

## PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (<http://bmjopen.bmj.com/site/about/resources/checklist.pdf>) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

### ARTICLE DETAILS

|                            |  |
|----------------------------|--|
| <b>TITLE (PROVISIONAL)</b> | Epidemiological trends in Covid-19 pandemic: prospective critical appraisal of observations from six countries in Europe and America |
| <b>AUTHORS</b>             | Velicu, Maria; Furlanetti, Luciano; Jung, Josephine; Ashkan, Keyoumars   |

### VERSION 1 – REVIEW

|                        |   |
|------------------------|---|
| <b>REVIEWER</b>        | Hussein H. Khachfe<br>American University of Beirut Medical Center, Lebanon |
| <b>REVIEW RETURNED</b> | 26-Nov-2020   |

|                         |   |
|-------------------------|---|
| <b>GENERAL COMMENTS</b> | <p>The authors present a rather interesting epidemiological study on covid-19 trends from six countries. However, I do believe some minor issues must be addressed before a final decision can be made.</p> <p>Materials and Methods<br/>- Please remove all urls from text and simply add them as in-text citations.</p> <p>Discussion<br/>- The authors explain the surge of cases using both analysis and their predictive model. They claim that the peak is September, however, we can see new spikes of covid-19 cases in a lot of countries and new peaks in countries such as Sweden. How can the authors explain this.</p> |
|-------------------------|---|

|                        |   |
|------------------------|---|
| <b>REVIEWER</b>        | Natalya Glushkova<br>Department of Epidemiology, Evidence Based Medicine and Biostatistics, Kazakhstan Medical University Higher School of Public Health (KSPH) |
| <b>REVIEW RETURNED</b> | 03-Jan-2021   |

|                         |  |
|-------------------------|--|
| <b>GENERAL COMMENTS</b> | <p>The manuscript is well written, and the results are very and convincing.</p> <p>Nevertheless some changes should be made in the results section and in the discussion section.</p> <p>The Methods Section, subsection "Data variables", line 46th: Please, clarify sentence "...In order to measure disease severity, infection fatality rate was preferred over the case fatality rate...", because disease severity can not be measured as IFR. Please, also rephrase it in the discussion section.</p> |
|-------------------------|--|

|  |   |
|--|---|
|  | In the Discussion section, subsection "Biological explanations" is very extensive and goes beyond the discussion of the research results. The section should be written more concisely, otherwise the description will shift to a discussion of virology and virus genetics, which is not the objective of the article. |
|--|---|

|                        |  |
|------------------------|--|
| <b>REVIEWER</b>        | Wang, Jinfeng<br>Institute of Geographic Sciences and Natural Resources<br>Research, Chinese Academy of Sciences |
| <b>REVIEW RETURNED</b> | 02-Feb-2021  |

|                         |  |
|-------------------------|--|
| <b>GENERAL COMMENTS</b> | <ol style="list-style-type: none"> <li>1. abstract: clarify the meaning of "outcomes"</li> <li>2. any categorical factors?</li> <li>3. measure and attribute the spatial stratified heterogeneity of the statistics, interpret the statistical findings in epidemiology</li> <li>4. draw a diagram to connect the parameters discussed in the paper</li> </ol> |
|-------------------------|--|

### VERSION 1 – AUTHOR RESPONSE

**REVIEWER #1:**

---

The authors present a rather interesting epidemiological study on covid-19 trends from six countries. However, I do believe some minor issues must be addressed before a final decision can be made.

a. Materials and Methods

- Please remove all urls from text and simply add them as in-text citations.

*Many thanks for the kind comment. We agree with your observation and have amended the manuscript accordingly, changing the websites' addresses to in-text citations.*

b. Discussion

- The authors explain the surge of cases using both analysis and their predictive model. They claim that the peak is September, however, we can see new spikes of covid-19 cases in a lot of countries and new peaks in countries such as Sweden. How can the authors explain this.

*Many thanks indeed for your comment. Our study focused on the data from March to September 2020 period. As you quite rightly state, in the last 4 months whilst our manuscript has been under review, the pandemic has continued to evolve with further peaks in various countries, as expected from such a dynamic disease. Clearly for the purposes of the study we had to have a start and an end date as mentioned above. Nonetheless, we hope you agree the information provided by our study contributes to the understanding and management of the current and potential future peaks.*

**REVIEWER #2:**

---

The manuscript is well written, and the results are very and convincing. Nevertheless some changes should be made in the results section and in the discussion section.

a. The Methods Section, subsection "Data variables", line 46th: Please, clarify sentence "...In order to measure disease severity, infection fatality rate was preferred over the case fatality rate...", because disease severity can not be measured as IFR. Please, also rephrase it in the discussion section.

*Many thanks indeed for the kind comment. The authors agree with the comment and have amended the sentence as follows:*

**Page 6, Lines 46-47**

***"Among the measures used to assess the proportion of individuals with fatal outcomes, infection fatality rate was preferred over the case fatality rate"***

b. In the Discussion section, subsection "Biological explanations" is very extensive and goes beyond the discussion of the research results. The section should be written more concisely, otherwise the description will shift to a discussion of virology and virus genetics, which is not the objective of the article.

*Thank you for this valuable comment. We agree with your point and have amended the subsection "Biological explanations", deleting a large paragraph there. Please see changes made at Page 15, where Lines 28-58 have been removed.*

**REVIEWER #3:**

---

a. abstract: clarify the meaning of "outcomes"

*Thank you for your comment. We have amended the manuscript accordingly, changing the term "outcomes" with "infection fatality rate and the number of intensive care unit (ICU) and hospital admissions".*

b. any categorical factors?

*All the factors used in this study are continuous variables. There are no categorical factors included in the analysis.*

c. measure and attribute the spatial stratified heterogeneity of the statistics, interpret the statistical findings in epidemiology

*Thank you for this valuable suggestion. As suggested, we have included the analysis of the variables daily new deaths, daily new tests, ICU and hospital admissions, IFR and prevalence using the method for the measurement of the spatial stratified heterogeneity (Wang, J., Zhang, T. and Fu, B., 2016. A measure of spatial stratified heterogeneity. Ecological Indicators, 67, pp.250-256), which we have also used as in-text citation. The description of the implementation of the statistic with our data has been added to our "Methods" section:*

***"A final analysis of data heterogeneity has been performed using the method proposed by Wang et al. (19) for the determination of spatial stratified heterogeneity( $q$ ) and its probability density function( $F$ ). The  $q$  statistic has been used as a tool for the assessment of the within and between countries heterogeneity. Data for each variable has been compared among the six countries during three consecutive periods corresponding to equally distributed time intervals from March until September. The variables included in the analysis were the numbers of daily new tests and deaths, the ICU and hospital admissions, and the IFR and prevalence. "***

*The results of the data processing using this method as well as their interpretation have been included in our "Results" section:*

***"When examined for heterogeneity, the analysis has shown that there is significant heterogeneity within the data records of each country and for all variables, with higher  $q$  statistic values reflecting the within country and not the between countries heterogeneity for the variable analysed ( $F_{\alpha}$  calculated for  $\alpha=0.05$ ). Overall, the analysis shows an increasing within country heterogeneity of the data towards September for the numbers of daily new deaths, ICU and hospital admissions, whereas for the number of daily tests, prevalence and IFR, the last period shows a trend towards less heterogenous data. The increased  $q$  statistic values towards September for the explanatory variables, and decreased for the outcome variables, are in accordance with the maintained low IFR across all countries during the time interval between July and September."***

d. draw a diagram to connect the parameters discussed in the paper

*Thank you for this suggestion. We agree that a diagram could contribute to a better understanding of the parameters that have been analysed, but our paper has already reached the upper limit of tables and figures allowed by the journal.*

**VERSION 2 – REVIEW**

|                         |  |
|-------------------------|--|
| <b>REVIEWER</b>         | Wang, Jinfeng<br>Institute of Geographic Sciences and Natural Resources<br>Research, Chinese Academy of Sciences |
| <b>REVIEW RETURNED</b>  | 26-Feb-2021  |
| <b>GENERAL COMMENTS</b> | revised  |