

PEER REVIEW HISTORY

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ARTICLE DETAILS

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| TITLE (PROVISIONAL) | Trends in mental health-related contacts among mothers of Aboriginal children in Western Australia (1990-2013): A linked data population-based cohort study of over 40,000 children. |
| AUTHORS | Lima, Fernando; Shepherd, Carrington; Wong, Janice; O'Donnell, Melissa; Marriott, Rhonda |

VERSION 1 - REVIEW

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| REVIEWER | Kathleen Falster Centre for Big Data Research in Health, University of New South Wales (UNSW) Sydney, Australia |
| REVIEW RETURNED | 13-Dec-2018 |

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| GENERAL COMMENTS | <p>This study sheds light on mental health service use in parents of Aboriginal children in Australia. This is important given the significant burden of mental health problems among Aboriginal Australians, the known impact of poor parental mental health on child outcomes, and the limited population-level evidence to date regarding mental health problems and related service use among Aboriginal parents in Australia.</p> <p>Please find comments/questions about specific details of the paper that could be improved/strengthened so that 'yes' is the consistent response to the review checklist questions for this paper.</p> <p>Introduction:</p> <ul style="list-style-type: none">- Some more context about the complex mental healthcare landscape in WA/Australia would be beneficial for readers (e.g. mix of public/private inpatient and outpatient mental health services, mainstream vs community controlled services for Aboriginal people), including what is/isn't captured in state and national population datasets.- This study can quantify particular types of mental health service use but can't quantify the prevalence of mental health problems; for this reason, it would be better to refer to the outcome as 'mental health service use' rather than interchangeably referring to 'mental health problems' when talking about the study outcome (e.g. in lines 13-14 page 3).- It would be useful to include more specific research question/objectives at the end of the Introduction; this will provide a basis for the reader to understand the author's selection of analysis methods, interpret findings etc. <p>Data:</p> <p>It would be useful to include a brief description of the information/services captured in the original data sources that have been linked for this study. For example, it would be useful to</p> |
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briefly describe the type of public/private mental health services captured in the HMDS and the MHIS, including any important limitations that are relevant to the interpretation of the findings.

Outcome:

- It would be more appropriate to define the outcome as 'mental health service use' (with specific details of the services captured and acknowledgement of what isn't captured in the methods), rather than mental health problems. This is the best available information at present, which makes it a valuable contribution in its own right, but it certainly isn't a measure of mental health problems at a population-level.

- The use of secondary diagnoses to identify the outcome is problematic for a few reasons. In the case where mental health hospitalisations and outpatient appointment are being used as a proxy for mental health problems (despite all the gaps in other MH service types/medicines etc), then using secondary diagnoses will introduce bias because sicker people (who are hospitalised) will more likely to be identified as having mental health problems than people who are not hospitalised. It is also likely that mental health problems are not consistently recorded as secondary diagnoses, unless they are very severe. If the outcome is redefined as 'mental health service use', then hospitalisations or outpatient appointments for other reasons should not be counted as mental health related.

- The study population was previously described as Aboriginal children born in WA between 1990 and 2013. But later the authors refer to 'in-scope' mothers (line 10, page 4) - please clarify what this means. Perhaps a section defining the study population and the focus on the children's mothers would be useful in an earlier section (e.g. under a heading 'Study design, population and setting').

- Given the reasons for hospitalisations and outpatient appointments are likely to differ substantially, it would be useful to present the two outcomes separately (e.g. panel figures side by side), in addition to (or alternative to) the aggregate outcome of hospitalisation or outpatient appointment.

- while social issues (e.g. related to housing, employment) frequently co-occur with mental health problems, it seems problematic to include these in the 'broader' mental health diagnosis category for this study. It comes back to whether the aim is to quantify MH service use or to create a proxy for MH problems with the available data, despite all the known service gaps and under ascertainment of MH problems based on service use alone. When it comes to interpreting the results later, it also seems problematic to say that 'broader' MH issues were one of the most prevalent MH problems, when really this is a mixed bag of otherwise un-categorised diagnoses.

Covariates:

- Maternal age at childbirth is not mentioned in the methods. It is unclear why the authors group maternal ages 20-29 years into one group - the majority of births lie in this category and aggregating up is likely to mask any variation across the maternal age range.

- what underlies your choice of the three covariates (SES, remoteness and maternal age) in your analysis? It is unclear from the introduction why you have selected these characteristics in particular and what your conceptual model of the relationships between these variables and the outcome are.

Statistical analysis:

- The first two sentences of the Statistical analysis section on page 5 (lines 37-40) seem redundant.
- line 39, page 5 - 'mother suffered from a mental illness' - suggest using language consistent with the outcome measure, e.g. 'mother who had mental health-related hospitalisations or outpatient appointments'
- lines 43-44: the prevalence of MH service use are presented in the figures, not the trends as a percentage change - these appear to be reported in the text only.
- given you are interested in variation in MH service use across areas, including how area characteristics such as disadvantage and remoteness play a role, it seems like a multi-level modelling approach may be more suitable to address this particular question? However, which analytical approach is most suitable really comes back to the specific research questions of interest. It is unclear if the authors wish to establish whether the area factors are associated with MH service use (then just univariate answers this), do the area factors effect MH service use (then adjust for confounders to isolate the effect), or do a group of factors predict MH service use (e.g. risk prediction approaches, although very few covariates included in the paper).

Results:

- Page 6 - reporting of an 'ever MH health service use' percentage (i.e. 61.3%) seems questionable given the different periods of follow-up for the mothers prior to birth, and therefore, varying opportunities for MH contacts? It is different when fixed look-back periods (such as 5 years) are applied.
- line 51-52 - what is meant by the term prevalence trajectories? Does it refer to the change in prevalence over time in the trends analysis in this case?
- in the first paragraph on page 7, there is no reference to whether the most common diagnoses change in the 1-year pre- and post-birth. This seems like an important issue for informing screening and support services in the ante- versus post-natal periods, when you may imagine there is a shift in the types of issues that women present with (or perhaps not for these services that are likely to see more severe and chronic MH problems).
- what is the conceptual model and research questions that underlie your analysis, including the decision to undertake a multivariate analysis of the relationship between the exposures (socio-economic status, remoteness and maternal age at childbirth) and the outcomes (mental health service contacts)?
- what are the models adjusted for?
- how does one interpret the adjusted ORs? e.g. after adjustment for socioeconomic position and remoteness, the effect of maternal age and other unmeasured covariates on MH service use was X? It would also be useful to present the unadjusted ORs because they tell us about the 'real world' differences between high and low SES areas etc. I am unclear how to interpret the adjusted models at present because the questions and conceptual model are not well described early in the paper. If the authors are not already familiar with the recent paper by Hernan, M.A 2018 American Journal of Public Health (The C Word: scientific euphemisms do not improve causal inference from observational studies), it is a nice summary that relates to a few of the previous questions.

Discussion:

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| | <ul style="list-style-type: none"> - same comment as previously re use of term 'MH problems' versus 'MH service use' when referring to study outcome throughout discussion - While it is important to note the policy and practice changes that might underlie some of the changes observed during the study period, it is important to acknowledge that there are methods (e.g. interrupted time series analysis) that could be applied to test the change in MH service use relating to a particular policy/practice change. - Page 7, line 56 'There was a consistent 2-fold increase...' - it is unclear what statistics this sentence is referring to. It reads as though there has been a comparison made between the prevalence of MH service use at 5-years compared with 1-year prior to birth, but I am unsure where this has been done. The comparisons appeared to be made across categories of SES, remoteness, maternal age at childbirth, and calendar years. - In discussing the implications in the paragraph starting on Page 7, line 56, it would be useful to acknowledge the type of MH service use captured in this study again as these data are more likely related to chronic and severe MH problems rather than post-natal depression that might be managed in primary care setting, for example. Also useful to acknowledge how the service models need to consider both mainstream and community controlled services (within the multi-sector approach). - Page 8, from line 34 - perhaps there has been a shift in the type of health services used after 2007 more than a change in prevalence of MH problems, which this study cannot measure? - Page 8, from line 42 - what are the unadjusted odds ratios? This is where you will see the real world burden of MH service use. Once you adjust for family-level socioeconomic indicators of disadvantage, the increased risks associated with maternal age are usually attenuated (e.g. relationship b/w maternal age and child development, PLOS Med 2018). - Limitations 1st paragraph - true, but need to acknowledge that also there are many types of MH services, and this study only captures some of that. - Concluding comments/implications to the paper after the Limitations? - Given there is such limited peer reviewed literature on this topic, the authors may wish to consider other relevant references relating to Aboriginal families and mental health and related health service use e.g. the SEARCH study in NSW (see papers by A Williamson), including cohort data on parent and child MH, and recent paper in BMJ Open on MH hospitalisations and ED presentations in Aboriginal children in the SEARCH cohort. The reviewer declares involvement in some, but not all, of this work. |
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| REVIEWER | Siham Sikander Health Services Academy & Human Development Research Foundation Pakistan |
| REVIEW RETURNED | 17-Jan-2019 |

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| GENERAL COMMENTS | <p>Important topic and paper. Overall paper written very clearly.</p> <p>In the abstract - the authors recommend holistic health care model, with a multisector approach, offering culturally appropriate services for Aboriginal people. The readers will benefit if this</p> |
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| | <p>recommendation (which is very apt and important) is also linked with the results/findings providing some rationale. It would benefit the readers to draw out the reasons for a sharp rise in Anxiety and Mood disorders category of mental health issues in 1997 and then more or less staying around the 70 per 1000 births.</p> |
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VERSION 1 – AUTHOR RESPONSE

Reviewer: 1

Reviewer Name: Kathleen Falster

| Comment | INTRODUCTION | |
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| 1 | - Some more context about the complex mental healthcare landscape in WA/Australia would be beneficial for readers (e.g. mix of public/private inpatient and outpatient mental health services, mainstream vs community controlled services for Aboriginal people), including what is/isn't captured in state and national population datasets. | Added a brief overview of the WA mental health services in the Methods section, under Data source. |
| 2 | - This study can quantify particular types of mental health service use but can't quantify the prevalence of mental health problems; for this reason, it would be better to refer to the outcome as 'mental health service use' rather than interchangeably referring to 'mental health problems' when talking about the study outcome (e.g. in lines 13-14 page 3). | Given the limitations of the data we agree with the reviewer to change the label of mental health problems to reflect service use. We have decided to use 'mental health-related contacts' to capture mental health diagnoses as well as mental health related issues. |
| 3 | - It would be useful to include more specific research question/objectives at the end of the Introduction; this will provide a basis for the reader to understand the author's selection of analysis methods, interpret findings etc. | We have provided a fuller description of the aims in the last paragraph of the Background. This includes an articulation of 4 specific aims. We believe this provides a clearer scaffold for the results and subsequent discussion |
| | DATA | |
| 4 | - It would be useful to include a brief description of the information/services captured in the original data sources that have been linked for this study. For example, it would be useful to briefly describe the type of public/private mental health services captured in the HMDS and the MHIS, including any important limitations that are relevant to the interpretation of the findings. | Extra information on mental health services captured by this study was included in this section under Primary outcome. Limitation on the data extended in Limitation section, first paragraph. |
| | OUTCOME | |

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| 5 | <p>- It would be more appropriate to define the outcome as 'mental health service use' (with specific details of the services captured and acknowledgement of what isn't captured in the methods), rather than mental health problems. This is the best available information at present, which makes it a valuable contribution in its own right, but it certainly isn't a measure of mental health problems at a population-level.</p> | <p>Refer to comment 2.</p> <p>We agree with the reviewer and have changed the label to 'mental-health related contacts' and we have included more information on what is captured in the methods.</p> |
| 6 | <p>- The use of secondary diagnoses to identify the outcome is problematic for a few reasons. In the case where mental health hospitalisations and outpatient appointment are being used as a proxy for mental health problems (despite all the gaps in other MH service types/medicines etc.), then using secondary diagnoses will introduce bias because sicker people (who are hospitalised) will more likely to be identified as having mental health problems than people who are not hospitalised. It is also likely that mental health problems are not consistently recorded as secondary diagnoses, unless they are very severe. If the outcome is redefined as 'mental health service use', then hospitalisations or outpatient appointments for other reasons should not be counted as mental health related.</p> | <p>Refer to comment 2.</p> <p>The objective of this study is to capture the wide majority of mental health related contacts using all available data due to the fact we will under-ascertain mental health issues using our data sources. Therefore, we have chosen to utilise the secondary diagnoses to improve the ascertainment and we have noted the reviewers concerns in the limitations that these may not be consistently recorded.</p> |
| 7 | <p>- The study population was previously described as Aboriginal children born in WA between 1990 and 2013. But later the authors refer to 'in-scope' mothers (line 10, page 4) - please clarify what this means. Perhaps a section defining the study population and the focus on the children's mothers would be useful in an earlier section (e.g. under a heading 'Study design, population and setting').</p> | <p>Then word 'in-scope' was removed.</p> |
| 8 | <p>- Given the reasons for hospitalisations and outpatient appointments are likely to differ substantially, it would be useful to present the two outcomes separately (e.g. panel figures side by side), in addition to (or alternative to) the aggregate outcome of hospitalisation or outpatient appointment.</p> | <p>While we recognise that the reasons for hospitalisations and mental health service contacts are likely to differ between services, presenting our results separately is not consistent with our primary objective. Geographical distribution of services and the differences in service utilisation and access across the state might create different mix of service use within the different regions, and</p> |

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| | <p>by showing them separately we do not think this would consistently capture the same measure of service use across the state. Therefore, we think that an aggregated outcome will provide a more homogenous measure.</p> |
| <p>9</p> <p>- while social issues (e.g. related to housing, employment) frequently co-occur with mental health problems, it seems problematic to include these in the 'broader' mental health diagnosis category for this study. It comes back to whether the aim is to quantify MH service use or to create a proxy for MH problems with the available data, despite all the known service gaps and under ascertainment of MH problems based on service use alone. When it comes to interpreting the results later, it also seems problematic to say that 'broader' MH issues were one of the most prevalent MH problems, when really this is a mixed bag of otherwise un-categorised diagnoses.</p> | <p>Addressed in part in comment 2.</p> <p>As mentioned earlier, this study aimed to analyse not exclusively mental health diagnosis but mental health-related contacts, which also encompasses other hospital admissions and mental health related contacts. We have therefore ensured that we have broken down the mental health-related codes to the specific diagnoses groups as well as mental health-related codes. Some context was added in Methods section under Primary outcome.</p> |
| <p>COVARIATES</p> | |
| <p>10</p> <p>- Maternal age at childbirth is not mentioned in the methods. It is unclear why the authors group maternal ages 20-29 years into one group - the majority of births lie in this category and aggregating up is likely to mask any variation across the maternal age range.</p> | <p>Added description under subsection for Covariates. Our main reason for establishing this grouping of maternal age was to compare our findings by maternal age with those of O'Donnell et al (2013) among the total population. One important finding of this study, as mentioned in the Conclusion, was that older maternal age was associated with higher maternal mental health contact among Aboriginal children, which is in contrast to the earlier, total population findings. In addition, we were keen to establish consistent age group categories, where possible with the available data; 5-year groups would have potentially provided some limitations for</p> |

analysis of 30-34 and 35-39 year groups.

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| 11 | <p>- what underlies your choice of the three covariates (SES, remoteness and maternal age) in your analysis? It is unclear from the introduction why you have selected these characteristics in particular and what your conceptual model of the relationships between these variables and the outcome are.</p> | <p>The choice of covariates partly reflects the available data items, although SES, remoteness and maternal age are prominent risk factors in the extant literature on mental health—and are commonly implicated as playing a role in the processes that lead to mental health problems. These issues are addressed in the Background section, which also outlines the related topic (for which we have no data) of discrimination, marginalisation and dispossession suffered by Aboriginal communities, and indirect mechanisms of transmission of disadvantage from parents to children. Further, this selection of variables enabled a comparison with the findings in O'Donnell at al. (2013) and, accordingly, a comparison of the scale and nature of risks in Aboriginal and non-Aboriginal settings.</p> |
| <hr/> STATISTICAL ANALYSIS <hr/> | | |
| 12 | <p>- The first two sentences of the Statistical analysis section on page 5 (lines 37-40) seem redundant.</p> | <p>Removed redundant text.</p> |
| 13 | <p>- line 39, page 5 - 'mother suffered from a mental illness' - suggest using language consistent with the outcome measure, e.g. 'mother who had mental health-related hospitalisations or outpatient appointments'</p> | <p>Changed text to 'mental health-related contact'.</p> |

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| 14 | <p>- lines 43-44: the prevalence of MH service use are presented in the figures, not the trends as a percentage change - these appear to be reported in the text only</p> | <p>To clarify, the word 'presented' was replaced by 'reported' and incidence rate ratios and confidence intervals were reported in brackets in the 'Analysis' section.</p> |
| 15 | <p>- given you are interested in variation in MH service use across areas, including how area characteristics such as disadvantage and remoteness play a role, It seems like a multi-level modelling approach may be more suitable to address This particular question? However, which analytical approach is most suitable really comes back to the specific research questions of interest. It is unclear if the authors wish to establish whether the area factors are associated with MH service use (then just univariate answers this), do the area factors effect MH service use (then adjust for confounders to isolate the effect), or do a group of factors predict MH service use (e.g. risk prediction approaches, although very few covariates included in the paper).</p> | <p>The reviewer raises an important point here and one that we had given consideration to. A multilevel approach is not entirely consistent with our stated aims here or the structure of the data. We were interested in analysing the likelihood of a child being born to a mother who had a mental health-related contact, and investigate its association with key social determinants of health, using the available information in our data. We were not particularly interested in the variation of mental health contact across areas, or how the relationship between maternal mental health contacts and the predictors vary between areas. Given that we are not interested in the random effect we run a logistic regression model and we are adjusting for independence of the data by including area level variables in the model as well as by clustering by mother id. Finally, our variable of area (SES and Remoteness) do not have high enough number of level units sufficient to being able to run a robust multilevel model. As recommended in the literature, when the number of high level units are low, estimates are not stable enough and cannot be trusted, neither the variation between units (Maas et al, 2005; Goldstain, 2010; UCLA). Refer to comment 11 about the reasons for selecting covariates and number of covariates.</p> |

RESULTS

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| 16 | <p>- Page 6 - reporting of an 'ever MH health service use' percentage (i.e. 61.3%) seems questionable given the different periods of follow-up for the mothers prior to birth, and therefore, varying opportunities for MH contacts? It is different when fixed look-back periods (such as 5 years) are applied.</p> | <p>We agree with the reviewer and have removed from text and added only the prevalence for 5years pre-birth and 1 year post birth.</p> |
| 17 | <p>- line 51-52 - what is meant by the term prevalence trajectories? Does it refer to the change in prevalence over time in the trends analysis in this case?</p> | <p>Changed text to 'changes in prevalence over time'.</p> |
| 18 | <p>- in the first paragraph on page 7, there is no reference to whether the most common diagnoses change in the 1-year pre- and post-birth. This seems like an important issue for informing screening and support services in the ante- versus post-natal periods, when you may imagine there is a shift in the types of issues that women present with (or perhaps not for these services that are likely to see more severe and chronic MH problems).</p> | <p>In the second paragraph on Page 6 - when describing the most common diagnoses are referenced Figures A and B on Appendix A section. These figures display the prevalence of children whose mother had a mental health-related contact within 1 year prior to birth and 1 year post birth by year of birth and diagnosis type, respectively. Trends by diagnosis type in these figures do not differ significantly from the Figure 2, showing prevalence by diagnosis type for contacts 5 years prior to birth. For these reason, these figures were presented in the appendix and only briefly referenced in the text.</p> |
| 19 | <p>- what is the conceptual model and research questions that underlie your analysis, including the decision to undertake a multivariate analysis of the relationship between the exposures (socioeconomic status, remoteness and maternal age at childbirth) and the outcomes (mental health service contacts)?</p> | <p>Refer to comment 3.</p> |
| 20 | <p>- what are the models adjusted for?</p> | <p>How the models were fitted is described in the Methods section. Generalised liner models used for the trend analysis were adjusted by the total number of birth by year, which specifies the amount of exposure over children with maternal mental health contact. Furthermore, robust adjusted standard errors were fitted using the variance covariance</p> |

matrix to account for non-independence of error.

For the logistic regression model, univariate and multivariate, the data was clustered by mother adjusting for confounding given that mothers would have more than one child. Also, in the multiple model, when including more than one covariate, the odds ratios are the adjusted odd ratios given that they are accounting for the effect of the other covariates in the association with the outcome variable. The available information limited the number of covariates used in the model, however, the model was tested and there wasn't specification error suggesting that we can assume that the logit function is a linear combination of predictors and that we have included all the variables that should be in the model.

- how does one interpret the adjusted ORs? e.g. after adjustment for socioeconomic position and remoteness, the effect of maternal age and other unmeasured covariates on MH service use was X?. It would also be useful to present the unadjusted ORs because they tell us about the 'real world' differences between high and low SES areas etc. I am unclear how to interpret the adjusted models at present because the questions and conceptual model are not well described early in the paper. If the authors are not already familiar with the recent paper by Hernan, M.A 2018 American Journal of Public Health (The C Word: scientific euphemisms do not improve causal inference from observational studies), it is a nice summary that relates to a few of the previous questions.

We included Univariate ORs in table 2.

Given the limitation on the data the model only included three covariates. It is true that a low number of covariates when using standard regression models does not fully address the problem of confounding by unmeasured covariates. However, it should be considered that this problem is present in many studies given limited information only allows to account for a limited amount of confounding. However, in our model (other than being tested for specification error), the covariates included are key sociodemographic indicators and of the most relevant factors of confounding, especially among the Aboriginal population. Also, we clustered

the models by mother, so the models are accounting for possible confounding between children who have the same mother. See comment 3 addressing the improved definition of the study objective.

Finally, it is important to consider that the analysis undertaken in the model is a secondary objective of the paper in which the principal aim is the analysis of trends in maternal mental health among Aboriginal children.

| DISCUSSION | | |
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| 22 | - Same comment as previously re use of term 'MH problems' versus 'MH service use' when referring to study outcome throughout discussion. | Changed. |
| 23 | - While it is important to note the policy and practice changes that might underlie some of the changes observed during the study period, it is important to acknowledge that there are methods (e.g. interrupted time series analysis) that could be applied to test the change in MH service use relating to a particular policy/practice change. | It is not within the study objectives to evaluate public policy. This is addressed in the last paragraph of the Limitations section, also referencing where a full policy evaluation can be found. |
| 24 | - Page 7, line 56 'There was a consistent 2-fold increase...' - it is unclear what statistics this sentence is referring to. It reads as though there has been a comparison made between the prevalence of MH service use at 5-years compared with 1-year prior to birth, but I am unsure where this has been done. The comparisons appeared to be made across categories of SES, remoteness, maternal age at childbirth, and calendar years. | This result is a simple comparison of the prevalence resulting from figure 1 (Added Figure 1 as reference in text). Following that is the discussion of these findings. |
| 25 | - In discussing the implications in the paragraph starting on Page 7, line 56, it would be useful to acknowledge the type of MH service use captured in this study again as these data are more likely related to chronic and severe MH problems rather than post-natal depression that might be managed in primary care setting, for example. Also useful to acknowledge how the service models need to consider both mainstream and community | As mention earlier, it is clear that this data is more likely to capture more chronic mental health issues, and this is acknowledged in paragraph 4 of the discussion section (also added in limitations, see comment 4). However, these data do not capture exclusively those issues. The very high prevalence of pre and post- |

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| | controlled services (within the multi-sector approach). | natal mental health contact found in the study suggests that it also capturing issues developing around pregnancy, as antenatal and/or postnatal depression (also addressed in paragraph 4 of discussion section). |
| 26 | - Page 8, from line 34 - perhaps there has been a shift in the type of health services used after 2007 more than a change in prevalence of MH problems, which this study cannot measure? | The second last paragraph of the discussion section suggests the possibility of a shift in service use after the introduction of the Better Access initiative. |
| 27 | - Page 8, from line 42 - what are the unadjusted odds ratios? This is where you will see the real world burden of MH service use. Once you adjust for family-level socioeconomic indicators of disadvantage, the increased risks associated with maternal age are usually attenuated (e.g. relationship b/w maternal age and child development, PLOS Med 2018). | Unadjusted ORs were included in table2 (Refer to comment 21). |
| 28 | - Limitations 1st paragraph - true, but need to acknowledge that also there are many types of MH services, and this study only captures some of that. | Added in first paragraph of Limitations section. |
| 29 | - Concluding comments/implications to the paper after the Limitations? | A Conclusion section was added after the Limitations section. |
| 30 | - Given there is such limited peer reviewed literature on this topic, the authors may wish to consider other relevant references relating to Aboriginal families and mental health and related health service use e.g. the SEARCH study in NSW (see papers by A Williamson), including cohort data on parent and child MH, and recent paper in BMJ Open on MH hospitalisations and ED presentations in Aboriginal children in the SEARCH cohort. The reviewer declares involvement in some, but not all, of this work. | Added reference to Background, 3rd paragraph. |
| References | <p>_O'Donnell M, Anderson D, Morgan VA, Nassar N, Leonard HM, Stanley FJ (2013). Trends in pre-existing mental health disorders among parents of infants born in Western Australia from 1990 to 2005 <i>Med J Aust</i> 2013; 198 (9): 485-488. doi: 10.5694/mja12.11783</p> <p>_Highet, NJ and Goddard, AK (2014) Aboriginal and Torres Strait Islander Perinatal Mental Health Mapping Project: A scoping of current practice surrounding the screening, assessment and management of perinatal mental</p> | |

health across Australia's New Directions: Mothers and Baby Service program. Centre of Perinatal Excellence (COPE). June 2014.

_Maas, CJM & Hox, JJ (2005). Sufficient sample sizes for multilevel modelling. Methodology, 1, 86-92.

_Goldstein H (2010). Multilevel Statistical Models, 4th Edition. Wiley series in probability and statistics. DOI:10.1002/9780470973394

_UCLA: Institute for Digital Research and Education University. Mixed effect logistic regression. Retrieved from <https://stats.idre.ucla.edu/stata/dae/mixed-effects-logistic-regression/>

Reviewer: 2

Reviewer Name: Siham Sikander

Comment

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| 1 | Overall paper written very clearly. | Thank you. |
| 2 | In the abstract - the authors recommend holistic health care model, with a multisector approach, offering culturally appropriate services for Aboriginal people. The readers will benefit if this recommendation (which is very apt and important) is also linked with the results/findings providing some rationale. | Given the word limitations, the discussion section in the abstract only is a brief summary of what is included in the paper's Discussion section. The specific comment in the abstract makes reference to the paragraph 4 in Discussion section. However, the implications and recommendations linked to our findings can be found throughout the whole Discussion section. |
| 3 | It would benefit the readers to draw out the reasons for a sharp rise in Anxiety and Mood disorders category of mental health issues in 1997 and then more or less staying around the 70 per 1000 births. | Added to the second last paragraph of Discussion section. |

VERSION 2 – REVIEW

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| REVIEWER | Siham Sikander Health Services Academy & Human Development Research Foundation |
| REVIEW RETURNED | 05-Mar-2019 |

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| GENERAL COMMENTS | The reviewer completed the checklist but made no further comments. |
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