Peer Review File

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Reviewer A:

The current study examined COVID-19 prevention behavior engagement among Japanese residents during the initial phases of COVID. This is an important contribution to the literature, as it better characterizes behavior change in the context of a pandemic and how government action potentially influenced those behaviors. I believe this study has important scientific merit, but would benefit from revisions in the introduction, methods, and results to facilitate clarity. My comments for potential points of improvement are below.

Reply: We are very grateful for your valuable comments. According to your advices, we have amended the relevant parts in the manuscript.

#Introduction

Comment 1: Page 2, line 75: "The first reported COVID-19 case was on January 16 until the end of March…" I'm confused by this statement, the first case lasted that long?

Reply 1: Thank you for pointing out this problem. We have amended the phrase to clear out the ambiguous meaning.
Revision:
The first reported COVID-19 case was on January 16; until the end of March, ; only sporadic outbreaks were identified. ; (Line 76—77, page 2)

Comment 2: The background information about the genome sequencing and the Diamond Princess seem unrelated to the paper.

Reply 2: Thank you very much for the comment. We have deleted the irrelevant parts.
Revision:
The World Health Organization officially named this new coronavirus disease 2019 (COVID-19) (1).(Line 74—75, page 2)

Comment 3: Page 2, line 81-82: "In early May, the daily reported cases remained a high level…" Just a small note, it seems like the word "at" is missing.

Reply 3: Thank you for the comment. We have added the word "at" in this phrase.

Revision:
In early May, the daily reported cases remained at a high level, and thus, the Japanese government maintained the nationwide state of emergency. (Line 82—84, page 2)

Comment 4: Page 2, line 83: "It was until May 21 that a considerable downtrend…" Should this say it wasn't until May 21? It may also help to add the year for future references.

Reply 4: Thank you for pointing out this issue. We have revised this phrase and added the year for future references.
Revision:
It wasn't until May 21, 2020 that a considerable downtrend of newly reported cases was observed, and the daily PCR confirmed cases remained below 50. (Line 84—85, page 2)

Comment 5: Page 2, line 87: You refer to mid-June, but a year would be helpful.

Reply 5: Thank you for pointing out this issue. We have added the year for future references.
Revision:
Up to mid-June 2020, the COVID-19 pandemic caused more than 7.7 million cases and nearly 430,000 deaths. (Line 121—122, page 3)

Comment 6: You discuss the state of emergency declaration, but then state that no mandatory lockdowns were enforced. It would be helpful to describe what procedures accompanied the state of emergency, if any, for those of us not from Japan so we can understand the context.

Reply 6: Thank you for this valuable comment. We have added a paragraph in the Introduction part to describe the procedures accompanied the state of emergency.
Revision:
The countermeasures implemented to control the spread of COVID-19 consisting of three phases: domestic spread prevention, preventing the spread of infection, and preventing severe spread. Under the state of emergency, the prefectural governors would ask the residents to stay at home unless necessary to maintain daily life and health. Department stores were asked to close every floor except those selling essential items such as food and medicine. Small-scale stores were demanded to take preventive measures against the infection. Extensive facilities such as universities/schools, sports centers, and those related to gatherings and exhibitions were requested to remain closed. Daycare centers, nursing schools, and welfare institutes were conditionally closed according to local government judgments. Meanwhile, public transportation was not stopped owing to the declaration. The Japanese government also vigorously promoted the "new lifestyle" to control the spread of infection, including the key message avoiding "3 Cs" (closed spaces,

crowded places, and close contact settings), and necessary measures such as keeping distance, wearing masks, and washing hands frequently. (Line 88—120, page 2—3)

Comment 7: Are there examples of the "straightforward and clear message" mentioned on page 3, line 96?

Reply 7: Thank you for the comment. We have amended the phrase in the manuscript.
Revision:
Meanwhile, to strengthen the citizens' awareness of self-restriction and behavioral change, Japanese government actively sent a straightforward and clear message through the mass media of avoiding the "3 C's" (5). (Line 129—131, page 3)

Comment 8: As I read through the rest of the paper, I'm not sure I have a clear timeline of events and declarations of emergency by region versus nationwide. It might be helpful to outline that further in the introduction for international readers.

Reply 8: Thank you very much for pointing out this weakness in our manuscript. We have revised the Figure 1 by adding the intervals of state of emergency and corresponding prefectures. Please see the revised Figure 1 for the details.

#Methods

Comment 9: What was the monetary incentive mentioned on line 121?

Reply 9: Thank you for the comment. We have completed the phrase in the Methods part.
Revision:
There was a monetary incentive for participants who complete the survey. (Line 160—161, page 3)

Comment 10: I believe the term "sex" should be used instead of "gender" given that male or female were asked about rather than man, woman, etc.

Reply 10: Thank you for the comment. We have replace the word "gender" by "sex" in the Methods, Results, Table 1, and Table 5.

Comment 11: What procedures did experts use to validate contents of the survey (line 124)?

Reply 11: Thank you for the comment. We have added the description of validation of questionnaire in the Methods part.
Revision:
The questionnaire was developed in Japanese, and local experts validated its content,

by inviting seven local people of different demographical backgrounds to test the questionnaires. (Line 184—185, page 4)

Comment 12: Line 128: "… evaluated score of the preventive activities by the local and central government." Can you describe this further?

Reply 12: Thank you for the comment. We have added the description of the score evaluation in the Methods part.
Revision:
Also, participants are asked to evaluated the preventive activities taken by the central/local government by giving an overall score (maximum 100) and reasons for it. (Line 191—193, page 4)

Comment 13: It is somewhat difficult to follow the data analysis description because I'm not fully informed about the measures used. Describing the measures in greater details and providing examples of questions would help make this clearer and replicable. Or, referring to Table 3 so we know where to find the list of questions.

Reply 13: Thank you for pointing out this deficiency. We have revised the Questionnaire design part.
Revision:
The questionnaire consisted of three parts: 1) demographic information including sex, education, occupation, income, location, with or without underlying disease; 2) preventive measures against COVID-19 before and after April 16, 2020 (questions are detailed in Table 2 and Table 3); 3) other behaviors related to COVID-19 pandemic (detailed in Table 4). The preventive behaviors are measured in five dimensions: personal protection, respiratory etiquette/cough etiquette, contact precautions, voluntary quarantine, and prompt reporting. Also, participants are asked to evaluate the preventive activities taken by the central/local government by giving an overall score (maximum 100) and reasons for it. (Line 185—193, page 4)

#Results

Comment 14: When you say "had the highest proportion of difference" (line 158), does that mean more people started engaging in that behavior? What is the percentage referring to, the change in the number of respondents doing that behavior or how many did it after the emergency was announced?

Reply 14: Thank you for the comment. We would like to say that more people started engaging in the behaviors by the expression of "had the highest proportion of difference". The percentage referring to the change in the number of respondents doing the preventive measures. We have revised the corresponding phrases for more accurate description of results in Table 2.
Revision:

According to the personal protection measures carried out among the participants from the emergency area, “wear a mask when going out” had highest proportion of increase in taking this measure after the announcement of state emergency (20.3%; 95% CI, 18.4–22.2), (Line 223—225, page 4)

Similar findings were found in the respondents from the nonemergency area; the proportion of increased participants in “wear a mask when going out” was 20.4% (95% CI, 18.4–22.4), (Line 226—228, page 4)

Moreover, “wash hands with soap (or disinfect hands) immediately after a cough or sneeze” had the most considerable proportion of increase in respiratory etiquette/cough etiquette carried out by the participants from the emergency area (11.8%; 95% CI, 10.3–13.4) and nonemergency area (10.5%; 95% CI, 8.9–12.0). (Line 229—247, page 4—5)

In terms of contact precaution measures, in the emergency area, it was the “avoid proximity (closeness) with other people” recorded the highest increase (20.9%; 95% CI, 18.9–22.9), (Line 247—249, page 5)
On the other hand, in the nonemergency area, “avoid being in an enclosed space with other people” (19.7%; 95% CI, 16.6–21.7) had the highest increase in proportion of differences, followed by “avoid proximity (closeness) with other people” (19.2; 95% CI, 17.2–21.2). (Line 250—253, page 5)

Comment 15: Lines 187-188: “Ages 41–50 (OR, 0.772; 95% CI, 0.633–0.942) and 51–60 (OR, 0.714; 95% CI, 0.580–0.880) were the negative factors related to preventive behaviors.” I’m not sure what this means.

Reply 15: Thank you for the comment. We would like to say that participants from these age groups were less likely to take the preventive measure in our survey. We have revised the corresponding parts.
Revision:
People of ages 41–50 (OR, 0.8; 95% CI, 0.6–0.9) and ages 51–60 (OR, 0.7; 95% CI, 0.6–0.9) were less likely to make preventive behaviors. (Line 267—269, page 5)

Comment 16: Lines 188-189: “While the participants with an annual household…” I think the word “while” should be removed.

Reply 16: Thank you for the comment. We have deleted the “while” in the revised manuscript.
Revision:
The participants with an annual household income between “500 to 800 ten thousand JPY” group and “more than 800 ten thousand JPY” group were more likely to take preventive measures; the OR values were 1.476 (95% CI, 1.192–1.827) and 1.334 (95% CI, 1.059–1.682), respectively. (Line 269—272, page 5)

#Discussion

Comment 17: The description of what action was taken during the state of emergency is very helpful! This would be more helpful in the introduction to set up the context of the rest of the paper.

Reply 17: Thank you very much for the suggestion. We have moved the description of actions taken during the state of emergency to the Introduction part. Also, we have revised this paragraph in the Discussion part.
Revision:
Including the request for shortening business hours (restaurants, public facilities, etc.), refraining from holding events and non-urgent and unnecessary going out are issued during the state of emergency period, and enhance of personal protection. (Line 276—279, page 5)

Comment 18: Line 207-208: This is the first mention of the "five dimensions." This should have been described in the methods section.

Reply 18: Thank you very much for the suggestion. We have moved the description of "five dimensions" to the Methods part, and revised the manuscript accordingly.
Revision:
Our study investigated the public's preventive measures against COVIDD-19, the results showed that, before and after the first declaration of the state of emergency (April 16), our participants had changed their behaviors in the aforementioned five dimensions. (Line 280—282, page 5)

Comment 19: The discussion is extremely easy to follow and really nicely sums up the results.

Reply 19: Thank you for the comment.

Reviewer B:

This manuscript carried out a national online survey to explore whether the behavioral change might differ between emergency and non-emergency areas after the first (on April 16, 2020) Japanese nationwide emergency announcement on COVID-19. The design of the study is overall rigorous. The data analysis is adequate. And the manuscript is well written. Congrats to the authors for their good work. Below are some recommendations for further refinement.

Reply: Thank you for the comments.

Comment 1: There are some inconsistent phrasing.
E.g. on page 1 line 1, in the title, it is mentioned “regional and nationwide emergency announcement” while through the manuscript and in the abstract on page 2 line 49 it is stated “first nationwide”;
On page 2 line 2, in the title, it is mentioned “preventive behavioral change” while on page 2 line 50-51 it is stated “preventive measures and behavioral change”.

The authors should guarantee the consistency of statement throughout the manuscript.

Also, better define the “first nationwide announcement” in the abstract too (though it is well defined the methods and results).

Reply 1: Thank you very much for indicating the inconsistency in the manuscript. We have revised our manuscript according to your advices. Please see the following Revisions for details.
Revision:
Implication of the nationwide emergency announcement on coronavirus disease 2019-related preventive behavioral change among Japanese residents – a cross sectional study (Line 1—2, page 1)

Background: To prevent the deteriorating COVID-19 situation in Japan, a nationwide state of emergency was declared on April 16, 2020. This study explores the impact of the first nationwide emergency announcement on Japanese residents’ COVID-19-related preventive behavioral change. (Line 52—55, page 2)

Therefore, this study aimed to explore their COVID-19-related preventive behavior before and after the first declaration of the state of emergency among Japanese residents regarding different emergency levels. (Line 146—148, page 3)

Comment 2: (Page 2, lines 52-55) The methods in the abstract are vague, lacking too much key information.
E.g., who are the potential survey receivers? When and how the survey was posted on what website? What are the relative factors? What do behaviors encompass? What method is used to design the survey?

Reply 2: Thank you very much for the suggestion. We have revised the Abstract part. Please see the following Revisions for details.
Revision:
Methods: We conducted an online cross-sectional survey between May 12 and 13, 2020, using a self-reported questionnaire to capture individual preventive behaviors. Quota sampling method was used to represent of Japanese population regarding sex and age. (Line 56—58, page 2)

Comment 3: Line 66-67 and lines 270-272:
The results given in this cannot support the conclusion "provides some positive evidence on how behavioral changes can tackle COVID-19" or "our survey provides a positive evidence on how behavioral change can contribute to tackling COVID-19 while lacking of an effective vaccine and medical therapy among Japanese society in early pandemic stage". This is because the authors did not prove the relationship between the behavioral changes in this manuscript and the COVID-19 pandemic in Japan during this timeframe. Not even can authors use the word "positive evidence" either.

But, I suppose this consideration does provide us implies. In this case, I may suggest the authors draw a figure (especially the timeline) that covers the COVID-19 trends in Japan, the nationwide announcement and key findings (behavioral changes).

Reply 3: Thank you very much for indicating this issue. We fully agreed that without prove of relationship between behavioral changes and COVID-19 pandemic, it was not rigorous to draw such conclusion in the original manuscript. We have revised the Abstract and Discussion parts accordingly. Please see the following Revisions for details.
Revision:
Despite the limitations mentioned above, this study was carried out within the first state of the emergency period; in addition, the large sample size of participants from the emergency/nonemergency areas allowed us to have a sight of public responses toward SARS-CoV-2 infection in Japan. Moreover, provide details of differences in behavioral changes regarding emergency levels during the nationwide state of emergency period. (Line 525—529, page 7)
Conclusions: This study investigated timely and regional differences in behavioral changes during the COVID-19 pandemic in Japan, which turned dramatically after the first nationwide state of emergency. However, with the evolving of the pandemic, the repeated survey should be advanced to grasp the trigger of behavioral changes. (Line 67—70, page 2)

Comment 4: Line 107 "insufficient information" does not mean no information. The author better briefly summarize the key findings of existing publications and cite them.

Reply 4: Thank you very much for the suggestion. We have revised the relevant part. Please see the following Revisions for details.
Revision:
A study finds that avoidance behaviors were the most significant behavior changes during the COVID-19 pandemic in the Japanese population (9). However, there is little knowledge regarding preventive behavioral changes at different emergency levels. Besides, though the declaration is nationwide, the severity of the epidemic varies by region. The status of personal preventive behavoir may differ depending on

the severity of emergency levels. (Line 141—145, page 3)

Comment 5: Lines 110-111:
In addition to stating the objective of this manuscript, I think it is critical to EXPLAIN the purpose. What can the answers to the research question bring to us? What does the findings may imply the policy making?

Reply 5: Thank you very much for the suggestion. We have revised the Introduction part. Please see the following Revisions for details.
Revision:
Therefore, this study aimed to explore their COVID-19-related preventive measures and behavior before and after the first declaration of the state of emergency among Japanese residents regarding different emergency levels. Furthermore, to investigated potential relative factors on the behavioral change. Preventive behaviors are indispensable in the measures taken against the COVID-19 pandemic. Thus, the investigation on behavioral change would provide insight into the future policy making aiming at raising self-protective behaviors. (Line 146—151, page 3)

Comment 6: Lines 122-123:
Though the survey design is not new, it is better to briefly describe it instead of just citing the reference.

Reply 6: Thank you very much for the suggestion. We have revised the relevant part. Please see the following Revisions for details.
Revision:
The questionnaire was developed in Japanese, and local experts validated its content by inviting 7 local people of different demographical backgrounds to test the questionnaires. (The questionnaire consisted of three parts: 1) demographic information including sex education, occupation, income, location, with or without underlying disease; 2) preventive measures against COVID-19 before and after April 16, 2020 (questions are detailed in Table 2 and Table 3); 3) other behaviors related to COVID-19 pandemic (detailed in Table 4). The preventive behaviors are measured in five dimensions: personal protection, respiratory etiquette/cough etiquette, contact precautions, voluntary quarantine, and prompt reporting. Also, participants are asked to evaluate the preventive activities taken by the central/local government by giving an overall score (maximum 100) and reasons for it. The results concerning anxiety symptoms in this survey were reported in our previous publication (10). (Line 184—194, page 4)

Comment 7: Line 125:
I recommend the authors provide the full version of the questionnaire in the supplement.

Reply 7: Thank you for the suggestion. It would be difficult for us to provide the

original full version of the questionnaire. However, the questions regarding the analysis in this study are listed in Table 2, Table 3 and Table 4.

Comment 8: Regarding the survey:
Would the authors explain ways and efforts used to try to get real data? As we know, much information collected might not be true or might be biased (e.g., the income).

Reply 8: Thank you very much for the comments. In the study design, we used the quota sampling method to attain a representative dataset of the Japanese population regarding sex and age structure. However, the validity of the data could not be guaranteed using an online questionnaire. Therefore, we have put these in the limitations.

Comment 9: Discussion:
The authors better focus on what do the findings mean for real-world practice and policy making.

Reply 9: Thank you very much for the comments. We have added a paragraph to discuss what our findings mean for real-world practice and policy making in Discussion part. Please see the following Revisions for details.
Revision:
Overall, the participants had changed their preventive behaviors after the declaration of the nationwide state of emergency, and significant differences in behaviors exist in participants from emergency and nonemergency areas. Moreover, the results of univariate and multivariable analyses found that participants aged between 41 and 60 years were less likely to take preventive measures against COVID-19, and the participants with higher incomes had better performance in preventive behaviors. These findings suggest that government authorities could reinforce the preventive measures implemented in the middle age population and enhance the publicity of health measures in nonemergency areas. (Line 510—517, page 6)

Comment 10: Line 61-63: better keep the number of decimals consistent throughout the manuscript.

Reply 10: Thank you for the comments. We have revised the number of decimals throughout the manuscript.