Reviewer’s report

Title: A mixed methods quality improvement study to implement nurse practitioner roles and improve care for residents in long-term care facilities

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Reviewer: Michal L. Boyd

Reviewer's report:

Thank you for the interesting manuscript about resident outcomes for those cared for by Nurse Practitioners in long-term care. I have few suggestions and questions about the manuscript.

Background:

- Overall the writing was at times difficult to follow and would benefit from additional editing. As an example, the last sentence of paragraph two (pg 2, line 89) states that understanding NPs contribution will help implementation but this statement doesn't seem to follow the previous statement describing what NPs do in long term care. More explanation is needed.

- In paragraph three (pg 5, line 97) the statement "Québec was meeting between 49% to 84% of long-term care benchmarking targets for seniors awaiting long-term care placement who required an emergency room visit" is not clear what benchmarks are being referred to here. More explanation of the benchmarking targets and their origin is needed.

- The explanation of the NP models of the care is not clear. Since the differences in these models of care is one of the main points of the paper the differences and similarities needs to be clarified and how these differs from the substitute model of care. It appears that in both models the NP is caring for patients directly, but in one model they are assigned residents and in the other model they are not. Please clarify. It may also be helpful to explain who employs the NPs to help with clarification of the different models of care.

- It is difficult to decipher the underlying message being conveyed in the last paragraph of the background (pg 6, line 123) and clarification is needed.

Methods

- One of the main weaknesses of the paper is the methods employed. Although this is a qualitative study, it is presented as if it is quantitative which is rather confusing.
- Using the term "interventions" is rather nebulous. More in-depth use of categories or themes of types of interventions would be helpful to improve understanding of the NP interventions.

- In the first paragraph under research design (pg 7, line 156) it states that there were 538 residents, but then in the next paragraph (pg 7, line 164) it states that the six sites serviced 776 residents. Please clarify.

- On page 8, line 167 it states that the site had a 'technology platform' but it is not clear what this is referring to.

- How was the resident data gathered and recorded? Did the NPs do it themselves or did facility administrative personnel or researchers do the data collection. If the NPs participants recorded resident data, how was the possible bias reduced?

- It appears that because the pre-intervention data was not available the intended research design was not able to be implemented. This has major implications for the rigour of this study.

- In the methods it states that this is a qualitative descriptive analysis, but then in the analysis section it states that quantitative descriptive statistics were generated - this seems contradictory.

- What was the operational definition of the a 'new event', and how were transfers, falls, restraints and ulcers defined? For instance, did this include stage 1 ulcers or just stage 2, 3 or 4?

- The definition of 'at risk' residents is difficult to follow? Why were respite residents included? How was death used to identify 'at risk' residents who were still alive? This is very difficult to follow and doesn't flow logically. Please clarify.

- Where did the pharmacy data come from? Was this obtained from a centralised database, facility electronic databases, or paper charts?

Results:

- The first paragraph of the results section appears to belong in the methods section

- Please define 'functional autonomy' and what tool was used to determine this score. This measure is not described in the methods and needs to be.

- The discussion about the lack physician partners is confusing - were the NPs unable to practice without the physician partners? Please clarify.

- Please define medication interventions (which should be clarified in the methods).
- It is unclear why site 4 was so different regarding medications. All sites would be caring for residents that had agitation and/or infections.

- How were the physician interventions separated from the NP interventions?

- How was hospital admission data obtained (this should be in the methods).

- Data means, ranges, standard deviations and/or confidence intervals are needed here. The data reported is quite imprecise.

Discussion:

- The first paragraph of the discussion should be in the results. The discussion should state how the results support the original aim of the research.

- On page 18, line 418, it states that the residents and families appreciated the addition of the NPs, but where is this data in the results to support this statement?

- More comparison of this studies results with international literature is needed.

- More description is needed of the implications of the different models of care.

Overall comment:

This is an important topic area and has the potential to add valuable information to changing models of care delivery in long-term care facilities. However, the methods used for the 'cohort study' are rather imprecise and lack the rigour needed to state definitive conclusions. It is not clear how the 'at risk' residents were included in the overall analysis. The paper is rather difficult to understand overall due to the imprecise description of the methods and the overall writing style. The results are presented as quantitative descriptive analysis, however there were no reports of simple standard deviations or confidence intervals. Given the impreciseness of the methods and results, it is difficult to accept the conclusion that resident care was improved with Nurse Practitioner care unfortunately nor to understand how the model of care influenced overall resident outcomes.

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

No

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

No
Are the conclusions drawn adequately supported by the data shown? 
If not, please explain in your comments to the authors.

No

Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review? 
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I recommend additional statistical review

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