PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	The experiences and impacts of health-care providers during the Coronavirus pandemic: protocol for a mixed methods systematic review
AUTHORS	Xu, Na; Lv, AiLi; Li, TianZi; Li, XiaoFeng; Huang, Mei; Su, Yan

VERSION 1 – REVIEW

REVIEWER	Lorena García-Fernández Clinical Medicine Department Universidad Miguel Hernández Servicio de Psiquiatría Hospital Universitario de San Juan
REVIEW RETURNED	23-Sep-2020

GENERAL COMMENTS	The study addresses a topic that is undoubtedly interesting and determinate for policy makers. My only doubt is to know how the variability between the different countries that provide studies where the circumstances of the helath care workers might be heterogeneous will be controlled and how it can be distinguished between the different specialties and roles within the health care system.

REVIEWER	Dr Matthew Roycroft Sheffield Teaching Hospitals, United Kingdom
REVIEW RETURNED	06-Oct-2020

GENERAL COMMENTS	An important topic. A number of significant psychological conditions caused by caring for patients in a pandemic are missed with the limitation to anxiety/depression/insomnia only. PTSD and burnout should be included as a minimum. COVID-19 due to the way it overwhelmed healthcare systems also created significant risk of Moral Injury but this is much less likely with other infections where there wasn't resource limitation. Wellbeing (although often poorly defined/explored) could also be considered. I'm not entirely sure what the quantitative analysis will show - really a change in time with different points in the pandemic would be more useful than single snapshots as without this there isn't really a baseline. You may end up showing people score a certain figure during the pandemic but do you know what it was before (and so whether that figure is unusual for the population studied). The qualitative analysis is well thought out but possibly expanding to compensate for the quantitative issues (as above) may help?

REVIEWER	Luciane C Lopes University of Sorocaba
REVIEW RETURNED	25-Oct-2020

GENERAL COMMENTS	- Following the instructions for authors, the abstract should be structured with the following sections: Introduction; Methods and analysis; Ethics and dissemination. Registration details should be included as a final section, if appropriate. The conclusion section is not needed for protocol papers. - Explain the language restriction to Chinese and English since we are talking about a pandemic and results from other languages could be useful. - What did you write in row 108? - The text would benefit from a thorough revision and edition. Clarifying the English would add to the reader's understanding of the project. - The introduction paragraphs are very long. The problem needs to be better qualified - Throughout the protocol, the SARS abbreviation is spelled wrong (SRAS) in certain sections. - Please explain why you didn´t consider RCT as a type of design for this RS. Also, explain how cross-section could be included. How do you intent to analyze the causal effect. - I don´t understand row 147 – 149. You will be looking for articles in the SR/MA or other types of review in order to identify more articles for your SR. Please, rephrase this paragraph. - I would consider using GRADE CERQUAL for the body of the evidence qualitative - I don´t understand the timeline information " This systematic review is scheduled to finish in October 2020": did you finish your SR before publishing the protocol? why are you planning to publish your protocol now? The data of register in PROSPERO is august. Could you please clarify it? - Where is the section outcome of interest? Please, explain in detail how the outcome will be measure. STRENGTHS AND LIMITATIONS - In the second topic of strengths and limitations, you refer to the study as a source of stronger evidence to the clinical practice, but at the last topic, you say that you cannot assure the quality of the evidence found in the research papers. I suggest a revision of the sentences. CONCLUSION - I suggest the removal of the conclusion section since it is a protocol paper, and no conclusion can be described yet.

VERSION 1 – AUTHOR RESPONSE

Reviewer #1:

Dear Dr. Lorena García-Fernández,

It is a great honor to get your approval of the topic of the manuscript, and we have the same expectation as you. We hope to do something for the prevention and control of the epidemic or possible future epidemic through this mixed methods systematic review.

Q1: How the variability between the different countries that provide studies where the circumstances of the health care workers might be heterogeneous will be controlled?

A1: We quite agree with your comment. In the included studies, differences in medical levels in different countries do have an impact on the results of systematic review. Therefore, we have made some adjustments according to your suggestion:

After intense discussion and extensive literature review, we believe that the effect of heterogeneity between countries on the integration of qualitative research results can be ignored. That's because the purpose of systematic integration of qualitative results is to understand the experience of medical workers more comprehensively and deeply. Moreover, it is found that the needs, experiences and feelings of health carers in different countries are similar in the special period of epidemic outbreak. And the main topics in the results are the distribution of medical materials, welfare support system, personal emotions and experiences, and the changes of social relations with relatives and friends. On this basis, we think that when the results of qualitative research are integrated, we can not consider the influence of differences between different countries on the integration results.

However, the heterogeneity among different countries in quantitative studies should deserve real attention. Therefore, we do our best to reduce heterogeneity between articles. Firstly, we will use a random-effects meta-analysis to estimate the condition of burnout, PTSD, anxiety, depression, insomnia and Coronavirus infected among medical staff. Then the subgroup analysis could classify countries by economic income levels according to the World Bank list of Economies (High income/ Upper middle income/ Lower middle income)[1]. This idea is based on the published article of systematic review and meta-analysis[2]. (See the part "***Subgroup analysis***", line 271 to line 273 of page 16 in the revised manuscript.)

[1] World Bank list of economies. World Bank website. databank.worldbank. org/data/download/site-content/CLASS.xls.
[2] Schreiber PW, Sax H, Wolfensberger A, Clack L, Kuster SP; Swissnoso. The preventable proportion of healthcare-associated infections 2005-2016: Systematic review and meta-analysis. Infect Control Hosp Epidemiol. 2018 Nov;39(11):1277-1295. doi: 10.1017/ice.2018.183. Epub 2018 Sep 20. PMID: 30234463.

Q2: How it can be distinguished between the different specialties and roles within the health care system.

A2: We plan to conduct subgroup analyses to examine whether different professions have different experiences and impacts.

For qualitative data, we will label the results of articles that are only included in a class of research objects when extracting the results of qualitative studies. If the experience of different occupations is same, we will integrate the results and not report according to different occupations. If people in

different occupations do have differences in experience and perspective, we will report it in the results. (This section has been added to the revised manuscript, line 259 to line 265 of page 15.) That's because we looked up a large number of literature and found that most primal articles identify medical workers as a whole/span>, and they worked closely together to fight the virus. And the results of the article were not reported according to the similarities and differences of different occupations. Of course, we also found that some qualitative studies did include only one category of occupations, such as doctors or nurses. But the number of such articles is relatively small.

For quantitative data, the subgroup analysis of different occupations (doctors, nurses and other medical workers) can be performed by using a mixed effect model to reduce the heterogeneity of the study and to distinguish the psychological and infection conditions of different occupations during the outbreak of the epidemic. (This section has been added to the revised manuscript, from line 266 of page 15 to line 270 of page 16.)

Especially grateful for your insightful comments.

Reviewer #2:

Dear Dr. Matthew Roycroft,

It is a great honor to have your approval of this topic. At the same time, thank you very much for your valuable advice, we have made corresponding changes according to your comment, as follows.

Q1: A number of significant psychological conditions caused by caring for patients in a pandemic are missed with the limitation to anxiety/depression/insomnia only. PTSD and burnout should be included as a minimum.

A1: This is a good suggestion. We have added the variables: burnout and PTSD. (See line 7, line 11 and line 18 of page 3, line 37 of page 4, line 89 of page 7 in the revised manuscript. And both are added to the Search Terms in Table 1. You can also see the changes in line 156, line 191, line 195, line 222, line 242,ine 247.)

Q2: COVID-19 due to the way it overwhelmed healthcare systems also created significant risk of Moral Injury but this is much less likely with other infections where there wasn't resource limitation. Wellbeing (although often poorly defined/explored) could also be considered.

A2: We are so sorry, and we regret that Wellbeing can not be used as outcome indicator of this study.

Before seeing your comment, we did not think about Wellbeing as an outcome of the study. Therefore, we went to consult the relevant literature. And we are also very interested in this outcome. We think it is important to understand the real experience and experience of medical workers.

However, after all the databases were searched by retrieval, it was found that there were few original studies, whether observational or experimental, to explore the wellbeing effects of health care workers during the epidemic. Besides, as you said, wellbeing often poorly defined, and quantity of the systematic review and meta-analysis have high requirements for heterogeneity of articles and results. If the indicators or results without uniform definition are included, the heterogeneity of the research is too large, which will reduce the credibility of the results. As a result, it is not appropriate to consider Wellbeing as the outcome of this study.

But in qualitative research, health-care workers may talk about the topic among Wellbeing. Therefore, we will pay attention to the impact of the outbreak on the wellbeing of medical staff in the process of data extraction and results reporting. If possible, we consider using the Moral Injury and Wellbeing of healthcare workers as our outcome in other future studies. Thank you again for your academic inspiration.

Q3: I'm not entirely sure what the quantitative analysis will show - really a change in time with different points in the pandemic would be more useful than single snapshots as without this there isn't really a baseline. You may end up showing people score a certain figure during the pandemic but do you know what it was before (and so whether that figure is unusual for the population studied).

A3: For quantitative data, we plan to present it in the form of incidence 'n%［95%CI(a%,b%)]', to assess the incidence of psychological problems and infections among health care workers worldwide. Then the quantitative results are transformed into descriptive text and interated with results of qualitative research. (Detailed explanations can be found in the section of "***Data synthesis and integration***", line 228, page 14 in the revised manuscript.)

About the question you mentioned that "a change in time with different points in the pandemic would be more useful than single snapshots as without this there isn't really a baseline". We have deeply considered and discussed this problem. As you think, we also want to give priority to studies with baseline data to compare.

But the systematic review is based on the original research. We have consulted the literature, perhaps because the outbreak occurred in a relatively short time, few articles compared with the changes in different times, and most of original studies are cross-sectional or investigative studies.

We want to do something for the outbreak as soon as possible with limited evidence, in order to enable more medical workers to correctly and objectively understand the experience and influence of their peers in the fight against the epidemic, so as to warn the relevant personnel to pay attention to the physical and mental health and needs of medical workers working in the epidemic, and to provide direction for future intervention research.

Q4: The qualitative analysis is well thought out but possibly expanding to compensate for the quantitative issues (as above) may help?

A4: We are sorry we didn't explain this part clearly. What needs to be clarified is that the qualitative component is undertaken firstly to comprehensively explore the experience and impact of health providers during pandemic of the coronavirus. Then the quantitative component of the psychological status and infected condition of caregivers is used to generalize or prove the qualitative results that caregivers are significantly affected during outbreaks. (Detailed description can be found in the section of " ***Design***", line 128, page 8 in the)

Thank you again sincerely for your meaningful questions.

Reviewer: #3

Dear Dr.Luciane C Lopes,

Thank you very much for your careful review of the original manuscript. Your pertinent comments are very important for the improvement of the quality of our manuscript. We will reply to a series of questions you raised below.

Q1: Following the instructions for authors, the abstract should be structured with the following sections: Introduction; Methods and analysis; Ethics and dissemination. Registration details should be included as a final section, if appropriate. The conclusion section is not needed for protocol papers.

A1: According to your comment, we have deleted the conclusion part. (See line 21 of page 3 in the revised manuscript.)

Q2: Explain the language restriction to Chinese and English since we are talking about a pandemic and results from other languages could be useful.

A2: At first, we only planned to include English articles. Because English is the universal language, and English articles contain the epidemic situation in various countries around the world, as well as the articles included are also comprehensive and high quality. But considering that the new epidemic outbreak was firstly reported in China. Adding Chinese articles may provide a more comprehensive and close understanding of the experience of health care workers in the outbreak. Articles that do not consider other languages are because our team members are not proficient in languages other than English and Chinese. If we add articles in other languages, we are afraid that we may not be able to deeply understand and analyze the expressions in the results written in other languages, so we plan to include only English and Chinese studies. So, we acknowledge that this is the limitation of this study.

Q3: What did you write in row 108? The text would benefit from a thorough revision and edition. Clarifying the English would add to the reader's understanding of the project.

A3: We have revised 108 lines "Psychology Information (PsycINFO), 万方/Wan Fang data, and 中国生物医学文献数据库/SinoMed" in the original manuscript to the "Psychology Information (PsycINFO), Wan Fang data, and SinoMed" of the new manuscript. (See line 142 of page 9 in the revised manuscript.)

The reason is that Wan Fang data and SinoMed are Chinese databases, and this format was referred to a published systematic review (IF=2.9). In the future, we will note that according to the format of the journal, thank you for your reminder.

Q4: The introduction paragraphs are very long. The problem needs to be better qualified.

A4: According to your comment, we have revised the introduction paragraphs as much as possible and hopefully the current version has met your requirements. Thanks.

(In the revised manuscript, we have reduced some content in line 46, line 58, line 60 and line 62 of page 5. A number of repetitions were deleted in line 72 of page 6. The sections from lines 83 of page 6 to 90 of page 7 were significantly reduced. At line 95 of page 7, we added the new content about Burnout. And we moved the content from 87 lines of page 7 to 109 lines of page 8.)

Q5: Throughout the protocol, the SARS abbreviation is spelled wrong (SRAS) in certain sections.

A5: We are very sorry for our negligence of the SARS abbreviation, and we have revised all the wrong abbreviations in the new manuscript. (See line 12 of page 3, line 37 of page 4, line 73 of page 6, line 157 of page 11, line 180 of page 12 in the revised manuscript.)

Q6: Please explain why you didn´t consider RCT as a type of design for this RS.

A6: Thank you for giving us the opportunity to explain. As you do, we want to give priority RCT, because it is relatively high-quality evidence. But when we write this protocol, we systematically look up the databases and find that there are very few RCT related to the subject of this study. For those few relevant RCT, its subjects were screened by the stress scale. That is to say that its population did not meet our requirements. Other RCTs are about clinical drug trials or protective measures. Because systematic review requires based on original research, and we can't choose RCT without original research. In addition, we want to minimize the types of research, which can reduce the heterogeneity of the study. This is why our current study didn't consider RCT.

Q7: Also, explain how cross-section could be included.

A7: Thank you for asking this question. Maybe we didn't make it clear in the original manuscript. The study population we plan to include are First-line workers who take care of infected patients, such as medical staff involved in the treatment of infected patients in ICU, emergency, pneumology and other

departments. And we plan to incorporate psychologically relevant cross-sectional studies that are similar to “Impact on mental health among medical and nursing staff in coronavirus disease outbreak”. The results must include one or more outcomes of burnout, PTSD, anxiety, depression, and insomnia. The measurement tool must be an international scale, and a self-made scale will not be considered.

The study on infection in health care workers is similar to “Analysis of the Infection Status of Health-care Workers in Wuhan During the COVID-19Outbreak: A Cross-sectional Study".

The investigation site must be a hospital designated for the treatment of the epidemic or a hospital for patients with the coronavirus infection. Conduct PCR, IgG, IgM tests to determine the specific infection rate in a community (seropositivity rate, SPR). Such cross-sectional studies we consider for inclusion. (For this question, we have added something to explain in the ***Outcome of interest*** section. See line 173 of page 11 to line 177 of page 12 in the revised manuscript.)

Q8: How do you intent to analyze the causal effect?

A8: The final integration of quantitative studies we included was presented in the form of incidence n%[95%CI (a%, b%)]. So we didn't plan to analyze the causal effect.

Q9: I don´t understand row 147 – 149. You will be looking for articles in the SR/MA or other types of review in order to identify more articles for your SR. Please, rephrase this paragraph.

A9: Thanks, we have revised according to your suggestion. (See line 188 of page 12 in the revised manuscript.)

Q10: I would consider using GRADE CERQUAL for the body of the evidence qualitative.

A10: We think this is an appropriate proposal, and we have revised it**.** (Line 295 on page 17 in the revised manuscript.)

Q11: I don´t understand the timeline information “ This systematic review is scheduled to finish in October 2020”: did you finish your SR before publishing the protocol? why are you planning to publish your protocol now? The data of register in PROSPERO is august. Could you please clarify it?

A11: We are very sorry for our negligence of the timeline information. We guarantee that data extraction has not yet started and that this systematic evaluation has not been completed. Because we didn’t have the experience to submit a protocol, and naively thought we'd get the offer soon. So the time was planned to be October 2020 previously. Now, we have revised the closing time to July 2021 in the new manuscript. (See 303 line on page 17 in the revised manuscript.)

We have been waiting for reviewer to revise the protocol. And we hope to successfully complete the protocol's acceptance. But now, we realize we're wrong. We apologize for our stupidity and innocence, and we hope you can forgive us, sincerely.

Q12: Where is ? Please, explain in detail how the outcome will be measure.

A12: The section outcome of interest in the original manuscript "Phenomenon of interest/exposure (s)". Considering that protocol is a mixed system review, we explain the qualitative and quantitative results together. But after you questioned, we discussed that this part of the previous expression was really unclear, so we modified it to report separately the phenomena of interest in qualitative research and the outcome of interest in quantitative research. (We added the section of "**Outcome**" to the revised manuscript, see line 170 of page 11.)

Q13: In the second topic of strengths and limitations, you refer to the study as a source of stronger evidence to the clinical practice, but at the last topic, you say that you cannot assure the quality of the evidence found in the research papers. I suggest a revision of the sentences.

A13: According to your suggestion, we have revised the part of strengths and limitations. The fourth point was revised to "The type of research included in the study is limited by the type of published original research." (See 35 line on page 4 in the revised manuscript.)

Q14: I suggest the removal of the conclusion section since it is a protocol paper, and no conclusion can be described yet.

A14: Thank you for your suggestion, we have deleted the conclusion section in the manuscript according to your suggestion. (See line 316 of page 18 in the revised manuscript.)

Sincerely thank you for a series of questions, which has provided us with great help.