

## PEER REVIEW HISTORY

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### ARTICLE DETAILS

<b>TITLE (PROVISIONAL)</b>	Risk Factors for Mental Workload: Influence of the Working Environment, Cardiovascular Health and Lifestyle. A Cross-Sectional Study
<b>AUTHORS</b>	Simonelli Muñoz, Agustín; López López, María Luisa; Balanza Galindo, Serafín; Vera Catalán, Tomás; Gallego Gómez, Juana Inés; Rodríguez González-Moro, María Teresa; Rivera-Caravaca, José Miguel

### VERSION 1 – REVIEW

<b>REVIEWER</b>	Els Clays Ghent University, Belgium
<b>REVIEW RETURNED</b>	12-Mar-2018

<b>GENERAL COMMENTS</b>	The paper lacks focus and the precise added value to existing literature remains unclear to the reader. The relation between occupational factors like mental workload and cardiovascular health is a widely studied topic. In the present paper, mental workload as dependent variable is analysed in relation to a wide range of risk factors including socio-demographics, occupational factors and lifestyle related cardiovascular risk factors. The rationale behind this analysis is weak, do the authors want to identify profile factors of workers with increased work load, or unravel mechanisms in the relation between work and CVD? To state that the vast majority of participants is exposed to at least one risk factor, is a misleading message in my opinion.
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<b>REVIEWER</b>	Maria M. Morales Suárez-Varela Valencia University
<b>REVIEW RETURNED</b>	12-Mar-2018

<b>GENERAL COMMENTS</b>	<p>The relationship between work activity and cardiovascular diseases is a subject of great importance, with special attention to measures that improve this situation and is well documented. The perspective of assessing the mental workload, workplace, cardiovascular diseases and lifestyle is very interesting and ambitious.</p> <p>Abstract: The objective is very unspecific, working conditions are very important in each group and sector of work, the objective should be more concrete. Method should be expanded Results, include standard deviation and 95% Confidence Interval for the OR, include the adjustment variables. Conclusions: You can not issue "is evident" opinions, eliminate it.</p>
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	<p>They are not based on an analytical perspective ... but they are interesting as a description of the study sample.</p> <p>In relation to the section What this paper adds ?, the first point is obvious, it does not belong to the work. The other points must be presented from a non-analytical descriptive perspective since the work is a transversal design, which does not allow establishing causality but association.</p> <p>Introduction: information on studies on this subject is missing. It would be improved by incorporating the work hypothesis.</p> <p>Methods: Being a cross-sectional design, I understand that they have made a nested control case on this transversal design. The heterogeneity of the population that collects, given that the characteristics are very different should be taken into account in the study.</p> <p>Using the data of the occupational risk prevention service adds a high risk of bias of the healthy worker, possibly their results underestimate the relationship.</p> <p>I do not understand how the sample has been calculated, what has been the criterion: expected prevalence ... expected risk ...? Please clarify how you have calculated the sample.</p> <p>The calculation of the sample is not only quantitative, but also the selection criteria, in this case I believe that they are very open, which harms the interpretation of the results.</p> <p>Criteria used to regroup the BMI, it seems that they are those of the WHO (?)</p> <p>What are the adjustment variables.</p> <p>Results: Clarifying tables of the characteristics of the population studied should be added based on the variables analyzed. Can not say (page 8, line 42) "Other interesting results" Another table for what is described on page10. Table 2 lacks the 95% confidence intervals, indicating which test is used to calculate the "p". And not using acronyms not explained</p> <p>Discussion: it has to be reformulated, there is no discussion with other studies.</p>
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<b>REVIEWER</b>	Dr. Christopher E. Ekpenyong University of Uyo, Uyo, Nigeria
<b>REVIEW RETURNED</b>	16-Mar-2018

<b>GENERAL COMMENTS</b>	<p>General comments:</p> <ul style="list-style-type: none"> <li>⊖ The authors of the present manuscript studied the relationship between mental workload, workplace factors, cardiovascular risk factors and lifestyle habits. Evidently, this study has not adequately demonstrated that relationship due to several limitations of the present study, and in particular several methodology issues. However, my comments are as follows;</li> <li>⊖ Authors should pay attention to several language errors in the manuscript.</li> <li>⊖ All abbreviations should be clearly defined before use subsequently.</li> </ul>
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	<p><b>Abstract:</b>  Lines 8-10:  The aim of the present study is not quite clear and should be reframed.</p> <p><b>Results:</b>  50.5% should be written in words.</p> <p><b>Keywords:</b> Appropriate</p> <p><b>What this paper adds;</b>  Should be revised for instance; Lines 10-13; this is a claim but not addition.</p> <p><b>Introduction:</b>  Page 5, Lines 27-31;  Please reframe the aim of the present study.  Page 7 line 26 SPSS should be written in full and the abbreviation put in a bracket.</p> <p><b>Methods:</b>  Page 6, line 5; non-probabilistic is preferable to “not-probabilistic”.  ♣ There is need to state the type of non-probabilistic sampling technique used in selecting the sample.  ♣ Why was the population said to be infinite and which statistical formula/method was used in estimating sample size of 384?  ♣ The socio-demographic characteristics of the participants are not shown.</p> <p><b>Table 1:</b>  ♣ The title needs modification, Relationship between gender and obesity level is preferable.  ♣ P-value written as 0,000 should be changed to 0.000.</p> <p><b>Table 2:</b>  ♣ The title needs modification, Association between demographic variables, lifestyle habits, and moderate-significant mental workload is preferable.</p> <p><b>Page 8, lines 14-25</b>  How lifestyle habits were assessed was not mentioned in the method section. Also, these lifestyle habits were not stratified in a conventional pattern. Even so, the classifications used by the authors are not defined. For instance, Page 8, lines 13-18 the classification of physical activity, smoking habits, and alcohol intake as “occasionally” former smokers, daily smokers and weekly alcohol intake is nonconventional and not defined. Also, the assessment of clinical and biochemical data were not described.</p> <p><b>Statistical Analysis</b>  ⊖ Parametric test was mentioned as the statistical technique used, but no such results were presented, therefore expunge.  ⊖ All commas in all the tables should be changed to a full stop dot.  ⊖ For all references group in the logistic regression, use OR of 1.00 since it is the reference group, just for clarity. It will enhance better understanding especially for those with little knowledge of statistics.  ⊖ Some of the results for univariate association/relationship for age and MSMW, company size VS MSMW, physical activity Vs MSMW and CVRF Vs MSMW were not presented.</p>
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	<p>⊞ No need to put the code for each of the levels of the independent variables as that can be taken care of in the methods section.</p> <p>⊞ Check the P-value reported in table 1 as it does not tally with my result.</p> <p>⊞ Is the P-value 0.000 or 0.001?</p> <p>⊞ The sum of BM&gt;30 is 55 and not 15.</p> <p>⊞ You may have to expand the interpretation of Table 2. The present interpretation is too brief.</p> <p>⊞ Effort should be made to systematically highlight those factors that were significant including their adjusted OR and their P-values.</p> <p><b>Results:</b> The data discussed in this section would have been more appreciated if they were also presented in a table format.</p> <p><b>Page 8, lines 42-44;</b> 58.9% of men have some level of obesity in a higher percentage than women (34.5%). Going by the definition of overweight and obesity, I think it is better to say that 58.9% of men had some level of overweight/obesity than .....</p> <p><b>Discussion:</b> Some of the results discussed in the discussion section are not shown in the results section.</p> <p><b>References:</b> Ensure all in-text references are represented in the reference section and are also correctly cited.</p>
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### VERSION 1 – AUTHOR RESPONSE

Reviewer: 1

The paper lacks focus and the precise added value to existing literature remains unclear to the reader. The relation between occupational factors like mental workload and cardiovascular health is a widely studied topic. In the present paper, mental workload as dependent variable is analysed in relation to a wide range of risk factors including socio-demographics, occupational factors and lifestyle related cardiovascular risk factors. The rationale behind this analysis is weak, do the authors want to identify profile factors of workers with increased work load, or unravel mechanisms in the relation between work and CVD? To state that the vast majority of participants is exposed to at least one risk factor, is a misleading message in my opinion.

>>> We apologize for these issues. In this revised version, we have improved the manuscript and in our opinion it is now clearer. Our main aim was to investigate risk factors for the development of mental workload. These risk factors included not only working conditions but also cardiovascular comorbidities and lifestyle habits.

Regarding our previous statement that the vast majority of participants were exposed to at least one risk factor, according to the “Manual for the Assessment and Prevention of Ergonomic and Psychosocial Risks in Small/Medium Sized Companies”, four items related to the work environment (item 1: “The work is based on information processing”; item 2: “The task requires a high level of attention”; item 3: “The work has little content and is very repetitive” and item 4: “Mistakes and breakdowns frequently appear at work”). Therefore, it is true that the vast majority of workers (99.5%) were exposed to at least one risk factor. However, in this revised version we have clarified that these

risk factors belong to the work environment.

Reviewer: 2

Thank you for allowing me to review the titled article "RELATIONSHIP BETWEEN RISK OF MENTAL WORKLOAD, WORKPLACE, CARDIOVASCULAR RISK FACTORS AND LIFESTYLE HABITS" (bmjopen-2018-022255).

The relationship between work activity and cardiovascular diseases is a subject of great importance, with special attention to measures that improve this situation and is well documented. The perspective of assessing the mental workload, workplace, cardiovascular diseases and lifestyle is very interesting and ambitious.

>>> Thank you for your comments.

Abstract:

The objective is very unspecific, working conditions are very important in each group and sector of work, the objective should be more concrete.

Methods should be expanded.

Results, include standard deviation and 95% Confidence Interval for the OR, include the adjustment variables.

Conclusions: You can not issue "is evident" opinions, eliminate it. They are not based on an analytical perspective ... but they are interesting as a description of the study sample.

>>> Thank you. We agree with you. In overall, the abstract has been rewritten to solve the deficiencies that you mention.

In relation to the section What this paper adds ?, the first point is obvious, it does not belong to the work. The other points must be presented from a non-analytical descriptive perspective since the work is a transversal design, which does not allow establishing causality but association.

>>> This section has been deleted per Editorial requirements as this is not part of journal format.

Introduction: information on studies on this subject is missing. It would be improved by incorporating the work hypothesis.

>>> This section has been improved by adding some information and hypothesis.

Methods: Being a cross-sectional design, I understand that they have made a nested control case on this transversal design.

>>> We are sorry but we did not perform nested control case as this was only a first exploratory study. However, we agree with you regarding the approach you comment and we will take in mind for future research.

The heterogeneity of the population that collects, given that the characteristics are very different should be taken into account in the study.

>>> We acknowledge that a great heterogeneity could exist. For this reason this has been included in the limitations section.

Using the data of the occupational risk prevention service adds a high risk of bias of the healthy worker, possibly their results underestimate the relationship.

>>> Thank you for your comment but we do not agree. Although data were recorded from a risk prevention service, all workers fulfilling inclusion criteria were included. It is true that workers with worse health probably did not appear here, but one of the inclusion criteria was that workers must be active. For this reason, we included all workers who attended the risk prevention service and were

active, without excluding any due to their health status.

I do not understand how the sample has been calculated, what has been the criterion: expected prevalence ... expected risk ...? Please clarify how you have calculated the sample.

The calculation of the sample is not only quantitative, but also the selection criteria, in this case I believe that they are very open, which harms the interpretation of the results.

>>> We apologize. As we commented above, this was an exploratory study, so no sample size calculation was performed. This has been removed from the manuscript.

Regarding inclusion criteria, we selected these ones in order to cover the widest possible range of workers. Indeed, we only excluded workers of the First sector to avoid a gender bias which may hinder the generalizability of the results.

Criteria used to regroup the BMI, it seems that they are those of the WHO (?)

>>> The reviewer is correct. We used the WHO criteria for the categorization of BMI. There were no "underweight" workers (i.e. BMI <18.5 kg/m<sup>2</sup>) and for this reason, this group did not appear.

What are the adjustment variables.

>>> We agree with you. Table 2 includes now both, univariate and multivariate analyses. Thus, the adjustment variables are now reported in this Table.

Results:

Clarifying tables of the characteristics of the population studied should be added based on the variables analyzed.

>>> Thank you. In this revised version we have included a Table 1 with baseline characteristics.

Can not say (page 8, line 42) "Other interesting results"

>>> We agree. We have deleted this sentence.

Another table for what is described on page10.

>>> This information is described in Table 1.

Table 2 lacks the 95% confidence intervals, indicating which test is used to calculate the "p". And not using acronyms not explained

>>> This table includes the results of the logistic regression analyses. The 95% confidence intervals are now reported for both, univariate and multivariate analyses.

Discussion: it has to be reformulated, there is no discussion with other studies.

>>> Discussion has been reformulated and expanded with new information and studies.

Reviewer: 3

General comments:

The authors of the present manuscript studied the relationship between mental workload, workplace factors, cardiovascular risk factors and lifestyle habits. Evidently, this study has not adequately demonstrated that relationship due to several limitations of the present study, and in particular several methodology issues. However, my comments are as follows;

Authors should pay attention to several language errors in the manuscript.

All abbreviations should be clearly defined before use subsequently.

>>> Thank you for your comments. In overall the manuscript has been improved, including English.

Although we have not demonstrated that some cardiovascular diseases increased the risk of mental

workload, we have observed that the sector of working, age, smoking habits and alcohol consumption are significantly associated with higher risk of mental workload.

Abstract:

Lines 8-10:

The aim of the present study is not quite clear and should be reframed.

>>> Thank you. We agree with you. In overall, the abstract has been rewritten to solve the deficiencies that you mention.

Results:

50.5% should be written in words.

>>> This sentence has been rephrased.

Keywords: Appropriate

>>> Thank you.

What this paper adds;

Should be revised for instance; Lines 10-13; this is a claim but not addition.

>>> This section has been deleted per Editorial requirements as this is not part of journal format.

Introduction:

Page 5, Lines 27-31;

Please reframe the aim of the present study.

>>> The aim has been reframed and now is clearer.

Page 7 line 26 SPSS should be written in full and the abbreviation put in a bracket.

>>> This has been corrected.

Methods:

Page 6, line 5; non-probabilistic is preferable to "not-probabilistic".

There is need to state the type of non-probabilistic sampling technique used in selecting the sample.

Why was the population said to be infinite and which statistical formula/method was used in estimating sample size of 384?

>>> We apologize. As we commented above, this was an exploratory study, so no sample size calculation was performed. This has been removed from the manuscript.

The socio-demographic characteristics of the participants are not shown.

>>> This information has been included in Table 1.

Table 1:

The title needs modification, Relationship between gender and obesity level is preferable.

P-value written as 0,000 should be changed to 0.000.

>>> Thank you for your suggestion. Previous Table 1 has been deleted and replaced by a table with baseline characteristics. We have taken into account that commas should be replaced to dots.

Table 2:

The title needs modification, Association between demographic variables, lifestyle habits, and moderate-significant mental workload is preferable.

>>> Thank you. The title of this table has been changed.

Page 8, lines 14-25

How lifestyle habits were assessed was not mentioned in the method section. Also, these lifestyle

habits were not stratified in a conventional pattern. Even so, the classifications used by the authors are not defined. For instance, Page 8, lines 13-18 the classification of physical activity, smoking habits, and alcohol intake as “occasionally” former smokers, daily smokers and weekly alcohol intake is nonconventional and not defined. Also, the assessment of clinical and biochemical data were not described.

>>> We agree. The Methods section has been modified and now is clearer. Also, in the results section we now mention how lifestyle habits and other parameters were classified.

#### Statistical Analysis

Parametric test was mentioned as the statistical technique used, but no such results were presented, therefore expunge.

All commas in all the tables should be changed to a full stop dot.

For all references group in the logistic regression, use OR of 1.00 since it is the reference group, just for clarity. It will enhance better understanding especially for those with little knowledge of statistics. Some of the results for univariate association/relationship for age and MSMW, company size VS MSMW, physical activity Vs MSMW and CVRF Vs MSMW were not presented.

No need to put the code for each of the levels of the independent variables as that can be taken care of in the methods section.

Check the P-value reported in table 1 as it does not tally with my result.

Is the P-value 0.000 or 0.001?

The sum of BM >30 is 55 and not 15.

You may have to expand the interpretation of Table 2. The present interpretation is too brief.

Effort should be made to systematically highlight those factors that were significant including their adjusted OR and their P-values.

>>> As we commented, no sample size calculation was performed.

All commas have been changed to dots.

Table 2 has been expanded and now it includes both, univariate and multivariate analyses. OR and p-values as well as adjusted variables are now clearer.

The codes of the items are not repeated in Results since they were already reported in Methods.

Previous Table 1 has been deleted and replaced by a table with baseline characteristics.

#### Results:

The data discussed in this section would have been more appreciated if they were also presented in a table format.

Page 8, lines 42-44;

58.9% of men have some level of obesity in a higher percentage than women (34.5%). Going by the definition of overweight and obesity, I think it is better to say that 58.9% of men had some level of overweight/obesity than .....

>>> This section has been rewritten. As we commented, new tables have been performed and the information is more structured and clearer.

#### Discussion:

Some of the results discussed in the discussion section are not shown in the results section.

>>> Apologies. We have corrected this section and now it does not present any result not already shown in Results section.

#### References:

Ensure all in-text references are represented in the reference section and are also correctly sited.

>>> We have revised references to ensure that all are correctly presented and cited.

### VERSION 2 – REVIEW

<b>REVIEWER</b>	Maria M. Morales Suárez-Varela Valencia University CIBERESP
<b>REVIEW RETURNED</b>	29-May-2018

<b>GENERAL COMMENTS</b>	<p>The work is better structured.</p> <p>Suggestions:</p> <p>Since the study of workers in the primary sector has been eliminated. It should be assumed from the beginning that the work deals with workers in the secondary and tertiary sector.</p> <p>The tables should be structured by the labor sectors studied. Add two columns one for each sector.</p> <p>Indicate both the summary and material and methods, as well as table 3, the adjustment variables in the adjusted OR.</p> <p>Make a comparison between the secondary and tertiary sector, add the p-value at the end of each row (table 1 and 2).</p> <p>Although this is anonymous data, I suggest that the approval of an ethical committee be added, for example, that of the university.</p> <p>Since there are 50% of women, work should be stratified by gender.</p> <p>In the discussion should be proposed, as a result of the results obtained, improvement actions to reduce the mental load.</p>
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<b>REVIEWER</b>	Dr. Chris Ekpenyong University of Uyo, Nigeria
<b>REVIEW RETURNED</b>	07-Jun-2018

<b>GENERAL COMMENTS</b>	<p>The quality of this manuscript has improved significantly, and the authors have addressed all my concerns.</p> <p>The manuscript should therefore be accepted for publication in its current state.</p>
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### VERSION 2 – AUTHOR RESPONSE

Reviewer: 2

Thank you for allowing me to review the work "Risk Factors for Mental Workload: Influence of the Working Environment, Cardiovascular Health and Lifestyle, A Cross-Sectional Study" (BMJopen - 2018- 022255.R1).

The work is better structured.

>>> Thank you for your comment.

Suggestions:

Since the study of workers in the primary sector has been eliminated. It should be assumed from the beginning that the work deals with workers in the secondary and tertiary sector.

>>> We agree with the reviewer. In this revised version we have clarified the aim and the conclusion taking into account that the study included only workers from the Secondary and Tertiary Sectors or workers with administrative tasks.

The tables should be structured by the labor sectors studied. Add two columns one for each sector.

>>> This is an interesting suggestion. We have added these columns to Table 1 (Secondary, Tertiary and Administrative groups).

Indicate both the summary and material and methods, as well as table 3, the adjustment variables in the adjusted OR.

>>> In the Methods section, we stated that we have performed a multivariate analysis including only

those variables with a p-value <0.15 in the univariate analyses. Therefore, those variables that were included in the multivariate analysis acted as adjustments variables. We have tried to clarify this also in the Results section. In the last version of our manuscript we have no Table 3 so we understand the reviewer referred to Table 2. This table already shows the complete univariate and multivariate analyses.

Make a comparison between the secondary and tertiary sector, add the p-value at the end of each row (table 1 and 2).

>>> P-values for comparison between the three groups of workers have been added to Table 1. Regarding Table 2, we have performed sub-analyses for each group (Secondary, Tertiary and Administrative) that have been included in the Supplementary Material.

Although this is anonymous data, I suggest that the approval of an ethical committee be added, for example, that of the university.

>>> Yes, you are right and we must acknowledge for this. As we have answered to the Editorial comment, approval from an ethics committee of the Risk Prevention Service was not obtained but it was required from our University. Thus, the study was approved by the Ethics Committee of the Catholic University of Murcia, as it is stated now in "Ethical Considerations" subsection. The Ethics Committee declared that given the design of the study and how the data were going to be obtained and treated, signed informed consent was not necessary.

Since there are 50% of women, work should be stratified by gender.

>>> Thank you for your suggestion. However, in our opinion the fact that 50% of our sample are women is a good new since it represents that the results are valid for both genders. Thus, the sample was balanced between both genders what avoid the probability that the results were biased by a high proportion of men (or vice versa). In addition, there were no differences in the proportion of female workers between the three groups of workers what also enhance our perspective regarding the validity of the results.

In the discussion should be proposed, as a result of the results obtained, improvement actions to reduce the mental load.

>>> Thank you for this suggestion. We have added some text to the Discussion section regarding this issue.

Reviewer: 3

The quality of this manuscript has improved significantly, and the authors have addressed all my concerns.

The manuscript should therefore be accepted for publication in its current state

>>> We thank the reviewer for his/her comments, they are really appreciated.

### VERSION 3 – REVIEW

<b>REVIEWER</b>	Maria M. Morales-Suárez-Varela Valencia University. Spain. CIBERESP. Spain
<b>REVIEW RETURNED</b>	15-Sep-2018
<b>GENERAL COMMENTS</b>	The objective of this study was to investigate risk factors for the onset of mental workload, including working conditions, cardiovascular comorbidities, and lifestyle habits, in a working population. The study was approved by the Ethics Committee of the Catholic University of Murcia (UCAM).

	<p>This is a cross-sectional study. The sample size was 408 workers from a Risk Prevention Service of Small/Medium Companies in Murcia (Spain). (145 Tertiary sector worker, 143 Secondary sector worker and 120 administrative workers).</p> <p>El estudio permite conocer el perfil de los trabajadores de las tres actividades.</p> <p>Univariate and multivariate analysis are show in the article, but they don't indicate the adjusted variables used.</p> <p>The main limitation of the study is that it is a cross-sectional study. This design does not allow establishing causality. Collect variables and mental workload simultaneously.</p> <p>I suggest that since the authors have information on prevention service workers they could conduct a cohort study. This cohort design would allow them to respond to their objectives more safely.</p>
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