PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Perceived barriers to the process of COVID-19 control among frontline healthcare workers in South Korea: a qualitative study
AUTHORS	Kwon, Sijoung; Kang, Bee-Ah; You, Myoungsoon; Lee, Heeyoung

VERSION 1 – REVIEW

REVIEWER	Spiers, Johanna University of Birmingham, College of Medical and Dental Sciences
REVIEW RETURNED	29-Apr-2022

GENERAL COMMENTS	Thank you for allowing me to review this interesting and important paper. I think it is close to being ready for publication but does need some tweaking. Abstract and intro I would suggest revising the opening line of your abstract, as it currently sounds like you're interested in the experiences of HCW during covid more generally as well as their experiences of barriers to disease control. In fact, you're only exploring the latter. Rewording to 'The study aimed to explore the barriers to disease control perceived by frontline healthcare workers (HCWs) during the COVID-19 pandemic in South Korea' (or similar) would be better. I'd suggest making a similar change in emphasis to the first line of the final paragraph of your introduction section. Aside from this, the opening of your study is strong - your argument is convincing and written succinctly. Method You mention data saturation, but only touch briefly on what this meant for your study. Data saturation is a term that comes from Grounded Theory (GT) and that wouldn't necessarily be applied in a thematic analysis; indeed, it is often used incorrectly and, in my opinion, as a way to appease quantitative reviewers who don't really understand the qualitative ethos. In GT, you reach data saturation by analysing transcripts at the same time as collecting data, starting to develop a theory, asking subsequent participants more questions about that theory, and then ceasing interviews once no new data about that particular theory is emerging. Is this what you did? If so, please explain this more fully. If not, either give more explanation of what data saturation meant in your study, or remove the term entirely if that's more fitting.

	Can you briefly explain why there was no PPI involvement? You mention the notetaker's reflexive notes in the 'data collection' section of your method. How did these influence the analysis of the focus group transcripts, if at all? I'm unsure about their relevance at the moment; you mention that they were shared and their main themes discussed, and that they informed next steps. Can you say more about this? It would be good to also include more information about who SK, BAK and MY are in terms of reflexivity - do they hold positions which might have influenced their analysis of the data? Are they healthcare professionals, for example? Were they impacted by the pandemic in a way that might have influenced their research? Otherwise, this section is fine and clear. Results It might be worth explaining a little more about the three participants who didn't hold a medical licence. Were they trainees? I would soften the language in your opening paragraph; labelling behaviours as 'immoral' is pejorative. 'Participants who had engaged in behaviours they wished to hide, such as adultery' would be better. Re your sub theme 'conflicts with other medical professionals' - it seems to me that the first quote implies that P16 also felt conflicted about implementing the government guidance, rather than solely being in conflict with other HCPs. There are several conflicts going on here for this participant - between having to follow guidance, being told things that 'make sense' by other professionals, and having to prevent the worst-case scenario. Can you draw this interesting tension out a little further? Can you say more about how the experience of receiving complaints from the public was a barrier to epidemiological decision making? I can see that it must have been stressful and unpleasant for the participants, but I'm not sure I understand how it would have been a barrier to disease control unless the participants were giving different advice as a result of those complaints. Similarly with the section on political issues, I would like to hear more about how this governmental pressure impacted the actual behaviour of the participants. Did they feel they had to submit to this pressure? The third section of this theme is better as you include the line 'Such tendencies prevented HCWs from taking adequate countermeasures based on epidemiological evidence.' Explanatory lines such as this would help in the previous two sub themes. On the whole, this is a well-organised and well-evidenced section, although the findings are a little basic. I think that's appropriate for this study as you're looking for quite straightforward ideas and reporting from the participants, rather than anything too psychological or nuanced, but I wonder if perhaps this makes this

	a piece of thematic analysis which explores and presents domains rather than themes, as per Braun and Clarke's 2019 paper on reflexive TA? (See page 593 in particular) If you agree, perhaps your claim that this is inductive TA (from your method section) needs another look. Discussion I was initially a bit confused about how you had arrived at the strategies listed in figure 1, as you present the figure before your discussion. Perhaps add some words to explain that you will suggest some strategies in the following section. The sentence which starts 'Expect for certain…' (bottom of page 10) is quite long and confusing and I think needs rewording. Your recommendation for team-building between HCW and CHCs feels a little unrealistic. When would there be time for this during a pandemic? Or are you suggesting that this team building work should happen outside of times of crisis? If the HCW who are doing this kind of work are temporary, would such team building work when then applied during another crisis (you do touch on this in a later paragraph)? This needs more thought. The task-shifting idea sounds more promising. This section ends really well, I agree entirely with your final point in which you state that merely employing more workers would not be enough. Limitations I don't really agree with your first two limitations. Qualitative research with only 20 participants is not aiming to be generalisable, so to state a lack of generalisability as a limitation is misunderstanding the point of the methodology. However, given the somewhat domain-level nature of your findings, you could perhaps make the point that had you wanted generalisability, a large-scale survey with some open text questions might have achieved that aim more fully. I would also posit that while it is harder, it is possible to achieve rapport via Zoom, especially as you only had four participants in each group, which is not a huge number. Your final point is much better. I would encourage you to rewrite this section as 'Strengths and limitations' and include some strengths instead of the two less convincing limitations. Conclusions Can you recap your empirical findings as well as your recommendations in this section? Overall While this paper is mostly well written, it could use a further proofread as there are a few errors in it.

	However, this is mostly a strong paper which deserves to be published. Well done.

REVIEWER	Harris, Bernice University of Pretoria, Health Systems and Public Health
REVIEW RETURNED	01-Jul-2022

GENERAL COMMENTS	Sound methodology and well written article. Is there maybe a better name for this category of HCWs? Epidemic investigation officers? Epidemic intelligence officers?

VERSION 1 – AUTHOR RESPONSE

Reviewer 1's Comments (Dr. Johanna Spiers, University of Birmingham)

* Comments to the Author
Thank you for allowing me to review this interesting and important paper. I think it is close to being ready for publication but does need some tweaking.
Response: We greatly appreciate the reviewer's positive and constructive comments on our manuscript. We hope our responses below have successfully addressed the reviewer's questions and comments and improved the overall quality of this paper.

*Abstract and introduction
I would suggest revising the opening line of your abstract, as it currently sounds like you're interested in the experiences of HCW during covid more generally as well as their experiences of barriers to disease control. In fact, you're only exploring the latter. Rewording to 'The study aimed to explore the barriers to disease control perceived by frontline healthcare workers (HCWs) during the COVID-19 pandemic in South Korea' (or similar) would be better.
Response: We agree with this comment and appreciate the reviewer's suggestion. Therefore, we revised the first sentence in the Abstract to clarify that this study focused on the HCWs' experiences of barriers to disease control (page 2).

This study aimed to explore the barriers to disease control perceived by frontline healthcare workers (HCWs) working in community settings during the COVID-19 pandemic in South Korea.

* I'd suggest making a similar change in emphasis to the first line of the final paragraph of your introduction section.
Response: We appreciate the reviewer's suggestion. We revised the sentence to explain more clearly that this research focused on not the general experiences, but the experience related to the disease control (page 4).

This research aims to explore the barriers to disease control perceived by HCWs working across varied locations and populations at each stage of work processes during the COVID-19 pandemic in South Korea.
* Aside from this, the opening of your study is strong - your argument is convincing and written succinctly.
Response: We are grateful for the reviewer's comment.

* Method
You mention data saturation, but only touch briefly on what this meant for your study. Data saturation is a term that comes from Grounded Theory (GT) and that wouldn't necessarily be applied in a thematic analysis; indeed, it is often used incorrectly and, in my opinion, as a way to appease quantitative reviewers who don't really understand the qualitative ethos. In GT, you reach data saturation by analysing transcripts at the same time as collecting data, starting to develop a theory, asking subsequent participants more questions about that theory, and then ceasing interviews once no new data about that particular theory is emerging. Is this what you did? If so, please explain this more fully. If not, either give more explanation of what data saturation meant in your study or remove the term entirely if that's more fitting.
Response: We thank the reviewer for pointing this out. We reviewed an article explaining 'data saturation' (O'Reilly, M., & Parker, N. (2013). 'Unsatisfactory Saturation': a critical exploration of the notion of saturated sample sizes in qualitative research. Qualitative research, 13(2), 190-197.). We acknowledged that the original purpose of saturation in GT is in the context of the goal to develop an explanatory theory of the social processes; thus, we realized that it is not appropriate to apply the notion of 'saturation' in all qualitative studies without considering the notion of saturation which came from GT. Therefore, we removed 'data saturation'.

* Can you briefly explain why there was no PPI involvement?
Response: We appreciate the reviewer's insightful question. We added a sentence to explain the reason. Since we aimed to understand problem of COVID-19 control based on providers' perspective, patients and the public were not directly involved (page 6).

Patients and/or the public were not involved. This study aims to explore the barriers of disease control through a health service provider's perspective.

* You mention the notetaker's reflexive notes in the 'data collection' section of your method. How did these influence the analysis of the focus group transcripts, if at all? I'm unsure about their relevance at the moment; you mention that they were shared and their main themes discussed, and that they informed next steps. Can you say more about this?
Response: We appreciate this important comment. We realized that we had inappropriately explained the role of 'reflexive memos.' Although we discussed themes, and sub-themes when writing the reflexive memos considering our social position, background, and interests after each interview, this was not related to 'data collection'. During data collection, we discussed whether new information came from participants. For example, regarding the 'poor work environment', lack of work phone, laptops, and personal protective equipment, and inappropriate workspace were repeatedly discovered from the first to fourth interviews. The same information was identified in the fifth interview. This kind of discussion during 'data collection' was not based on 'reflexivity'. Thus, we removed the 'the notetaker's reflexive notes' in 'data collection'. Instead, we briefly described the data collection process (page 5).

Upon completion of each interview, co-authors discussed whether the participants had provided any new information. No new information was identified in the fifth interview, and all authors agreed to stop collecting data.

*It would be good to also include more information about who SK, BAK and MY are in terms of reflexivity- do they hold positions which might have influenced their analysis of the data? Are they healthcare professionals, for example? Were they impacted by the pandemic in a way that might have influenced their research?

Response: We thank the reviewer for pointing this out. We agreed that 'reflexivity' of researchers is important as an influence on their research interest, analysis, and interpretation. Thus, we clarified researchers' academic background, position, and research interest. We added sentences to explain how reflexivity was applied in our research (page 6).

In terms of reflexivity, SK is a PhD student in sociology, trained in qualitative research methods. This allowed SK to focus on disease control and existing social problems. BAK is a PhD student in public health, trained in qualitative research. MY is a professor of public health, who has studied on infectious disease control system. BAK and MY helped SK to reflect on the importance of 'evidence' from the public health perspective and explore the barriers in the evidence-based approach. Both inductive and deductive analyses were used.

We also added more detail on our research analysis process. We clarified that we inductively coded our data and then deductively divided codes into the groups based on the current work process. We created themes and sub-themes in each group.

The initial codes were inductively identified, refined through an iterative process, and finalized upon discussion and consensus among research team members. Then the codes were deductively divided by the work process.

* Results
It might be worth explaining a little more about the three participants who didn't hold a medical licence. Were they trainees?
Response: We appreciate this comment. We added explanations about three participants who did not hold a medical license to clarify their status and role (page 6).

Three participants held no licenses but each had a master's/doctoral degree in public health. All participants performed the same tasks regardless of their medical license status.

* I would soften the language in your opening paragraph; labelling behaviours as 'immoral' is pejorative. 'Participants who had engaged in behaviours they wished to hide, such as adultery' would be better.
Response: We appreciate the reviewer's insightful comments. We agreed that 'immoral' is derogatory; accordingly, we changed expression following the reviewer's suggestion (page 7).

This tendency was more apparent among patients who had engaged in behaviors they wished to hide, such as adultery or affiliation with socially stigmatized groups (e.g., sexual minorities, religious cult groups).

* Re your sub theme 'conflicts with other medical professionals' - it seems to me that the first quote implies that P16 also felt conflicted about implementing the government guidance, rather than solely being in conflict with other HCPs. There are several conflicts going on here for this participant - between having to follow guidance, being told things that 'make sense' by other professionals, and having to prevent the worst-case scenario. Can you draw this interesting tension out a little further?
Response: Thank you for this important comment, which allowed us to explore again the fundamental reason of this barrier. After thorough consideration of the comment, we concluded that these conflicts resulted from the gap between guidance and reality. Since the guidance did not fully cover complex situations in practice, HCWs had to communicate with other professionals, or classified persons, as

close contacts, which made them struggle to follow the guidance. Therefore, we changed the sub theme to 'The gap between guidance and reality' and added a related quote (page 9).
Participants stated that the guidance did not always fit well with the reality. Sometimes other healthcare professionals' clinical opinions differed from the guidance. Moreover, physically vulnerable persons were in practice unable to comply with the self-isolation rule in the guidance. It was hard for HCWs to make flexible classifications due to fears of responsibility. One participant mentioned,

"It was difficult to communicate with hospital staff especially those working in the field of infectious disease. They told me certain cases have low infection probability, so quarantine is not necessary. It makes sense, but HCWs have to comply with the government protocol and take a conservative approach to contact classifications to prevent the worst-case scenario… I got a lot of stress when I classified a person as a close contact (for self-isolation) but (s)he cannot live alone. (s)he needed a caregiver" (Participant 16)

* Can you say more about how the experience of receiving complaints from the public was a barrier to epidemiological decision making? I can see that it must have been stressful and unpleasant for the participants, but I'm not sure I understand how it would have been a barrier to disease control unless the participants were giving different advice as a result of those complaints.
Response: Thank you for pointing this out. We added a sentence to emphasize this point. There was a tendency to refuse to comply with HCWs decision among people who complained to HCWs due to economic concern. And this these complains made that HCWs had a difficulty in dispassionately determining the intensity of the measures (page 9).

Some people often pressured HCWs to withdraw such countermeasures arguing that they were unable to comply with the rigid decision in terms of earning a livelihood. The complaints made HCWs face difficulties in dispassionately determining the intensity of the measures.

* Similarly with the section on political issues, I would like to hear more about how this governmental pressure impacted the actual behaviour of the participants. Did they feel they had to submit to this pressure?
Response: We appreciate the reviewer's suggestions. We revised a sentence to explain this point clearly. HCWs must submit the report if an elected politician requests that they do. Thus, participants submitted the report. This influenced HCWs to make inflexible and conservative decisions to avoid being accused off acting politically (page 10).

In addition, one participant stated that politicians asked HCWs to draft a report for political use, specifically, for negative campaigning against the current administration. HCWs have a duty to submit a report upon receiving an official request from an elected politician. This made HCWs hesitant to take flexible countermeasure accordingly to avoid being accused off politically.

* The third section of this theme is better as you include the line 'Such tendencies prevented HCWs from taking adequate countermeasures based on epidemiological evidence.' Explanatory lines such as this would help in the previous two sub themes.
Response: Thank you for pointing this out. We added explanatory lines to help explicate two sub-themes (Economic issues, Political issues) (pages 9-10).

Economic issues
Some people often pressured HCWs to withdraw such countermeasures arguing that they were unable to comply with the rigid decision in terms of earning a livelihood. The complaints made HCWs face difficulties in dispassionately determining the intensity of the measures.

Political issues
Such political interruption forced HCWs to take unnecessary countermeasures.

*On the whole, this is a well-organised and well-evidenced section, although the findings are a little basic. I think that's appropriate for this study as you're looking for quite straightforward ideas and reporting from the participants, rather than anything too psychological or nuanced, but I wonder if perhaps this makes this a piece of thematic analysis which explores and presents domains rather than themes, as per Braun and Clarke's 2019 paper on reflexive TA? (See page 593 in particular) If you agree, perhaps your claim that this is inductive TA (from your method section) needs another look.
Response: We greatly appreciate the reviewer's insightful comments. We thoroughly reviewed the paper on thematic analysis again, and tried to keep in mind the difference between domains and themes (Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. Qualitative research in sport, exercise and health, 11(4), 589-597) After we realized that we had confused domain summary and theme, we sought to find the patterns of meaning, and rename the themes. Followings contrast the prior 'domain' and new 'themes' (pages 7-9).

Perceived barriers to the investigation of newly diagnosed COVID-19 cases
 Theme 1: uncooperative public and unprepared community health center
Perceived barriers to the collection and analysis of digital data
 Theme 2: uncoordinated disease control system
Perceived barriers to the classification of close and casual contacts
 Theme 3: the gap between responsibilities and capabilities
Perceived barriers to epidemiological decision-making
 Theme 4: struggling with persons who have different interests and priorities

*Discussion
I was initially a bit confused about how you had arrived at the strategies listed in figure 1, as you present the figure before your discussion. Perhaps add some words to explain that you will suggest some strategies in the following section.
Response: We appreciate the reviewer's helpful suggestion. We added a few sentences to explain that we discuss and recommend strategies for improving the current COVID-19 response in the following section (page 11).

In the following, we will discuss how specific barriers could be alleviated. The following figure 1 illustrates the barriers and recommended strategies.

*The sentence which starts 'Except for certain…' (bottom of page 10) is quite long and confusing and I think needs rewording.
Response: Thank you for pointing this out. We agree that this sentence needs to be more concise. We had intended to distinguish between intentional false reporting and unintentional incorrect reporting. Thus, we cited the cases of patients who were unable to provide accurate answers due to cognitive impairment. However, this study did not focus on special HCWs working in psychiatric care or elderly care facilities; accordingly, we decided that it could be better remove 'cognitive impairments' cases to reduce confuse for the readers. We have modified it as follows (page11).

Patients' false reporting derived from privacy concerns or fear of stigma were the biggest challenge encountered by HCWs at the beginning stage.

*Your recommendation for team-building between HCW and CHCs feels a little unrealistic. When would there be time for this during a pandemic? Or are you suggesting that this team building work should happen outside of times of crisis? If the HCW who are doing this kind of work are temporary, would such team building work when then applied during another crisis (you do touch on this in a later paragraph)? This needs more thought. The task-shifting idea sounds more promising.
Response: We appreciate and agree with this comment. Given the time pressures and the fact that most HCWs are temporarily employed, team-building between HCWs and CHCs seems less likely to be viable. We found that the lack of support from CHCs is related with priority conflicts between HCWs and CHCs, and that this resulted from an uncoordinated disease control system between HCWs and CHCs. Thus, we completely agree with the comment that task-shifting seems more promising and have removed the 'team-building' part accordingly (page11).

Our findings emphasized that the importance of support from CHCs. Although South Korea has proactively adopted digital technologies to rapidly obtain and analyze personal data, we discovered that a lack of administrative and technical support from CHCs impeded the utilization of technologies among HCWs. This resulted from priority conflicts between HCWs working for pandemic response and CHCs staff working for the community's diverse health needs as well as pandemic. This shows uncoordinated disease control systems between newly employed workforce and existing system. Thus, we would suggest "task-shifting". Although not extensively studied in the context of COVID-19 yet, this may be a viable strategy in workplaces where professions and the level of skills vary among health workers.[26-30] Systematically delegating tasks from higher-to lower-skilled workers or from workers with general training to those with specific training may increase productivity, reduce time and costs, and enhance team functioning.[26,29]

* Limitations
I don't really agree with your first two limitations. Qualitative research with only 20 participants is not aiming to be generalisable, so to state a lack of generalisability as a limitation is misunderstanding the point of the methodology. However, given the somewhat domain-level nature of your findings, you could perhaps make the point that had you wanted generalisability, a large-scale survey with some open text questions might have achieved that aim more fully.
Response: Thank you for your valuable suggestion. We agree with the comment and deleted the two limitations. We returned to the research purpose and rewrote limitations to add a whole new point (page12).

Despite these strengths, there were two limitations. This study explored only the direct barriers to disease control. However, HCWs' work could be affected indirectly by a reduction in job satisfaction, motivation, and commitment through lack of social recognition, low salary, and fear of infection. In addition, to understand disease control process comprehensively, future studies are needed to explore both direct/indirect barriers and the facilitators. This would help to improve the overall quality of healthcare as well as the pandemic response.

* I would also posit that while it is harder, it is possible to achieve rapport via Zoom, especially as you only had four participants in each group, which is not a huge number.
Response: We appreciate the reviewer's comment. We agree that it is possible to build rapport via Zoom in a small number of focus groups. Thus, we removed this limitation.

* Your final point is much better. I would encourage you to rewrite this section as 'Strengths and limitations' and include some strengths instead of the two less convincing limitations.
Response: We are grateful for the reviewer's comment. As mentioned above, we deleted 'limitation' and wrote 'strengths and limitations' again (page12).

The study recruited COVID-19 control workforce currently at the forefront of the pandemic and explored their work experiences in community settings where diverse needs and interests of the public and stakeholders intersect. Our study design provides timely insights into the improvement of the disease response system. Moreover, participants in this study make up a newly organized pandemic workforce, comprised of public health doctors and professional epidemiologists with various types of medical license, which may inform workforce planning and management during a health crisis.
Despite these strengths, there were two limitations. This study explored only the direct barriers to disease control. However, HCWs' work could be affected indirectly by a reduction in job satisfaction, motivation, and commitment through lack of social recognition, low salary, and fear of infection. In addition, to understand disease control process comprehensively, future studies are needed to explore both direct/indirect barriers and the facilitators. This would help to improve the overall quality of healthcare as well as the pandemic response.

* Conclusions
Can you recap your empirical findings as well as your recommendations in this section?
Response: We appreciate the reviewer's thoughtful comments We summarized our empirical findings by restating the main themes (page12).

Four themes were generated: (1) unprepared public and community health center; (2) uncoordinated disease control system; (3) the gap between responsibilities and capabilities; (4) struggling with persons who have different interests and priorities. Each themes show the problems HCWs encountered at each step of COVID-19 control process.

* Overall
While this paper is mostly well written, it could use a further proofread as there are a few errors in it. However, this is mostly a strong paper which deserves to be published. Well done.
Response: We are grateful for the reviewer's positive comment. We have taken the reviewer's comment into full consideration and endeavored to remove any errors from the revised version of the manuscript.

Reviewer 2's Comments (Dr. Bernice Harris, University of Pretoria)

* Comments to the Author
Sound methodology and well written article. Is there maybe a better name for this category of HCWs? Epidemic investigation officers? Epidemic intelligence officers?
Response: Thank you for this suggestion. We thought for a long time about what name (or what category) is better to explain HCWs job and role. We acknowledge the official name – 'Epidemic Intelligence Service (EIS) officers.'– could be more accurate. However, in the case of South Korea, the current EIS officers consisted of diverse jobs such as public doctors, nurses, professional epidemiologists. Therefore, we concluded that a broader name as healthcare workers would be better to encompass their characteristics. Moreover, we considered that EIS officers' roles could differ and create confusion in comparison with other countries where individuals operate under the same title but are assigned a different task scope. Instead, we clarified the official name in 'acknowledgement' of the declaration section (page14).

We are grateful to participants in this research. Furthermore, we thank Jeonghyun Oh, an Epidemic Intelligence Service officer working for the Gyeonggi-do infectious disease control center. She helped data collection.

VERSION 2 – REVIEW

REVIEWER	Spiers, Johanna University of Birmingham, College of Medical and Dental Sciences
REVIEW RETURNED	15-Sep-2022

GENERAL COMMENTS	The authors have done a great job of responding to my comments, and I believe this paper is now ready for publication. I did spot a few more proofreading errors so would suggest running the final manuscript through Grammarly to pick these up if possible, but otherwise this ready to go. Well done to the authors on an important piece of work.