Risk factors for workplace bullying, severe psychological distress and suicidal ideation during the COVID-19 pandemic among the general working population in Japan: a large-scale cross-sectional study

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ABSTRACT

Objectives To investigate the risk factors for workplace bullying and mental health outcomes among workers during the COVID-19 pandemic.

Design A cross-sectional study.

Setting A nationwide online survey was conducted from August to September 2020 in Japan.

Participants 16384 workers (men: n=9565; women: n=6789).

Main outcome variables Workplace bullying was measured by one item from the Brief Job Stress Questionnaire; severe psychological distress according to the Kessler Psychological Distress Scale (≥13) and suicidal ideation by one item. Prevalence ratios were calculated by modified Poisson regression analyses adjusting for potential confounders such as gender, age, occupational characteristics and a prior history of depression.

Results Overall, 15% of workers experienced workplace bullying, 9% had severe psychological distress and 12% had suicidal ideation during the second and third wave of the COVID-19 pandemic in Japan. The results of this study showed men, executives, managers and permanent employees had a higher risk of bullying than women or part-time workers. Increased physical and psychological demands were common risk factors for bullying, severe psychological distress and suicidal ideation. Starting to work from home was a significant predictor for adverse mental health outcomes but a preventive factor against workplace bullying.

Conclusions The results of this study showed different high-risk groups for bullying or mental health during the pandemic. Any intervention to decrease workplace bullying or mental health problems should focus not only on previously reported vulnerable workers but also workers who have experienced a change in work style or job demands.

INTRODUCTION

Workplace bullying is defined as a situation where worker(s) suffer from repeated hostile or aggressive acts, including physically abusing, harassing, offending, socially excluding someone or negatively affecting someone’s work tasks, for example, by withholding relevant information. Workplace bullying is a severe job stressor in the workplace. Although the prevalence of workplace bullying during the COVID-19 pandemic is unknown, the global prevalence before the pandemic was reported as 14.6% in a meta-analysis by Nielsen et al.

Previous studies clearly show workplace bullying has a severe adverse effect on workers’ mental health. For example, longitudinal associations between workplace bullying and depression, post-traumatic stress disorder and suicidal ideation have been reported in systematic reviews or meta-analyses. Moreover, mental health problems are not only ‘outcomes’ but also ‘antecedents’ of workplace bullying. Meta-analyses on the association between workplace bullying and mental health have consistently reported that baseline mental health problems are associated with an increased risk of exposure to...
workplace bullying.\(^2\)\(^3\)\(^6\) Thus, when investigating the association between bullying and mental health, the reverse effect should be taken into consideration.

Previous studies have suggested that women and younger workers are more likely to experience bullying.\(^7\)\(^8\) although the results on the association between age and bullying were found to be inconsistent in a recent systematic review.\(^7\) Low socioeconomic status (SES), measured by education, income and occupation, was also reported as a risk factor for workplace bullying.\(^9\) This is probably due to the lower organisational positions occupied by lower SES workers; workers in more senior positions such as managers were less likely than unskilled workers to be exposed to bullying.\(^10\) Nevertheless, only one previous study on workplace bullying has focused on income,\(^9\) and a few on education,\(^9\)\(^11\)\(^12\) but most other studies only investigated occupation as a risk factor for workplace bullying.\(^7\)

Low SES workers tend to have unstable working conditions and their economic situation may have worsened during the COVID-19 pandemic, increasing their vulnerability.\(^13\) More research on workplace bullying needs to focus on the most disadvantaged workers in society.

Although high job demands are associated with exposure to workplace bullying,\(^7\)\(^14\)\(^16\) no study has investigated an association between increased job demands or new work style—working from home—and exposure to workplace bullying. Under the COVID-19 pandemic, many workers, especially essential workers, experienced workloads that were physically and psychologically excessive and have developed psychological distress or burnout.\(^17\)\(^18\) In contrast, the number of non-essential workers working from home increased during the pandemic.\(^19\) These changes in work style or the workplace can also result in workplace bullying as change causes stress among workers and stressful working environments increase bullying behaviours.\(^8\)\(^20\)\(^21\)

An association between working from home and adverse mental health has not been fully investigated. During the pandemic, suicide rates increased from 2019 to 2020 in Japan, for the first time in a decade.\(^22\) Determinants of the increase have not been fully investigated yet, but a recent study reported an increase in social isolation associated with suicidal ideation in the general population during the pandemic.\(^23\) In general, workers are less likely to be isolated compared with unemployed people because they usually have daily opportunities for social interaction in the workplace. However, the situation may be different for people working from home who will not have this social interaction, although working from home itself has a positive impact on workers’ work–life balance.\(^24\) A recent large-scale study in an information company with over 60,000 employees during the pandemic showed that working from home has negative effects, such as decreasing synchronous communication between workers and decreasing bridges between disparate departments in a company.\(^25\)

Various risk factors for mental health problems among workers have been reported during the COVID-19 pandemic. For example, healthcare workers,\(^18\)\(^20\) less-educated workers\(^27\) and non-regular female workers\(^28\) were more likely to have greater psychological distress. However, studies focusing on the general working population from various industries are scarce, since the majority have focused only on healthcare workers.\(^26\)

Therefore, the aim of this study was to identify the potential risk factors for workplace bullying, severe psychological distress and suicidal ideation during the pandemic, such as gender, age, SES, job demands and working from home, using a nationwide internet survey for the general working population in Japan.

METHODS

Data

We used the baseline cross-sectional data of an ongoing web-based nationally representative longitudinal study, the ‘Japan ‘COVID-19 and Society’ Internet Survey’ (JACSIS) study. The baseline survey was conducted in August and September 2020. Survey requests were sent by the research agency (Rakuten Insight, Tokyo, Japan) to 224,389 panelists who were selected by each gender, age and prefecture category using simple random sampling. Once the target number of participants (N=28,000) answered the questionnaire, the recruitment process stopped, resulting in a participation rate for the survey of 12.5% (28,000 of 224,389). The details of the study protocol are described elsewhere.\(^29\)

To validate data quality, we excluded respondents showing discrepancies and artificial/unnatural responses.\(^30\) The checks used to detect discrepancies were: failing to correctly respond to the request: ‘Please choose the second from the bottom,’ answering ‘yes’ to every item in a set of questions for using drugs, and answering ‘yes’ to every item in a set of questions for having chronic diseases. Excluding these respondents (n=2518) resulted in a total of 25,482 participants.

Patient and public involvement statement

No patients and the public were involved in the design, the recruitment and conduct of this study. They will be involved when the study results of the study are disseminated via website or social networking services.

Measurements

Risk factors

Our exposure variables of interest were respondents’ demographic variables including gender,\(^7\) age,\(^8\) residential area and marital status (having a partner/spouse), SES,\(^9\) occupational characteristics and current work situation. The SES variables included education (high school or below, junior college/vocational school and university or above)\(^3\); annual household income during the previous year (1.99 million, 2.00–3.99 million, 4.00–5.99 million, 6.00–7.99 million, 8.00–9.99 million, 10 million and unknown); and occupation/employment status (executive, self-employed/individual business owner, family
| Individual characteristics | n  | %   |
|----------------------------|----|-----|
| **Gender**                 |    |     |
| Men                        | 9595| 58.6|
| Women                      | 6789| 41.4|
| **Age**                    |    |     |
| Under 24                   | 1024| 6.3 |
| 25–34                      | 2964| 18.1|
| 35–44                      | 3673| 22.4|
| 45–54                      | 4146| 25.3|
| 55–64                      | 2914| 17.8|
| Over 65                    | 1663| 10.2|
| **Have a partner/spouse**  |    |     |
| Yes                        | 9633| 58.8|
| No                         | 6751| 41.2|
| **Residential area**       |    |     |
| Prefecture under special precautions | 10246 | 62.5 |
| Other                      | 6138| 37.5|
| **Socioeconomic status (SES)** |   |     |
| **Education**              |    |     |
| High school or below       | 4167| 25.4|
| Junior college/vocational school | 3658 | 22.3 |
| University or above        | 8559| 52.2|
| Annual household income during the previous year (million yen) | | |
| 1.99 or less               | 987 | 6.0 |
| 2.00–3.99                  | 3053| 18.6|
| 4.00–5.99                  | 3469| 21.2|
| 6.00–7.99                  | 2481| 15.1|
| 8.00–9.99                  | 1744| 10.6|
| 10.00 or more              | 1998| 12.2|
| Unknown                    | 2652| 16.2|
| **Occupation/employment status** | | |
| Executive                  | 927 | 5.7 |
| Self-employed/individual business owner | 1548 | 9.4 |
| Family business assistance | 210 | 1.3 |
| Manager                    | 2014| 12.3|
| Permanent worker (non-manager) | 7201 | 44.0 |
| Agency worker              | 366 | 2.2 |
| Contract worker            | 1062| 6.5 |
| Part-time worker           | 3056| 18.7|
| **Occupational characteristics** | | |
| Industry                   |    |     |
| Public administration      | 1065| 6.5 |
| Agriculture, forestry and fishing | 181 | 1.1 |
| Construction               | 908 | 5.5 |
| Manufacturing              | 2748| 16.8|
| Electricity, gas and water supply | 235 | 1.4 |
| Telecommunication          | 844 | 5.2 |
| Transport                  | 684 | 4.2 |
| Wholesale                  | 571 | 3.5 |
| **Retail trade**           | 1269| 7.7 |
| **Finance**                | 423 | 2.6 |
| Insurance                  | 288 | 1.8 |
| Real estate                | 396 | 2.4 |
| Restaurants                | 508 | 3.1 |
| Hotels                     | 151 | 0.9 |
| Healthcare                 | 1201 | 7.3 |
| Welfare                    | 704 | 4.3 |
| Education and learning assistance | 853 | 5.2 |
| **Office size (employees)** |    |     |
| 1–4                        | 2379| 14.5|
| 5–29                       | 3241| 19.8|
| 30–49                      | 1161| 7.1 |
| 50–99                      | 1625| 9.9 |
| 100–299                    | 2145| 13.1|
| 300–499                    | 999 | 6.1 |
| 500–999                    | 1065| 6.5 |
| Over 1000                  | 3158| 19.3|
| **Job types**              |    |     |
| Desk based                 | 7944| 48.5|
| Working with people        | 4024| 24.6|
| Physical work              | 4416| 27.0|
| **Current working situation** |  |     |
| Started to work from home during the pandemic | | |
| Yes                        | 1382| 8.4 |
| No                         | 15002| 91.6 |
| Worked from home since before the pandemic | | |
| Yes                        | 2964| 18.1|
| No                         | 13420| 81.9 |
| **Increased physical demands** |  |     |
| Yes                        | 3389| 20.7|
| No                         | 12995| 79.3 |
| **Increased psychological demands** |  |     |
| Yes                        | 5421| 33.1|
| No                         | 10963| 66.9 |
| **Weekly working hours during the previous month** | | |
| Less than 20 hours/week    | 2688| 16.4|
| 20–29 hours/week           | 1821| 11.1|
| 30–39 hours/week           | 3103| 18.9|
| 40–44 hours/week           | 4676| 28.5|
| 45–49 hours/week           | 1900| 11.6|
| 50–59 hours/week           | 1265| 7.7 |
| Over 60 hours/week         | 931 | 5.7 |
| **History of psychiatric disorders** | | |
| Mental illness             |  |     |
| Depression                 |  |     |
During the previous 6 months, whether they had witnessed bullying in their workplace during the past 30 days (‘0=never,’ ‘1=rarely,’ ‘2=sometimes,’ ‘3=often’ or ‘4=always’). In this study, a cut-off score of 13 was used for defining severe psychological distress. Suicidal ideation was assessed by one question ‘Since April 2020, have you ever wished you were dead?’ The response options were ‘1=yes, for the first time,’ ‘2=yes, but I experienced this before April 2020’ or ‘3=never experienced it’. Answering ‘yes’ was defined as having suicidal ideation.

**Mental health outcomes**

Severe psychological distress was measured by the 6-item Kessler Psychological Distress Scale (K6). The K6 consists of six items and assesses how frequently respondents have experienced symptoms of psychological distress during the past 30 days. A cut-off score of 13 was used for defining severe psychological distress. Prevalence ratios (PRs) and 95% confidence intervals (CIs) were calculated adjusting for individual characteristics (gender, age, having a partner and residential area); SES (education, household income and employment status) (model 1); occupational characteristics (industry, office size and job type) (model 2); all variables including current work situation (started to work from home during the pandemic, increased physical demands, including current work situation (started to work from home during the pandemic, increased physical demands, increased physical demands and increased weekly working hours during the previous month) and a prior history of depression (model 3). To examine the relationship between workplace bullying and mental health outcomes, we also conducted another modified Poisson regression analysis. In these analyses, PRs and 95% CIs were calculated adjusting for individual characteristics, SES, occupational characteristics (model 1) and a prior history of depression (model 2). Finally, we conducted a modified Poisson regression analysis stratified by gender. In this analysis, the prevalence ratios of two mental health outcomes were calculated by adjusting individual characteristics, SES, occupational characteristics, workplace bullying and a prior history of depression. The two-tailed p value for statistical significance to see the differences between one indicator and another was set at 0.05. All analyses were conducted using SPSS V.27.0 for Windows. There were no missing values in these data because all questions required an answer.

**Statistical analyses**

We used a modified Poisson regression analysis with robust error variance to examine the relationship between risk factors and workplace bullying because most of the outcome prevalence is common (>10%) in this study. Prevalence ratios (PRs) and 95% confidence intervals (CIs) were calculated adjusting for individual characteristics (gender, age, having a partner and residential area); SES (education, household income and employment status) (model 1); occupational characteristics (industry, office size and job type) (model 2); all variables including current work situation (started to work from home during the pandemic, increased physical demands, increased physical demands and increased weekly working hours during the previous month) and a prior history of depression (model 3). To examine the relationship between workplace bullying and mental health outcomes, we also conducted another modified Poisson regression analysis. In these analyses, PRs and 95% CIs were calculated adjusting for individual characteristics, SES, occupational characteristics (model 1) and a prior history of depression (model 2). Finally, we conducted a modified Poisson regression analysis stratified by gender. In this analysis, the prevalence ratios of two mental health outcomes were calculated by adjusting individual characteristics, SES, occupational characteristics, workplace bullying and a prior history of depression. The two-tailed p value for statistical significance to see the differences between one indicator and another was set at 0.05. All analyses were conducted using SPSS V.27.0 for Windows. There were no missing values in these data because all questions required an answer.

**RESULTS**

**Characteristics of participants**

Table 1 shows the participant characteristics. Of 25,482 respondents, we analysed 16,384 workers in this study after excluding students, retired persons, full-time housewives/househusbands and those who were not working at the time of the survey. The average participant age was 45.7 (SD: 13.8) years old. The majority were men, 45–54 years old, had a partner/spouse and 36% were part-time workers. The majority of respondents were business assistance, manager, permanent worker, agency worker, contract worker and part-time worker).

**Occupational characteristics** included industry, office size and job type (desk based, working with people (eg, sales staff, hospitality workers) and physical work (eg, delivery staff, care staff)). To assess their current work situation, we asked respondents if they had experience of working from home or increased physical or psychological demands during the COVID-19 pandemic. Weekly working hours during the previous month were also assessed as categorical variables.

Finally, prior history of depression and other mental illnesses was assessed, since baseline mental health problems were associated with an increased risk of exposure to workplace bullying.

**Workplace bullying**

Workplace bullying was assessed by a self-labelling method, using a sub-scale of the New Brief Job Stress Questionnaire. 9 First, respondents were asked whether they experienced bullying during the previous 6 months, using the single item ‘Have you been bullied in your workplace during the 6 months since April 2020?’ Respondents who chose ‘yes’ were defined as ‘victims’. In the survey, we did not provide a definition of bullying for respondents due to limitations of space. In addition to the above-mentioned question, respondents were asked whether they had witnessed bullying in their workplace during the previous 6 months.

| Table 1 Continued |
|-------------------|
| **Individual characteristics** | n | % |
| **Never** | 14,782 | 90.2 |
| **Past** | 989 | 6.0 |
| **Current** | 613 | 3.7 |
| **Other mental illness** | | |
| **Never** | 15,203 | 92.8 |
| **Past** | 611 | 3.7 |
| **Current** | 570 | 3.5 |
| **Exposure to workplace bullying** | | |
| **Yes** | 2,441 | 14.9 |
| **No** | 13,943 | 85.1 |
| **Witnessed workplace bullying** | | |
| **Yes** | 2,940 | 17.9 |
| **No** | 13,444 | 82.1 |
| **Severe psychological distress (K6 ≥13)** | | |
| **Yes** | 1,442 | 8.8 |
| **No** | 14,942 | 91.2 |
| **Suicidal ideation** | | |
| **Yes** | 1,890 | 11.5 |
| **No** | 14,494 | 88.5 |

K6, Kessler Psychological Distress Scale.
| Workplace bullying | PRs (95% CI) Model 1 | PRs (95% CI) Model 2 | PRs (95% CI) Model 3 |
|--------------------|----------------------|----------------------|----------------------|
| Case (%)           |                      |                      |                      |
| Gender             |                      |                      |                      |
| Men                | 1588 (16.6)          | 1.30 (1.20 to 1.42)  | 1.32 (1.21 to 1.44)  | 1.32 (1.21 to 1.45) |
| Women              | 853 (12.6)           | 1.00 (reference)     | 1.00 (reference)     | 1.00 (reference)     |
| Age                |                      |                      |                      |
| Under 24           | 227 (22.2)           | 2.98 (2.36 to 3.76)  | 2.73 (2.16 to 3.51)  | 2.71 (2.14 to 3.42)  |
| 25–34              | 570 (19.2)           | 2.74 (2.22 to 3.39)  | 2.58 (2.08 to 3.20)  | 2.55 (2.06 to 3.15)  |
| 35–44              | 599 (16.3)           | 2.41 (1.96 to 2.97)  | 2.33 (1.90 to 2.88)  | 2.29 (1.86 to 2.82)  |
| 45–54              | 610 (14.7)           | 2.18 (1.77 to 2.68)  | 2.14 (1.74 to 2.64)  | 2.10 (1.70 to 2.58)  |
| 55–64              | 331 (11.4)           | 1.70 (1.37 to 2.10)  | 1.67 (1.34 to 2.07)  | 1.64 (1.32 to 2.03)  |
| Over 65            | 104 (6.3)            | 1.00 (reference)     | 1.00 (reference)     | 1.00 (reference)     |
| Have a partner/spouse |                    |                      |                      |
| Yes                | 1318 (13.7)          | 1.00 (reference)     | 1.00 (reference)     | 1.00 (reference)     |
| No                 | 1123 (16.6)          | 1.01 (0.92 to 1.09)  | 0.99 (0.92 to 1.08)  | 0.999 (0.92 to 1.09) |
| Residential area   |                      |                      |                      |
| Prefecture under special precautions | 1534 (15.0) | 1.01 (0.93 to 1.08) | 1.00 (0.93 to 1.08) | 1.00 (0.93 to 1.08) |
| Other              | 907 (14.8)           | 1.00 (reference)     | 1.00 (reference)     | 1.00 (reference)     |
| Education          |                      |                      |                      |
| High school or below | 617 (14.8)      | 1.06 (0.97 to 1.16)  | 1.08 (0.99 to 1.19)  | 1.09 (0.99 to 1.20)  |
| Junior college/vocational school | 501 (13.7) | 1.00 (0.90 to 1.10)  | 0.99 (0.90 to 1.10)  | 1.00 (0.91 to 1.11)  |
| University or above | 1323 (15.5)     | 1.00 (reference)     | 1.00 (reference)     | 1.00 (reference)     |
| Annual household income during the previous year (million yen) |                  |                      |                      |
| Unknown            | 194 (19.7)           | 1.17 (1.01 to 1.36)  | 1.22 (1.05 to 1.42)  | 1.22 (1.05 to 1.42)  |
| 1.99 or less       | 503 (16.5)           | 1.74 (1.46 to 2.09)  | 1.84 (1.53 to 2.21)  | 1.82 (1.52 to 2.19)  |
| 2.00–3.99          | 527 (15.2)           | 1.34 (1.16 to 1.55)  | 1.39 (1.20 to 1.61)  | 1.39 (1.20 to 1.62)  |
| 4.00–5.99          | 346 (13.9)           | 1.13 (0.99 to 1.30)  | 1.17 (1.01 to 1.34)  | 1.16 (1.01 to 1.34)  |
| 6.00–7.99          | 234 (13.4)           | 1.01 (0.88 to 1.18)  | 1.03 (0.89 to 1.20)  | 1.03 (0.89 to 1.20)  |
| 8.00–9.99          | 275 (13.8)           | 0.97 (0.82 to 1.13)  | 0.98 (0.83 to 1.15)  | 0.98 (0.83 to 1.14)  |
| 10.00 or more      | 362 (13.7)           | 1.00 (reference)     | 1.00 (reference)     | 1.00 (reference)     |
| Occupation/employment status |              |                      |                      |
| Executive          | 178 (19.2)           | 1.69 (1.43 to 2.00)  | 1.77 (1.49 to 2.12)  | 1.76 (1.48 to 2.09)  |
| Self-employed/ individual business owner | 129 (8.3)     | 0.77 (0.63 to 0.94)  | 1.05 (0.82 to 1.35)  | 1.05 (0.82 to 1.35)  |
| Family business assistance | 21 (10.0)    | 0.93 (0.61 to 1.40)  | 1.18 (0.76 to 1.83)  | 1.15 (0.75 to 1.78)  |
| Manager            | 341 (16.9)           | 1.47 (1.26 to 1.71)  | 1.39 (1.19 to 1.64)  | 1.40 (1.20 to 1.65)  |
| Permanent employee (non-manager) | 1250 (17.4)  | 1.32 (1.17 to 1.50)  | 1.27 (1.11 to 1.45)  | 1.27 (1.12 to 1.45)  |
| Agency worker      | 44 (12.0)            | 0.93 (0.70 to 1.26)  | 0.88 (0.65 to 1.19)  | 0.87 (0.65 to 1.18)  |
| Contract worker    | 142 (13.4)           | 1.20 (0.99 to 1.44)  | 1.14 (0.94 to 1.38)  | 1.13 (0.93 to 1.37)  |
| Part-time worker   | 336 (11.0)           | 1.00 (reference)     | 1.00 (reference)     | 1.00 (reference)     |
| Industry           |                      |                      |                      |
| Public administration | 170 (16.0)    | 1.00 (reference)     | 1.00 (reference)     | 1.00 (reference)     |
| Agriculture, forestry and fishing | 31 (17.1)    | 1.34 (0.95 to 1.89)  | 1.31 (0.91 to 1.87)  | 1.31 (0.92 to 1.87)  |
| Construction       | 133 (14.6)           | 0.99 (0.81 to 1.22)  | 0.97 (0.76 to 1.22)  | 0.98 (0.77 to 1.23)  |
| Manufacturing      | 456 (16.6)           | 1.04 (0.89 to 1.22)  | 0.92 (0.76 to 1.12)  | 0.92 (0.76 to 1.12)  |
| Electricity, gas and water supply | 44 (18.7)    | 1.18 (0.87 to 1.59)  | 1.08 (0.78 to 1.48)  | 1.07 (0.78 to 1.47)  |
| Telecommunication  | 126 (14.9)           | 0.92 (0.75 to 1.14)  | 0.83 (0.66 to 1.06)  | 0.84 (0.66 to 1.07)  |

Continued
### Table 2  Continued

| Workplace bullying | PRs (95% CI) Model 1 | PRs (95% CI) Model 2 | PRs (95% CI) Model 3 |
|--------------------|----------------------|----------------------|----------------------|
| Transport          | 107 (15.6)           | 0.98 (0.79 to 1.22)  | 0.87 (0.67 to 1.11)  | 0.87 (0.68 to 1.12) |
| Wholesale          | 93 (16.3)            | 1.08 (0.86 to 1.36)  | 1.01 (0.78 to 1.29)  | 1.01 (0.78 to 1.30) |
| Retail trade       | 158 (12.5)           | 0.97 (0.79 to 1.20)  | 0.87 (0.69 to 1.11)  | 0.88 (0.70 to 1.12) |
| Finance            | 67 (15.8)            | 1.06 (0.82 to 1.38)  | 0.93 (0.70 to 1.23)  | 0.94 (0.71 to 1.25) |
| Insurance          | 37 (12.8)            | 0.96 (0.69 to 1.33)  | 0.86 (0.61 to 1.22)  | 0.87 (0.61 to 1.23) |
| Real estate        | 56 (14.1)            | 1.15 (0.87 to 1.53)  | 1.13 (0.84 to 1.52)  | 1.15 (0.85 to 1.55) |
| Restaurants        | 81 (15.9)            | 1.21 (0.94 to 1.55)  | 1.12 (0.85 to 1.48)  | 1.13 (0.85 to 1.48) |
| Hotels             | 24 (15.9)            | 1.09 (0.74 to 1.61)  | 0.97 (0.65 to 1.47)  | 0.97 (0.64 to 1.45) |
| Healthcare         | 205 (17.1)           | 1.23 (1.02 to 1.48)  | 1.10 (0.88 to 1.37)  | 1.11 (0.89 to 1.38) |
| Welfare            | 119 (16.9)           | 1.22 (0.98 to 1.52)  | 1.13 (0.89 to 1.44)  | 1.12 (0.88 to 1.43) |
| Education and learning assistance | 104 (12.2) | 0.98 (0.78 to 1.23)  | 0.91 (0.71 to 1.17)  | 0.91 (0.71 to 1.17) |
| Other              | 430 (12.8)           | 0.98 (0.83 to 1.16)  | 0.92 (0.76 to 1.12)  | 0.92 (0.76 to 1.13) |
| Office size        |                      |                      |                      |                      |
| 1–4                | 208 (8.7)            | 1.00 (reference)     | 1.00 (reference)     | 1.00 (reference)     |
| 5–29               | 427 (13.2)           | 1.32 (1.08 to 1.62)  | 1.32 (1.06 to 1.61)  | 1.31 (1.07 to 1.60) |
| 30–49              | 165 (14.2)           | 1.39 (1.11 to 1.76)  | 1.39 (1.10 to 1.76)  | 1.38 (1.10 to 1.75) |
| 50–99              | 252 (15.5)           | 1.51 (1.22 to 1.88)  | 1.52 (1.22 to 1.90)  | 1.52 (1.22 to 1.89) |
| 100–299            | 398 (18.6)           | 1.76 (1.43 to 2.16)  | 1.78 (1.44 to 2.19)  | 1.78 (1.44 to 2.19) |
| 300–499            | 171 (17.1)           | 1.61 (1.28 to 2.02)  | 1.63 (1.30 to 2.05)  | 1.62 (1.29 to 2.05) |
| 500–999            | 197 (18.5)           | 1.79 (1.43 to 2.24)  | 1.82 (1.45 to 2.29)  | 1.81 (1.44 to 2.28) |
| Over 1000          | 541 (17.1)           | 1.62 (1.32 to 2.00)  | 1.68 (1.37 to 2.06)  | 1.68 (1.37 to 2.06) |
| Government office  | 82 (13.4)            | 1.30 (0.99 to 1.71)  | 1.28 (0.93 to 1.75)  | 1.28 (0.94 to 1.76) |
| Job type           |                      |                      |                      |                      |
| Desk based         | 1161 (14.6)          | 1.00 (reference)     | 1.00 (reference)     | 1.00 (reference)     |
| Working with people| 619 (15.4)           | 1.09 (0.996 to 1.19) | 1.10 (0.98 to 1.22)  | 1.09 (0.98 to 1.21) |
| Physical work      | 661 (15.0)           | 1.04 (0.996 to 1.19) | 1.01 (0.91 to 1.11)  | 1.00 (0.90 to 1.10) |
| Started to work from home during the pandemic | | | | |
| Yes                | 406 (13.7)           | 0.83 (0.74 to 0.91)  | 0.82 (0.74 to 0.92)  | 0.81 (0.73 to 0.91) |
| No                 | 2035 (15.2)          | 1.00 (reference)     | 1.00 (reference)     | 1.00 (reference)     |
| Worked from home since before the pandemic | | | | |
| Yes                | 188 (13.6)           | 1.06 (0.92 to 1.22)  | 1.11 (0.96 to 1.27)  | 1.08 (0.94 to 1.25) |
| No                 | 2253 (15.0)          | 1.00 (reference)     | 1.00 (reference)     | 1.00 (reference)     |
| Increased physical demands | | | | |
| Yes                | 696 (20.5)           | 1.45 (1.34 to 1.57)  | 1.42 (1.31 to 1.54)  | 1.40 (1.29 to 1.51) |
| No                 | 1745 (13.4)          | 1.00 (reference)     | 1.00 (reference)     | 1.00 (reference)     |
| Increased psychological demands | | | | |
| Yes                | 953 (17.6)           | 1.25 (1.16 to 1.35)  | 1.23 (1.14 to 1.33)  | 1.21 (1.12 to 1.31) |
| No                 | 1488 (13.6)          | 1.00 (reference)     | 1.00 (reference)     | 1.00 (reference)     |
| Weekly working hours during the previous month | | | | |
| Less than 20 hours/week | 355 (13.2) | 1.00 (reference) | 1.00 (reference) | 1.00 (reference) |
| 20–29 hours/week  | 279 (15.3)           | 1.08 (0.94 to 1.24)  | 1.05 (0.91 to 1.21)  | 1.04 (0.91 to 1.20) |
| 30–39 hours/week  | 441 (14.2)           | 0.83 (0.73 to 0.95)  | 0.82 (0.71 to 0.94)  | 0.82 (0.72 to 0.94) |
| 40–44 hours/week  | 679 (14.5)           | 0.73 (0.64 to 0.83)  | 0.71 (0.63 to 0.82)  | 0.72 (0.63 to 0.82) |
| 45–49 hours/week  | 285 (15.0)           | 0.74 (0.63 to 0.87)  | 0.73 (0.62 to 0.85)  | 0.74 (0.63 to 0.86) |
| 50–59 hours/week  | 222 (17.5)           | 0.86 (0.73 to 1.02)  | 0.85 (0.72 to 1.01)  | 0.86 (0.73 to 1.01) |
| Over 60 hours/week| 180 (19.3)           | 0.98 (0.83 to 1.17)  | 0.99 (0.83 to 1.18)  | 0.99 (0.83 to 1.17) |
lived in a prefecture under special precautions during the first COVID-19 state of emergency in Japan (April–May 2020). Regarding SES variables, most of the participants had graduated from university or school, earned ¥4.00–¥5.99 million during the previous year and were permanent workers. Regarding occupational characteristics, the majority worked in the manufacturing industry and in a small office with 5–29 employees or a large office with more than 1000 employees. Their work was mainly desk based. Only 8% had started to work from home since before the pandemic began, meaning in total about 30% of participants were working from home during the pandemic period. Although most of the participants had worked 40–44 hours/week during the past month, 6% worked over 60 hours/week. Overall, 21% experienced increased physical demands and 33% experienced increased psychological demands during the pandemic. About 4% had depression or other mental illness at the time of the survey and 6% or 4% had a prior history of depression or other mental illness, respectively.

Overall, 15% of the participants had experienced workplace bullying during the past 6 months and 18% witnessed bullying at their workplaces during the past 6 months. About 9% had experienced severe psychological distress during the past 30 days and 12% had suicidal ideation during the past 6 months.

Risk factors for exposure to workplace bullying
Table 2 shows the results of the modified Poisson regression analysis, which calculated the PRs for workplace bullying. The significant risk factors for workplace bullying were gender (men), younger age, lower household income (¥1.99–¥5.99 million), occupation (executive, manager and permanent employee), larger office size, increased physical or psychological demands and current or prior history of depression or other mental illness. Those who started to work from home during the pandemic or worked 30–49 hours/week had a lower risk of exposure to workplace bullying.

Association between workplace bullying and mental health outcomes
Exposure to workplace bullying was significantly associated with severe psychological distress and suicidal ideation (PR for severe psychological distress: 2.84 (95% CI 2.55 to 3.15); PR for suicidal ideation: 2.13 (95% CI 1.94 to 2.34)), after adjusting for individual characteristics, SES, occupational characteristics and a prior history of depression (model 2 in Table 3). Although larger PRs were observed for exposure to workplace bullying, witnessing bullying was also significantly associated with severe psychological distress and suicidal ideation in model 2 (PR for severe psychological distress: 1.90 (95% CI 1.60 to 2.25); PR for suicidal ideation: 1.41 (95% CI 1.20 to 1.64)). When stratified by gender, men who experienced workplace bullying had higher PRs for both severe psychological distress and suicidal ideation than women (PR for severe psychological distress: 3.60 (95% CI 3.13 to 4.14) in men vs 2.28 (95% CI 2.28 to 3.14) in women; PR for suicidal ideation: 2.17 (95% CI 1.92 to 2.46) in men vs 2.08 (95% CI 1.81 to 2.40) in women).

Other risk factors for mental health outcomes
In men, younger age, not having a partner, low household income (lower than ¥3.99 million), working from home since before the pandemic, starting to work from home during the pandemic, increased physical or psychological demands during the pandemic and current or prior history of depression were significantly and independently associated with both severe psychological distress and suicidal ideation in the workplace bullying adjusted model (Table 4). In women, similar trends were observed, but working from home was not associated with

Table 2: Continued

| Mental illness | Workplace bullying | PRs (95% CI) Model 1 | PRs (95% CI) Model 2 | PRs (95% CI) Model 3 |
|---------------|--------------------|----------------------|----------------------|----------------------|
| Depression    |                    |                      |                      |                      |
| Never         | 2032 (13.7)        | 1.00 (reference)     | 1.00 (reference)     | –                    |
| Past          | 223 (22.5)         | 1.58 (1.40 to 1.79)  | 1.58 (1.40 to 1.78)  | –                    |
| Current       | 186 (30.3)         | 2.00 (1.76 to 2.27)  | 1.98 (1.75 to 2.25)  | –                    |
| Other mental illness |                     |                      |                      |                      |
| Never         | 2102 (13.8)        | 1.00 (reference)     | 1.00 (reference)     | 1.00 (reference)     |
| Past          | 158 (25.9)         | 1.75 (1.53 to 2.01)  | 1.74 (1.51 to 1.99)  | 1.59 (1.37 to 1.83)  |
| Current       | 181 (31.8)         | 2.09 (1.84 to 2.38)  | 2.08 (1.83 to 2.36)  | 2.01 (1.77 to 2.29)  |

Model 1: Individual characteristics (gender, age, residential area and having a partner) and SES (education, household income and employment status) adjusted in the model.
Model 2: In addition to model 1, occupational characteristics (industry, office size and job type) were adjusted in the model.
Model 3: In addition to model 2, a prior history of depression was entered in the model.

Bold values show statistically significant results.
PRs, prevalence ratios; SES, socioeconomic status.
either severe psychological distress or suicidal ideation (table 5).

DISCUSSION

In this nationwide internet survey for the general working population, 15% of workers experienced workplace bullying, 9% had severe psychological distress and 12% had suicidal ideation during the second and third wave of the COVID-19 pandemic in Japan (April–September 2020). Our results showed younger age, low household income, increased physical demands, increased psychological demands and a prior history of depression were common significant risk factors for workplace bullying, severe psychological distress and suicidal ideation. Although this pattern is similar to the trend before the pandemic, a different pattern was also observed in this study: men and workers with higher occupational positions such as executives, managers or permanent workers had a higher risk of bullying than women or part-time workers. As workload has been reported as an antecedent to bullying, COVID-19-related working environment changes, such as an increase in physical or psychological demands, may affect the findings. A new work style—working from home—was also associated with adverse mental health; however, starting to work from home was found to be a preventive factor against workplace bullying. This indicates that working from home has both advantages and disadvantages: although working from home contributes to a decrease in aggressive and negative acts from supervisors or coworkers, it isolates workers due to lack of social interaction. This may contribute to psychological distress because the amount of social support also decreases. Overall, the results of this study suggest that when designing interventions to prevent workplace bullying or mental health problems among workers, we should focus not only on previously reported

| Table 3  | Workplace bullying and mental health outcomes: modified Poisson regression analysis |
|----------|----------------------------------------------------------------------------------|
|          | Severe psychological distress | Suicidal ideation |
|          | Case/all (%) | PRs (95% CI) | PRs (95% CI) | Case/all (%) | PRs (95% CI) | PRs (95% CI) |
| All (N=16384) | | | | | | |
| Not exposed or witnessed | 761/12869 (5.9) | 1.00 (reference) | 1.00 (reference) | 1,182/12869 (9.2) | 1.00 (reference) | 1.00 (reference) |
| Not exposed but witnessed | 135/1074 (12.6) | 2.01 (1.69 to 2.38) | 1.90 (1.60 to 2.25) | 150/1074 (14.0) | 1.48 (1.26 to 1.72) | 1.41 (1.20 to 1.64) |
| Exposed | 546/2441 (22.4) | 3.30 (2.98 to 3.66) | 2.84 (2.55 to 3.15) | 558/2441 (22.9) | 2.23 (2.03 to 2.45) | 2.13 (1.94 to 2.34) |
| Men (N=9565) | | | | | | |
| Not exposed or witnessed | 365/7361 (5.0) | 1.00 (reference) | 1.00 (reference) | 593/7361 (8.1) | 1.00 (reference) | 1.00 (reference) |
| Not exposed but witnessed | 81/646 (12.5) | 2.30 (1.83 to 2.90) | 2.22 (1.77 to 2.80) | 92/646 (14.2) | 1.67 (1.37 to 2.04) | 1.58 (1.29 to 1.93) |
| Exposed | 357/1588 (22.5) | 3.69 (3.21 to 4.25) | 3.60 (3.13 to 4.14) | 340/1588 (21.4) | 2.27 (2.01 to 2.57) | 2.17 (1.92 to 2.46) |
| Women (N=6789) | | | | | | |
| Not exposed or witnessed | 396/5508 (7.2) | 1.00 (reference) | 1.00 (reference) | 589/5508 (10.7) | 1.00 (reference) | 1.00 (reference) |
| Not exposed but witnessed | 54/428 (12.6) | 1.72 (1.33 to 2.22) | 1.65 (1.28 to 2.13) | 58/428 (13.6) | 1.26 (0.99 to 1.61) | 1.21 (0.95 to 1.54) |
| Exposed | 189/853 (22.2) | 2.81 (2.40 to 3.30) | 2.28 (2.28 to 3.14) | 218/6789 (12.7) | 2.19 (1.91 to 2.53) | 2.08 (1.81 to 2.40) |

Model 1: Adjusted for individual characteristics (gender, age, residential area and having a partner), SES (education, household income and employment status) and occupational characteristics (industry, office size and job type).
Model 2: In addition to model 1, prior history of depression was adjusted.
Bold values show statistically significant results.
PRs, prevalence ratios; SES, socioeconomic status.
Table 4  Risk factors for mental health outcomes among men (N=9565): modified Poisson regression analysis

|                      | All         | Severe psychological distress | Suicidal ideation |
|----------------------|-------------|------------------------------|-------------------|
|                      | Case (%)    | PRs (95% CI)*                | Case (%)          | PRs (95% CI)*                |
| **Age**              |             |                              |                   |                               |
| Under 24             | 512         | 94 18.4                      | 119 23.2          | 4.38 (2.98 to 6.45)           |
| 25–34                | 1659        | 221 13.3                     | 240 14.5          | 3.44 (2.39 to 4.95)           |
| 35–44                | 2112        | 212 10.0                     | 269 12.7          | 3.46 (2.43 to 4.93)           |
| 45–54                | 2431        | 196 8.1                      | 258 10.6          | 2.93 (2.06 to 4.16)           |
| 55–64                | 1816        | 63 3.5                       | 103 5.7           | 1.71 (1.18 to 2.49)           |
| Over 65              | 1065        | 17 1.6                       | 36 3.4            | 1.00 (reference)              |
| **Having a partner/spouse** |           |                              |                   |                               |
| Yes                  | 6093        | 369 6.1                      | 464 7.6           | 1.00 (reference)              |
| No                   | 3502        | 434 12.4                     | 561 16.0          | 1.37 (1.20 to 1.56)           |
| **Residential area** |             |                              |                   |                               |
| Prefecture under special precautions | 6008 | 526 8.8 | 1.09 (0.95 to 1.25) | 662 | 11.0 | 1.05 (0.93 to 1.19) |
| Other                | 3587        | 277 7.7                      | 363 10.1          | 1.00 (reference)              |
| **Education**        |             |                              |                   |                               |
| High school or below | 2246        | 179 8.0                      | 249 11.1          | 0.97 (0.84 to 1.13)           |
| Junior college/vocational school | 1360 | 112 8.2 | 0.91 (0.74 to 1.11) | 158 | 11.6 | 1.00 (0.84 to 1.18) |
| University or above  | 5989        | 512 8.5                      | 618 10.3          | 1.00 (reference)              |
| **Annual household income during the previous year (million yen)** | | | | |
| Unknown              | 1241        | 66 5.3                       | 100 8.1           | 1.04 (0.79 to 1.37)           |
| 1.99 or less         | 450         | 86 19.1                      | 117 26.0          | 2.40 (1.82 to 3.17)           |
| 2.00–3.99            | 1592        | 185 11.6                     | 234 14.7          | 1.66 (1.30 to 2.13)           |
| 4.00–5.99            | 2177        | 175 8.0                      | 241 11.1          | 1.38 (1.09 to 1.74)           |
| 6.00–7.99            | 1602        | 120 7.5                      | 140 8.7           | 1.21 (0.94 to 1.56)           |
| 8.00–9.99            | 1164        | 80 6.9                       | 102 8.8           | 1.25 (0.96 to 1.63)           |
| 10.00 or more        | 1369        | 91 6.6                       | 91 6.6            | 1.00 (reference)              |
| **Occupation/employment status** |           |                              |                   |                               |
| Executive            | 733         | 68 9.3                       | 77 10.5           | 0.88 (0.65 to 1.18)           |
| Self-employed/individual business owner | 1144 | 79 6.9 | 1.33 (0.92 to 1.92) | 120 | 10.5 | 0.998 (0.72 to 1.38) |
| Family business assistance | 69 | 15 21.7 | 2.34 (1.46 to 3.76) | 12 | 17.4 | 1.05 (0.62 to 1.78) |
| Manager              | 1699        | 111 6.5                      | 133 7.8           | 0.74 (0.56 to 0.97)           |
| Permanent worker (non-manager) | 4588 | 423 9.3 | 0.79 (0.60 to 1.05) | 516 | 11.3 | 0.76 (0.60 to 0.95) |
| Agency worker        | 142         | 17 12.0                      | 27 19.0           | 1.05 (0.72 to 1.43)           |
| Contract worker      | 598         | 31 5.2                       | 51 8.5            | 0.78 (0.57 to 1.07)           |
| Part-time worker     | 642         | 59 9.2                       | 89 13.9           | 1.00 (reference)              |
| **Industry**         |             |                              |                   |                               |
| Public administration | 771         | 73 9.5                       | 69 8.9            | 1.00 (reference)              |
| Agriculture, forestry and fishing | 134 | 19 14.2 | 1.32 (0.84 to 2.07) | 19 | 14.2 | 1.30 (0.82 to 2.08) |
| Construction         | 623         | 37 5.9                       | 55 8.8            | 0.98 (0.69 to 1.39)           |
| Manufacturing        | 2089        | 182 8.8                      | 206 10.0          | 0.97 (0.73 to 1.30)           |
| Electricity, gas and water supply | 173 | 16 9.2 | 0.93 (0.55 to 1.58) | 24 | 13.9 | 1.28 (0.80 to 2.02) |
| Telecommunication    | 649         | 50 7.7                       | 78 12.0           | 1.15 (0.82 to 1.60)           |
| Transport            | 523         | 38 7.3                       | 66 12.6           | 1.13 (0.80 to 1.60)           |

Continued
|                          | Severe psychological distress |                      | Suicidal ideation |                      |
|--------------------------|-------------------------------|----------------------|-------------------|----------------------|
|                          | Case % | PRs (95% CI)*               | Case % | PRs (95% CI)*               |
| Wholesale                | 376    | 33 | 8.8 | 1.09 (0.75 to 1.61) | 43 | 11.4 | 1.23 (0.85 to 1.79) |
| Retail trade             | 538    | 39 | 7.2 | 0.93 (0.63 to 1.37) | 60 | 11.2 | 1.12 (0.78 to 1.60) |
| Finance                  | 239    | 12 | 5.0 | 0.66 (0.36 to 1.19) | 16 | 6.7  | 0.73 (0.43 to 1.23) |
| Insurance                | 139    | 11 | 7.9 | 1.09 (0.96 to 2.01) | 10 | 7.2  | 0.87 (0.45 to 1.68) |
| Real estate              | 261    | 16 | 6.1 | 0.97 (0.57 to 1.63) | 24 | 9.2  | 1.22 (0.77 to 1.94) |
| Restaurants              | 170    | 23 | 13.5 | 1.29 (0.83 to 2.00) | 26 | 15.3 | 1.13 (0.72 to 1.75) |
| Hotels                   | 68     | 7  | 10.3 | 1.00 (0.47 to 1.92) | 9  | 13.2 | 1.13 (0.61 to 2.11) |
| Healthcare               | 414    | 39 | 9.4 | 1.08 (0.73 to 1.58) | 43 | 10.4 | 1.30 (0.70 to 1.52) |
| Welfare                  | 270    | 24 | 8.9 | 0.97 (0.62 to 1.53) | 32 | 11.9 | 1.06 (0.70 to 1.61) |
| Education and learning assistance | 402    | 35 | 8.7 | 1.00 (0.67 to 1.40) | 44 | 10.9 | 1.20 (0.84 to 1.72) |
| Other                    | 1776   | 149 | 8.4 | 1.02 (0.76 to 1.35) | 201 | 11.3 | 1.09 (0.81 to 1.46) |
| Office size              |        |    |     |                      |    |     |                      |
| 1–4                      | 1462   | 94  | 6.4 | 1.00 (reference)     | 154 | 10.5 | 1.00 (reference)     |
| 5–29                     | 1569   | 121 | 7.7 | 1.22 (0.90 to 1.65) | 170 | 10.8 | 0.96 (0.74 to 1.25) |
| 30–49                    | 615    | 46  | 7.5 | 1.18 (0.78 to 1.74) | 55  | 8.9  | 0.80 (0.57 to 1.12) |
| 50–99                    | 892    | 89  | 10.0 | 1.47 (1.06 to 2.03) | 104 | 11.7 | 1.01 (0.76 to 1.36) |
| 100–299                  | 1280   | 122 | 9.5 | 1.33 (0.897 to 1.83) | 151 | 11.8 | 0.988 (0.75 to 1.33) |
| 300–499                  | 602    | 60  | 10.0 | 1.36 (0.94 to 1.97) | 74  | 12.3 | 1.03 (0.75 to 1.3)  |
| 500–999                  | 640    | 62  | 9.7 | 1.47 (1.03 to 2.11) | 73  | 11.4 | 1.06 (0.76 to 1.47) |
| Over 1000                | 2094   | 169 | 8.1 | 1.24 (0.90 to 1.72) | 210 | 10.0 | 0.96 (0.72 to 1.27) |
| Government office        | 441    | 40  | 9.1 | 1.39 (0.91 to 2.13) | 34  | 7.7  | 0.79 (0.51 to 1.23) |
| Job type                 |        |    |     |                      |    |     |                      |
| Desk based               | 4795   | 395 | 8.2 | 1.00 (reference)     | 492 | 10.3 | 1.00 (reference)     |
| Working with people      | 2145   | 200 | 9.3 | 1.01 (0.85 to 1.19) | 233 | 10.9 | 0.93 (0.79 to 1.08) |
| Physical work            | 2655   | 208 | 7.8 | 0.87 (0.73 to 1.04) | 300 | 11.3 | 0.96 (0.83 to 1.12) |
| Started to work from home during the pandemic |        |    |     |                      |    |     |                      |
| Yes                      | 1973   | 178 | 9.0 | 1.20 (1.01 to 1.41) | 223 | 11.3 | 1.23 (1.06 to 1.43) |
| No                       | 7622   | 625 | 8.2 | 1.00 (reference)     | 802 | 10.5 | 1.00 (reference)     |
| Worked from home since before the pandemic |        |    |     |                      |    |     |                      |
| Yes                      | 888    | 112 | 12.6 | 1.60 (1.33 to 1.93) | 140 | 15.8 | 1.45 (1.23 to 1.71) |
| No                       | 8707   | 691 | 7.9 | 1.00 (reference)     | 885 | 10.2 | 1.00 (reference)     |
| Increase in physical demands |        |    |     |                      |    |     |                      |
| Yes                      | 1813   | 339 | 18.7 | 2.38 (2.09 to 2.71) | 378 | 20.8 | 1.87 (1.67 to 2.11) |
| No                       | 7782   | 464 | 6.0 | 1.00 (reference)     | 647 | 8.3  | 1.00 (reference)     |
| Increase in psychological demands |        |    |     |                      |    |     |                      |
| Yes                      | 2930   | 429 | 14.6 | 2.28 (2.00 to 2.60) | 549 | 18.7 | 2.24 (2.00 to 2.51) |
| No                       | 6665   | 374 | 5.6 | 1.00 (reference)     | 476 | 7.1  | 1.00 (reference)     |
| Weekly working hours during the previous month |        |    |     |                      |    |     |                      |
| Less than 20hours/week   | 943    | 90  | 9.5 | 1.00 (reference)     | 120 | 12.7 | 1.00 (reference)     |
| 20–29 hours/week         | 747    | 101 | 13.5 | 1.19 (0.93 to 1.52) | 134 | 17.9 | 1.25 (0.996 to 1.56) |
| 30–39 hours/week         | 1686   | 124 | 7.4 | 0.80 (0.63 to 1.03) | 175 | 10.4 | 0.94 (0.76 to 1.18) |
| 40–44 hours/week         | 3040   | 216 | 7.1 | 0.77 (0.61 to 0.98) | 283 | 9.3  | 0.84 (0.68 to 1.03) |
| 45–49 hours/week         | 1416   | 82  | 5.8 | 0.65 (0.48 to 0.86) | 117 | 8.3  | 0.76 (0.608 to 0.98) |
| 50–59 hours/week         | 1009   | 97  | 9.6 | 0.97 (0.74 to 1.27) | 103 | 10.2 | 0.91 (0.71 to 1.181) |
| Over 60 hours/week       | 754    | 93  | 12.3 | 1.15 (0.88 to 1.51) | 93  | 12.3 | 0.99 (0.77 to 1.27) |

Table 4 Continued

Continued
or new work practices including working from home. New work practices included working from home, changed work schedules, and new technologies such as online meetings. During the pandemic, executives and managers had to adapt new technologies and work practices.

A study of managers has reported that the risk for exposure to bullying was higher in those who suffered from work stress, were less satisfied with their salary, and could not see opportunities for promotion within their organisation. Managers in Japan have been reported as highly stressed workers since most are middle managers with heavy workloads and limited autonomy, often described as ‘player managers’ (managers who are part of a team as well as its manager). This may also contribute to the high prevalence of workplace bullying we found among managers.

Interestingly, men were more likely to be exposed to workplace bullying than women. Previous studies have shown the opposite results: women are at higher risk for workplace bullying than men. In general, perpetrators of workplace bullying are mainly managers and males. In Japan, most manager positions are dominated by men. A recent national survey has reported that women occupy only 13.2% of managerial positions in 2021. In other words, 86.8% of managers are men. Since men tend to be bullied by other men, the gender imbalance of managers in Japan might have caused a higher risk of men in the prevalence of workplace bullying.

Exposure to workplace bullying was significantly associated with severe psychological distress and suicidal ideation in both men and women, even after adjusting for individual characteristics, SES, occupational characteristics and a prior history of depression. This indicates a strong relationship between bullying and mental health problems, as previously shown. Moreover, we found that witnessing bullying was also associated with both severe psychological distress and suicidal ideation. This is in line with a longitudinal study which showed a spillover effect of workplace bullying on non-victims’ psychological distress.

Men were more likely to have severe psychological distress or suicidal ideation than women as a result of bullying. Although gender differences have not been investigated in the meta-analyses on the association between bullying and mental health, the results of this study are consistent with a study of the association between work-related physical violence and depression in Japan. Two possible explanations are considered. First, men were more likely to be in managerial positions

Table 4 Continued

| History of depression | All | Severe psychological distress | Suicidal ideation |
|-----------------------|-----|-------------------------------|------------------|
|                       | Case | %   | PRs (95% CI)* | Case | % | PRs (95% CI)* |
| Never                 | 8644 | 544 | 6.3 | 1.00 (reference) | 706 | 8.2 | 1.00 (reference) |
| Past                  | 559 | 100 | 17.9 | 2.16 (1.71 to 2.72) | 148 | 26.5 | 2.70 (2.32 to 3.16) |
| Current               | 392 | 159 | 40.6 | 3.20 (2.77 to 3.69) | 171 | 43.6 | 3.70 (3.19 to 4.29) |

Bold values show statistically significant results.

*Individual characteristics (gender, age, residential area and having a partner), SES (education, household income and employment status), occupational characteristics (industry, office size and job type), workplace bullying and a prior history of depression adjusted.

PRs, prevalence ratios; SES, socioeconomic status.

vulnerable workers but also those whose work style or job demands have changed.

The prevalence of workplace bullying in this study was similar to the global prevalence before the pandemic. Although higher than previously reported in the representative working sample in Japan (6.1%), it does not necessarily mean that more workers experienced bullying during the pandemic because the measurement durations are different. The previous study measured experiencing workplace bullying during the previous month, but this study measured the previous 6 months. Measurement methods greatly contributed to the prevalence rates of workplace bullying. As a recent national survey of workplace bullying and harassment in Japan showed a non-different prevalence of workplace bullying in 2020 (31.4%) and in 2016 (32.5%), the prevalence itself may not have changed before and during the pandemic in Japan.

In this study, younger workers, workers with lower household income, executives, managers, permanent workers, those working in larger sized offices, those experiencing increased physical or psychological demands, and those with current or prior history of depression or other mental illnesses were more likely to be exposed to workplace bullying. Although the results are mostly consistent with previous studies, inconsistent results were observed in terms of occupational positions, executives and managers had a higher risk of experiencing workplace bullying compared with women and part-time workers. This trend may be caused by the pandemic, since an increase in physical or psychological demands was also associated with exposure to bullying in this study. During the pandemic, managers had responsibility for implementing countermeasures to protect employees against COVID-19. At the same time, they had to follow government guidelines against COVID-19, which may have decreased their job autonomy or control. Moreover, during the pandemic, executives and managers had to adapt new technologies such as online meetings or new work practices including working from home. Since most executives and managers were unlikely to have had expertise in infection control or new technologies, their subordinates’ frustration may have increased and led to aggressive behaviour toward managers.

Table 4

| History of depression | All | Severe psychological distress | Suicidal ideation |
|-----------------------|-----|-------------------------------|------------------|
|                       | Case | %   | PRs (95% CI)* | Case | % | PRs (95% CI)* |
| Never                 | 8644 | 544 | 6.3 | 1.00 (reference) | 706 | 8.2 | 1.00 (reference) |
| Past                  | 559 | 100 | 17.9 | 2.16 (1.71 to 2.72) | 148 | 26.5 | 2.70 (2.32 to 3.16) |
| Current               | 392 | 159 | 40.6 | 3.20 (2.77 to 3.69) | 171 | 43.6 | 3.70 (3.19 to 4.29) |

Bold values show statistically significant results.

*Individual characteristics (gender, age, residential area and having a partner), SES (education, household income and employment status), occupational characteristics (industry, office size and job type), workplace bullying and a prior history of depression adjusted.

PRs, prevalence ratios; SES, socioeconomic status.
### Table 5  Risk factors for mental health outcomes among women (N=6789): modified Poisson regression analysis

| Age          | All  | Severe psychological distress | Suicidal ideation |
|--------------|------|-------------------------------|-------------------|
|              | Case | %    | PRs (95% CI)* | Case | %    | PRs (95% CI)* |
| Under 24     | 512  | 88   | 17.2          | 3.92 (2.43 to 6.34) | 111  | 21.7 | 2.87 (1.95 to 4.21) |
| 25–34        | 1305 | 163  | 12.5          | 3.33 (2.11 to 5.25) | 198  | 15.2 | 2.26 (1.58 to 3.24) |
| 35–44        | 1561 | 175  | 11.2          | 3.06 (1.97 to 4.84) | 233  | 14.9 | 2.18 (1.53 to 3.09) |
| 45–54        | 1715 | 135  | 7.9           | 2.24 (1.42 to 3.53) | 201  | 11.7 | 1.79 (1.26 to 2.55) |
| 55–64        | 1098 | 57   | 5.2           | 1.51 (0.93 to 2.45) | 83   | 7.6  | 1.22 (0.83 to 1.79) |
| Over 65      | 598  | 21   | 3.5           | 1.00 (reference)   | 39   | 6.5  | 1.001.00 (reference) |
| Having a partner/spouse | Yes  | 3540 | 258 | 7.3 | 1.00 (reference) | 338 | 9.5 | 1.00 (reference) |
|              | No   | 3249 | 381 | 11.7 | 1.23 (1.03 to 1.47) | 527 | 16.2 | 1.24 (1.06 to 1.46) |
| Residential area | Prefecture under special precautions | 4238 | 402 | 9.5 | 1.01 (0.86 to 1.17) | 517 | 12.2 | 0.91 (0.80 to 1.03) |
|              | Other | 2551 | 237 | 9.3 | 1.00 (reference) | 348 | 13.6 | 1.00 (reference) |
| Education | High school or below | 1921 | 184 | 9.6 | 1.03 (0.85 to 1.24) | 257 | 13.4 | 0.98 (0.82 to 1.17) |
|              | Junior college/vocational school | 2298 | 184 | 8.0 | 0.86 (0.72 to 1.04) | 278 | 12.1 | 1.00 (0.85 to 1.19) |
|              | University or above | 2570 | 271 | 10.5 | 1.00 (reference) | 330 | 12.8 | 1.00 (reference) |

| Annual household income during the previous year (million yen) | All  | Severe psychological distress | Suicidal ideation |
|---------------------------------------------------------------|------|-------------------------------|-------------------|
|                                                              | Case | %    | PRs (95% CI)* | Case | %    | PRs (95% CI)* |
| Unknown                                                      | 1411 | 128 | 9.1           | 1.31 (0.94 to 1.83) | 176 | 12.5 | 1.27 (0.93 to 1.74) |
| 1.99 or less                                                | 537  | 73  | 13.6          | 1.59 (1.10 to 2.31) | 107 | 19.9 | 1.49 (1.05 to 2.12) |
| 2.00–3.99                                                   | 1461 | 161 | 11.0          | 1.43 (1.04 to 1.98) | 241 | 16.5 | 1.58 (1.16 to 2.14) |
| 4.00–5.99                                                   | 1292 | 120 | 9.3           | 1.37 (0.99 to 1.89) | 151 | 11.7 | 1.25 (0.91 to 1.72) |
| 6.00–7.99                                                   | 879  | 76  | 8.6           | 1.28 (0.90 to 1.82) | 90  | 10.2 | 1.15 (0.82 to 1.62) |
| 8.00–9.99                                                   | 580  | 38  | 6.6           | 1.08 (0.72 to 1.63) | 46  | 7.9  | 0.93 (0.62 to 1.38) |
| 10.00 or more                                               | 629  | 43  | 6.8           | 1.00 (reference)   | 54  | 8.6  | 1.00 (reference) |

| Occupation/employment status | All  | Severe psychological distress | Suicidal ideation |
|------------------------------|------|-------------------------------|-------------------|
| Executive                    | 194  | 27   | 13.9          | 1.17 (0.81 to 1.69) | 31  | 16.0 | 0.91 (0.62 to 1.34) |
| Self-employed/individual business owner | 404 | 29  | 7.2           | 0.97 (0.64 to 1.48) | 45  | 11.1 | 0.94 (0.65 to 1.36) |
| Family business assistance   | 141  | 19   | 13.5          | 1.79 (1.12 to 2.87) | 15  | 10.6 | 0.79 (0.45 to 1.38) |
| Manager                      | 315  | 30   | 9.5           | 0.87 (0.60 to 1.27) | 37  | 11.7 | 0.75 (0.52 to 1.07) |
| Permanent worker (non-manager) | 2633 | 256 | 9.7           | 0.88 (0.71 to 1.09) | 311 | 11.8 | 0.72 (0.60 to 0.87) |
| Agency worker                | 224  | 30   | 13.4          | 1.33 (0.93 to 1.89) | 37  | 16.5 | 0.98 (0.68 to 1.41) |
| Contract worker              | 464  | 44   | 9.5           | 0.96 (0.70 to 1.33) | 65  | 14.0 | 0.89 (0.68 to 1.18) |
| Part-time worker             | 2414 | 204  | 8.5           | 1.00 (reference)   | 324 | 13.4 | 1.00 (reference) |

| Industry | All  | Severe psychological distress | Suicidal ideation |
|----------|------|-------------------------------|-------------------|
| Public administration       | 294  | 32   | 10.9          | 1.00 (reference)   | 34  | 11.6 | 1.00 (reference) |
| Agriculture, forestry and fishing | 47  | 7    | 14.9          | 1.19 (0.57 to 2.48) | 10  | 21.3 | 2.00 (1.10 to 3.64) |
| Construction                | 285  | 25   | 8.8           | 0.73 (0.45 to 1.19) | 41  | 14.4 | 1.31 (0.85 to 2.00) |
| Manufacturing               | 679  | 49   | 7.2           | 0.57 (0.37 to 0.88) | 78  | 11.5 | 1.03 (0.69 to 1.52) |
| Electricity, gas and water supply | 62  | 5    | 8.1           | 0.51 (0.21 to 1.24) | 13  | 21.0 | 1.56 (0.87 to 2.81) |

Continued
| Table 5 | Continued |
|---------|------------|
| All | Severe psychological distress | Suicidal ideation |
| | Case | % | PRs (95% CI)* | Case | % | PRs (95% CI)* |
| Telecommunication | 195 | 20 | 10.3 | 0.68 (0.41 to 1.14) | 22 | 11.3 | 0.90 (0.54 to 1.50) |
| Transport | 161 | 19 | 11.8 | 0.98 (0.58 to 1.66) | 31 | 19.3 | 1.71 (1.08 to 2.70) |
| Wholesale | 195 | 20 | 10.3 | 0.73 (0.44 to 1.22) | 21 | 10.8 | 0.87 (0.53 to 1.45) |
| Retail trade | 731 | 71 | 9.7 | 0.85 (0.57 to 1.29) | 100 | 13.7 | 1.12 (0.76 to 1.65) |
| Finance | 184 | 18 | 9.8 | 0.74 (0.43 to 1.29) | 23 | 12.5 | 1.12 (0.67 to 1.86) |
| Insurance | 149 | 10 | 6.7 | 0.55 (0.27 to 1.12) | 16 | 10.7 | 0.99 (0.56 to 1.75) |
| Real estate | 135 | 12 | 9.3 | 0.74 (0.40 to 1.36) | 16 | 11.9 | 1.12 (0.63 to 1.89) |
| Restaurants | 338 | 49 | 14.5 | 1.09 (0.71 to 1.69) | 62 | 18.3 | 1.26 (0.83 to 1.90) |
| Hotels | 787 | 71 | 9.0 | 0.79 (0.53 to 1.18) | 83 | 10.5 | 0.99 (0.67 to 1.47) |
| Healthcare | 434 | 33 | 7.6 | 0.71 (0.44 to 1.14) | 71 | 16.4 | 1.51 (1.02 to 2.23) |
| Welfare | 451 | 38 | 8.4 | 0.83 (0.54 to 1.29) | 36 | 8.0 | 0.76 (0.48 to 1.18) |
| Education and learning assistance | 1579 | 152 | 9.6 | 0.79 (0.55 to 1.15) | 197 | 12.5 | 1.02 (0.71 to 1.47) |
| Office size | | | | | | | |
| 1–4 | 917 | 94 | 6.4 | 1.00 (reference) | 154 | 10.5 | 1.00 (reference) |
| 5–29 | 1672 | 121 | 7.7 | 0.87 (0.65 to 1.17) | 170 | 10.8 | 0.94 (0.74 to 1.20) |
| 30–49 | 546 | 46 | 7.5 | 0.99 (0.70 to 1.40) | 55 | 8.9 | 1.10 (0.83 to 1.46) |
| 50–99 | 733 | 89 | 10.0 | 0.90 (0.63 to 1.27) | 104 | 11.7 | 0.90 (0.67 to 1.20) |
| 100–299 | 865 | 122 | 9.5 | 0.88 (0.63 to 1.23) | 151 | 11.8 | 0.84 (0.63 to 1.12) |
| 300–499 | 397 | 60 | 9.7 | 0.96 (0.66 to 1.40) | 73 | 11.4 | 0.90 (0.64 to 1.26) |
| 500–999 | 425 | 62 | 9.7 | 0.96 (0.66 to 1.40) | 73 | 11.4 | 0.90 (0.64 to 1.26) |
| Over 1000 | 1064 | 169 | 8.1 | 1.01 (0.73 to 1.41) | 210 | 10.0 | 0.98 (0.75 to 1.30) |
| Government office | 170 | 40 | 9.1 | 0.57 (0.29 to 1.11) | 34 | 7.7 | 1.09 (0.66 to 1.78) |
| Job type | | | | | | | |
| Desk based | 3149 | 395 | 8.2 | 1.00 (reference) | 492 | 10.3 | 1.00 (reference) |
| Working with people | 1879 | 200 | 9.3 | 0.86 (0.72 to 1.04) | 233 | 10.9 | 0.97 (0.82 to 1.14) |
| Physical work | 1761 | 208 | 7.8 | 0.82 (0.66 to 1.01) | 300 | 11.3 | 0.86 (0.71 to 1.02) |
| Started to work from home during the pandemic | | | | | | | |
| Yes | 991 | 178 | 9.0 | 1.15 (0.94 to 1.40) | 223 | 11.3 | 0.97 (0.81 to 1.18) |
| No | 5798 | 625 | 8.2 | 1.00 (reference) | 802 | 10.5 | 1.00 (reference) |
| Working from home since before the pandemic | | | | | | | |
| Yes | 494 | 112 | 12.6 | 1.28 (0.99 to 1.65) | 140 | 15.8 | 1.13 (0.89 to 1.43) |
| No | 6295 | 691 | 7.9 | 1.00 (reference) | 885 | 10.2 | 1.00 (reference) |
| Increase in physical demands | | | | | | | |
| Yes | 1576 | 265 | 16.8 | 2.14 (1.84 to 2.50) | 338 | 21.4 | 1.84 (1.62 to 2.08) |
| No | 5213 | 374 | 7.2 | 1.00 (reference) | 527 | 10.1 | 1.00 (reference) |
| Increase in psychological demands | | | | | | | |
| Yes | 2491 | 411 | 16.5 | 2.86 (2.44 to 3.34) | 510 | 20.5 | 2.18 (1.92 to 2.47) |
| No | 4298 | 228 | 5.3 | 1.00 (reference) | 355 | 8.3 | 1.00 (reference) |
| Weekly working hours during the previous month | | | | | | | |
| Less than 20 hours/week | 1745 | 168 | 9.6 | 1.00 (reference) | 222 | 12.7 | 1.00 (reference) |
| 20–29 hours/week | 1074 | 94 | 8.8 | 0.86 (0.67 to 1.08) | 151 | 14.1 | 1.03 (0.85 to 1.23) |
| 30–39 hours/week | 1417 | 124 | 8.8 | 0.81 (0.64 to 1.02) | 165 | 11.6 | 0.92 (0.76 to 1.11) |
| 40–44 hours/week | 1636 | 145 | 8.9 | 0.74 (0.58 to 0.95) | 201 | 12.3 | 0.90 (0.74 to 1.10) |
| 45–49 hours/week | 484 | 59 | 12.2 | 1.02 (0.75 to 1.37) | 72 | 14.9 | 1.07 (0.82 to 1.39) |

Continued
than women. The high prevalence of workplace bullying observed in executives and managers in this study may affect the high prevalence of severe psychological distress or suicidal ideation in men. The second possible explanation is low psychological preparedness, which refers to a sense of control over trauma. Since men had a lower risk of workplace bullying before the pandemic, experiencing such behaviour may have been more shocking and led to more severe mental health problems than for women who have a higher risk for bullying in general.

In this study, newly starting working from home was a preventive factor against workplace bullying but was a predictor for adverse mental health outcomes. As noted previously, there are advantages and disadvantages to working from home: while interaction with potential bullies is decreased, social support from coworkers is also decreased and this may contribute to a deterioration of mental health. In this study, although working from home since before the pandemic was associated with both severe psychological distress and suicidal ideation, newly initiated working from home was associated with only suicidal ideation. This is consistent with a study which reported long-term working from home reduced communication with, or support from, coworkers. Thus, these results highlight the importance of retaining social support for remote workers and monitoring their mental health.

We found younger age, not having a partner, lower household income, increased physical demands, increased psychological demands and a prior history of depression were risk factors for severe psychological distress and suicidal ideation both in men and women, in addition to workplace bullying. Although the existing literature has shown a significant association between job demands and mental health, the findings of this study show the effects of changes in job demands may also affect severe psychological distress or suicidal ideation during a pandemic.

Several limitations should be noted. First, this study was cross-sectional, so that causality cannot be determined. Although we adjusted for a prior history of depression to avoid reverse causality, a longitudinal study is needed to clarify the association between risk factors and workplace bullying, severe psychological distress and suicidal ideation in the COVID-19 pandemic. Second, workplace bullying was measured by a self-labelling method, which may cause underestimation compared with the behavioural experience method that asks respondents how often they experienced various negative acts without using the term ‘harassment’ or ‘bullying’. This underestimation might have caused gender difference in prevalence of workplace bullying, for example, women may not have realised that they were bullied. In addition, we did not ask the gender distribution in the workplace. Such working environment factors may influence the experience of workplace bullying. Third, there might be a sampling bias due to the nature of online surveys. In this study, the recruitment process stopped once the target number of participants answered the questionnaire, which means that our sample comprised early responders who may have been people with more time available to them. Seriously bullied persons or highly stressed people may not have participated in this study, which might have caused an underestimation of the prevalence of workplace bullying or mental health outcomes. Moreover, recall bias would also have occurred, since we asked the participants about bullying experiences during the previous 6 months. This may limit the generalisability of our study results.

Despite these limitations, this study was the first to identify important risk factors for workplace bullying, severe psychological distress and suicidal ideation in a large-scale nationwide study for the general working population in Japan. The strength of this study was the identification of various new risk factors, including working from home, for severe psychological distress or suicidal ideation, and an increased risk of workplace bullying for managers. Further research is needed to examine other possible risk factors for workplace bullying, severe psychological distress and suicidal ideation in a longitudinal design.

### Table 5—Continued

| Severe psychological distress | Suicidal ideation |
|-----------------------------|------------------|
| All | Case | % | PRs (95% CI)* | Case | % | PRs (95% CI)* |
| 50–59 hours/week | 256 | 34 | 13.3 | 1.22 (0.84 to 1.76) | 32 | 12.5 | 0.99 (0.69 to 1.41) |
| Over 60 hours/week | 177 | 15 | 8.5 | 0.71 (0.43 to 1.16) | 22 | 12.4 | 0.91 (0.62 to 1.34) |
| History of depression | | | | | | | |
| Never | 6138 | 449 | 7.3 | 1.00 (reference) | 609 | 9.9 | 1.00 (reference) |
| Past | 430 | 99 | 23.0 | 2.58 (2.13 to 3.13) | 136 | 31.6 | 2.72 (2.32 to 3.18) |
| Current | 221 | 91 | 41.2 | 4.06 (3.33 to 4.93) | 120 | 54.3 | 4.06 (3.47 to 4.75) |

Bold values show statistically significant results.

*Individual characteristics (gender, age, residential area and having a partner), SES (education, household income and employment status), occupational characteristics (industry, office size and job type), workplace bullying and a prior history of depression adjusted.

CI, confidence interval; PRs, prevalence ratios; SES, socioeconomic status.
CONCLUSIONS

Overall, 15% of workers experienced workplace bullying, 9% had severe psychological distress and 12% had suicidal ideation during the second and third wave of the COVID-19 pandemic in Japan. The results of this study showed men, executives, managers and permanent workers were at a higher risk of bullying than women or part-time workers. Increased physical or psychological demands were common risk factors for bullying, severe psychological distress and suicidal ideation. Newly starting working from home was a significant predictor for adverse mental health outcomes, but was also found to be a preventive factor against workplace bullying. The results of this study show that the pattern of high-risk groups changed during the pandemic. Interventions to decrease workplace bullying or mental health problems should focus on new high-risk groups or workers who experienced a change of work styles or job demands, in addition to previously reported vulnerable workers.

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Data availability statement Data are available on reasonable request. The data used in this study are not available in a public repository because they contain personally identifiable or potentially sensitive patient information. Based on the regulations for ethical guidelines in Japan, the Research Ethics Committee of the Osaka International Cancer Institute has imposed restrictions on the dissemination of the data collected in this study. All data inquiries should be addressed to the person responsible for data management, TT, at the following email address: tabuchitak@gmail.com.

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