PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (see an example) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below. Some articles will have been accepted based in part or entirely on reviews undertaken for other BMJ Group journals. These will be reproduced where possible.

ARTICLE DETAILS

<table>
<thead>
<tr>
<th>TITLE (PROVISIONAL)</th>
<th>“Musculoskeletal disorders among municipal solid waste collectors in Mansoura, Egypt: A Cross-sectional Study”</th>
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<tbody>
<tr>
<td>AUTHORS</td>
<td>Abou-ElWafa, Hala; El-Bestar, Sohair; El-Gilany, Abdel-Hady; Awad, Ehab</td>
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VERSION 1 - REVIEW

<table>
<thead>
<tr>
<th>REVIEWER</th>
<th>Ramin Mehrdad. MD. MPH. Associate professor of Occupational Medicine Center for Research on Occupational Diseases Tehran University of Medical Sciences Tehran, Iran.</th>
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<tbody>
<tr>
<td>REVIEW RETURNED</td>
<td>07-Jun-2012</td>
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<tr>
<th>THE STUDY</th>
<th>As a limitation sample size is not big enough and response rate is relatively low. The authors have mentioned these two points as limitation in the manuscript.</th>
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<tbody>
<tr>
<td>GENERAL COMMENTS</td>
<td>However research on work related health problems among different jobs such as solid waste workers is not new but this is an important issue so I think this manuscript is good for publication. Some points that may improve the manuscript: 1- Prevalence rate is not correct. We can't use rate for prevalence (in abstract and main text). 2- In the first sentence of study population, “all were male” is better than “all are male”. 3- Table 1- Family income per month (enough or indebt). Please explain in methods how you get family income and what do you (or they) mean about enough or indebt income. 4- In the table 5 high decision latitude is associated with low risk of MSDs but in the sentence after this table low decision latitude has been considered as associated factor with low risk of MSDs. Which one is correct?</td>
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<th>REVIEWER</th>
<th>P Paul FM Kuijer, consultant workrelated musculoskeletal disorders Academic Medical Center Coronel Institute of Occupational Health Amsterdam The Netherlands</th>
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<td>REVIEW RETURNED</td>
<td>28-Jun-2012</td>
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| GENERAL COMMENTS | With interest I have read the paper entitled ‘Musculoskeletal disorders among municipal solid waste collectors in Mansoura, |
The aim of the paper is to assess the prevalence of these disorders and personal and work-related risk factors. To reach this aim a cross-sectional study with waste collectors (n=120) and reference group (n=110) was performed. The prevalence among waste collectors of one or more MSDs was 61% and among the reference group was 44%. Factors significantly associated with these MSDs (table 4) were employment > 15 yrs, decision latitude, handling loads > 20 kg, performing repetitive movements, sitting, and walking.

Waste is collected nearly all around the world and the amount is increasing yearly. A review by Kuijer et al. (2010) on health and safety in waste collection revealed that only three peer-reviewed papers were available on MSDs in waste collection. All were cross-sectional in nature and only one of these studies had a reference group. Therefore, the present paper adds valuable information. Moreover, the paper is well structured and has informative tables, and the conclusions are in line with the results. Well done!

I have got the following remarks and/or suggestions. Hopefully they are of use for the authors.

Major Revisions
• Please make reference in the introduction to studies that are worldwide accessible and published in peer reviewed journals, see references 21, 22, 25, 26, 28, 29, 33
• Table 4 shows eight significant variables (two sociodemographic - employment > 15 yrs, decision latitude - and six physical workload factors - handling load > 20 kg, performing repetitive movements of trunk, neck and wrist, sitting, walking -). Please provide after table 4 and before table 5 also a table with the results of the logistic regression with all these significant variables included
• The discussion section can be more informative by relating your findings regarding prevalence of MSDs and risk factors to other studies on this topic. Are results the same or different?, what are explanations for these findings?, what might be effective measures to overcome MSDs and are these measures applicable and affordable? What is the role of physicians in this process? Do not repeat results such as on page 16, line 3-22 and please be more elaborate and specific than only saying ‘The same findings were reported from different studies … countries’, page 15, line 55.
• Start your discussion with a short summary of the main results and may be you can structure the discussion based on the following or other headings like strengths and limitations, prevalence and risk factors in Egypt and other countries, preventive measures, relevance for practice.
• Although I am no native speaker, please let the scientific English writing be checked by a trained translator.

Minor Revisions
Abstract
• Setting: Add ‘, Egypt.’, page 2 line 13
• Participants: page 2, line 17: should ‘are’ be ‘were’?
• Outcome: page 2, line 27 Delete ‘Our planned and finally ... assess’
• page 2, line 31-32 What is the difference between risk factors and independent predictors. Please keep in mind that you report about cross-sectional data: only associations can be reported and no of the factors ‘predict’
• Results, Page 2, line 48-51, please also provide 95% CI of the Ors
• Conclusion: Please add also a conclusion regarding the aim on risk factors.

Introduction
• Nice introduction!
• Page 3, line 5, ‘these wastes are’ probably should be ‘this waste is’.
• Page 3, line 29: according to the systematic review by kuijer et al. (2010), not only MSDs but also respiratory complaints are quite prevalent and probably to a lesser extent gastrointestinal disorders and hearing loss

Subjects and methods
• Page 4, line 13: Rephrase ‘ A cross-sectional study with a comparison …’
• Page 4, line 39-44, Place this sentence (The MSW … for signing) after line 30 (… 75%).
• Page 5, line 6: Did the MSW collectors all fill in the questionnaire themselves. How did you overcome the problem of illiteracy as mentioned in table 1?
• Page 5, line 13-16, Please provide the exact question and answering categories for the data used in table 3.
• Page 5, line 49: Rephrase kg/m2 (without capitol K and without space after /)
• Page 6, line 4: What do you mean by “cleaned”?
• Page 6, line 22: Rephrase: A p-value ...

Results
• Please make headings in the results section
• Please give first a description of the results before presenting the tables.
• Table 1:
  o What do you mean by family income is enough and indebt? Do the MSW collectors also have other informal jobs? If yes, how does this attribute to the prevalence of MSDs
  o Add also the data on BMI in this table (page 9, line 17-20)
• Page 7, line 36: “matched” should be “comparable”
• Table 2
  o Do you have data about how much waste (kg) is collected per person per day?
  o How much time do both groups spend on collecting waste (the comparison group also collects commercial and institutional waste). Does this influence your interpretation of the prevalence of MSDs in this group (Table 3)?
• Page 9, line 3, 6: waste instead of wastes
• Page 9, line 17-20 (The percentage of obesity …): add to the paragraph that described table 1
• Table 3: What were the answering categories and how are these grouped.
• Page 12, line 9: III instead of I (physical workload factors)
• Page 12, line 9: You have not measured the work load (bodily response), therefore I prefer physical work demands: see also the remaining of the document
• Page 12, Please provide the cut-off points for the physical workload factors in table 4: is it yes or no or another categorisation
Discussion
• See the comments mentioned underneath Major Compulsory Revisions
• The 12 months prevalence of low back complaints of the general population is estimated at about 30% (Kuiper JI, et al. Assessing the work-relatedness of nonspecific low-back pain. Scand J Work Environ Health. 2005 Jun;31(3):237-43.) How do you explain the relatively low percentage in your study?
• Are the risk factors the same as in other studies?
• Are there differences on work demands between sources of collected waste or collection unit. What method is preferable?

What this paper adds
• Page 20, line 50: Mention the exact prevalence(s)
• Page 20, line 51: Mention the most prominent risk factors
• Page 20, line 53: The last bullet ‘Implementation...of MSDs’ is an advice: so formulate it more prudent, for instance ‘might’ in stead of ‘will’.

Again, hopefully my comments are of use for the authors to improve their interesting and relevant paper.

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<td>Reviewer: Ramin Mehrdad, MD. MPH.</td>
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<tr>
<td>Associate professor of Occupational Medicine</td>
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<tr>
<td>Center for Research on Occupational Diseases</td>
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<tr>
<td>Tehran University of Medical Sciences</td>
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<td>2- In the first sentence of study population, “all were male” is better than “all are male”. Reply: it is corrected in text.</td>
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<td>3- Table 1- Family income per month (enough or indebt). Please explain in methods how you get family income and what do you (or they) mean about enough or indebt income. Reply: it is explained as a footnote under the table.</td>
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<td>4- In the table 5 high decision latitude is associated with low risk of MSDs but in the sentence after this table low decision latitude has been considered as associated factor with low risk of MSDs. Which one is correct? Reply: the table is the correct one and it is corrected in text.</td>
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Reviewer: P Paul FM Kuijer, consultant workrelated musculoskeletal disorders |
Academic Medical Center |
Coronel Institute of Occupational Health |
Amsterdam The Netherlands

Major Revisions
• Please make reference in the introduction to studies that are worldwide accessible and published in peer reviewed journals, see references 21, 22, 25, 26, 28, 29, 33
• Table 4 shows eight significant variables (two sociodemographic - employment > 15 yrs, decision latitude - and six physical workload factors - handling load > 20 kg, performing repetitive movements of trunk, neck and wrist, sitting, walking -). Please provide after table 4 and before table 5 also a table with the results of the logistic regression with all these significant variables included
Reply: these variables were significant in bivariate analysis. However, in regression, they were
excluded from the model due to small frequencies in the group of MSW collectors without MSDs in each of them.

- The discussion section can be more informative by relating your findings regarding prevalence of MSDs and risk factors to other studies on this topic. Are results the same or different?, what are explanations for these findings?, what might be effective measures to overcome MSDs and are these measures applicable and affordable? What is the role of physicians in this process? Do not repeat results such as on page 16, line 3-22 and please be more elaborate and specific than only saying ‘The same findings were reported from different studies … countries’, page 15, line 55.

Reply: it is corrected.
- Start your discussion with a short summary of the main results and may be you can structure the discussion based on the following or other headings like strengths and limitations, prevalence and risk factors in Egypt and other countries, preventive measures, relevance for practice.

Reply: short summary of results was added at the start of the discussion. It is corrected.
- Although I am no native speaker, please let the scientific English writing be checked by a trained translator.

**Minor Revisions**

**Abstract**

- Setting: Add ‘, Egypt.’ page 2 line 13

Reply: it is added.
- Participants: page 2, line 17: should ‘are’ be ‘were’?

Reply: it is corrected.
- Outcome: page 2, line 27 Delete ‘Our planned and finally ... assess’

Reply: it is deleted.
- page 2, line 31-32 What is the difference between risk factors and independent predictors. Please keep in mind that you report about cross sectional data: only associations can be reported and no of the factors ‘predict’

Reply: they are the same. “Predictors” was replaced by risk factors.
- Results, Page 2, line 48-51, please also provide 95% CI of the ORs

Reply: they are provided.
- Conclusion: Please add also a conclusion regarding the aim on risk factors.

Reply: a conclusion is added on risk factors.

**Introduction**

- Nice introduction!
- Page 3, line 5, ‘these wastes are’ probably should be ‘this waste is’

Reply: it is corrected.

Reply: it is used.
- Page 3, line 29: according to the systematic review by kuijer et al. (2010), not only MSDs but also respiratory complaints are quite prevalent and probably to a lesser extent gastrointestinal disorders and hearing loss

Reply: it is mentioned.

**Subjects and methods**

- Page 4, line 13: Rephrase ‘A cross-sectional study with a comparison …’

Reply: it is corrected.
- Page 4, line 39-44, Place this sentence (The MSW … for signing) after line 30 (... 75%).

Reply: it is placed.
- Page 5, line 6: Did the MSW collectors all fill in the questionnaire themselves. How did you
overcome the problem of illiteracy as mentioned in table 1?  
Reply: the interview was carried out personally by the investigator and each questionnaire was completed within the range of 10 to 15 minutes.

• Page 5, line 13-16, Please provide the exact question and answering categories for the data used in table 3.  
Reply: the categories were classified according to the Standardized Nordic Musculoskeletal Questionnaire (Kuorinka et al., 1987)

• Page 5, line 49: Rephrase kg/m2 (without capitol K and without space after /)  
Reply: it is corrected.

• Page 6, line 4: What do you mean by ‘cleaned’?  
Reply: it means, cleaned from outliers and inconsistencies.

• Page 6, line 22: Rephrase: A p-value ...  
Reply: it is rephrased.

Results
• Please make headings in the results section  
Reply: headings are added.

• Please give first a description of the results before presenting the tables.  
Reply: the description is moved before each table.

• Table 1:  
o What do you mean by family income is enough and indebt? Do the MSW collectors also have other informal jobs? If yes, how does this attribute to the prevalence of MSDs  
Reply: It is based on subjective term
- Operational definition:  
Enough means that their income meets their daily needs; while indebt means that their income is not satisfactory.
- They have no other informal jobs.
  
o Add also the data on BMI in this table (page 9, line 17-20)  
Reply: they are added.

• Page 7, line 36: ‘matched’ should be ‘comparable’  
Reply: it is corrected.

• Table 2  
o Do you have data about how much waste (kg) is collected per person per day?  
Reply: data are not available.

 o How much time do both groups spend on collecting waste (the comparison group also collects commercial and institutional waste). Does this influence your interpretation of the prevalence of MSDs in this group (Table 3)?  
Reply: data are not available.

• Page 9, line 3, 6: waste instead of wastes  
Reply: it is replaced.

• Page 9, line 17-20 (The percentage of obesity …): add to the paragraph that described table 1  
Reply: it is added.

• Table 3: What were the answering categories and how are these grouped.  
Reply: the categories were classified according to the Standardized Nordic Musculoskeletal Questionnaire (Kuorinka et al., 1987)

• Page 12, line 9: III instead of I (physical workload factors)  
Reply: it is corrected.

• Page 12, line 9: You have not measured the work load (bodily response), therefore I prefer physical work demands: see also the remaining of the document  
Reply: it is replaced.

• Page 12, Please provide the cut-off points for the physical workload factors in table 4: is it yes or no or another categorization
Reply: they are yes or no.

Discussion
• See the comments mentioned underneath Major Compulsory Revisions
• The 12 months prevalence of low back complaints of the general population is estimated at about 30% (Kuiper JL, et al. Assessing the work-relatedness of nonspecific low-back pain. Scand J Work Environ Health. 2005 Jun;31(3):237-43.) How do you explain the relatively low percentage in your study?
Reply: our relatively low percentage of low back-pain (22.5%) could be explained by the fact that it is self reported by the workers and they believe that, being healthy means not having to go to hospital, not taking medicines, and not catching a severe disease like cancer, tuberculosis .... etc.
• Are the risk factors the same as in other studies?
Reply: they are mentioned in text.
• Are there differences on work demands between sources of collected waste or collection unit. What method is preferable?
Reply: we did not study these differences between sources of collected waste or collection unit because of the small numbers in each category.
The following measures to reduce the physical workload among refuse collectors have been evaluated and seem to be effective:
*Job rotation between collecting bags, sweeping streets, and driving a sweeping machine (Kuijer et al., 1999)
*Job rotation between collecting two-wheeled containers and driving a refuse truck (Kuijer, 2002)
*Replacement of bags and bins with wheeled containers (de Looze et al., 1995; Schibye et al., 2001)

What this paper adds
• Page 20, line 50: Mention the exact prevalence(s)
Reply: it is mentioned.
• Page 20, line 51: Mention the most prominent risk factors
Reply: they are added.
• Page 20, line 53: The last bullet ‘Implementation...of MSDs’ is an advice: so formulate it more prudent, for instance ‘might’ instead of ‘will’.
Reply: it is replaced.

Again, hopefully my comments are of use for the authors to improve their interesting and relevant paper.
Reply: Your comments are very valuable and they made the paper more satisfactory, many thanks.

VERSION 2 – REVIEW

| REVIEWER | P Paul FM Kuijer, consultant workrelated musculoskeletal disorders
|          | Academic Medical Center
|          | Coronel Institute of Occupational Health
|          | Amsterdam The Netherlands
|          | No competing interests |

| REVIEW RETURNED | 16-Jul-2012 |

| GENERAL COMMENTS | The authors have addressed most of my remarks in a satisfactory manner. If I am correct, no reply was given regarding the following two major suggestions.
|                  | Please make reference in the introduction to studies that are worldwide accessible and published in peer reviewed journals, see references 21, 22, 25, 26, 28, 29, 33 |

The authors have addressed most of my remarks in a satisfactory manner. If I am correct, no reply was given regarding the following two major suggestions.

- Please make reference in the introduction to studies that are worldwide accessible and published in peer reviewed journals, see references 21, 22, 25, 26, 28, 29, 33
  Reply: it is mentioned.
- Although I am no native speaker, please let the scientific English writing be checked by a trained translator.
  Reply: it has been checked.

In addition, I have got the following suggestions regarding the discussion section. Hopefully these are useful for the authors.

- Page 18, line 3: I would suggest 'prevent' instead of 'overcome'
  Reply: it is replaced.
- Page 18, line 4 – 34: At the moment, the paragraph only consists of a straightforward summary of possible preventive measures. I would suggest writing a paragraph consisting of these measures including an explanation why these measures are or can be effective in preventing MSDs. The arguments are preferably supported by evidence, see for instance the suggestions done in my former review. This will improve the readability of this section and understanding of the preventive measures.
  Reply: it is modified.
  Reply: it is deleted.
- Page 18, line 44: Replace 'affection' with 'disorders'

Again, hopefully my comments are of use for the authors to improve the quality of their interesting and relevant paper about a profession that is performed nearly all around the world.

VERSION 2 – AUTHOR RESPONSE

The authors have addressed most of my remarks in a satisfactory manner. If I am correct, no reply was given regarding the following two major suggestions.

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- Page 18, line 44: Replace 'affection' with 'disorders'
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Again, hopefully my comments are of use for the authors to improve the quality of their interesting and relevant paper about a profession that is performed nearly all around the world.
Reply: many thanks for your valuable comments