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Title: The impact of COVID-19 on primary care physicians and nurses in Nova Scotia: a qualitative exploratory study
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Reviewer 1: David Snadden
Institution: Faculty of Medicine, Family Practice, University of British Columbia
General comments (author response in bold)

Thank you for the opportunity to review this work. In terms of transparency and potential conflict of interest I do work as part of a large team with one of the authors on a different national project, but did not know of the project reported here, have not participated in it in any way and have not seen this research article before in any form.

This research article is timely and well written. The background explains the context of the article well and describes the rationale for the study and a clear area of enquiry for the research. The methods are very well described and give sufficient detail not just about the approach and the process of analysis but also the many steps taken to ensure trustworthiness of the findings, all of which give confidence in the findings. The qualitative methods references are very comprehensive. This is a strength of this article and an exemplar for others, as I not infrequently see qualitative articles submitted for publication which have given only superficial descriptions of the methods and give the reader little confidence in the results.
Thank you for very much for your comments.

The results relate to the methods and the narrative interpretation is supported by the quotes. The results are important in the context of the pandemic with regard to primary care and make total sense to me from my view of the impacts of the pandemic on primary care providers in rural BC where the conversations also revolve around disruption to work/life balance, to non-COVID care, dealing with an influx of constantly changing information and the impact of policies. In particular the section on the way that urban based policies do not transfer to rural contexts is well known by rural practitioners, but not yet well understood in urban centres and therefore this article adds to others that are creating an evidence based dialogue that will hopefully begin to penetrate the discussions of policy makers. This brings an authenticity to the analysis of this article as it is a very accurate reflection of what others are seeing "on the ground". The comments on the use of Video technology and its benefits and limitations are also helpful and reflect what is happening in this area, and in terms of future research it will be very interesting to hear patients perceptions of video access to primary care and what they would like to see in the future.
The text boxes containing the quotes are helpful, there are sufficient illustrative quotes and the reflect the interpretive narrative well.
The findings are placed within relevant literature and will be important not just to primary care providers but to pandemic leadership, public health and policy makers as they will help others understand that the context in which policy etc. has to be adapted to be successful. The interpretation section summarises the findings well and makes important points that are relevant in guiding policy, in particular the call for policy to be tailored to local contexts.

This is a very timely piece of research, it is well written and described in a way that can be replicated. Nice work, well done.

Reviewer 2: Kathleen Rice
Institution: Faculty of Medicine, Family Medicine, McGill University
General comments (author response in bold)

Thank you for the opportunity to review this manuscript. The topic is important and timely, and the manuscript is clear and well-written. It provides insights that policymakers and healthcare administrators need and will be of interest to primary care providers. I would like to see it published. While I have requested "Major Revisions", the revisions that I suggest fall somewhere between minor and major, and I don't believe that they will be too onerous to implement. My comments are as follows:

My major concern with this paper is methodological. I am less concerned with what was actually done, but more so with how the approach is conveyed. As it stands, the methodology section is written in style that leads me to believe that the authors are either primarily quantitative researchers who believe that in order to be valid, qualitative research must be mimic the standards of rigour to which quantitative research is upheld, or they are well-trained in qualitative research but are willing to employ concepts (e.g. saturation, member-checking, thematic "emergence") that have become standard in biomedical publishing, but are conceptually flawed yet tend to placate the standards of biomedical publishing (which remain quite positivist, and thus misaligned with most qualitative research). If it is the latter, I invite the authors to have more courage. Unfortunately, this is quite common within qualitative research that is targeted to biomedical journals (although thankfully this is changing). Most of my concerns are summarized in the following article, which I strongly recommend the authors read, reflect on, and apply in their revision:
Varpio L, Ajjawi R, Monrouxe LV, O'Brien BC, Rees CE. Shedding the cobra effect: problematising thematic emergence, triangulation, saturation and member checking. Medical education. 2017 Jan;51(1):40-50.
Used a balanced approach throughout to accommodate suggests and maintain reasonable word-count.
Thank you for suggestions, revisions have been made throughout.

For example, themes to do not emerge (they are not present in the data, waiting to be found by anyone and everyone). They are developed by researchers through an analytic process that draws on both the expertise of the researchers (which, for this team, seems ample), and is inseparable from your positionalities and entails reflexivity. I notice that you use the term “interpretation” at one point, and “generated” at another; these are much better.
Four inter-related themes were identifed within the data
Thank you, revisions have been made.

Secondly, you mention that member-checking was done, but what was the justification for this? I’m not saying that member-checking is categorically a bad idea, but we need to know what you aimed to determine through member-checking?There is no reason why non-researchers and trained researchers would come to the same conclusions about the data's meaning, so it is not necessary for researchers and their study participants to agree on the interpretation of the data.

Member checking (16) was achieved by providing interviewees a copy of their interview transcript and an opportunity to provide additional feedback or comments.
Revised.

Finally, the authors state that a "qualitative research design" was used. This is vague and encompasses a huge range of approaches. Is this a generic qualitative study?
Thank you for your comments the authors agree and have provided additional information about the study's design.

Comments on the content:

The authors have done a great job of ensuring that their participants represent a diversity of professions and regions.

I would like to see a brief explanation of the COVID-19 situation in Nova Scotia at the time that this research was carried out. My understanding is that Nova Scotia has not struggled with large-scale outbreaks, and I think it is interesting and important to note that PCPs were evidently highly impacted by pandemic policies despite relatively low risks of community transmission or workplace infection (of course this is relative; I am in based in Montreal).
See above

Overall, I feel that your team has taken on a lot with this paper; all the themes could certainly warrant more discussion than what is possible within the parameters of a biomedical journal. I think especially that the rural-specific issues are interesting and important, and I haven't seen much published on this subject. The themes themselves are clear, and are generally well-supported by the supplied quotes. There is some overlap (or complementarity?) between Boxes 3 and 4 (around internet access and poverty); as I explain below, I think this could be taken up in the discussion.
Thank you, due to length issues we are unable to accommodate this request.

Minor suggestions: I'd remove the final quote from Box 1, because you already use that quote to open that section.
No changes due to editor's comments

Quote 5 in Box 3: I don't see how this is an example of simplifying VC.

Discussion:

The points that are made are great, but the discussion is a bit short. There is no discussion of Theme 4 (influx of information) at all. Also, I think it would be good to mention the ways in which COVID-19 policies have impacted the care for low-income Nova Scotians in particular. This issue comes up both with respect to virtual care and rural healthcare. I love your recommendation that policies be tailored to the specific needs of communities (I have argued this myself with respect to pandemic perinatal care, so it's exciting to see the importance of this approach demonstrated in the broader context of primary care), and I think it would be worth noting that this should include the specific needs of low-income patients, wherever they are located.
Due to article word limit we focused the discussion on the main implications and takeaways of the results.

Reviewer 3: Erica Barbazza
Institution: Department of Public and Occupational Health, University of Amsterdam
General comments (author response in bold)

My complements to the authors for a well conducted and reported study. My comments are for the most part minor in nature and hopefully can help to further clarify some key messages.

Major comment
The four clustering of themes is clear and well defined. However, I challenge the authors to reconsider the phrasing of the third theme “Impact of provincial/centralized policies.” It differs from the approach used to label the three other themes, which are more instructive as to a particular impact resulting from the pandemic in relation to the topic of questioning (e.g. access to information being described as the challenge of “Filtering and processing an influx of information”. The theme around ‘impact of provincial/centralized policies’ misses the 'effect' and only states the 'what'. It also repeats the angle of the title of the figure ('impact' of covid) I appreciate this theme is more nuanced, with subthemes of virtual and rural differences. Perhaps this needs to be better reflected in the titling.
Thank you, we appreciate your point, however this theme is also the only one with subthemes, and we believe the existing theme name does account for both subthemes.

Participants
What was the target sample for recruitment defined? The approach to identify and engage prospective informants is clear and there is mention of intake questions to achieve a desired recruitment mix but what the intended mix is not stated.
Purposive sampling of PCPs was done through authors’ professional contacts and targeted newsletter and listservs of local organizations (ex. Dalhousie University, Nova Scotia Health) with the goal of recruiting 25-30 PCPs

Additionally, what was the timeframe of recruitment? Were participants contacted on a rolling basis? The period of data collection spans 11 months. It would be helpful to understand why. Its noted in the limitations the possibility of memory recall bias. This begs the question what period of time were respondents asked to comment on? It would be helpful to make this clearer in the methods what is meant by ‘early pandemic’.
Participants responded to questions related to four topics (Table 1) in relation to their experiences from the early phases of the pandemic.
Delays in recruitment were due to staffing and recruitment issues that caused pauses in the research project.
Revised.

Minor points
Introduction:
L17: “In many jurisdictions” suggest adding ‘in the Canadian context and abroad’ or similar. The sources include outside of Canada but the sentence currently doesn’t have context and could be misread as provinces/territories.
“In many jurisdictions public health policies and recommendations resulted in nonessential health services being cancelled or delayed (3,4), disruptions in continuity of care for patients with chronic conditions (5–7) and heightened reliance on virtual care (VC)(8).”

Page 1: "Public health policies and recommendations resulted in nonessential health services being cancelled or delayed (3,4), disruptions in continuity of care for patients with chronic conditions (5–7) and heightened reliance on virtual care (VC)(8)."
The authors agree that the sentence could be mis-interpreted to reflect only the Canadian context. We have removed the wording in question to prevent narrowing the scope of the information.

Table 2 – suggest to add total N into the table itself for ease interpretation of the percentage.
Number
Number (N=23)
Thank you for your comment. This suggestion has been implemented.

While the labelling of quotes helps to signal the profile of the informant quoted, it would be interesting as a reader to understand if the same person is being quoted multiple times or the examples used are all different informants. If you agree, please consider assigning a random number to informants and using this to identify those quoted (e.g. Nurse Practitioner–1, Nurse Practitioner–2, etc.)
Thank you for your comment. Unique identifiers have been added to each quote to address this concern.

Theme 2 – the quote following the sub-heading in this section is repeated in the box. I suggest one is changed to avoid the repetition this creates. Also, in the sub-heading it is referenced as "Nurse practitioner" but in box 2 it is referenced as "physician"
Thank you for your comment. The repeated quote has been removed from the Box 2 and the profession attached to the quote has been confirmed.

Interpretation
For balance, it could be helpful to recall the positive effects of VC that were described in findings also in the interpretation section. Additionally, this section currently emphasizes local, patient focused interventions. The first theme around work/life balance disruptions however did suggest a number of safety concerns of health professionals. Are there provincial measures from hospital care that could be borrowed to ensure better protection for PHC providers? It seems as though a reflection on safety and personal/professional isolation for PHC professionals appears missed.
Due to article word limit we focused the discussion on the main implications and takeaways of the results.

Abstract: "however, few studies have investigated the impact on primary health care."
Word permitting, suggest to specify: "few studies from the perspective of PHC professionals"
...however, few studies have investigated the impact on primary health care.
...however, few studies have investigated this from the perspective of primary care providers (PCPs)

Reviewer 4: Q. Jane Zhao
Institution: Project ECHO at UHN, University Health Network
General comments (author response in bold)

This is an interesting and relevant qualitative paper regarding the impact of the COVID-19 pandemic on primary care providers in Nova Scotia, Canada. 24 participants were interviewed and one withdrew their data. Four themes were described with more detail: disruption on work/life balance, disruptions to “Non-COVID” patient care, impact of policies, and the impact of information during the COVID-19 pandemic. A strong argument is presented for the tailoring of pandemic responses to primary care.

I would recommend making the following changes to make the manuscript stronger:

General:
- Please make sure COVID-19 is spelled and capitalized consistently throughout (more detailed keywords pg 1, abstract pg 2, pdf pg 9).
“non-covid” now reads “non-COVID-19" and all others read “COVID-19”

- Are family practice nurses registered nurses?
There remains a need to investigate from the perspective of primary care providers (e.g., physicians, nurse practitioners and registered nurses such as family practice nurses. Thank you.
- Sample size: would a participant who withdrew count in the total sample size? Did the participants have to respond to their transcript in order to participate in the study? I found it confusing how there was repeated mention of 24 participants but in table 1, only 23 participants’ data was reported and one was cited to have withdrawn their data upon seeing their interview transcript. I would suggest reporting 23 participants to avoid any confusion (changes in COREQ and full manuscript).
Checked and revised.
Note: Participants had a set period of time to respond to the transcript. If they did not respond within that time frame the transcript was deemed acceptable. However, we always followed up and received a response. Thank you.

- Consistent use of acronyms: I would suggest using acronyms at their first mention, so primary care providers in the first Introduction paragraph would be (PCPs) and then used thereon.
...there remains a need to investigate from the perspective of primary care providers (e.g.,
there remains a need to investigate from the perspective of primary care providers (PCPs; e.g., . Checked and revised.

- Consistent use of language: please choose either PCP or provider consistently and use throughout.
...it influenced the providers lives and practices
...it influenced the lives and practices of primary care providers (PCPs)

- Context of participant quotations: though the profession is disclosed for each illustrative quotation, it would be helpful to know the participants’ sex and location as well (especially relevant to themes 1 and 3).
See above comment

PDF page 1:
- More detailed keywords: COVID
Appendix A: COREQ checklist

- Pg 5: “Did the research use audio or visual recording to collect the data?” – since some interviews were conducted over the telephone, how were these interviews recorded?
Thank you for your comment. We have clarified the form of recordings used when interviewing within the text of the manuscript and the COREQ.

- Pg 6: “How many data coders coded the data?” – which authors (initials) were involved in the coding?
Thank you for your comment. We have provided this information.

Introduction
- “Healthcare systems have seen a tremendous impact” – would consider reversing. “Healthcare systems have seen a tremendous impact, caused by gaps in critical knowledge, staffing shortages, and the psychological and social impact on patients (1) and healthcare professionals (2).”
Page 1: “Healthcare systems have experienced tremendous impact, caused by gaps in critical knowledge, staffing shortages, and the psychological and social impact on patients (1) and healthcare professionals (2).”
Thank you for your comment. We have edited the sentence in our revised manuscript to improve clarity.

- Add a comma after “In many jurisdictions”.
“In many jurisdictions public health policies and recommendations resulted in nonessential health services being cancelled or delayed (3,4), disruptions in continuity of care for patients with chronic conditions (5–7) and heightened reliance on virtual care (VC)(8).”
Thank you for your comment. We have since removed this text during our revisions.

- Add a comma after “disruptions in continuity of care for patients with chronic diseases (5-7)”.
In many jurisdictions public health policies and recommendations resulted in nonessential health services being cancelled or delayed (3,4), disruptions in continuity of care for patients with chronic conditions (5–7) and heightened reliance on virtual care (VC)(8).
Page 1: In many jurisdictions public health policies and recommendations resulted in nonessential health services being cancelled or delayed (3,4), disruptions in continuity of care for patients with chronic conditions (5–7), and heightened reliance on virtual care (VC)(8).
Thank you. We have edited the sentence in the revised manuscript to improve sentence structure.

- Use of the word “providers” – would consider adding healthcare providers to be clear. “The pandemic not only forced changes to patient care, it influenced providers’ lives and practices, including their personal and family well-being (9).”
Page 1: “The pandemic not only forced changes to patient care, it influenced primary care providers’ (PCPs) lives and practices, including their personal and family well-being (9).”
The authors agree with your suggestion and have edited the sentence in the revised manuscript to clarify who is referred to as providers.

- Primary care is not always the first point of contact with the health system at any time. Patients can also access healthcare through emergency rooms and walk-in clinics.
A first point of contact with the health system at any time (12), primary care can be a first line of defence during public health emergencies (13), providing disease management, health promotion, community-based screening and surveillance, and emergency response (12), making it central to an equitable and sustainable health system (14).
Page 1: Often, a first point of contact with the health system (12), primary care can be a first line of defence during public health emergencies (13), providing disease management, health promotion, community-based screening and surveillance, and emergency response (12), making it central to an equitable and sustainable health system (14).
Thank you for your thoughtful comment. We agree, primary care is not exclusively the first point of contact in the health system. We have edited the revised manuscript to clarify the suggested scope of primacy care as a first point of contact.

- The last sentence of the introduction is long and argues several points. Consider splitting to clarify the meanings.
"While the overall project investigated the impact across multiple disciplines, this paper reports data from family physicians (physicians), nurse practitioners (NPs) and family practice nurses (FPNs), collectively referred to as PCPs in the remainder of this paper."
Page 1: "The overall program of research investigated the impact across multiple PCPs. This paper reports data from family physicians (physicians), nurse practitioners (NPs) and family practice nurses (FPNs), collectively referred to as PCPs in the remainder of this paper."
The authors agree with your suggested edits and have edited the sentence in the revised manuscript.

- Would consider changing the wording: "Exploring the experiences of PCPs during the pandemic may provide insight into the primary care response to, and the impact of, a major health emergency." to "The experiences of PCPs during the pandemic may provide insight into the primary care response and impact of a major health emergency."
"Exploring the experiences of PCPs during the pandemic may provide insight into the primary care response to, and the impact of, a major health emergency."
Page 1: "Exploring the experiences of PCPs during the pandemic may provide insight into the primary care response and impact of a major health emergency."
The authors agree with your suggested edits and have edited the sentence in the revised manuscript.

- Perhaps a question for the methods section as well, but since the experience of multiple disciplines were explored in this study, why are only family physicians and nursing professionals reported in this study? Why not include perspectives from other professions as well?
This was a timing issue. Other PCPs are being interviewed for subsequent study.

Methods
- Please move researcher's initials for those who conducted the interviews earlier, from the Data Collection section to the Research Design section (after "trained research personnel").
Revised based on editors comments.

- Please describe the process behind purposive recruitment.
Purposive sampling of PCPs was done through authors' professional contacts and targeted newsletter and listservs of local organizations (ex. Dalhousie University, Nova Scotia Health). Research staff sent interested participants study information and a consent form. Participants had the opportunity to ask questions via email, then answered questions (discipline, age, geographic location of practice) to guide recruitment. All participants provided informed, voluntary, oral consent at the beginning of the remote interview.

- Please change "policymakers" to one word.
Revised

- Since interviews spanned from June 2020 (early phase of the pandemic) to April 2021 (wave three?), was the timing of interview data collected considered when analyzing the data? Did participants who were interviewed later describe the impact of the pandemic differently on their practice compared to those in earlier phases? Did this impact perceptions regarding information pathways?
Participants responded to questions related to four topics (Table 1) in relation to their experiences from the early phases of the pandemic.
Note: The delays in recruitment were related to challenges in the health system during the time of recruitment. We do not expect it influenced their perceptions of early months of the pandemic.

- What were the refinements made to the semi-structured interview guide after four pilot interviews were conducted?
No changes were made after pilot interviews.

Results
- Table 2: for those not familiar with Nova Scotia's health authority zones, could a map be referenced or city descriptions be described beside Central, Northern, Eastern, and Western? For example, where does Halifax fall in these regions? Which are considered more "rural" areas, as this relates to theme 3?
Additional description was added in methods.

- Table 2: What was the sex (or gender) of participants who were interviewed? The illustrative quotations from theme 1 and recommendation in the interpretation section on reveal a heavy gendered aspect regarding the nature of caregiving in the family that seem to play a prominent part of participants' worries.
See above comment.

- Since interviews spanned into April 2021, I'm not sure if the authors can still write "during the first months of COVID-19" unless specific instruction was made at the beginning of the interviews to think back to the first months of the pandemic.
Specific instructions were made for participants to reflect upon the first wave of covid. This is reflected in interview guide.

- Please remove the comma after "additional anxiety".
Thank you for your comment. This edit has been made.

- Theme 2: "health care costs" is mentioned in the body paragraph but it is unclear where these cost concerns come from in the quotations. Please elaborate.

Costs is removed. Thank you

- Theme 3: it is unclear what the provincial public health policy changes were. Please describe all the relevant policy changes at the beginning that influenced the transitions to virtual care and rural clinic challenges. Was this just changes to provincial billing or were there other policy changes?
Citations that detail policies and additional discussion have been added.

- Box 5: please keep consistent the profession formatting and the spacing between quotations.
revised

Interpretation
- Please change the last sentence in the first paragraph of this section to the order of the themes presented in the paper.
The impact of provincial policy, disruption to “non-COVID-19” patient care, filtering and processing information, and disruptions to providers’ work/life balance influenced PCPs experience and delivery of care.
The disruptions to providers’ work/life balance, disruption to “non-COVID-19” patient care, impact of, and filtering and processing information influenced PCPs experience and delivery of care.
Thank you for your comment. The organization of this sentence has been restructured to reflect this observation.

- Recommendations regarding tailored primary care responses are made, but it seems that the transition to virtual care and resulting inequities is only briefly discussed though this is a consistent finding across many studies. Please elaborate more on the role of virtual care and impacts on rurality for PCPs in Nova Scotia.
Due to article word limit we focused the discussion on the main implications and takeaways of the results.

- Limitations: in the strengths sentence of this manuscript, it is not clear who on the research team was a patient. Please clarify.
This has been clarified.