PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Awareness of occupational hazards and use of safety measures among welders : a cross-sectional study from eastern Nepal.
AUTHORS	Budhathoki, Shyam; Singh, Suman; Sagtani, Reshu; Niraula, Surya; Pokharel, Paras

VERSION 1 - REVIEW

REVIEWER	Patti Erdely NIOSH United States
REVIEW RETURNED	13-Feb-2014

GENERAL COMMENTS	Line 8: Insert "The" before "mask" Line 55-56: There are some grammatical changes that could be made, but overall it is not badly written. For instance, line 55 "in Nepal" should be added at the end of the sentence starting with "Occupational..." to make it less generalized. Line 22: The sentence beginning with, "Educated people..." needs revised, it is not grammatically correct. Table 2. Could the authors elaborate in the discussion on the finding that the longer employed welders were LESS aware of the workplace hazards. It seems the opposite should be true, that with experience you become more aware of the workplace hazards around you. Is it a generational effect possibly? This reviewer would find it worthwhile to show a non-standard PPE photograph, perhaps the cotton mask and sunglasses that are typically used in Nepal versus the standard PPE that is approved for welding work.

REVIEWER	Jennifer Cavallari, ScD, CIH UConn Health Center, USA
REVIEW RETURNED	07-Mar-2014

GENERAL COMMENTS	The authors have created an impressive dataset through their interviews with 300 workers. This manuscript describes an important and understudied topic, and I believe that the results have important implications for occupational health and safety and will be of interest to readers. However, there are some problems with the manuscript in its current form. The authors must provide more detailed information on the "semi-structured questionnaire, as the methods used by the authors are unclear: were open-ended interviews used,

	or was there a questionnaire that the participants responded to verbally? Without understanding the methods used, I cannot evaluate whether the results and conclusions are valid. If the method was open-ended interviews, I feel that more emphasis should be placed on describing trends across groups of participants rather than on the results of statistical analyses. If the method was instead a questionnaire or structured interview, the statistical analysis is perhaps appropriate, however, the authors must elaborate on what types of statistical tests and analyses they used. In this case, I would suggest that the authors make their hypotheses more clear in the introduction, and then consider statistical analyses that allow for exploration of the effect of confounders or effect modifiers on the associations that they are testing, such as regression models. In addition, the statements in the abstract, results, and conclusions do not match up well. I think that this problem could be reduced again if the authors provide a clear set of hypotheses and organize each section of the paper around this framework. Specific Comments Abstract: It seems that the main result of this paper is that while most welders report that they are aware of the hazards of welding and that they are aware of PPE, they do not know all of the hazards of welding and they do not use appropriate/adequate PPE during their work. The authors also identified some factors that could be related to the use of PPE such as education level and duration of employment. I suggest that the authors organize the abstract and the rest of the paper around these results, and clearly state their hypotheses. Abstract: In the abstract, the authors conclude that "more awareness and campaign programs" should be designed in order to raise awareness of PPE among welders. However, the authors also state that 90% of their participants were aware of PPE. So the authors should reconsider this conclusion and make it more specific to the results described in this study, for instance, it seems that a major result is that while welders are aware of PPE they are not actually aware of the CORRECT or ALL of the PPE that they should be using, so the conclusion should perhaps be made more specific to the specific results and hypotheses tested in this study. Methods: The authors state several times that this is a descriptive study, indicating that the authors intend to describe features of their population rather than performing inferential analyses. However, the results are heavy with statistical testing. Please correct this discrepancy. Methods: Please expand your description of the methods used to perform the interviews. Was there a script to follow? How were the questions developed? Was the same script followed for each participant? Were the questions open-ended or did they have fixed answers? As stated above, I feel that if the questions were open-ended, then perhaps an emphasis on statistical testing is not appropriate for this study. Methods: Please provide further description of the type of statistical testing used for analyses in the paper. This information should also be included in the description of the tables (footnotes). Results: The authors mentioned that the 300 welders who agreed to

	participate became their study population. What was the actual response rate? How many welders did not agree to participate? Could there have been anything different about the group that did not agree to participate compared to participants? Results: The results mentioned for sunglasses and protective cloths are not included in any of the tables. Also, the authors state that sunglasses were the most frequently used protective device at around 75%, but in the tables it appears that eye protection is what workers are most aware of (87%), and that only 18% of workers actually wear eyewear. I expect that sunglasses were considered part of the eyewear category but it would be helpful for the authors to clarify this point (is it 75% of the 18% of workers wearing eyewear, or 75% of the 87% of workers aware of eyewear, or another explanation, and also to clarify where cloth masks fit in, and how the authors got this information on the type of eyewear/masks that were used. Results: The authors are interpreting their odds ratios as if they were risk ratios. Throughout, the results should state that, eg, "The welders with secondary level or more education had sixty times greater odds of being aware of the hazards of welding than the illiterate welders". Tables: Please clarify what the #multiple responses footnote denotes. Tables: Please choose a consistent number of significant figures for the p-values.

VERSION 1 – AUTHOR RESPONSE

Reviewer: Patti Erdely, NIOSH, United States
Thank you for all your comments.
Comment 1: Include study design in the title
Response: The new title includes ": A cross-sectional study" at the end of the old title. The new title is "Awareness of occupational hazards and use of safety measures among welders: a cross-sectional study from eastern Nepal".
Comment 2: Please state any Competing Interests or state 'None declared'
Response: The page 18, line 21 of the pdf document declares no interest under Conflicting Interests. It has been reframed as "Competing interests: None declared in this revision".
Comment 3: Line 8: Insert "The" before "mask"
Response: In Page 15, Line 8, "The" has been inserted before mask.
Comment 4: Line 55-56: There are some grammatical changes that could be made, but overall it is not badly written. For instance, line 55 "in Nepal" should be added at the end of the sentence starting with "Occupational..." to make it less generalized.
Response : In page 5, line 55, "in Nepal" has been added as advised. The manuscript has been rechecked for grammatical changes and changes typed in red font in the new revised manuscript.
Comment 5: Line 22: The sentence beginning with, "Educated people..." needs revised, it is not grammatically correct.
Response: In page 15, Line 22, The grammatically incorrect sentence beginning with, "Educated people..." has been revised as "Welders who have had higher levels of schooling..." and marked in red font.
Comment 6: Table 2. Could the authors elaborate in the discussion on the finding that the longer employed welders were LESS aware of the workplace hazards. It seems the opposite should be true, that with experience you become more aware of the workplace hazards around you. Is it a

generational effect possibly?
Response: The findings of Table 2 does show that the longer employed welders showed less awareness of the workplace hazards. While the opposite should generally be true.
The findings have been discussed in the Discussion section with new addition in red font.
This finding among the longer employed welders showing les awareness is possibly due to these welders failing to acknowledge the exposure they have been having on daily basis as a hazard after being exposed for many years. These welders however are seen be using more PPE compared to the those welders who have been employed for lesser number of years. The longer employed welders seem to continue the use of PPE they have been using to some extent but fail to recognise the hazards as hazards anymore. However the welders with lesser years of employment though more aware of hazard are using lesser PPE compared to the longer employed. This effect could be due to younger people having more tendency of risk taking behavior by not wearing PPE. This finding must however be further explored with future studies to confirm the arguments made in this section.
Comment 6: A picture of a non-standard PPE used by welders in Nepal vs the standard PPE approved for Welding work.
Response: A picture of Welder wearing a sunglass and cotton mask only during a welding session has been added as Figure 1, in the manuscript.

Reviewer 2: Jennifer Cavallari, ScD, CIH, UConn Health Center, USA

Thank you for all your comments.
Comment 1: Please state any Competing Interests or state 'None declared'
Response: The page 18, line 21 of the pdf document declares no interest under Conflicting Interests. It has been reframed as "Competing interests: None declared in this revision".

General Comments: The authors have created an impressive dataset through their interviews with 300 workers. This manuscript describes an important and understudied topic, and I believe that the results have important implications for occupational health and safety and will be of interest to readers. However, there are some problems with the manuscript in its current form. The authors must provide more detailed information on the "semi-structured questionnaire, as the methods used by the authors are unclear: were open-ended interviews used, or was there a questionnaire that the participants responded to verbally? Without understanding the methods used, I cannot evaluate whether the results and conclusions are valid. If the method was open-ended interviews, I feel that more emphasis should be placed on describing trends across groups of participants rather than on the results of statistical analyses. If the method was instead a questionnaire or structured interview, the statistical analysis is perhaps appropriate, however, the authors must elaborate on what types of statistical tests and analyses they used. In this case, I would suggest that the authors make their hypotheses more clear in the introduction, and then consider statistical analyses that allow for exploration of the effect of confounders or effect modifiers on the associations that they are testing, such as regression models. In addition, the statements in the abstract, results, and conclusions do not match up well. I think that this problem could be reduced again if the authors provide a clear set of hypotheses and organize each section of the paper around this framework.
Response:
The "semi-structured questionnaire" used have been explained and added under the methods section of the revised manuscript.
The questionnaire was developed by the investigators after visiting few grill workshops from another district which was not the study area of this study which was also pre-tested there and revised. The final questionnaire was administered by the investigators who are the authors of this paper themselves to the welders at their workplace using a personal interview of 30 to 60 minutes per person. The same questionnaire was used to interview all 300 welders in this study. The questionnaire contained open questions on age, level of education and duration of employment in

years. These variables were divided into categories later during data analysis.
Other questions on awareness hazards of welding and personal protective equipments were structured. The questions on use of PPE was also asked during the interview using the structured questions. The welders were asked to list the hazards of welding and followed by yes/no response for light/radiation, welding fumes, sharp metals, electrical current, heat, noise, sparks, vibration, physical environment at work and open option for any other hazards. Similarly for awareness and use of PPE, the welders were asked to list any PPE they used followed by yes/no option for welding helmet/faceshield, protective gloves, welding goggles/eyeshield, respirators/masks, sturdy footwear, apron, ear muffs and an open option for any other equipment they wore for their protection. The welders were asked to show us the PPE they used during the welding.
Data collected were entered into an excel sheet and analysed using SPSS 11.5. Bivariate analysis for categorical data was done using chi square test ($\chi 2$). The strength of association was calculated using Odds Ratio (OR). The probability of significance was set at 5% level of significance and 95% Confidence Interval.
The abstract , results and conclusions are revised.
The acronym BPKIHS has been expanded to its full form B P Koirala Institute of Health Sciences. (page 7, line 23)
Page14, line 13: 77,9% has been corrected as 77.9% (comma replaced by a dot)
Page 15, line 17, line 19 & line 32: P
Specific Comments:
Comment 1 on Abstract : It seems that the main result of this paper is that while most welders report that they are aware of the hazards of welding and that they are aware of PPE, they do not know all of the hazards of welding and they do not use appropriate/adequate PPE during their work. The authors also identified some factors that could be related to the use of PPE such as education level and duration of employment. I suggest that the authors organize the abstract and the rest of the paper around these results, and clearly state their hypotheses.
Response: The paper has been revised according to the comment.
Comment 2 on Abstract: In the abstract, the authors conclude that "more awareness and campaign programs" should be designed in order to raise awareness of PPE among welders. However, the authors also state that 90% of their participants were aware of PPE. So the authors should reconsider this conclusion and make it more specific to the results described in this study, for instance, it seems that a major result is that while welders are aware of PPE they are not actually aware of the CORRECT or ALL of the PPE that they should be using, so the conclusion should perhaps be made more specific to the specific results and hypotheses tested in this study.
Response: The conclusion has been revised according to the finding of the study. As there seems to be a gap between awareness and the use of PPE at work. We suggest further exploration of the gap and promotion of use of PPE among the welders of the area.
Comment 1 on Methods: The authors state several times that this is a descriptive study, indicating that the authors intend to describe features of their population rather than performing inferential analyses. However, the results are heavy with statistical testing. Please correct this discrepancy.
Response: The study design has been corrected to a cross-sectional study.
Comment 2 on Methods: Please expand your description of the methods used to perform the interviews. Was there a script to follow? How were the questions developed? Was the same script followed for each participant? Were the questions open-ended or did they have fixed answers? As stated above, I feel that if the questions were open-ended, then perhaps an emphasis on statistical testing is not appropriate for this study.
Response: As mentioned in the response for the General comments, we have explained the interview methods and data collection tools using pre tested questionnaire. We have also explained about the same pretested questionnaire been used for all 300 welders. The semi-structured questionnaire contains some open questions and awareness and use questions were had fixed answers as multiple options with an option to add other answers at the end.
These changes have been added to the Methods section of the revised manuscript.

Comments 3 on Methods: Please provide further description of the type of statistical testing used for analyses in the paper. This information should also be included in the description of the tables (footnotes).
Response: Categorical data were compared using a Chi square test ($\chi 2$). Strength of association was calculated for the variables using Odds Ratio (OR).
Comment 1 on Results: The authors mentioned that the 300 welders who agreed to participate became their study population. What was the actual response rate? How many welders did not agree to participate? Could there have been anything different about the group that did not agree to participate compared to participants?
Response: The response rate was 100%. All the welders approached for the study agreed to participate in the study. This information has been added to the methods section of the revised manuscript.

Comments 2 on Results: The results mentioned for sunglasses and protective cloths are not included in any of the tables. Also, the authors state that sunglasses were the most frequently used protective device at around 75%, but in the tables it appears that eye protection is what workers are most aware of (87%), and that only 18% of workers actually wear eyewear. I expect that sunglasses were considered part of the eyewear category but it would be helpful for the authors to clarify this point (is it 75% of the 18% of workers wearing eyewear, or 75% of the 87% of workers aware of eyewear, or another explanation, and also to clarify where cloth masks fit in, and how the authors got this information on the type of eyewear/masks that were used.
Response: The sunglasses was not mentioned in the results as it was agreed among us that we will not list in the table since it was a incidental finding during the study and ordinary sunglasses not a part of the standard list of PPE. The percentage 74.3% was the percentage among those who were aware i.e. the 260 welders who said that they were aware of welding goggles/eye shield as a PPE to be worn during welding.
The % mentioned in the table 1, for mask (45%) all refer to the users of ordinary cotton masks. All welders who reported using mask, used cotton masks. Making it uniform while we did not add sunglasses to table we removed mask 45% as well from the table as they are both standard PPE for welding.
The information on the type of PPE worn was verified by observation during the interview session at their workplace.
The changes have been made in the revised manuscript of this paper.
Comment 3 on Results: The authors are interpreting their odds ratios as if they were risk ratios. Throughout, the results should state that, eg, "The welders with secondary level or more education had sixty times greater odds of being aware of the hazards of welding than the illiterate welders".
Response: The changes in have been made for correct interpretation of the odds ratios in the results and discussions sections as, "the welders who were aware of the hazards were seven times more likely to have had primary education and sixty times more likely to have had secondary level or more education compared to those welders who were not aware of the hazards".

Comment 1 on Tables: Please clarify what the #multiple responses footnote denotes.
Response: The multiple response indicated the each welders gave multiple responses on awareness and use of PPE. The responses do not add to 300.
We changed to "#Each welder could give multiple responses".
Comment 2 on Tables: Please choose a consistent number of significant figures for the p-values.
Response: We chose to mention the p value cut off of <0.05 in the text as significant values. The changes have been made in the manuscript.

VERSION 2 – REVIEW

REVIEWER	Jennifer Cavallari, ScD, CIH University of Connecticut Health Center Farmington, CT USA
REVIEW RETURNED	25-Apr-2014

GENERAL COMMENTS	Overall, the authors have done a nice job addressing many of my previous concerns, and this version of the manuscript is much more clear and cohesive than the previous version. The comments below provide explanations for any "no" answers above. 1. The research question does not align with the analyses performed. The authors state that "the current study was designed to assess awareness of occupational hazards and protective measures among welders working in three districts of eastern Nepal. We also tried to find the possible relationship of awareness with the actual use of PPE." However, this objective does not take into account the results presented in tables 2-4, which address factors related to awareness and use. Please change the objective to read: "the current study was designed to assess awareness of occupational hazards and protective measures among welders working in three districts of eastern Nepal, FACTORS ASSOCIATED WITH awareness of occupational hazards and protective measures and use of protective measures, and the possible relationship of awareness with the actual use of PPE." 4. It is still unclear to me what the actual participation rate for this study is. Is it true that 300 people were approached to participate, and every one of them agreed to participate (as indicated by the 100% participation rate claimed)? Please clarify. If this is the case, I consider the extremely high participation rate to be a strength of the study that should be highlighted. Also, please describe how the continuous variables (age, education, experience) were categorized. How were the category cutoffs chosen? 7. Did the authors consider any adjustment for correlation among welders working in the same workshop? Also, please provide more information on how the OR was calculated (what procedure was used in SPSS). Finally, did the authors consider performing any adjustment of the OR's for confounders? If not, please explain the rationale in the manuscript. 8. Please provide a justification and corresponding references in the introduction for the choice of education level and duration of employment as the two major factors investigated associated with awareness of hazards and awareness and use of PPE. 15. The English in the paper is fairly good, but I recommend that the authors read through the manuscript closely one more time to ensure that proper grammar is being used consistently.

VERSION 2 – AUTHOR RESPONSE

Reviewer: Jennifer Cavallari, ScD, CIH, UConn Health Center, USA

Reviewer's comment: Please state any competing interests or state 'None declared': None declared
Justification : It has now been mentioned after acknowledgements in the manuscript.

Reviewer's comment: The research question does not align with the analyses performed. The authors state that "the current study was designed to assess awareness of occupational hazards and protective measures among welders working in three districts of eastern Nepal. We also tried to find the possible relationship of awareness with the actual use of PPE." However, this objective does not take into account the results presented in tables 2-4, which address factors related to awareness and use. Please change the objective to read: "the current study was designed to assess awareness of occupational hazards and protective measures among welders working in three districts of eastern Nepal, FACTORS ASSOCIATED WITH awareness of occupational hazards and protective measures and use of protective measures, and the possible relationship of awareness with the actual use of PPE."
Justification: As correctly pointed out by the reviewer, we have now modified the objectives as suggested.

Reviewer's comment: It is still unclear to me what the actual participation rate for this study is. Is it true that 300 people were approached to participate, and every one of them agreed to participate (as indicated by the 100% participation rate claimed)? Please clarify. If this is the case, I consider the extremely high participation rate to be a strength of the study that should be highlighted.
Justification: Since, the permission was taken from the grillbar association and the authors have been working in this particular area with other programs of occupational safety and health, all the workers did agree to be a part of the study. We have mentioned it in the study now.

Reviewer's comment: Please describe how the continuous variables (age, education, experience) were categorized. How were the category cutoffs chosen?
Justification: The continuous variables were categorized according to literature review and with the aim of creating similar class intervals as shown in the discussion. Also, in case of education, the levels of education was thought to give a more clear picture about its impact on use of PPE which was shown by other studies as well. We have tried to incorporate this explanation in methodology now.

Reviewer's comment: Did the authors consider any adjustment for correlation among welders working in the same workshop? Also, please provide more information on how the OR was calculated (what procedure was used in SPSS). Finally, did the authors consider performing any adjustment of the OR's for confounders? If not, please explain the rationale in the manuscript.
Justification: Correlation among welders working in the same workshop was not adjusted. The OR was calculated with the help of the software Epi-Info 7 , CDC Atlanta which has now been mentioned in the methods section. The adjustment for Odds ratios were not performed considering the width of confidence intervals and less number of significant variables. However, if the Justification is not relevant and the reviewer would suggest to present adjusted ORs, we will include them.

Reviewer's comment: Please provide a Justification and corresponding references in the introduction for the choice of education level and duration of employment as the two major factors investigated associated with awareness of hazards and awareness and use of PPE.
Justification: During our literature, we found that education and duration of employment are associated with awareness of hazards and awareness from reference 14. We have highlighted it in the introduction section now.

Reviewer’s comment: The English in the paper is fairly good, but I recommend that the authors read through the manuscript closely one more time to ensure that proper grammar is being used consistently.
Justification: We have tried to correct the grammatical mistakes to produce a more cohesive manuscript.