

## PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (<http://bmjopen.bmj.com/site/about/resources/checklist.pdf>) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

### ARTICLE DETAILS

<b>TITLE (PROVISIONAL)</b>	Work-Related Musculoskeletal Disorders, Fatigue and Stress Among Gas Station Workers in China: a cross-sectional study
<b>AUTHORS</b>	Fan, Jialin; Tan, Xiaotong; Smith, Andrew; Wang, Jing

### VERSION 1 – REVIEW

<b>REVIEWER</b>	Pääsuke, Mati University of Tartu, Institute of Exercise Biology and Physiotherapy
<b>REVIEW RETURNED</b>	08-Dec-2023

<b>GENERAL COMMENTS</b>	<p>This is an interesting cross-sectional study assessing the prevalence of work-related musculoskeletal disorders (WMSDs) in association with stress and fatigue in gas station workers. A total 2,962 gas station workers (43% men, mean age = 37 yrs) with different job positions from an oil and gas company in China participated in this study. WMSDs were assessed using the Nordic Musculoskeletal Questionnaire, and occupational stress and fatigue were evaluated using the Smith Well-being Questionnaire. The results indicated that the prevalence of WMSDs within the 12 months prior to the study was 73%, with the highest prevalence in the neck (42%), shoulders (36%) and ankles/feet (35%). Fatigue and job role were the strongest predictors of WMSDs. The Authors concluded that the prevalence of WMSDs among workers in the gas station industry is high, whereas they had a medium-to-high level of fatigue and stress. The workers who reported high fatigue were more than two times more likely to report WMSDs.</p> <p>The manuscript is generally well written. However, the design of this paper should be improved.</p> <p>1. The authors should present for better understanding the recruited participants:</p> <p>(1) The age range of the participants in Abstract and Material and methods (Participants).</p> <p>(2) The minimum work experience in a gas station (in years) which was used as inclusion criteria (in the Material and methods, Participants).</p> <p>(3) The exclusion criteria of this study of the Material and methods (Participants).</p> <p>(a) Did the participants exclude if they suffered from known traumas or other musculoskeletal disease, also metabolic, cardiovascular, severe chronic obstructive pulmonary disease defined, neurological or mental conditions etc.?</p> <p>(b) Did the participants exclude if they were obese (body mass index, BMI &gt; 35 kg/m<sup>2</sup>)?</p> <p>2. In my opinion, it is obligatory to add more limiting factors of the study at the end of the Discussion. This is mainly descriptive study without the measurement of associations of the prevalence and</p>
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	<p>localization of WMSDs with body composition (BMI) and physical activity of the participants. It was used a subject population with unknown habitual physical activity level, and, therefore, it is difficult to associate the results to age and functional level. These limiting factors should be mentioned and analyzed at the end of the Discussion.</p> <p>Specific Comments</p> <p>Abstract Page 2. Please add the information about the age range and gender (% men) of measured participants (see General Comments).</p> <p>Material and methods Participants and Procedure Page 6. Please add the information about: (1) the age range and gender (% men) of the participants; (2) the minimum work experience in a gas station (in years), and (3) the exclusion criteria of this study (see General Comments).</p> <p>Analyses Page7-8. Please add that data were mean <math>\pm</math> standard deviation, and statistical significance was set at <math>P &lt; 0.05</math>.</p> <p>Discussion Page 14-15. Please add more limiting factors of the study at the end of the Discussion (see general Comments).</p>
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<b>REVIEWER</b>	Erhieyovwe, Emmanuel Withybush General Hospital, General Internal Medicine
<b>REVIEW RETURNED</b>	03-Apr-2024

<b>GENERAL COMMENTS</b>	<p>Thank you for the opportunity to review this paper. Overall, the study is commendable and represents a significant contribution to the field. The paper outlines a cross-sectional study aimed at determining the prevalence of Work-Related Musculoskeletal Disorders (WMSDs) and fatigue among workers at gas stations operated by an oil and gas company in China.</p> <p>Here are a few recommendations for consideration:</p> <ol style="list-style-type: none"> <li>1. In the definition of WMSDs, it would be beneficial to acknowledge that these musculoskeletal disorders may also be caused by or worsened by work conditions (Centers for Disease Control and Prevention, 2019). However, it is clear, as recognised in the limitation that this study design would not be able to establish causality.</li> <li>2. Including citations for factual statements in the introduction would allow readers to further explore these sources and enhance the study's credibility. Some of these statements can be found in various lines throughout the introduction - Page 3 lines 54 -55, Page 4 lines 65-67, 78-79, page 5 line 93 and105.</li> <li>3. The description of the participants in page 6 line 126 could be more specific, referring to staff from the gas station(s) within an oil and gas company in China. Additionally, clarification on whether there are multiple gas stations within the company and their locations in China would be helpful. If there is only one gas station, it may be worth mentioning this.</li> </ol>
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	<p>4. Ensuring a clear distinction between the terms Musculoskeletal Disorders and Musculoskeletal Symptoms throughout the paper would prevent them from being used interchangeably. For example, in page 6 line 143, It would be more appropriate to use the term "musculoskeletal symptoms" as stated in the questionnaire.</p> <p>I hope these suggestions are helpful. Thank you.</p>
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### VERSION 1 – AUTHOR RESPONSE

Responses to comments from reviewer 1 :

#### General Comments

1.The authors should present for better understanding the recruited participants:

(1)The age range of the participants in Abstract and Material and methods (Participants).

Response:

We have revised the manuscript according to your suggestions (line 22, 130). Thank you.

(2)The minimum work experience in a gas station (in years) which was used as inclusion criteria (in the Material and methods, Participants).

Response:

Thank you for your suggestion. There was no work experience requirement for participants in this study. For data collection, anyone who was a gas station worker for the company at the time was allowed to participate in this study.

(3)The exclusion criteria of this study of the Material and methods (Participants). (a)Did the participants exclude if they suffered from known traumas or other musculoskeletal disease, also metabolic, cardiovascular, severe chronic obstructive pulmonary disease defined, neurological or mental conditions etc.? (b)Did the participants exclude if they were obese (body mass index, BMI > 35 kg/m<sup>2</sup>)?

Response:

Thank you for asking. Employees in the gas station company were required to take regular complete health check-ups as the majority of the job roles were safety-critical. In practice, if employees are suffering from the above diseases or health problems, the gas station company will strictly require them to take sick leave without attending work. This study was conducted for the employees who were working at that time, so it was able to ensure that they did not have the above-mentioned diseases or health problems of illness. Besides, although we are not able to collect the detailed BMI of participants in the present study due to the company and union policy, the participants who were obesity (BMI > 30 kg/m<sup>2</sup>, WHO's standard for Chinese people) were excluded during questionnaire distribution. We have edited it (line 141-146).

2. In my opinion, it is obligatory to add more limiting factors of the study at the end of the Discussion. This is mainly descriptive study without the measurement of associations of the prevalence and localization of WMSDs with body composition (BMI) and physical activity of the participants. It was used a subject population with unknown habitual physical activity level, and, therefore, it is difficult to associate the results to age and functional level. These limiting factors should be mentioned and analyzed at the end of the Discussion.

Response:

We appreciate the reviewer's comments and have made the necessary additions in the discussion section (line 348-351). Thank you for your helpful suggestions.

## Specific Comments

1. Abstract Page 2. Please add the information about the age range and gender (% men) of measured participants (see General Comments).

Response:

Thank you for your suggestion. We have added (line 22).

2. Material and methods Participants and Procedure Page 6. Please add the information about: (1) the age range and gender (% men) of the participants; (2) the minimum work experience in a gas station (in years), and (3) the exclusion criteria of this study (see General Comments).

Response:

We have made the necessary additions (line 129-131, 141-146). Thank you.

3. Analyses Page7-8. Please add that data were mean  $\pm$  standard deviation, and statistical significance was set at  $P < 0.05$ .

Response:

Thank you for your suggestion. We have added (line 185-186).

4. Discussion Page 14-15. Please add more limiting factors of the study at the end of the Discussion (see general Comments).

Response:

We appreciate the reviewer's comments and have made the necessary additions in the discussion section (line 348-357). Thank you for your helpful suggestions.

Responses to comments from reviewer 2 :

1. In the definition of WMSDs, it would be beneficial to acknowledge that these musculoskeletal disorders may also be caused by or worsened by work conditions (Centers for Disease Control and Prevention, 2019). However, it is clear, as recognised in the limitation that this study design would not be able to establish causality

Response:

We appreciate the reviewer's comments and have made the necessary additions in the introduction section (line 69-71). We appreciate the opportunity to clarify this point and would like to emphasize that our findings are correlational and not causal. We believe that future research, possibly employing longitudinal or experimental study designs, could more directly address the question of causality and provide a deeper understanding of the mechanisms by which work conditions influence the onset and progression of WMSDs.

2. Including citations for factual statements in the introduction would allow readers to further explore these sources and enhance the study's credibility. Some of these statements can be found in various lines throughout the introduction - Page 3 lines 54 -55, Page 4 lines 65-67, 78-79, page 5 line 93 and105.

Response:

We have carefully noted your suggestions and made the necessary revisions to include citations for the statements mentioned in the specified lines (line 54-55, 65-66, 81-82, 94-96, 107-109). Thank you.

3. The description of the participants in page 6 line 126 could be more specific, referring to staff from the gas station(s) within an oil and gas company in China. Additionally, clarification on whether there are multiple gas stations within the company and their locations in China would be helpful. If there is only one gas station, it may be worth mentioning this.

Response:

Thank you for your suggestion. We have added (line 129-130).

4. Ensuring a clear distinction between the terms Musculoskeletal Disorders and Musculoskeletal Symptoms throughout the paper would prevent them from being used interchangeably. For example, in page 6 line 143, It would be more appropriate to use the term "musculoskeletal symptoms" as stated in the questionnaire.

Response:

We have corrected in line 156 and checked the full text. Thank you once again for your thorough review and constructive suggestions.

#### VERSION 2 – REVIEW

<b>REVIEWER</b>	Pääsuke, Mati University of Tartu, Institute of Exercise Biology and Physiotherapy
<b>REVIEW RETURNED</b>	06-Jun-2024
<b>GENERAL COMMENTS</b>	The design of this manuscript was improved in process of review.
<b>REVIEWER</b>	Erhieyovwe, Emmanuel Withybush General Hospital, General Internal Medicine
<b>REVIEW RETURNED</b>	28-May-2024
<b>GENERAL COMMENTS</b>	Thank you for the reviewed manuscript. I have no additional questions or comments.