Title: Excess Mortality in Suicide caused by COVID-19 in Japan: Update up to April, 2022

Junko Kurita[1],Tamie Sugawara[2], Yasushi Ohkusa[2]

1 Department of Nursing, Faculty of Sports & Health Science, Daitoubunka University, Higashimatsuyama,Saitama, Japan

[2] Infectious Disease Surveillance Center, National Institute of Infectious Diseases, Shinjuku, Tokyo, Japan

*) Correspondence to:

Infectious Disease Surveillance Center, National Institute of Infectious Diseases, 1-23-1 Toyama, Shinjuku-ku, Tokyo 162-8640, Japan

Tamie Sugawara tammy@nih.go.jp

ICMJE Statement

Contributors TS was responsible for the organization and coordination of the study. JK was the chief investigator and responsible for the data setting. YO developed the estimation model. All authors contributed to the writing of the final manuscript.

Keywords: COVID-19; excess mortality; NIID model; stochastic frontier estimation; suicide

Abstract

Background: Countermeasures against COVID-19 outbreak such as lockdown and voluntary restrictions against going out adversely affect human stress and economic activity. Particularly, this stress might lead to suicide.

Object: We examined excess mortality attributable to suicide caused by COVID-19.

Method: We applied the NIID model to suicide deaths from October 2009 through April 2022 for the whole of Japan by gender. Effects of the great earthquake that struck in eastern Japan on March 11, 2011, were incorporated into the estimation model.

Results: Significant excess mortality in suicide was found between July, 2020 and July, 2021 for both genders. However, in August and September, 2021, excess mortality in suicide was detected only in female. It was greater among females than among males. In total, 2950 excess cases of mortality were identified.

Discussion and Conclusion: Excess mortality during the four months was more than two times greater than the number of COVID-19 deaths confirmed by PCR testing. Countermeasures against COVID-19 should be chosen carefully in light of suicide effects.

1. Introduction

Since the emergence of COVID-19, excess mortality from all causes has been low in Japan [1] before the delta variant strain had emerged. However, countermeasures against COVID-19 outbreak such as lockdowns or voluntary restrictions against going out can cause stress and can suppress economic activity. Countermeasures might lower incomes or cause job loss. Such economic stress might lead to suicide [2]. Such difficulties should be counted as part of the costs for countermeasures.

Excess mortality attributable to suicide due to COVID-19 had been indicated [3,4]. However, the former may use inappropriate statistical method to estimate excess mortality and the latter used the data only until January 2021. Therefore, this study aims to update the situation of excess mortality attributable to suicide up to the latest available data using appropriate statistical method to estimates excess mortality.

2. Method

The estimation procedure was almost identical to that used for an earlier study [4] and thus we skip to describe detail about estimation procedure. The study area encompassed the entire nation of Japan. The study period for estimation was October 2009 throughApril, 2022 because of data availability. Suicide is defined as X60-X84 in ICD10. We adopted 5% as the level at which significance was inferred for results.

3. Results

Figure 1 presents observed suicide deaths, the estimated baseline, and its threshold

for males. Figure 2 shows corresponding data for females. These figures showed that males are more numerous than females, but consistently decline is noted in the period for both genders. The sharpest spike occurred around May 2011, probably because of the great earthquake that struck eastern Japan on March 11, 2011. More than two months passed after the event before suicide increased. The second sharpest increase occurred probably in the latest period.

Figure 3 presents excess mortality attributable to suicide since 2019. Among females, clearly large excess mortality was found since June, 2010. Among males, these were not greater than among females, but excess mortality in male was larger than female only in November, 2020. In the last 26 months since the beginning of 2020, total excess mortality in suicide was approximately 3624, especially in female, even though it declined sharply recently.

4. Discussion

This study applied the NIID model to suicide deaths to detect excess mortality attributable to COVID-19. Results showed that significant excess mortality attributable to suicide was found between July, 2020, and July, 2021, in both gender. .

Especially, suicide in females was extremely high in October, 2020. However, in November and December, 2020, excess mortality in suicide decreased. It might be affected by activation of “Go To Travel Campaign” on July 22 which subsidized travel and issuing coupons for shopping at tourist destinations which aims to enforce sightseeing business.

On the other hand, in August and September 2021, excess mortality was not observed in male. This is the first time of no excess morality in male or female since July, 2020. It might indicate that the effect of COVID-19 outbreak might disappear at least in male. Conversely, 91 and 13 suicide excess mortality was observed in female on the same months. This asymmetric phenomena may match the tact that suicide excess mortality in female was much larger than in male. The impact of COVID-19 outbreak for female might continue for a while.

To ascertain the most appropriate countermeasures for COVID-19 in Japan, cost-effectiveness analysis is necessary. At that time, loss of quality of life in should be counted among the costs of restriction of economic activity as a major part of countermeasures. It remains as a subject for our next research challenge.

5. Conclusion

The obtained results show excess mortality in suicide between July, 2020 and July, 2021 in both of gender. Especially, suicide in female in October, 2020 was remarkable. Moreover, in August and September, 2021, the suicide excess mortality was observed only in female. Though the number of suicide was larger in male than female, impact of COVID-19 outbreak for female may be larger than male. Continued careful monitoring of excess mortality attributable to suicide is expected to be necessary so as to control counter measure for COVID-19 not to be too restrictive for business and daily life.

The present study is based on the authors' opinions: it does not reflect any stance or policy of their professionally affiliated bodies.

6. Acknowledgement

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7. Conflict of interest

The authors have no conflict of interest to declare.

8. Ethical considerations

All information used for this study was published on the web site of MHLW [5]. Therefore, no ethical issue is presented.

9. References

1) Kurita J, Sugawara T, Ohkusa Y. Huge Excess Mortality Due to the Delta Strain of COVID-19 in Japan in August 2021. JDR 2022;17:57-60.

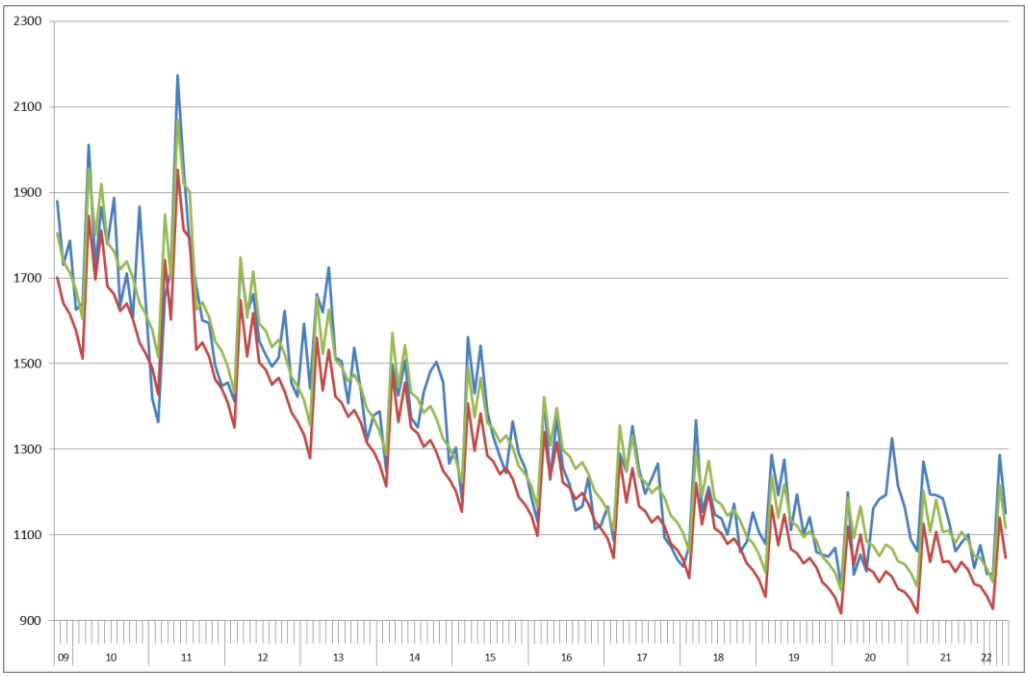
2) Japan times. Pandemic raises Japan suicide rate after decade of decline. https://www.japantimes.co.jp/news/2021/01/22/national/japan-suicide-rate/ [accessed on July 3, 2022]

3) Watanabea M, Tanaka H. Increased suicide mortality in Japan during the COVID-19 pandemic in 2020. Psychiatry Res 2022; 309: 114422.

4) Kurita J, Sugawara T, Ohkusa Y. Excess Mortality in Suicide caused by COVID-19 in Japan. Journal of Disaster Research 2022.17;51-6.

5) Ministry of Health, Labour and Welfare. Preliminary statistics on demographicshttps://www.mhlw.go.jp/toukei/list/81-1a.html (in Japanese) [accessed on July 17, 2022]

Figure 1: Observations of the estimated baseline and threshold for suicide deaths from October 2009 through April, 2022, among males.

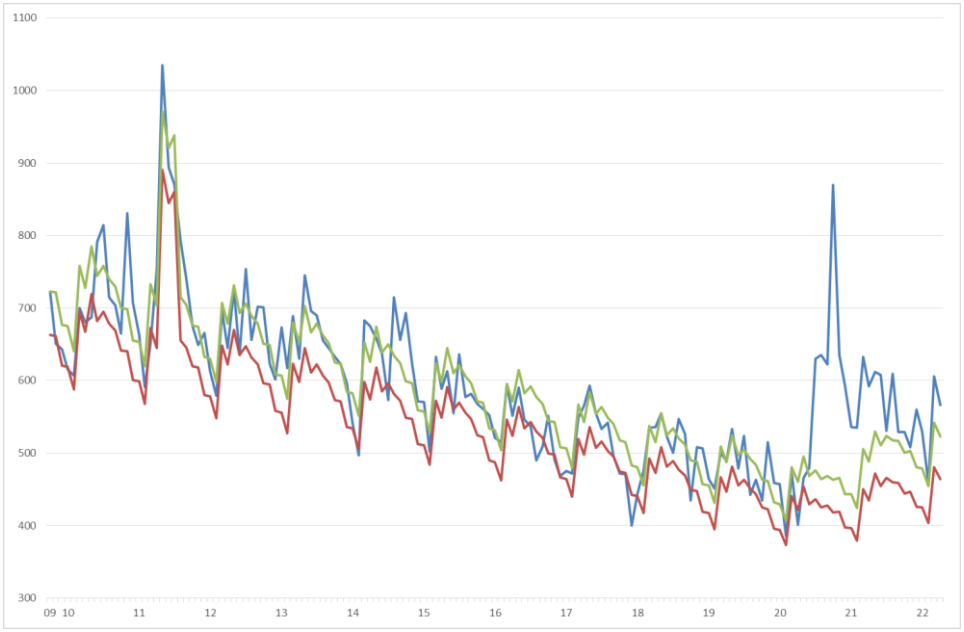


(persons)

Month/Year

Note: The blue line represents observations. The red line represents the estimated baseline. The green line shows its threshold.

Figure 2: Observations of the estimated baseline and threshold for suicide from October 2009 through April, 2022, among females.



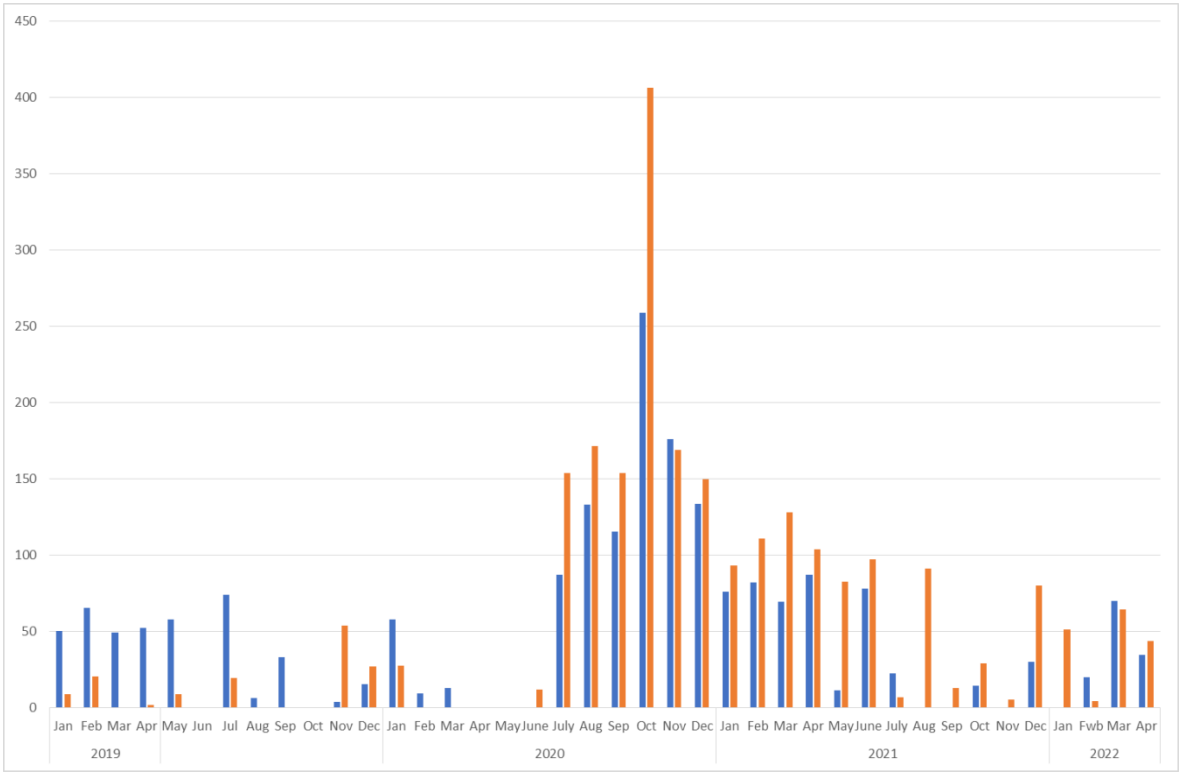
(persons)

Month/Year

Note: The blue line represents observations. The red line represents the estimated baseline. The green line shows its threshold.

Figure 3: Excess mortality in suicide by gender since 2019 by month in Japan.

(persons)



Note: The blue bars represents excess mortality in suicide among males. Orange bars indicate that among females.