Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Public Health 189 (2020) 91–93

Contents lists available at ScienceDirect

Public Health

journal homepage: www.elsevier.com/locate/puhe

Short Communication

COVID-19 preventive behaviours among people with anxiety and depressive symptoms: findings from Japan

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ARTICLE INFO

Article history:
Received 4 July 2020
Received in revised form
11 September 2020
Accepted 25 September 2020
Available online 10 October 2020

Keywords:
Anxiety
Depression
COVID-19
Health behaviour
Japan

ABSTRACT

Objectives: The aim of the study was to examine COVID-19 preventive behaviours among individuals with mental health problems.
Study design: This is a pooled cross-sectional study.
Methods: Online survey data were analysed from 2000 Japanese adults collected in April and May 2020. Information was obtained on 13 COVID-19 preventive behaviours and anxiety and depressive symptoms using the Generalized Anxiety Disorder 7-item scale and Patient Health Questionnaire-9, respectively. Linear regression analysis was used to examine the associations.
Results: In models adjusted for demographic and socio-economic factors, anxiety (coefficient: −0.77, 95% confidence interval [CI]: −1.30, -0.24) and depressive symptoms (coefficient: −0.82, 95% CI: −1.34, -0.30) were both associated with significantly lower engagement in COVID-19 preventive behaviours.
Conclusion: Our results highlight the importance of facilitating the performance of preventive behaviours in individuals with mental health problems to prevent the spread of COVID-19 in this population.

As yet, there has been little research on the association between common mental disorders (CMDs) and infectious disease, and it is thus uncertain how the presence of pre-existing CMDs such as anxiety and depression might be linked to health behaviours during the ongoing COVID-19 pandemic. A recent editorial has suggested, for example, that differing levels of health anxiety might result in either a maladaptive engagement in (e.g., excessive handwashing [high anxiety]) or a disregard for (e.g., no handwashing [low anxiety]) preventive behaviours.[1] In addition, other authors have previously hypothesised that characteristics associated with CMDs such as depression, including lower levels of energy, a decreased focus, and greater hopelessness, might also be important for (non-)engagement in necessary health behaviours.[2]

The few studies that have examined how CMDs are linked to infectious disease preventive behaviours have produced mixed results. An earlier study from Hong Kong found that compared with those with low anxiety, individuals with high and, especially, moderate levels of anxiety had significantly higher odds for adopting ≥5 precautionary measures against severe acute respiratory syndrome.[3] Support for the notion that CMDs might be associated with increased engagement in preventive behaviours also comes from another study from Hong Kong, which recently found that people with symptoms of anxiety were more likely to adopt social distancing measures in response to the threat of COVID-19.[4] In contrast, other research from China found that anxiety was not related to any differences in the adoption of preventive measures, while people with depression took fewer preventive measures in response to the COVID-19 pandemic.[5]

The present study will examine the effects of anxiety and depressive symptoms on COVID-19 preventive behaviours in a sample of the Japanese general population. A focus on Japan may be particularly instructive. Although the effects of COVID-19 have not been as severe in Japan as in many other countries—at least in terms of the number of deaths—coronavirus cases began to increase quickly from early July to mid-July after the ending of a nationwide state of emergency in late May. This increase may be linked to several factors including the use/non-use of preventive measures. Specifically, a recent study has reported that although the vast majority of

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https://doi.org/10.1016/j.puhe.2020.09.017
0033-3506/

Japanese adults have adopted preventive measures, around 20% of the working-age population (age: 20–64 years) is reluctant to do so.[6] However, that study did not specifically focus on the possible effects of CMDs on the non-use of preventive behaviours.

Two rounds of an online survey of the Japanese population were administered between April 16 and April 18, 2020 (1st round), and between May 15 and May 17 (2nd round). A commercial survey company, the Survey Research Center, was tasked to send out a set of screening questions to approximately 10,000 respondents from its commercial web panel and then to construct a sample of 1000 respondents based on their demographic characteristics in each round. A new set of respondents was drawn in the second round. The final sample comprised respondents who were representative of the Japanese general population in terms of the area of their residency, sex, and age distribution. The respondents in the final sample answered online questions about their mental health, personal economic situation, and preventive behaviour with regard to COVID-19, among others. The final sample size was 2000. The self-report Patient Health Questionnaire-9 was used to assess depressive symptoms in the past two weeks.[7] A score of 10 or higher (out of 27) was regarded as a case of at least moderate depressive symptomatology. The Cronbach's alpha value for the scale was 0.90. The self-administered Generalized Anxiety Disorder 7-item scale was used to measure anxiety symptoms in the past two weeks.[8] A score of 10 or higher (out of 21) was regarded as a case of at least moderate anxiety. The scale had a good degree of internal reliability (Cronbach's alpha = 0.92). Information was collected on 13 COVID-19 preventive behaviours (no/yes). The specific behaviours and their frequency are detailed in Appendix A in the supplementary data. Information was also obtained on a number of covariates including age, sex, education, income, household financial situation (versus previous year), employment status, and data survey round.

Linear and logistic regression analyses were performed to examine the association between anxiety and depressive symptoms and preventive behaviours. In the first analysis, a combined preventive behaviour score variable was created by summing the responses for each preventive behaviour, and linear regression analysis was used to examine the associations. In the second analysis, the association between anxiety and depressive symptoms and each of the individual preventive behaviours was examined using binomial logistic regression. All analyses were adjusted for the previously listed covariates. The standard errors were heteroskedasticity robust and clustered by prefecture. The analysis was conducted using STATA/MP (version 16, Stata Corporation, College Station, TX). The results are presented as coefficients (Coef.) and odds ratios (ORs) with 95% confidence intervals (CIs). The level of statistical significance was set at $P < 0.05$ (two-tailed).

The frequency of anxiety and depressive symptoms was 10.9% and 17.3%, respectively. Both anxiety (Coef: −0.77, 95% CI: −1.30, -0.24) and depression (Coef: −0.82, 95% CI: −1.34, -0.30) were associated with significantly reduced engagement in all of the preventive behaviours combined (Table 1). For anxiety, in the logistic regression analyses, ORs were negative for 11 of the 13 preventive behaviours (Appendix A). Individuals with symptoms of anxiety were significantly less likely to engage in six of the preventive behaviours. Specifically, they had a 40–49% reduction in the odds for washing hands, wearing a mask, and avoiding crowds and a 26–38% reduction in the odds for using a tissue/sleeve when coughing/sneezing, avoiding touching the face, and cancelling going out. Depressive symptoms were also associated with significantly reduced odds for the same six preventive behaviours. In addition, they were also associated with a 27% reduction in the odds for avoiding engaging in gatherings (OR: 0.73, 95% CI: 0.58–0.90).

Although a study from China reported that neither state nor trait anxiety was associated with COVID-19 preventive behaviours,[5] other recent studies have all linked anxiety with an increased likelihood of engaging in preventive behaviours.[4,9,10] This conflicts with our finding that anxiety symptoms were associated with reduced preventive behaviour. It is uncertain what underlies this difference, but underlines the need for future studies to collect information on the specific causes of anxiety, especially as it has been suggested that high levels of 'health' anxiety might be linked to engaging in excessive preventive behaviour.[1] Regarding depression, our findings accord with those from the above-mentioned Chinese study, which showed that depressive symptoms may inhibit preventive behaviours in response to the COVID-19 pandemic.[5] It is possible that various mechanisms might underlie the association between CMDs and reduced preventive behaviour in Japanese adults. For example, it can be speculated that symptoms that are characteristic of these disorders such as fatigue and reduced concentration might be important in this regard.

Table 1
Association between anxiety and depressive symptoms and all COVID-19 preventive behaviours combined among Japanese adults.[a]

	Anxiety	Depression
	Coef. (95% CI)	Coef. (95% CI)
Preventive behaviours	−0.77 (−1.30, −0.24)[b]	−0.82 (−1.34, -0.30)[b]

Coef: coefficient; CI: confidence interval.
Both analyses were adjusted for age (reference: young), sex (reference: female), education (reference: less than college), income (reference: high income), household financial situation (reference: better/same as in the previous year), employment (reference: unemployed not in the labour force), and data survey round (reference: round 1).
[a] Anxiety and depressive symptoms were the exposures; COVID-19 preventive behaviours were the outcomes.
[b] $p < .01$.

This study has some limitations. The use of cross-sectional data meant that we were not able to establish causality or the direction of the observed associations. In addition, we also lacked information on prior psychiatric diagnoses of the respondents. It is possible, therefore, that poorer mental health might have been a psychological response to the threat of COVID-19 or the rigours of quarantine. Keeping this in mind, the results of this study indicate that people with mental health problems may be at increased risk of COVID-19 infection, given their lower engagement in a number of preventive behaviours. This highlights the importance of educating individuals with poorer mental health about the dangers of COVID-19 and how to protect themselves against the virus. In addition, our findings also suggest that further research on the effects of COVID-19 among individuals with mental health problems is now urgently warranted.

Author statements

Ethical approval

This study was approved by the Ethics Committee of Waseda University (approval case number: 2020-050) and Osaka School of International Public Policy, Osaka University. The survey participants were informed of the purpose of the study before their participation and had the option to quit the survey at any time. The respondents provided explicit consent that the information they provided could be used for the purpose of this study. The data are completely anonymous.

Funding

This work was financially supported by JSPS Grants-in-Aid for Scientific Research Grant Number 20H01584. The funders had no

role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Competing interests

The authors declare that they have no conflicting interests.

Author contributions

M.U. and T.M. were responsible for data acquisition. A.S. wrote the main text. M.U. analyzed the data and contributed to the writing of the text. T.M. and H.S. reviewed and revised the manuscript.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.puhe.2020.09.017.

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