Reviewer's report

Title: Changes in mental health services and suicide mortality in Norway: an ecological study

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Reviewer: Girdhar Agarwal

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Review of the paper “Changes in mental health services and suicide mortality in Norway: an ecological study” by Håkon A. Johannessen, Gudrun Dieserud, Bjørgulf Claussen and Per-Henrik Zahl

The aim of the present study is to determine if the increased mental health service resources had an impact on suicide mortality in five Norveiginal health services in period 1990-2006.

I have following comments:

1. Quality of data : The regional figures are available from 1998 onwards. For period before 1998, figures for the whole country are used. Why are not they doing the study for the period 1998-2006, when the actual data are available for the five regions in question. Otherwise they should do the study for the whole country for the period 1990-2006. For year 1998 data, the average of figures for 1997 and 1999. All these factors will have bearings on the analysis.

2. Choice of Model I am not cleat about the use of Poisson regression model. Why are not they using “Suicide mortality rate” as outcome variable (Y) and use logistic regression model. In order to use Poisson distribution, they have to check its assumptions, namely mean, variance and cumulants of Y should be approximately equal. In the case of failure of the Poisson assumptions, the negative binomial distribution will be a reasonable alternative model.

3. Choice of explanatory variables I am sceptical about the choice of “five mental health services variables” (no. of man-labor years, no. of discharges,.....etc.). They are studying the impact of mental health services in the improvement of suicide rate in the period 1990-2006. The choice of variables should reflect this fact, e.g. the selected health services should be those, which were not available prior to the year 1990 or the ones which reflect the changes (e.g. increase or decrease in no. of man-labor years etc.)

4. Time should be a covariate as the incidence rate might be changing with time.

5. Collinearity (p. 5) Collinearity among explanatory variables is checked by finding the correlations between them. This is not done. If collinearity is present, what measures were taken to handle it?

6. Result In this section crude RR is expressed in fractions as well as in
percentage. Only one format should be used.

The suicide rates decline mostly from 1990 to 1994 and levelled off after that. In contrast, the major changes in health services occur during the period 200-2006. Obviously, there is no association between suicide rates and improved health services. Hence, there is no need to fit any kind of models.

In this situation, subgroup analyses should be performed for the periods (i) 1990-1994, (ii) 1995-1999 and (iii) 2000-2006.

7. No significant association is found between the suicide mortality and the five mental health services variables. These might be due to the facts mentioned above (Comments 1-5).

8. The significant association is found between outcome variable and sales of alcohol, unemployment and education. For these variables, confidence intervals are given. These should be accompanied by exact p-values. In my view, these associations will be marginal since the most of the limits of confidence intervals are close to 1.0. Again these significance might be superfluous in view of comments 1-5.

In view of the above comments, I could not recommend the paper for publications.

Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:

I declare that I have no competing interests.