

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

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| TITLE (PROVISIONAL) | Effect of the Tokyo 2020 Summer Olympic Games on COVID-19 Incidence in Japan: A Synthetic Control Approach |
| AUTHORS | Yoneoka, Daisuke; Eguchi, Akifumi; Fukumoto, Kentato; Kawashima, Takayuki; Tanoue, Yuta; Tabuchi, Takahiro; Miyata, Hiroaki; Ghaznavi, Cyrus; Shibuya, Kenji; Nomura, Shuhei |

VERSION 1 – REVIEW

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| REVIEWER | Dergaa, Ismail Primary Health Care Corporation |
| REVIEW RETURNED | 14-Mar-2022 |

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| GENERAL COMMENTS | <p>BMJ Open Review (R1):</p> <p>"Cases and Races: the Tokyo 2020 Summer Olympic Games and COVID-19 Cases in Japan, a Synthetic Control Study". The article assessed whether the hosting of the Tokyo Olympic Games was associated with a change in the number of COVID-19 cases in Japan. Thus, new findings in this regard might be important for sports scientists, sports managers, and major event organizers, as well as physicians, public health specialists, and epidemiologists. The manuscript fits the scope of BMJ Open and presents interesting findings, so I recommend it for publication. However, the manuscript still contains some lacune and some comments should be considered before acceptance. I recommend a major revision.</p> <p>1. Title should be rephrased: Either you delete Cases and Races or replace it by something else. 1. Kindly delete these sections: "Design: Synthetic control design." "Main outcome measures: Daily confirmed cases of COVID-19 per 1,000,000 population."</p> <p>Keep the abstract simple (Background, Aim, Methods, Results and conclusion)</p> <p>2. Abstract: results section: don't start it with: We found as of the closing day of the Olympics, just present your results directly.</p> <p>3. Some of the Keywords are duplicated with the title please delete Japan, COVID-19, synthetic control, Olympic</p> <p>You may add also: Just keep "mega-events" Pandemic, sars-cov-2, delta variant</p> |
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| | <p>4. Introduction: The introduction is lacking much background information; the authors are requested to read and cite those manuscripts which are pioneer studies in sports event organisation. The authors are also requested to modify their introduction and discussion section accordingly.</p> <p>A. Dergaa, I., Abdelrahman, H., Varma, A., Yousfi, N., Souissi, A., Ghram, A., ... & Farzian, S. (2021). COVID-19 vaccination, herd immunity and the transition toward normalcy: challenges with the upcoming sports events. <i>Annals of Applied Sport Science</i>, 9(3), 0-0. DOI: http://dx.doi.org/10.52547/aassjournal.1032</p> <p>B. Dergaa, I., Varma, A., Tabben, M., Malik, R. A., Sheik, S., Vedasalam, S., ... & Chamari, K. (2021). Organising football matches with spectators during the COVID-19 pandemic: What can we learn from the Amir Cup Football Final of Qatar 2020? A call for action. <i>Biology of Sport</i>, 38(4), 677. DOI: https://dx.doi.org/10.5114%2Fbiolsport.2021.103568</p> <p>C. Dergaa, I., Saad, H. B., Souissi, A., Musa, S., Abdulmalik, M. A., & Chamari, K. (2022). Olympic Games in COVID-19 times: lessons learned with special focus on the upcoming FIFA World Cup Qatar 2022. <i>British Journal of Sports Medicine</i>. DOI: https://doi.org/10.1136/bjsports-2021-105276</p> <p>D. Dergaa, I., Musa, S., Romdhani, M., Souissi, A., Abdulmalik, M., Chamari, K., & Saad, H. B. (2022). FIFA World Cup 2022: What can we learn from the inspiring Tokyo 2020 Olympic Games held in COVID-19 times?. <i>Biology of Sport</i>, 39(4), 1073-1080. DOI: https://doi.org/10.5114/biolsport.2022.113293</p> <p>5. Discussion: Avoid using the present tense, keep the past tense everywhere. This will make sense for reader who will see your manuscript in the next years.</p> <p>Lane 1 of the discussion: The sentence should start this way “Our intention was to....”</p> |
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| REVIEWER | Zhang, Tao Sichuan University |
| REVIEW RETURNED | 22-Mar-2022 |

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| GENERAL COMMENTS | <ol style="list-style-type: none"> 1、 Authors need to provide justification behind the motivation of choosing such model. 2、 Methods section needs more explanation and justification, including adding formula. Authors need to mention the methods used in this study in the abstract and give the specific weight value in SCM. 3、 Authors have taken nice model for the study but they should justify these finding other studies also. 4、 Authors should supplement a discussion of SCM applications and related research in the Introduction section. 5、 Authors need to clarify the significance and advantages of this research, such as: what suggestions can be provided for future policy making? 6、 Authors need to add references to the Data section. 7、 Reference 5 is a Japanese PPT, please add a link to the webpage or an English PPT. |
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VERSION 1 – AUTHOR RESPONSE

Reviewer: 1

1. Title should be rephrased: Either you delete Cases and Races or replace it by something else.

We have revised the title from “Cases and Races: the Tokyo 2020 Summer Olympic Games and COVID-19 Cases in Japan, a Synthetic Control Study” to “Effect of the Tokyo 2020 Summer Olympic Games on COVID-19 Incidence in Japan: A Synthetic Control Approach.”

2. Kindly delete these sections:

“Design: Synthetic control design.”

“Main outcome measures: Daily confirmed cases of COVID-19 per 1,000,000 population.”

Keep the abstract simple (Background, Aim, Methods, Results and conclusion)

We have reconstructed the abstract accordingly.

3. Abstract: results section: don't start it with: We found as of the closing day of the Olympics, just present your results directly.

We have revised the results section in the abstract as follows. In addition, we found that the original data has been updated since the first submission (i.e., health expenditure in Hong Kong: 6.9 -> 6.5), so we re-estimated with the new data, which changes the estimated counterfactuals slightly.

Revised sentence in Abstract from:

We found as of the closing day of the Olympics, the number of observed cases per 1,000,000 population was 109.2 (7-day-average), which was 115.7% higher than the counterfactual trajectory comprising 50.6 confirmed cases per 1,000,000 population.

To:

The number of observed cases per 1,000,000 population on the last day of the Games was 109.2 (7-day-average), which was 115.7% higher than the counterfactual trajectory comprising 51.0 confirmed cases per 1,000,000 population.

4. Some of the Keywords are duplicated with the title please delete Japan, COVID-19, synthetic control, Olympic

You may add also:

Just keep “mega-events” Pandemic, sars-cov-2, delta variant

We have changed the Keywords accordingly.

5. Introduction: The introduction is lacking much background information; the authors are requested to read and cite those manuscripts which are pioneer studies in sports event organisation. The authors are also requested to modify their introduction and discussion section accordingly. A. Dergaa, I., Abdelrahman, H., Varma, A., Yousfi, N., Souissi, A., Ghram, A., ... & Farzian, S. (2021). COVID-19 vaccination, herd immunity and the transition toward normalcy: challenges with the

upcoming sports events. *Annals of Applied Sport Science*, 9(3), 0-0. DOI: <http://dx.doi.org/10.52547/aassjournal.1032>

B. Dergaa, I., Varma, A., Tabben, M., Malik, R. A., Sheik, S., Vedasalam, S., ... & Chamari, K. (2021). Organising football matches with spectators during the COVID-19 pandemic: What can we learn from the Amir Cup Football Final of Qatar 2020? A call for action. *Biology of Sport*, 38(4), 677. DOI: <https://dx.doi.org/10.5114%2Fbiolsport.2021.103568>

C. Dergaa, I., Saad, H. B., Souissi, A., Musa, S., Abdulmalik, M. A., & Chamari, K. (2022). Olympic Games in COVID-19 times: lessons learned with special focus on the upcoming FIFA World Cup Qatar 2022. *British Journal of Sports Medicine*. DOI: <https://doi.org/10.1136/bjsports-2021-105276>

D. Dergaa, I., Musa, S., Romdhani, M., Souissi, A., Abdulmalik, M., Chamari, K., & Saad, H. B. (2022). FIFA World Cup 2022: What can we learn from the inspiring Tokyo 2020 Olympic Games held in COVID-19 times?. *Biology of Sport*, 39(4), 1073-1080. DOI: <https://doi.org/10.5114/biolsport.2022.113293>

Thank you very much for this comment to improve the quality of our manuscript. We completely agree that it is better to include these prior studies.

To clarify this point, we have added the following sentence to Line 16-19 in Page 5:

For example, a series of studies concerning COVID-19 infection risk in upcoming sporting mega-events such as FIFA World Cup Qatar 2022 conducted by Dergaa and colleagues concluded that stringent public health policies such as a tight “bubble system” for players were key components to ensuring the successful containment of COVID-19.

6. Discussion: Avoid using the present tense, keep the past tense everywhere. This will make sensor for reader who will see your manuscript in the next years.

Lane 1 of the discussion: The sentence should start this way “Our intention was to....”

We have changed the tense and revised the Discussion section accordingly.

Reviewer: 2

1. Authors need to provide justification behind the motivation of choosing such model.

We highly appreciate this comment to improve the quality of our manuscript. This is a good discussion point. While there are other modeling methods such as the difference-in-differences approach, the SCM can be easily applied to specific cases where there is a pool of multiple control units and it is difficult to select the optimal group of controls. More precisely, in this study, it is difficult to select an ideal control for Japan from another country in the pool due to diverse differences in culture, politics and public-health approaches. The motivation for adopting the SCM is that it can generate (hypothetical) control with the optimal weights that yield the minimal mean squared prediction error (MSPE).

To clarify this point, we have added the following sentence to Line 5-7 in Page 7:

While other modeling methods such as the difference-in-differences approach are available, the SCM can be easily applied to specific cases where there are multiple control units and it is difficult to select the optimal group of controls for comparison with only one treated unit.

2. Methods section needs more explanation and justification, including adding formula. Authors need to mention the methods used in this study in the abstract and give the specific weight value in SCM.

Thank you very much for this important comment. We completely agree with this point. We have added the following sentences including the SCM formula in the abstract and method sections. In addition, we report the estimated values of weights in Supplementary Figure 1. To clarify the detailed values in Supplementary Figure 1, we have decided to include the values in Supplementary Table 2.

Revised the sentences from Line 31-32 in Page 6:

prediction error (MSPE) during the pre-intervention period. The conjugate gradient method was used for the optimization.

To Line 32 in Page 7 – Line 11 in Page 8:

prediction error (MSPE) during the pre-intervention period. More precisely, the SCM completes the following two-step minimization task iteratively to find optimal values of the predictor weight

vector β and the country weight vector γ :

where β , γ , M is the number of predictors, J is the number of control countries, and β_j and γ_j are the predictor vectors for the treated country (i.e., Japan) and the other J countries, respectively. Then, the weight vector β is optimized via the following:

where t_0 is the pre-intervention period and $I_j(t)$ and $I_o(t)$ are the number of COVID-19 cases in Japan and the other countries at time of t .

3. Authors have taken nice model for the study but they should justify these finding other studies also.

In conjunction with comment #5 from reviewer 1, we have decided to include several prior studies that are related to mega-sports events such as the Olympics and the FIFA World Cup. In addition, we found one more paper by Yamamoto et al. (2022, Ref #26 in the manuscript) that tried to evaluate the impact of the Tokyo Olympic on COVID-19 cases in Japan using the SCM. The major difference between our studies is that they created controls from other prefectures in Japan, whereas we created controls using other countries. They reported similar results to our findings: the number of observed cases per 1,000,000 population was around 100, while the number of counterfactual cases per 1,000,000 population was around 50, as of August 8, 2021.

To clarify this point, we have revised the manuscript as follow:

Add sentences to Line 16-19 in Page 5:

For example, a series of studies concerning COVID-19 infection risk in upcoming sporting mega-events such as FIFA World Cup Qatar 2022 conducted by Dergaa and colleagues concluded that stringent public health policies such as a tight “bubble system” for players were key components to ensuring the successful containment of COVID-19.

Add sentences to Line 7-10 in Page 11:

This estimate was consistent with prior results reported by Yamamoto et al. (2022), which compared Tokyo with other prefectures in Japan and found that the number of observed cases per 1,000,000 population in Tokyo was approximately 100, while the number of counterfactual cases per 1,000,000 population was approximately 50, as of the closing day of the Olympics.

4. Authors should supplement a discussion of SCM applications and related research in the Introduction section.

In conjunction with comment #1 from reviewer 2, we have added some sentences to the Introduction and Methods sections to supplement the SCM applications and to introduce some related research as follows:

Add sentence to Line 25-28 in Page 5:

The SCM has been widely used in the social sciences and is increasingly used in epidemiology to assess the impact of public health interventions, such as tobacco control policies, soft drink taxation, social welfare reform and COVID-19 interventions.

Add sentence to Line 5-7 in Page 7:

While other modeling methods such as the difference-in-differences approach are available, the SCM can be easily applied to specific cases where there are multiple control units and it is difficult to select the optimal group of controls for comparison with only one treated unit.

5. Authors need to clarify the significance and advantages of this research, such as: what suggestions can be provided for future policy making?

Thank you very much for this important comment to improve the quality of our manuscript. We have modified the Discussion section to include suggestions for future policy making.

To clarify this point, we have added the following sentence to Line 12-20 in Page 12:

In order to minimize the spread and burden of infectious diseases during mega-events, efforts should be made prior to the events to improve vaccination coverage in the host areas and the broader population, beyond the recommendation of the vaccination of athletes and other relevant persons including staff. In addition, we encourage consideration of additional health needs of not only those participating in the events, but also those who work and reside around the event locations, as well as the communities where most human traffic occurs as a result of the events. Preparations should be made at the clinic and hospital levels to accommodate an influx of patients who may be affected by changes in social behavior that can precipitate or further propagate disease outbreaks.

6. Authors need to add references to the Data section.

Regarding the data sources, we have detailed information in the Supplementary file with the citation URLs. We decided to include them in the main manuscript as well.

7. Reference 5 is a Japanese PPT, please add a link to the webpage or an English PPT.

Unfortunately, we were only able to locate this PPT in Japanese, and there does not appear to be an English version. We appreciate the Reviewer's understanding. Instead, we have added one reference (Ref#15) in English.

VERSION 2 – REVIEW

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| REVIEWER | Zhang, Tao Sichuan University |
| REVIEW RETURNED | 22-Aug-2022 |
| GENERAL COMMENTS | Agree to accept. |