for fitness for duty or a designation by the researchers. It was a little unclear to me if these physicals were voluntary (for research only) or if they were part of annual medical/physical occupational exams and the participants consented to allow their data to be used for research.

For the participants who were considered "unfit", were they removed from duty?

There is a difference between physical fitness and being fit or unfit for duty based on required job tasks. I suggest minor editing to address these differences and ensure the purpose statement accurately reflects the research presented - this study examined fitness for duty, not physical fitness.

For race categories, are the authors using standard terminology? For example, the NIH suggests the following categories for race: White, Black or African American, American Indian or Alaska Native, Asian, and Native Hawaiian or Other Pacific Islander.

Did the participants provide any self-report data? Musculoskeletal diseases are discussed in the Results but it is not discussed how they were assessed in the Methods. Same for psychiatric diseases, medications, smoking, and physical activity. More information on how these variables were collected with help with comparison to other studies reproducibility. The authors address in the Discussion it can be difficult to compare occupational stress and mental illness across studies due to different instruments of assessment, however, the authors did not clearly identify what they used to assess
psychiatric disorders, further perpetuating this issue.

| REVIEWER | Karla Sampaio  
| Postgraduate Program in Pharmaceutical Sciences, Pharmaceutical Sciences |
| REVIEW RETURNED | 03-May-2021 |

| GENERAL COMMENTS | Overall, the manuscript is interesting, and the subject of the research is important to be investigated. The sample size and number of variables analyzed are quite substantial, which gives strength to the study. However, I recommend a professional copyediting service to review the manuscript once some sentences do not make sense as written. In addition to this, there are some questions regarding the analysis that need clarification. |

Abstract

In the results section of the abstract, the authors describe that variables associated with physical unfitness were diabetes mellitus, dyslipidemia, systemic hypertension..... The authors present the results of the multiple logistic regression as the Odds Ratio for each variable analyzed. What this analysis is showing is that there is a higher chance of finding unfit professionals among the professionals with each condition described and not a simple association. Rewriting the results will enhance the main finds of the study.

Also in the results section of the abstract, the sentence “Other variables included smoking, physical inactivity, increased waist circumference, excessive intake of alcoholic beverages and psychiatric diseases” does not make sense. What do the authors mean? Do these represent other variables that were analyzed or other variables associated with physical unfitness? Please clarify and rewrite the sentence.

Strengths and weakness of the study

The authors assume as one strength of the study that “few studies have compared these two groups of professionals, who are healthy when they start their careers”. The last sentence needs rewriting. Although the professionals evaluated undergo health-based selection exams before admission it is difficult to assure that ALL PROFESSIONALS are healthy when they start their careers, once not all diseases are evaluated in the pre-admission selection. The authors can assume that there is a health-based selection that can determine what is known in the literature as the ‘healthy worker effect’.

Introduction

The sentence “suggesting that the perception that the physical demands firefighters face ensure they are in better health does not reflect reality” (line 58-60, page 2), is confusing and needs rewriting.

The sentence “what data there is based on small samples” (line 12, page 2), is confusing and needs rewriting. Besides, the data already published in this population should be acknowledged.

Study design and population evaluated

Line 36-37, page 3. “To identify the group with the greatest risk for chronic diseases, male participants were divided into three groups according to their age”. Was this stratification adopted to identify participants with increased risk for chronic disease? Was a risk
assessment analysis for chronic disease performed? It seems that the stratification was conducted to better identify the PREVALENCE of chronic disease by age group but a risk assessment analysis for chronic disease was not performed in the study.

It is worth adding a sentence justifying why men were analyzed separated from women.

Data collection

In the data collection, it is stated that the medical assessment was conducted to determine whether the professionals had chronic diseases or not. This is the opposite of the justification given above for the stratification of the groups.

Can the authors provide more details on how the blood pressure data were collected? For how long were the patients in the resting condition before measurements? What recommendations were provided to the patient previously to the measurement? The authors mentioned that measurements were conducted twice. What was the procedure when the two measurements were divergent? Was a third measurement conducted? Were all measurements performed recorded in files and stored for posterior calculation of the mean?

It would also be good if the authors add a description of the certification of the health professionals involved in the collection of the data.

Statement of Patient and Public Involvement

The authors need to include a statement about the confidentiality of their subjects in this section.

Statistical analysis

The authors describe that the logistic regression models were adjusted for factors associated with the result of clinical assessment (fit or unfit). However, there is no description of the method used for entering the data in the logistic regression model. This should be clarified to properly describe how the analysis was conducted.

Results

Line 19-20, page 7. “Table 2 shows the analysis of the data for men by age group and allows the group with the highest prevalence of risk factor or diseases to be identified.” This sentence is in tune with what it was mentioned about line 36-37 of study design. The stratification was not conducted to perform a risk assessment analysis, but only to identify the prevalence of diseases in each group studied.

Line 31-34, page 8. “After adjusting the multivariate model for predicting unfitness and using the explanatory variables police officer/firefighter, sex and age, the probability of being classified as unfit could be estimated (Table 4).” Why other variables associated with an unfit profile were not included in the model?

Line 15-16, page 9. “Behavioral interventions to encourage healthy habits should be implemented in order to help modify the profile of
chronic disease found in this study.” This sentence should be in the discussion and not in the description of the results.

Line 2-24, page 9. The description of the results could be improved, when the authors state that there is an association between the outcome evaluated (unfitness) and the variables analyzed by presenting the OR values. The univariate analyzes show an association between variables, but the OR is showing, for instance, that there is a higher chance of unfit professionals among police officers. Besides, as previously mentioned, there is no detailed description of how the variables were added to the model. It gives the impression that the analysis as performed is not considering the interaction between factors, but that each factor was tested independently. Variables tested clearly interact with the outcome and therefore if the interaction between them is not considered, the authors may be finding strong assumptions, which may not be present when an interaction between factors is considered.

Line 19-20, page 10. “This clearly shows that priority should be given to male police officers over the age of 31 with increased….”. This sentence shows an interpretation of the data and should be in the discussion section not in the description of the results. Besides, I cannot fully agree with the authors. If the older groups present more chronic diseases, it requires intervention in this population but preventive actions on the younger ones to avoid future illness of this population. Both points should be addressed in the discussion.

Discussion
State in the first paragraph of the discussion the main findings of the study.
Although the data has been confronted with a few other studies, there are plenty of data in firefighters approaching the same variables analyzed that can be also added to improve the discussion of the data.

**VERSION 1 – AUTHOR RESPONSE**

Reviewer 1:

Dr. Brittany Hollerbach, Skidmore College, National Development and Research Institutes Comments to the Author:

This is a well-written and timely manuscript. Comparisons often do not exist in the literature comparing the health outcomes of firefighters and police officers, but instead are siloed and each occupation is discussed separately. These results are interesting as they are different than I would have expected, at least for police and firefighters in the US.

Response: We appreciate your time in reviewing our manuscript. Your comments raised some valuable points and we have therefore revised our manuscript accordingly. Our responses to your specific comments are given below:

There are just a few grammatical errors and I suggest review by a native English speaker before publication for clarity.
Response: Thanks for your comment. We submitted the manuscript to editorial review as recommended.
I suggest clarification of "unfitness". The authors state that participants were considered "unfit" or "fit" based on the results of their ET. However, I am curious if this is a designation for fitness for duty or a designation by the researchers.

Response: In order to better explain this issue, we’d like to kindly recall you that all participants underwent medical assessment that included an analysis of their clinical history, physical examination and laboratory tests; those aged 40 years or over also did an exercise stress test (ET) on a treadmill. After this initial assessment, participants were considered either fit or unfit for active duty based. Participants who were 40 years or older were considered unfit if the results of their ET were suggestive of ischemia, cardiac arrhythmia, or if they presented disabling musculoskeletal diseases, uncontrolled hypertension or diabetes mellitus.

It was a little unclear to me if these physicals were voluntary (for research only) or if they were part of annual medical/physical occupational exams and the participants consented to allow their data to be used for research.

Response: Thank you for raising this very important concern. This study utilized data from the annual medical/physical occupational exams of military police officers and firefighters. Participants consented to allow their data to be used for research. All of them, signed a voluntary informed-consent form. The study was approved by the Ethics Committee in the Health Sciences Department, Federal University of Paraná, ref. number 85780418.0.0000.0102.

For the participants who were considered "unfit", were they removed from duty?

Response: Exactly, they were removed from duty and referred for additional tests or treatment.

There is a difference between physical fitness and being fit or unfit for duty based on required job tasks. I suggest minor editing to address these differences and ensure the purpose statement accurately reflects the research presented - this study examined fitness for duty, not physical fitness.

Response: Thank you for your comment. Indeed, as you pointed it out, this study examined fitness for duty, not physical fitness. As suggested, the purpose of the study was rewritten to clarify this issue as follows:

"Therefore, the present study sought to evaluate the health condition of military police officers and firefighters in the state of Paraná, Brazil, and to identify the risk factors associated with unfitness for duty".

For race categories, are the authors using standard terminology? For example, the NIH suggests the following categories for race: White, Black or African American, American Indian or Alaska Native, Asian, and Native Hawaiian or Other Pacific Islander.

Response: Thanks for your comment. The Brazilian population is highly admixed, resulting from 5 centuries of colonization and interbreeding, mainly, but not exclusively, among Native Americans, Europeans, and Africans. This complex migration history has shaped the strong regional differences in the admixture proportions across the country. The racial categories suggested by foreign institutions, such as the NIH, does not match the Brazilian racial diversity. So that, it was used the standard terminology proposed by The Brazilian Institute of Geography and Statistics (IBGE, Instituto Brasileiro de Geografia e Estatística) which recommend five pre-established color categories based...
on self-assessment White, Brown, Black, Yellow, and Indigenous (Native American). Furthermore, the self-assessment of color tool has been extensively used for Brazilian population characterization. We added this information on the manuscript (Page 3, lines 31-32) and (page 4, lines 1-2).

Did the participants provide any self-report data? Musculoskeletal diseases are discussed in the Results but it is not discussed how they were assessed in the Methods. Same for psychiatric diseases, medications, smoking, and physical activity. More information on how these variables were collected with help with comparison to other studies reproducibility. The authors address in the Discussion it can be difficult to compare occupational stress and mental illness across studies due to different instruments of assessment, however, the authors did not clearly identify what they used to assess psychiatric disorders, further perpetuating this issue.

Response: Thank you for your comment. The data on musculoskeletal and psychiatric disorders, as well as on any other diseases, were self-reported during the medical history or based on the use of medication. Likewise, lifestyle history, such as smoking, was collected through medical history. Alcohol consumption and physical activity were assessed through the AUDIT-C (Alcohol Use Disorders Identification Test–Concise) questionnaire and according to the intensity of the physical activity itself, respectively, as described in the method section (Page 4, lines 21-25).

Reviewer 2:

Dr. Karla Sampaio, Postgraduate Program in Pharmaceutical Sciences Comments to the Author:
Overall, the manuscript is interesting, and the subject of the research is important to be investigated. The sample size and number of variables analyzed are quite substantial, which gives strength to the study.

Response: We are grateful to reviewer 2 for the critical comments and useful suggestions that have helped us to considerably improve our manuscript. As indicated in the responses that follow, we have taken all of these comments and suggestions into account in the revised version of our manuscript.

However, I recommend a professional copyediting service to review the manuscript once some sentences do not make sense as written. In addition to this, there are some questions regarding the analysis that need clarification.

Response: Thank you very much for your comments. We took advantage of professional English proofreading to correct grammatical errors.

Abstract

In the results section of the abstract, the authors describe that variables associated with physical unfitness were diabetes mellitus, dyslipidemia, systemic hypertension……. The authors present the results of the multiple logistic regression as the Odds Ratio for each variable analyzed. What this analysis is showing is that there is a higher chance of finding unfit professionals among the professionals with each condition described and not a simple association. Rewriting the results will enhance the main finds of the study.

Response: Thanks for your kind advice. We have changed the results section of the abstract according to the reviewer’s recommendation. (Page 2, line 13-21).
Also, in the results section of the abstract, the sentence “Other variables included smoking, physical inactivity, increased waist circumference, excessive intake of alcoholic beverages and psychiatric diseases” does not make sense. What do the authors mean? Do these represent other variables that were analyzed or other variables associated with physical unfitness? Please clarify and rewrite the sentence.

Response: Thank you for your comment. We have re-written this paragraph taking into consideration the reviewer’s comment, and deleted the sentence referred (Page 1).

Strengths and weakness of the study

The authors assume as one strength of the study that “few studies have compared these two groups of professionals, who are healthy when they start their careers”. The last sentence needs rewriting. Although the professionals evaluated undergo health-based selection exams before admission it is difficult to assure that ALL PROFESSIONALS are healthy when they start their careers, once not all diseases are evaluated in the pre-admission selection. The authors can assume that there is a health-based selection that can determine what is known in the literature as the ‘healthy worker effect’.

Response: We thank the reviewer for the thoughtful and helpful commentary. We have applied all corrections suggested. The last sentence was rewritten. (Page 2, lines 9-10). We agreed that there is a health-based selection that can determine what is known in the literature as the ‘healthy worker effect’. Employers have the right to reject certain persons for employment because of physical disabilities, or poor general health. An employer will exclude those obviously at high risk. Person selection may also be influenced by habits and physical conditions such as weight, smoking, or alcoholism. We have incorporated the following sentence “who undergo physical and resistance tests for health-based selection process before they start their careers”. (Page 2, line 6-8).

Introduction

The sentence “suggesting that the perception that the physical demands firefighters face ensure they are in better health does not reflect reality” (line 58-60, page 2), is confusing and needs rewriting. Response: Thank you for the helpful comments. We fully agree with your concerns regarding that sentence, and have made the following alterations. “The high prevalence of risk factors remains a concern given that they are called upon to exert maximal effort under stressful conditions” (Page 3, line 25-27).

The sentence “what data there is based on small samples” (line 12, page 2), is confusing and needs rewriting. Besides, the data already published in this population should be acknowledged. Response: We have re-written this paragraph taking into consideration the reviewer’s comment, and deleted the sentence above (Page 2, line 25-27).

Study design and population evaluated

Line 36-37, page 3. “To identify the group with the greatest risk for chronic diseases, male participants were divided into three groups according to their age”. Was this stratification adopted to identify participants with increased risk for chronic disease? Was a risk assessment analysis for chronic disease performed? It seems that the stratification was conducted to better identify the PREVALENCE of chronic disease by age group but a risk assessment analysis for chronic disease was not performed in the study.
Response: Thank you for your very helpful comment. We have added the word prevalence to the sentence (Page 3, line 19).

It is worth adding a sentence justifying why men were analyzed separately from women. Response: We have incorporated a new paragraph in the study design and population evaluated section throughout the revised manuscript. “Moreover, women were analyzed separately from men because of their biological and behavioral characteristics, highlighting the sex difference in cardiometabolic, obesity and physical performance parameters” (Page 3, lines 22-26).

Data collection

In the data collection, it is stated that the medical assessment was conducted to determine whether the professionals had chronic diseases or not. This is the opposite of the justification given above for the stratification of the groups. Response: We have modified the writing to make this clearer. “The participants were military police officers and firefighters performing regular duties who underwent elective medical assessment during the annual health inspections. Questions concerning chronic diseases such as diabetes mellitus and hypertension, used medications, physical activity, smoking and drink habits were made” (Page 4, line 29-32).

Can the authors provide more details on how the blood pressure data were collected? For how long were the patients in the resting condition before measurements? What recommendations were provided to the patient previously to the measurement? The authors mentioned that measurements were conducted twice. What was the procedure when the two measurements were divergent? Was a third measurement conducted? Were all measurements performed recorded in files and stored for posterior calculation of the mean? Response: Thank you for raising this very important concern, we have provided more information on the data collection as required (Page 4, line 8-15).

It would also be good if the authors add a description of the certification of the health professionals involved in the collection of the data. Response: Thanks for your comment. Physical examination was performed by doctors or trained nurses (Page 4, line 11).

Statement of Patient and Public Involvement

The authors need to include a statement about the confidentiality of their subjects in this section. Response: Thank you for pointing this out. This has been corrected:

“Participants were not involved in the design, conduct or analysis of this study. The results will be shared with the participants and general population through the publication of this article.” (Page 5, line 10-11).

Statistical analysis

The authors describe that the logistic regression models were adjusted for factors associated with the result of clinical assessment (fit or unfit). However, there is no description of the method used for
entering the data in the logistic regression model. This should be clarified to properly describe how
the analysis was conducted.
Response: Thank you very much for your comments. Description of statistical analysis was
complemented to include the criteria used for variables included in the multivariate model and
description of interaction assessment.
"Variables with p<0.05 in the univariate analysis were included in the multivariate model. Interaction
was assessed for firefighters/police officers and each variable considered for the multivariate model. If
present, the interaction term was included in the model adjusted for other variables" (Page 5, lines 17-
20).

Results

Line 19-20, page 7. “Table 2 shows the analysis of the data for men by age group and allows the
group with the highest prevalence of risk factor or diseases to be identified.” This sentence is in tune
with what it was mentioned about line 36-37 of study design. The stratification was not conducted to
perform a risk assessment analysis, but only to identify the prevalence of diseases in each group
studied.
Response: We rewrote the sentence according to the reviewer’s suggestion (Page 7, line 2).

Line 31-34, page 8. “After adjusting the multivariate model for predicting unfitness and using the
explanatory variables police officer/firefighter, sex and age, the probability of being classified as unfit
could be estimated (Table 4).” Why other variables associated with an unfit profile were not included
in the model?
Response: We have already analyzed all the explanatory variables according to the table 4
(univariate and multivariate logistic regression model for explanatory variables). In our opinion, an
important objective of this table 4 was to promote a practical way to select the group of individuals
with the highest need for medical attention by demographic data. The probability of being classified as
unfit could be estimated using the explanatory variables: police officer/firefighter, sex and age (Page
9).

Line 15-16, page 9. “Behavioral interventions to encourage healthy habits should be implemented in
order to help modify the profile of chronic disease found in this study.” This sentence should be in the
discussion and not in the description of the results.
Response: We thank the reviewer for the helpful commentary. We have added the sentence in the
discussion section (page 11, lines 9-10).

Line 2-24, page 9. The description of the results could be improved, when the authors state that there
is an association between the outcome evaluated (unfitness) and the variables analyzed by
presenting the OR values. The univariate analyzes show an association between variables, but the
OR is showing, for instance, that there is a higher chance of unfit professionals among police
officers. Besides, as previously mentioned, there is no detailed description of how the variables were
added to the model. It gives the impression that the analysis as performed is not considering the
interaction between factors, but that each factor was tested independently. Variables tested clearly
interact with the outcome and therefore if the interaction between them is not considered, the authors
may be finding strong assumptions, which may not be present when an interaction between factors is
considered.
Response: We thank the reviewer for the helpful commentary.

A significant interaction was identified between physical activity and firefighter/police officer \(p=0.015\) such that the odds ratio of unfit for firefighter are higher than for police officer (Table 5). There was no interaction of other variables with firefighter/police officer.

<table>
<thead>
<tr>
<th>Group</th>
<th>Physical activity</th>
<th>(p^*)</th>
<th>OR (95% CI)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firefighter (1)</td>
<td>300 min/week (1)(ref)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 150 min/week</td>
<td>0.056</td>
<td>1.42 (0.99 – 2.03)</td>
<td></td>
</tr>
<tr>
<td>&lt; 150 min/week</td>
<td>&lt;0.001</td>
<td>2.18 (1.41 – 3.38)</td>
<td></td>
</tr>
<tr>
<td>Police officer (0)</td>
<td>300 min/week (1)(ref)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 150 min/week</td>
<td>0.002</td>
<td>1.26 (1.09 – 1.45)</td>
<td></td>
</tr>
<tr>
<td>&lt; 150 min/week</td>
<td>&lt;0.001</td>
<td>1.60 (1.38 – 1.86)</td>
<td></td>
</tr>
</tbody>
</table>

*Logistic regression model adjusted for sex and age group, waist circumference, smoking, alcohol consumption, hypertension, dyslipidemia, diabetes mellitus, heart disease, psychiatric diseases and total cholesterol; Wald test, \(p<0.05\)

Line 19-20, page 10. “This clearly shows that priority should be given to male police officers over the age of 31 with increased….”. This sentence shows an interpretation of the data and should be in the discussion section not in the description of the results. Besides, I cannot fully agree with the authors. If the older groups present more chronic diseases, it requires intervention in this population but preventive actions on the younger ones to avoid future illness of this population. Both points should be addressed in the discussion.

Response: We thank the reviewer for the helpful commentary. We have added in the discussion section and we commented preventive actions on the younger ones. (Page 12, line 26).

Discussion

State in the first paragraph of the discussion the main findings of the study.

Response: We have re-written this paragraph taking into consideration the reviewer’s comment (Page 10, lines 14-20)

Although the data has been confronted with a few other studies, there are plenty of data in firefighters approaching the same variables analyzed that can be also added to improve the discussion of the data.

Response: We thank the reviewer for the recommendations. We have reviewed and added references in order to improve the discussion section (Page 11, line 15-19 e 26-31).
first epidemiologic examination of military police and firefighters with respect to morbidities. I disagree and the authors site much of the previous work, so I caution over-sell the novelty of this work. Further, I wonder what this adds to the previous literature. Much of the results are similar to previous work. It is well documented the police and firefighters are at increased risk of morbidities such as heart disease due both to the strenuous nature of their occupations as well as due to occupational influences such as shift schedule, poor nutrition habits, and a lack of dedicated time for physical activity. I wonder what this paper adds to the wealth of literature that exists. Perhaps I'm missing it, and the authors just need to better sell the novelty of this particular study and sample.

There is an extremely small sample of women, which, though there are few women in the career field, does not discount the importance of examining that subset of the population.

As I stated the first time, this manuscript would benefit from English language review and editing. There are several instances where the wording is redundant or does not make sense as written. In the Introduction, there are two sentences which are separate as if they are each a paragraph, which they are not. I suggest combining such sentences to make a fluent paragraph. Further, I suggest checking the required journal formatting to be consistent with subheadings such as "Patients and Methods". Should this be Participants? The Methods need to be explicated. What questionnaires were used to ask about chronic disease history and physical activity (are these standard questionnaires)?

I still do not understand the researchers' classification of being "unfit" for duty. For example, it seems the researchers classified someone with Diabetes as unfit however if they are healthy otherwise and the Diabetes is managed, I disagree with this classification. More description is necessary as to what constituted "uncontrolled hypertension" or "diabetes mellitus".

For the treadmill test, more information is necessary. Why are two protocols listed? When was one used as opposed to the other? Was oxygen consumption measured or estimated? What other measurements were taken during the treadmill test? What stopping guidelines were in place? In order for this research to be compared to previous research or to be replicated in the future, much more detailed information is required.

There is a discrepancy as to the total number of firefighters. Page 3, line 30 states 1,347 firefighters took part in the study while page 5, line 52 indicates 3,167 firefighters were examined. Further, that sentence is hard to understand and should include the races to which the authors are referring. This number on page 5 differs from that on page 3 as well as the number listed in the tables.

The Conclusion suggests there is a need for regular medical assessments for police and firefighters. This research is the result of regular annual physicals, correct? What do the authors suggest in addition to what is already being done in order to address the issues discovered in this research?

REVIEWER
Karla Sampaio  
Postgraduate Program in Pharmaceutical Sciences, Pharmaceutical Sciences

REVIEW RETURNED
15-Oct-2021

GENERAL COMMENTS
The manuscript has been much improved after the authors' modifications. However, there are still some minor points to address and a few sentences that still need English revision.
Abstract: result section, line 42. Change professional for professionals.

Introduction: page 2, line 47-52

Even though firefighters are subjected to physical demands, the prevalence of overweight and obesity among them is similar to that of the general population, the high prevalence of CVD risk factors remains a concern given that they are called upon to exert maximal effort under stressful conditions.

I suggest punctuation between statements.

Even though firefighters are subjected to physical demands, the prevalence of overweight and obesity among them is similar to that of the general population. The high prevalence of CVD risk factors remains a concern given that they are called upon to exert maximal effort under stressful conditions.

Introduction: page 4, lines 5-8. There seems to be missing a verb in the sentence.

Data regarding chronic diseases, such as diabetes mellitus, hypertension and medications in use, as well as lifestyle history, such as physical activity, smoking and drink habits, self-reported during medical history.

Suggestion:

Data regarding chronic diseases, such as diabetes mellitus, hypertension and medications in use, as well as lifestyle history, such as physical activity, smoking and drink habits, were self-reported during medical history.

Results: page 10, lines 22-37. The point raised in the previous recommendations for the authors was that the strength of these results could be much improved if the authors referred to the increased chance of finding unfit professionals within a certain category, instead of simply point for an association. I do not understand why the authors added another result table in their answer. The suggestion was simply to change the description of this result section as it was changed in the abstract.

Discussion: The authors have improved the discussion.

**VERSION 2 – AUTHOR RESPONSE**

Reviewer 2:

Dr. Karla Sampaio, Postgraduate Program in Pharmaceutical Sciences

Comments to the Author:

The manuscript has been much improved after the authors’ modifications. However, there are still some minor points to address and a few sentences that still need English revision.

Response: Thanks for your comment. The manuscript was submitted to English language review and editing (Job Code is SPBVE_1_2).
Abstract: result section, line 42. Change professional for professionals

Response: We thank the reviewer for this point. We have modified this term on page 2 of the manuscript.

Introduction: page 2, line 47-52

Even though firefighters are subjected to physical demands, the prevalence of overweight and obesity among them is similar to that of the general population, the high prevalence of CVD risk factors remains a concern given that they are called upon to exert maximal effort under stressful conditions.

I suggest punctuation between statements.

Even though firefighters are subjected to physical demands, the prevalence of overweight and obesity among them is similar to that of the general population. The high prevalence of CVD risk factors remains a concern given that they are called upon to exert maximal effort under stressful conditions.

Response: Thank you for your comment. We have changed as suggested on page 3.

Introduction: page 4, lines 5-8. There seems to be missing a verb in the sentence.

Data regarding chronic diseases, such as diabetes mellitus, hypertension and medications in use, as well as lifestyle history, such as physical activity, smoking and drink habits, self-reported during medical history.

Suggestion:

Data regarding chronic diseases, such as diabetes mellitus, hypertension and medications in use, as well as lifestyle history, such as physical activity, smoking and drink habits, were self-reported during medical history.

Response: Thank you for your comment. We have re-written this sentence on data collection section as suggested (Page 4).

Results: page 10, lines 22-37. The point raised in the previous recommendations for the authors was that the strength of these results could be much improved if the authors referred to the increased chance of finding unfit professionals within a certain category, instead of simply point for an association. I do not understand why the authors added another result table in their answer. The suggestion was simply to change the description of this result section as it was changed in the abstract.

Response: We have changed the description on results section (Pages 7-12).

Discussion: The authors have improved the discussion.

Response: Thank you very much for your comments.

We sincerely hope you will reconsider your decision.
Reviewer: 1

Dr. Brittany Hollerbach, NDRI-USA, Inc.

Comments to the Author:

This paper is strengthened from the initial submission. I do, however, have several issues to address. First, the authors state in numerous places (Abstract, Introduction, Conclusion) that this is the first epidemiologic examination of military police and firefighters with respect to morbidities. I disagree and the authors site much of the previous work, so I caution over-selling the novelty of this work.

Response: This study is the largest epidemiologic examination of military police and firefighters with respect to morbidities in Paraná, South of Brazil. We have changed the phrase on discussion section (Page 12).

Further, I wonder what this adds to the previous literature. Much of the results are similar to previous work. It is well documented the police and firefighters are at increased risk of morbidities such as heart disease due both to the strenuous nature of their occupations as well as due to occupational influences such as shift schedule, poor nutrition habits, and a lack of dedicated time for physical activity. I wonder what this paper adds to the wealth of literature that exists. Perhaps I’m missing it, and the authors just need to better sell the novelty of this particular study and sample.

Response: This study aimed to evaluate and compare the prevalence of chronic diseases among different categories of these public officers, in order to further understand the health risks associated with these occupations. Considerable research on the health of public officers has been conducted in many countries, focusing mainly on cardiovascular diseases, chronic diseases and mental disorders. However, comparable research in South America is scarce. Furthermore, our findings suggested a subgroup that should receive more frequently medical assessments and the necessary healthcare interventions. (Page 14-15)

There is an extremely small sample of women, which, though there are few women in the career field, does not discount the importance of examining that subset of the population.

Response: We fully agree. Although females represented a small percentage of the police force and the fire service, they are an integral part of the workforce. Neglecting this subset of the population can lead to negative health outcomes. We have highlighted this issue on the discussion section. (Pages 13,14)

As I stated the first time, this manuscript would benefit from English language review and editing. There are several instances where the wording is redundant or does not make sense as written.

Response: Thank you very much for your valuable suggestion. The manuscript was submitted to English language review and editing, as suggested (Job Code is SPBVE_1_2). We hope that it is now acceptable.
In the Introduction, there are two sentences which are separate as if they are each a paragraph, which they are not. I suggest combining such sentences to make a fluent paragraph. Further, I suggest checking the required journal formatting to be consistent with subheadings such as "Patients and Methods". Should this be Participants?

Response: We have changed as suggestion. (Page 3-4)

The Methods need to be explicated. What questionnaires were used to ask about chronic disease history and physical activity (are these standard questionnaires)?

Response: A semi-structured questionnaire was used and participants were asked if they had been diagnosed with diabetes, hypertension, musculoskeletal, cardiovascular, endocrine, respiratory, neurological, psychiatric diseases or any other medical condition. If the answer was yes for any disease, the treatment used was asked. The physical activity level of the participants was assessed by applying the short form of the International Physical Activity Questionnaire (IPAQ). (Pages 3-5)

I still do not understand the researchers' classification of being "unfit" for duty. For example, it seems the researchers classified someone with Diabetes as unfit however if they are healthy otherwise and the Diabetes is managed, I disagree with this classification.

Response: We are sorry we didn't make it clear before, we finally made the choice to remove the term "unfit" for clarity and so that the meaning is understood. The term has been replaced on by medically read for active duty or not ready, which seems to make more sense in this case.

More description is necessary as to what constituted "uncontrolled hypertension" or "diabetes mellitus".

Response: We have added the description on data collection section. High blood pressure was defined when the systolic blood pressure readings was ≥140 mmHg and/or the diastolic blood pressure was ≥90 mmHg. Uncontrolled hypertension was defined as systolic blood pressure ≥140 mmHg and/or diastolic blood pressure ≥ 90 mmHg in patients taking antihypertensive medications. (Page 5)

High fasting plasma glucose was defined when the glucose was >99 mg/dl. Uncontrolled diabetes was defined when fasting plasma glucose >130 mg/dl in patients taking anti-diabetic medications. (Pag. 6)

For the treadmill test, more information is necessary. Why are two protocols listed? When was one used as opposed to the other? Was oxygen consumption measured or estimated? What other measurements were taken during the treadmill test? What stopping guidelines were in place? In order for this research to be compared to previous research or to be replicated in the future, much more detailed information is required.

Response: Protocol choice depends on the patient being assessed. Staggered protocols, such as Bruce, Ellestad, Sheffield and Naughton, commonly used in treadmill tests, recommend workload increases (inclination and velocity) at regular intervals of 2 or 3 minutes. The intensity of the work...
remains constant during some minutes and then it is suddenly increased. Patients with different characteristics, such as age, sex, and physical conditioning are submitted to pre-determined workloads of the same intensity, which will cause great variances in examination time according to the characteristics of each individual assessed. We have added the description on cardiorespiratory assessment section (Page 6).

There is a discrepancy as to the total number of firefighters. Page 3, line 30 states 1,347 firefighters took part in the study while page 5, line 52 indicates 3,167 firefighters were examined.

Further, that sentence is hard to understand and should include the races to which the authors are referring. This number on page 5 differs from that on page 3 as well as the number listed in the tables.

Response: In order to better explain this issue, we have changed the paragraph on results section (Page 7).

The Conclusion suggests there is a need for regular medical assessments for police and firefighters. This research is the result of regular annual physicals, correct? What do the authors suggest in addition to what is already being done in order to address the issues discovered in this research?

Response: Thank you for your comments. We now highlighted in the conclusion that, according to our findings, medical assessment should be carried out more frequently and earlier to improve the health conditions of police officers and firefighters and that the health conditions of females should not be neglected, as you may read below:

“Our study highlights the need for regular medical assessments and follow-ups of police officers and firefighters, as well as for the promotion of preventive health care. These measures need to be offered earlier and more frequently for police officers. The health condition of female police officers and firefighters should not be neglected as they are exposed to the same work-related risk factors as males and, consequently, may also present a high prevalence of CVD risk factors and chronic diseases. It should be stressed that the police officers and firefighters included in this study were working under normal conditions and were unaware of their medical status. This scenario may adversely affect both the workers’ own health and the health of others when they are performing their duties” (Page 14-15).

**VERSION 3 – REVIEW**

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<th>REVIEWER</th>
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