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Title: Post-pandemic recovery in psychiatric services: a cross-sectional comparison of inpatient admissions and acuity across three time periods
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Reviewer 1: Dallas Seitz
Institution: Department of Psychiatry, University of Calgary
General comments (author response in bold)

1. How was the OMHRS data obtained for research purposes? Even if informed consent is not required from participants for the use of the data an REB application is required to use the data for research. I actually don't think that this is an REB exempt study. The data in OMHRS is actually not available to the public, if there is a publicly available OMHRS dataset that could be used to provide this analysis (i.e. that anyone could download) then the authors should provide a link to this. The OMHRS data is also available through other sources such as ICES but even ICES access to data does require an REB approval.
Thank you for drawing our attention to this matter. We indeed received approval from the hospital's research ethics board for this study, and we reported this incorrectly in the original manuscript. We now state in the revised manuscript: "This study is part of a project that received approval from the authors' institutional research ethics board with a waiver of patient consent based on the Tri-Council Policy Guidelines for waiver of consent (HPRA#19.12.03)." (p. 7)

2. The methods in the abstract should include more information about the study sample, primary outcome measures and statistical analysis.
Thank you for your recommendation to include more information about the study sample, primary outcomes and statistical analysis in the abstract. We now state in the methods section of the abstract:
"We examined the changes between three time periods (pre-lockdown-June 22, 2019, to March 16, 2020; lockdown-March 17, 2020, to June 21, 2020; and post-lockdown-June 22, 2020, to March 16, 2021) in patient characteristics, including involuntary status, diagnosis and clinical scales using descriptive analysis. A cross-sectional sample of 9848 patients admitted to eight psychiatric hospitals in Ontario was included in the analysis." (p. 2)

3. The specific time periods of study should be included in the abstract as this is the exposure of interest.
Thank you for the recommendation, we have now included the time periods in the abstract. (p. 2)

4. I think that the relative risk measures might be more informative to report in the abstract than the absolute measures. Throughout the manuscript the values that are being contrasted along with the relative risks or odds ratios should be presented.
Thank you for your suggestion. In the abstract, we now report absolute measures, relative change in admissions and other variables. We agree that relative risk measures can be more informative. They can be especially useful to address research questions such as "what is the odds of being admitted post-lockdown relative to pre-lockdown" and "what are the predictors of admission rates." However, in our analysis, we did not conduct regression modelling to examine the associations between the admission rate and predictors. We were interested in

examining the impact of "lockdown" rather than forecasting the continued admission rate, and so we reported the descriptive data (number of involuntary admissions, average clinical presentation measures) and compared the three-time points (pre-lockdown, lockdown, and post-lockdown). The objective was to understand the discrete impact of lockdown (associated restrictions) in a specific time-period by comparing it with the pre-lockdown and post-lockdown periods. (p. 2)

5. How were the eight psychiatric hospitals selected (or why only 8 hospitals). Were these hospitals acute psychiatric hospitals accepting patients from emergency rooms or were they tertiary hospitals only accepting patients from acute psychiatric hospitals. The characteristics of the hospitals should be provided in more detail and contrasted to the remaining hospitals in Ontario.
Thank you for your question and recommendation. We did not include acute-care hospitals, which provide emergency care and urgent mental health assessments. We included the four specialty psychiatric hospitals in Ontario (CAMH, Ontario Shores, The Royal Ottawa/Brockville, and Waypoint), which include about half (1389) of the 2,760 long-term psychiatric beds across Ontario (Auditor's Annual Report, 2016 https://www.auditor.on.ca/en/content/annualreports/arreports/en16/v1_312en16.pdf). We also included four other regional psychiatric hospitals in the geographic areas not covered by the specialty hospitals. These eight hospitals encompass approximately 2/3 of long-term psychiatric hospital beds in the province. We provide the rationale for this selection in the Sample section of the revised manuscript:
"We accessed a cross-sectional sample of civil psychiatric patient admissions encompassing eight Ontario psychiatric hospitals that provide acute and longer-term adult mental health services, including the four largest specialty psychiatric hospitals in Ontario, encompassing 2/3 of Ontario's psychiatric beds." (p. 4)

6. I believe that restrictions (either partial or complete) were also implemented throughout the post-lockdown time period. How was this accounted for in the analysis?
Thank you for your comment and question. We chose the upper limit of the lockdown based on the date when most of Ontario with the exception of Windsor Essex (about 3% of the Ontario population) reached stage 2 of the recovery plan (s.https://globalnews.ca/news/6859636/ontario-coronavirus-timeline/). At this point, gatherings were permitted, and many indoor services and outdoor spaces reopened. Therefore, despite some restrictions, the population was no longer in a strict lockdown. That said, we agree that some partial restrictions were implemented throughout the post-lockdown period, and we have revised the manuscript in response to this and other reviewer comments:
1) we have added a new Figure 1 that shows admission changes over expanded pre-lockdown and post-lockdown periods;
2) we acknowledge the challenges of defining the lockdown and post-lockdown periods and the potential effects on our results in the Limitations section:
"we acknowledge that there is no clear-cut definition of lockdown.We conducted a secondary analysis of available, anonymized health records using a retrospective, cross-sectional design. Consequently, we could not examine the circumstances surrounding admissions, such as whether pandemic-related restrictions contributed" (Figure 1, p. 11)

Reviewer 2: David Rudoler
Institution: Institute for Mental Health Policy Research, Centre for Addiction and Mental Health
General comments (author response in bold)

1. Page 4: It would be helpful if the authors could provide a definition of psychiatric hospitals as it relates to this study. It would also be helpful if they could describe the acute care sector in Ontario, and how psychiatric hospitals fit into that sector.
Thank you for your suggestion. Our definition of a psychiatric hospital is a specialized hospital that provides psychiatric assessment and treatment services rather than general medicine or other specialized non-mental health services. The psychiatric hospitals in our study can work within the acute care sector, receiving admissions directly or transfers from a non-psychiatric hospital following emergency care and/or urgent mental health assessments. We now provide this definition and context in the manuscript as follows:
"We accessed a cross-sectional sample of civil psychiatric patient admissions encompassing eight Ontario psychiatric hospitals that provide acute and longer-term adult mental health services, including the four largest specialty psychiatric hospitals in Ontario, encompassing 2/3 of Ontario's psychiatric beds." (p. 4)

2. Page 4: Please provide additional details on the "major restrictions" that were lifted post-lockdown. This is needed to understand why there would be an affect on psychiatric hospitalization.
Thank you for your comment and suggestion. We chose the upper limit of the lockdown based on the date when most of Ontario with the exception of Windsor Essex (about 3% of the Ontario population) reached stage 2 of the recovery plan and most major restrictions were lifted (s.https://globalnews.ca/news/6859636/ontario-coronavirus-timeline/). At this point, gatherings were permitted and many indoor services and outdoor spaces reopened. Therefore, even though some restrictions remained, the population was no longer in a strict lockdown.
We now expanded the sentence to include the following in the Study Tim Periods part of Methodology:
"Then we defined lockdown from the date Ontario's state of emergency was declared to the date many indoor services and outdoor spaces were reopened: … (pp. 4, 5)

3. Page 4: It would be helpful if the authors explicitly stated their hypotheses as suggested in the STROBE statement.
Thank you for this suggestion. We have now explicitly stated our hypotheses as follows:
"We hypothesized: 1) the admission rate would decrease during lockdown but approximate the pre-lockdown rate in the post-lockdown period; 2) the involuntary admission rate would increase during lockdown but approximate the pre-lockdown rate in the post-lockdown period; and 3) measures of clinical presentation would show higher acuity during lockdown but approximate pre-lockdown levels in the post-lockdown period." (p. 4)

4. Page 4: Please provide additional details on how duplicates were handled; for instance, were the most recent admissions used?
Thank you for your question. We have included more detail in the revised manuscript and now state:
"We excluded 310 (3%) cases with no unique identification and 1435 repeated admission (comprising 6%, 1%, and 6% of pre-lockdown, lockdown, and post-lockdown admissions respectively. The final sample comprised 9848 cases.." (p. 4)

5. Page 5: The description of the OHMRS database could be more specific -- it could state that it includes demographic and clinical data on all adult psychiatric inpatient hospitalizations in Ontario.
Thank you for your suggestion. We now state:
" We used data extracted from the Ontario Mental Health Reporting System (OMHRS). OMHRS incorporates the Resident Assessment Instrument — Mental Health (RAI-MH) (24) and demographic and clinical data on all adult psychiatric inpatient hospitalizations in Ontario." (p. 5)

6. Page 5: It is not clear how the collection of sociodemographic variables (e.g., sex, age, marital status, education, and income insecurity are related to the study objectives. The same comment applies to length of stay. Please provide some rationale for the collection and analysis of these variables, and how they pertain to the study objectives and hypotheses.
Thank you for your feedback. To address the study objective to examine the changes in patient characteristics admitted to psychiatric hospitals in three time periods, including before the first COVID-19 lockdown, during lockdown and post-lockdown, we conducted a descriptive analysis to compare admission rates, involuntary admission status and clinical presentation between the three time-periods. Separate from our study objectives, we also described our sample using demographic variables to understand the broader characteristics of the patients (e.g., age, sex and length of stay). We included this descriptive information because it may contribute to identifying target patients when strategizing mitigation policies and guidelines as we navigate the new normal. (p. 7)

7. With respect to the statistical analyses, I wonder if the independence assumption holds. This study involves the use of repeat cross-sections on 8 psychiatric hospitals in Ontario. I also wonder if the authors considered modelling approaches that are more typical for repeated cross-sectional designs. A similar paper was published using similar data (also cited by the authors) that uses these approaches: Strauss R, Fu L, Guan J, et al. Utilization of Physician-Based Mental Health Care Services Among Children and Adolescents Before and During the COVID-19 Pandemic in Ontario, Canada. JAMA Pediatr. 2022 Feb 7;e216298.
Thank you for suggesting a repeated cross-sectional design. In the paper you suggested, the authors measured changes in utilization of mental health care, using Poisson generalized estimating equations models for clustered count data to model 3-year pre–COVID-19 trends and used these to forecast expected post–COVID-19 trends in the absence of restrictions. In the current study, we were interested in examining the impact of "lockdown" rather than forecasting the continued admission rate and factors associated with psychiatric admissions. So instead, we simply reported the descriptive data (number of voluntary admissions, average clinical rating scales) and compared the three-time points (pre-lockdown,

lockdown, and post-lockdown). Our objective was to understand the discrete impact of lockdown (associated restrictions) in a specific period by comparing it with the pre-lockdown and post-lockdown periods. (pp. 4, 6)

8. Throughout the results section, I think it is important that the authors not only comment on the statistical significance of their results, but also the policy/clinical significance. For example, is a .42 increase in the Violence Sum clinically meaningful, or a .25 decrease in the Depression Severity Scale?
Thank you for your feedback and suggestion. Although we could not find references to minimally clinically important differences for the RAI-MH, we now comment on the clinical meaningfulness of our findings for outcomes that were associated with a provisional diagnosis and the policy implications for the study findings in the Interpretations section.
Specifically, we state:
"Due to the apparent increase in clinical acuity – likely further exacerbated by the social, economic, and health inequities that emerged during the pandemic – broader policy initiatives that address the social determinants of mental health and provide equitable, timely and well-coordinated access to mental health services are urgently needed." (p. 10)

9. Can the authors comment on why they decided not to include all inpatient hospitalizations in Ontario in their analysis (i.e., data from the Discharge Abstract Database)? Do the authors have a sense of what proportion of mental health-related hospitalizations they capture, and how generalizable their findings are? Or, should the generalizability of their findings be restricted to the 8 observed psychiatric hospitals?
Thank you for your comment. As we described earlier, the data we include captured approximately 2/3 of psychiatric beds across the province. We do feel this provides some basis for generalizability. When discussing generalizability in the Interpretation section, we now specifically mention "other psychiatric hospitals in Ontario ..." (p. 11)