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Short communication

Mental health of family, friends, and co-workers of COVID-19 patients in Japan

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ABSTRACT

As the coronavirus disease 2019 (COVID-19) pandemic rages on, the mental health of both the infected and non-infected is a rising concern. We used administrative survey data (16402 responses in the last two weeks) using a chatbot on LINE, the most popular social networking service (SNS) in Japan, to show that people with COVID-19 patients in a close setting had higher psychological distress level than those without. We believe that the results indicate an urgent need to prioritize the establishment and implementation of mental health and psychosocial support tailored to family, close relatives, and friends of COVID-19 patients.

The number of infections and deaths from coronavirus disease 2019 (COVID-19) continues to rise worldwide (World Health Organization, 2020). Because viruses are invisible, it causes psychological distress including fear, denial, and anxiety in the general population (Pappas et al., 2009). The novel coronavirus mandates local, nationwide, and worldwide quarantine measures and this type of strong countermeasures also induce population-level psychological distress (Rubin and Wessely, 2020). Home quarantine at the request of governments dramatically changed people lives. Prohibitions on non-essential activities outside the home, school closures, and working from home forced millions to modify their daily routines at very short notice. It is known that disruptions in daily routines increase the risk of developing a variety of mental disorders (Lyall et al., 2018). Disruption of lifestyle rhythms due to prolonged home quarantine as a countermeasure against COVID-19 may increase psychological distress which might result in the risk of developing mental illness even in healthy individuals without a medical history (Liu et al., 2020; Qiu et al., 2020; Zhang and Ma, 2020).

On March 5, 2020, Kanagawa Prefecture (Japan's second largest

prefecture with a population of about 9 million after Tokyo) launched an individualized support program for prefectural residents using LINE's chatbot (Japan's largest messenging application with about 83 million active users, accounting for 65% of Japan's population) in response to the COVID-19 outbreak (Kanagawa Prefecture, 2020). The prefectural government circulated a questionnaire on the current physical condition of users in the prefecture. Those who report a fever of 37.5°C or more, or strong fatigue or difficulty breathing (hereinafter referred to as poor health), are asked further questions about their psychological distress level using three questions (a 5-point Likert-style questionnaire that partially utilized the K6). The questionnaire also asks if anyone close to them (i.e. family members living with them, colleagues or friends at school or work: hereinafter referred to as someone in a close setting) had received a positive diagnosis of the COVID-19. Based on the answers, users are directed to consultation services and receive information aimed to prevent infections. The questionnaire also asks for basic information such as age and gender.

We received data from Kanagawa Prefecture and analyzed the initial response of 16,402 people aged 15 years and older over the span of
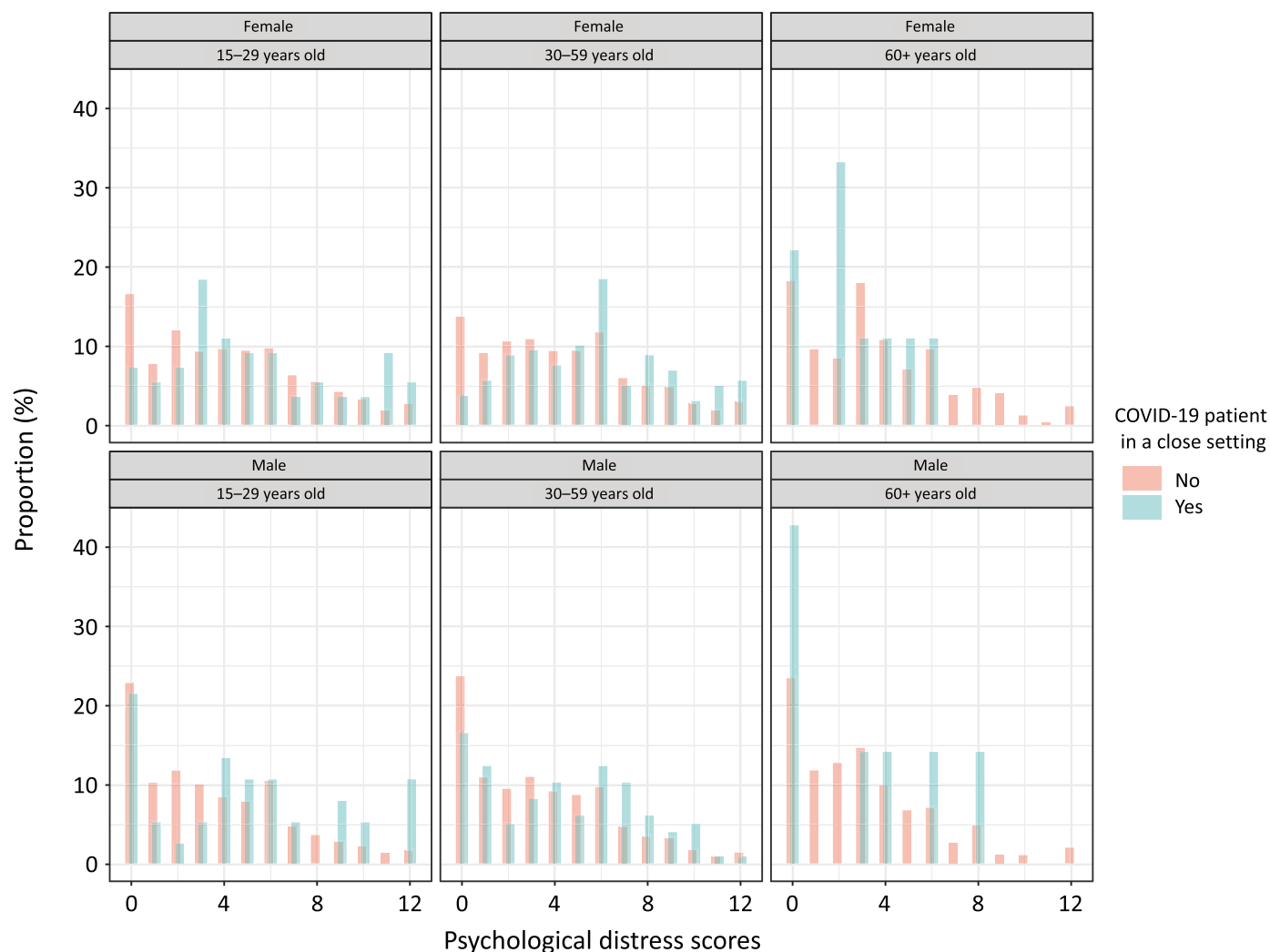
Fig. 1. Psychological distress scores.
The results of the *t*-test for the psychological distress scores for the presence or absence of a COVID-19 patient in a close setting are as follows: female 15–29 years old, *p*-value < 0.05; female 30–59 years old, *p*-value < 0.001; female 60+ years old, *p*-value = 0.3; male 15–29 years old, *p*-value < 0.05; male 30–59 years old, *p*-value < 0.01; male 60+ years old, *p*-value = 0.9.

two weeks (from March 24 to April 6, 2020) to examine the relationship between the presence or absence of a COVID-19 patient in a close setting and psychological distress levels. It should be noted that this data is only available for LINE app users who actively responded to the survey in the early stages and reported poor health. For these reasons, our results are not necessarily representative of the general population of Kanagawa Prefecture, nor of the Japanese population as a whole. In addition, K6 was originally a six-item measure of mental discomfort and stress (Kessler et al., 2002). Because the service aimed not merely to screen psychological distress, but rather to screen for COVID-19-related health concerns and to rapidly provide proper information at the prefectural level, the following three out of six items were selected for this service. The selected items were: 'about how often during the past 30 days did you feel nervous?', 'during the past 30 days, about how often did you feel restless or fidgety?', and 'how often did you feel so depressed that nothing could cheer you up?'. Then, for psychological distress scores, the scores for each item (0–4) were summed to calculate the scaled score (0–12) for each respondent.

The distribution of psychological distress scores in the presence or absence of someone with COVID-19 in a close setting is shown in Fig. 1. The data are presented by age group (15–29 years old, 30–59 years old, 60+ years old) and gender. In the groups under 60 years of age, respondents with COVID-19 patients in a close setting had higher

psychological stress scores than those without, regardless of gender, and the difference was statistically significant. While caution is necessary as confounding factors were not adjusted for, the results suggest that the establishment and implementation of mental health and psychosocial support measures tailored to family and close relatives and friends of COVID-19 patients are warranted. Currently, the COVID-19 hotline provided by the public healthcare centers aims to identify people who may be infected and does not guarantee psychological support to alleviate residents' fears. Our results indicate an urgent need of reaching out to the family, friends, and co-workers of COVID-19 patients. The strategy must include a strong message to avoid personal and social prejudice and discrimination (Shigemura et al., 2020).

CRediT authorship contribution statement

Yuta Tanoue: Conceptualization, Methodology, Software, Validation, Writing - original draft, Writing - review & editing. **Shuhei Nomura:** Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Resources, Data curation, Writing - original draft, Writing - review & editing, Visualization, Supervision. **Daisuke Yoneoka:** Conceptualization, Methodology, Software, Validation, Formal analysis, Writing - original draft, Writing - review & editing, Visualization, Supervision. **Takayuki Kawashima:**

Conceptualization, Methodology, Software, Validation, Writing - original draft, Writing - review & editing. **Akifumi Eguchi:** Conceptualization, Methodology, Software, Writing - review & editing, Visualization. **Shoi Shi:** Conceptualization, Methodology, Writing - review & editing, Visualization. **Nahoko Harada:** Validation, Writing - original draft, Writing - review & editing. **Hiroaki Miyata:** Conceptualization, Validation, Investigation, Resources, Data curation, Writing - review & editing, Supervision, Project administration, Funding acquisition.

Declaration of Competing Interest

Ethics statement

Ethical approval was granted by the ethics committee of Keio University School of Medicine, under authorization number 20190338. We only obtained data from those who have given consent for the prefecture that administers the questionnaire to provide their response data to a third party for research use. Respondents must give their consent on the LINE chatbot before they proceed to the questionnaire response page.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.psychres.2020.113067.

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