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Physical and verbal abuse amid COVID-19: a nationwide cross-sectional survey in Japan

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2 **1 Physical and verbal abuse amid COVID-19: a nationwide cross-sectional survey in Japan**
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22 **Abstract**

23 **Objectives**

24 The detrimental impacts of abuse on victims' well-being are well documented globally,
25 including Japan. The ongoing COVID-19 pandemic may increase the incidence of abuse in the
26 community, creating an additional burden amid the crisis. However, the incidence of abuse in
27 Japan during COVID-19 remains to be evaluated. Accordingly, our study aimed to assess the
28 incidence of physical and verbal abuse among the general population in Japan and to identify the
29 associated factors of abuse during COVID-19.

30 **Design and setting**

31 We used the data obtained from a nationwide, cross-sectional internet survey conducted in Japan
32 between August and September 2020. Sampling weights were used to calculate national
33 estimates, and multivariable logistic regression was performed to identify the associated factors
34 for physical and verbal abuse.

35 **Results**

36 Out of the total 25,482 participants, 965 (3.8 %) reported experiencing physical abuse and 1941
37 (7.6%) verbal abuse from April 2020 to September 2020. The incidence of physical and verbal
38 abuse was higher among female participants. As key findings of our study, participants with
39 COVID-19 symptoms, whose income was significantly reduced due to pandemic, those with
40 already strained relationships, widows, divorcees, and those who did not regularly follow
41 preventive behaviors such as wearing masks in public places were more likely to experience
42 physical and verbal abuse.

46 **Conclusion**

47 The impact of abuse was found disproportionately greater in more vulnerable groups of the
48 population. Pandemic has reinforced the existing social inequalities, which need to be addressed
49 timely to prevent precarious repercussions.

51 **Keywords:** physical abuse, verbal abuse, Japan, pandemic, social inequality, vulnerable
52 population

54 **Word count:** 3295

56 **Strength and Limitation of the study**

- 57 • This is the first nationwide cross-sectional study conducted to explore the incidence of abuse
58 amid COVID-19 during the restriction period.
- 59 • Prevalance of the physical and verbal abuse and its associated factors were identified in this
60 study.
- 61 • The findings of this study could be highly valuable for designing effective interventions to
62 mitigate this problem amid crises.
- 63 • Participants who participated in the internet-based survey might differ from the general
64 population. However, we used an inverse probability weighting (IPW) approach throughout the
65 analyses to adjust the difference of response between the current internet survey and nationwide
66 representative survey.

67 Introduction

68 Abuse is a serious public health problem that fundamentally violates human rights. Globally, one
69 in three women and one in five men have been subjected to different forms of violence.^{1,2} In the
70 United States alone, 20 people per minute are physically abused by their partner, equating to
71 more than 10 million women and men in one year.^{3,4}

72
73 Although the incidence of abuse is highly prevalent among women, it is not limited to particular
74 gender only. All people, regardless of their races, cultures, or sexual orientations are exposed to
75 abuse and have to deal with it in their lifetime.⁵ Exposure to any kind of abuse is stressful
76 whether it be physical abuse (infliction of physical pain by hitting, punching, strangling,
77 restraining, pushing, or slapping), verbal abuse (demonstrating mental anguish by shouting and
78 yelling), sexual or emotional abuse.

79
80 With the advent of COVID-19, the incidence of abuse has become more apparent than ever
81 before.⁶ Travel restrictions and stay-at-home orders adopted to curb the spread of the virus have
82 a profound impact on society leading to social, financial, and psychological repercussions.⁷

83 Stay-at-home orders have exacerbated the vulnerabilities of individuals whose lives are already
84 afflicted by domestic violence.⁸ Furthermore, business closures have significantly increased the
85 unemployment rate and economic strain; all this has negatively impacted the mental health of the
86 general population.^{9,10} Financial hardships, increased threats to physical health coupled with their
87 daily responsibilities have made people more violent and aggressive. While hotlines have been
88 receiving complaints of domestic violence,¹¹ multiple instances of abuse were also seen outside
89 the closed room among general people. Some instances include abusing health workers for

1
2 90 spreading COVID-19,¹² abusing people for not wearing masks,^{13,14} for not being able to pay
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4 91 room rents,¹⁵ etc.
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9 93 The consequences of such abuse are deleterious and can result in long-term damage to victims'
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11 94 physical and mental well-being.^{16,17} While physical abuse has direct effects on the physical body,
12
13 95 verbal abuse affects victims' thoughts and emotions. The immediate effects of physical abuse
14
15 96 include bruises, cuts, fractures, loss of teeth/hair, miscarriage, etc.¹⁸ Verbal abuse does not
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17 97 manifest visible effects immediately; however, it directly affects the victims' self-esteem.
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19
20 98 Prolonged exposure to abuse can lead to various mental health problems, including depression,
21
22 99 anxiety, and posttraumatic stress disorder (PTSD).^{19,20} Victims are 1.7 to 4.6 times more likely to
23
24 100 develop an anxiety disorder, PTSD, or eating disorders.^{21,22} Similarly, the effects on physical
25
26 101 health include the higher age-adjusted mortality rates and various chronic health problems such
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28 102 as asthma, epilepsy, migraines, hypertension, etc.²³⁻²⁵. Under current stressful living conditions,
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30 103 the additional burden of abuse could take a heavy toll on people.
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36 105 In Japan, spousal, elderly, and child abuse have been noted from time to time. In 2019, more than
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38 106 80,000 cases of domestic violence consultations were reported.²⁶ Similarly, the prevalence of
39
40 107 elder abuse was found to be 12.3%, with 2.6% experiencing physical abuse and 11.6%
41
42 108 experiencing verbal abuse.²⁷ Furthermore, as mentioned above, COVID-19 has created a
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44 109 situation of widespread uncertainty and panic which might stimulate abuse in the community.
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46 110 Apparently, as mentioned on various news portals, multiple cases of abuse were reported among
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48 111 the general population in Japan.^{28,29} However, detailed study on this issue has not been done yet.
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51 112 Taken together, our study aimed to i) identify the incidence of physical and verbal abuse among
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2 113 the general population of Japan amid COVID-19 and ii) investigate factors associated with such
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4 114 abuses.

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10 116 **Methods**

13 117 **Settings and Participants**

17 118 We used the data from Japan COVID-19 and Society Internet Survey study` (JACSIS) collected
18
19 119 by a large internet research agency Rakuten Insight, Inc., which had approximately 2.2 million
20
21 120 qualified panelists. It was a cross-sectional, web-based, self-reported questionnaire survey, which
22
23 121 was distributed to 224,389 participants selected through simple random sampling. The online
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25 122 questionnaires were distributed from August 25, 2020, and were completed on September 30,
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27 123 2020, after reaching a total target sample size of 28,000 participants from all 47 prefectures.
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34 125 **Ethical approval**

38 126 The ethical approval was received from the Research Ethics Committee of the Osaka
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40 127 International Cancer Institute (Approval No. 20084). Web-based informed consent was obtained
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42 128 from the participants before providing access to the main questionnaire. Participants had an
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44 129 option to discontinue at any time during the survey. Participants involved in the study were
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46 130 provided with “e-points”, credit points that can be used for internet shopping.
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6 132 **Patient and public involvement**

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9 133 There were no patients involved in this study

10 11 12 134 **Outcome variable and assessment**

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15 135 **Physical and verbal abuse:** Participants were asked whether they encountered any form of
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17 136 physical or verbal abuse from April 2020 (from emergency declaration due to COVID-19) to the
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19 137 data collection period. They were asked whether they were physically assaulted by anyone such
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21 138 as being punched, kicked, thrown, or locked in the room. Similarly, they were asked if they were
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23 139 verbally abused or ignored for a long time, or encountered any self-esteem damaging behaviors
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25 140 from others. Responses were measured in the binary outcome, “Yes” and “No” each.
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32 142 **Exposure variables and assessment**

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35 143 **Socio-demographic characteristics:** The demographics included age (categorized as: below 20,
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37 144 20-40, 40-60 and above 60), gender, education levels (Junior High School, High School,
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39 145 College, University/Graduate school, and others), marital status (with spouse, unmarried,
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41 146 widow/widower, divorced), number of people living together (only one, 2-5 members, more than
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43 147 5), change in income after pandemic (categorized as a decrease by more than 50%, decrease by
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45 148 less than 50%, constant, increase by 50% and increase by 100%), types of job (public servant,
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47 149 agriculture, working in the industry, business, medical care, education, and other services), work
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49 150 from home since March or April (yes, no), and relationship with a spouse (Better, constant,
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51 151 worse, do not know, not applicable).
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2 153 **Personal health status:** Participants were asked about their perceived health status, presence of
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4 154 walking impairment, and presence of any COVID-19-related symptoms. Perceived health status
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6 155 was asked in the five-item Likert scale from “good” to “not good”. Similarly, COVID-19
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8 156 symptoms were asked such as high fever, fatigue, sore throat, cough, nausea, smell disorder, etc.
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10 157 which were considered to have high sensitivity and specificity.³⁰ Responses were measured as
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12 158 binary options “Yes” and “No”. Rather than treating each variable separately, they were treated
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14 159 as a continuous variable (more symptoms of COVID-19, more severe the problem).
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20 161 **Prefecture-wise COVID-19 infection and Emergency declaration:** The number of COVID-19
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22 162 cases by prefecture was calculated from January 15, 2020, to September 30, 2020. They were
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24 163 divided by the population per prefecture based on the estimate on October 1, 2019. During
25
26 164 analyses, the number of COVID-19 cases/prefecture was divided into three categories using
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28 165 quartile (lowest, medium, and highest).
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31 166 For the emergency declaration variable, three categories were created; category 1 included
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33 167 prefectures where the state of emergency was enforced, category 2 included the prefecture with
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35 168 specific alerts and category 3 included the remaining prefecture.
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41 170 **Personal Behaviors:** Personal behaviors were also included such as substance abuse, frequency
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43 171 of alcohol intake, and use of masks in the public areas. The frequency of alcohol intake was
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45 172 asked as less than 1 cup, more than 1 less than 2 cups, more than 2 but less than 3, and more than
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47 173 3. These were treated as a continuous variable during analysis and the same for substance abuse.
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49 174 Responses for use of mask while visiting public places were categorized as always, sometimes,
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51 175 and never/rarely.
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5 178 **Data analysis**

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8 179 Out of 28,000 responses collected, 25,482 were included in the analysis after removing
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10 180 discrepancies and unnatural responses. Three criteria were used to detect such discrepancies; i)
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12 181 those who selected "yes" to all asked diseases listed ii) those who ticked wrong response to the
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14 182 verification question "Please choose the second from the bottom", iii) those who selected all
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16 183 options for drug use behaviors, who were then removed from the analysis.

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18
19 184 First, we compared the socio-demographic characteristics and all other exposure variables among
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21 185 participants experiencing physical abuse and those who did not. The same procedure was applied
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23 186 for verbal abuse as well. As participants who participated in the internet-based survey might
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25 187 differ from the general population, we used an inverse probability weighting (IPW) approach
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27 188 throughout the analyses to adjust the difference of response between the current internet survey
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29 189 and nationwide representative survey. Propensity scores were calculated by logistic regression
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31 190 analysis using sex, age, and socioeconomic factors to adjust for differences between a current
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33 191 and population-based sample from the Comprehensive Survey of Living Conditions of People on
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35 192 Health and Welfare 2016. Detailed methods (e.g. participation rate and data management) are
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37 193 presented in the previous study.³¹

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40 194 Second, we performed simple and multivariable logistic regression to identify the factors
41
42 195 associated with physical and verbal abuse. For each outcome, we constructed two regression
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44 196 models to control for potential confounders. Simple logistic regression was conducted to identify
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46 197 the significant factors followed by multivariable logistic regression for adjusting confounders
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48 198 and covariates. Weighted multivariable logistic regression models, with standard error (SEs)
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50 199 clustered at the prefecture level, were used to account for the potential correlation of respondents
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2 200 within the same prefecture. A separate analysis was conducted for both physical and verbal
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4 201 abuse. Statistical significance was set at 0.05.
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8 202 **Results**

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11 203 Table 1 shows the characteristics of participants experiencing physical and verbal abuse.

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13 204 Analyses were weighted to adjust the difference between participants in this internet survey and
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15 205 national representative samples. The unweighted characteristics of participants experiencing
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17 206 physical and verbal abuse is presented in the supplementary information.

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20 207 Of the total, 965 (3.8%) participants mentioned experiencing physical abuse, and 1941 (7.6%)
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22 208 encountering verbal abuse. Both physical abuse and verbal abuse were most common among the
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24 209 age group 20-40 years with 70.6% and 46.6% respectively. The incidence of physical abuse was
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26 210 higher among females with 73.3% and verbal abuse higher among male participants with 55.5%.
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29 211 Among participants experiencing physical abuse, 176 (18.2%) experienced income loss of more
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31 212 than 50% during a pandemic, only 121 (12.5%) mentioned having “good” health status, 356
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33 213 (36.9%) were working from home and 91 (9.5%) started having the worst relationship with their
34
35 214 spouse during a pandemic. Similarly, among participants experiencing verbal abuse, 197 (10.2%)
36
37 215 experienced income loss of more than 50% during the pandemic, only 152 (7.8%) mentioned
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39 216 having “good” health status, 71,143 (58.9%) were working from home, and 394 (20.3%) started
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41 217 having the worst relationship with their spouse during a pandemic.
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Table 1: Characteristics of participants experiencing physical and verbal abuse (N= 25,482)

Variables	Total n	Weightage incidence of physical abuse				P value	Weightage incidence of verbal abuse				P value
		Yes		No			Yes		No		
		n	%	n	%		n	(%)	n	(%)	
		965	(3.8)	24517	(96.2)		1941	(7.6)	23541	(92.4)	
Age						<0.001					<0.001
Below 20	1214	82	(8.5)	1132	(4.6)		118	(6.1)	1096	(4.7)	
20-40	6978	681	(70.6)	6297	(25.7)		905	(46.6)	6074	(25.8)	
40-60	9150	142	(14.7)	9008	(36.7)		558	(28.8)	8592	(36.5)	
Above 60	8140	60	(6.2)	8080	(33.0)		360	(18.6)	7780	(33.0)	
Sex						<0.001					0.256
Female	12673	708	(73.3)	11965	(48.8)		1,078	(55.5)	11595	(49.3)	
Male	12809	257	(26.7)	12552	(51.2)		863	(44.5)	11946	(50.7)	
Education Level						<0.001					0.459
Junior High School	1732	74	(7.6)	1658	(6.8)		108	(5.6)	1624	(6.9)	
High School	9640	256	(26.5)	9385	(38.3)		454	(23.4)	9186	(39.0)	
College	4928	101	(10.5)	4827	(19.7)		329	(17.0)	4599	(19.5)	
University/Graduate school	8975	512	(53.1)	8462	(34.5)		1,048	(54.0)	7927	(33.7)	
Others	207	22	(2.3)	185	(0.8)		2	(0.1)	205	(0.9)	
Marital Status						<0.001					<0.001
With spouse	16100	257	(26.6)	15844	(64.6)		895	(46.1)	15205	(64.6)	
Unmarried	6046	192	(19.8)	5854	(23.9)		452	(23.3)	5594	(23.8)	
Widow/Widower	1949	504	(52.2)	1446	(5.9)		521	(26.8)	1428	(6.1)	
Divorced	1387	13	(1.4)	1373	(5.6)		73	(3.8)	1314	(5.6)	
Change in income						<0.001					<0.001
Decrease by more than 50%	1886	176	(18.2)	1710	(7.0)		197	(10.2)	1689	(7.2)	
Decrease by less than 50%	4482	99	(10.2)	4384	(17.9)		314	(16.2)	4168	(17.7)	
Constant	10594	133	(13.8)	10460	(42.7)		484	(25.0)	10109	(42.9)	

Increase by 50%	798	18	(1.8)	781	(3.2)	164	(8.5)	634	(2.7)
Increase by 100%	7722	539	(55.9)	7183	(29.3)	781	(40.2)	6942	(29.5)
Number of people living together						0.001			0.131
Only one	4117	300	(31)	3817	(15.6)	174	(9.0)	3943	(16.7)
2-5 members	20537	622	(64.5)	19915	(81.2)	1,697	(87.4)	18840	(80.0)
More than 5	828	43	(4.5)	785	(3.2)	70	(3.6)	758	(3.2)
Prefecture by level of Covid-19 infection						0.447			0.423
High	3541	428	(44.3)	3113	(12.7)	148	(7.6)	3393	(14.4)
Moderate	8885	266	(27.6)	8619	(35.2)	880	(45.3)	8005	(34.0)
Low	13056	271	(28.1)	12785	(52.1)	913	(47.1)	12143	(51.6)
Emergency declaration						0.577			0.179
Emergency declared prefecture	7251	601	(62.3)	6650	(27.1)	671	(34.6)	6580	(28)
Specific alert prefectures	3790	59	(6.1)	3731	(15.2)	158	(8.1)	3632	(15.4)
No specific restriction	14441	305	(31.6)	14137	(57.7)	1,112	(57.3)	13329	(56.6)
Perceived Health status						<0.001			<0.001
Good	4889	121	(12.5)	4769	(19.4)	152	(7.8)	4738	(20.1)
Tolerable	5360	211	(21.9)	5149	(21.0)	558	(28.8)	4802	(20.4)
Usual	11787	424	(44.0)	11363	(46.3)	521	(26.9)	11266	(47.9)
Not so good	2717	192	(19.9)	2525	(10.3)	277	(14.3)	2440	(10.4)
Not good	729	17	(1.7)	712	(2.9)	433	(22.3)	296	(1.3)
Work from home						0.017			0.002
No	12653	609	(63.1)	12044	(49.1)	798	(41.1)	11855	(50.4)
Yes	12829	356	(36.9)	12473	(50.9)	1,143	(58.9)	11686	(49.6)
Type of work						0.596			0.118
Public servant	973	143	(17.8)	830	(5.7)	41	(3.2)	932	(6.6)
Agriculture	217	11	(1.4)	206	(1.4)	19	(1.5)	198	(1.4)
Industry	5111	210	(26.2)	4901	(33.4)	380	(30.3)	4731	(33.3)
Business	2719	53	(6.6)	2666	(18.2)	160	(12.8)	2559	(18)
Food and Beverage	492	9	(1.2)	483	(3.3)	54	(4.3)	438	(3.1)
Medical	1166	53	(6.6)	1113	(7.6)	66	(5.2)	1100	(7.7)
Welfare	677	18	(2.3)	658	(4.5)	44	(3.5)	633	(4.5)

Education	919	10	(1.2)	909	(6.2)	160	(12.7)	759	(5.3)
Other (not classified elsewhere)	3182	293	(36.6)	2889	(19.7)	332	(26.5)	2849	(20.1)
Relationship with spouse									
Better	935	26	(2.7)	909	(3.7)	303	(15.6)	632	(2.7)
constant	13656	379	(39.3)	13277	(54.2)	659	(34.0)	12996	(55.2)
Worse	1221	91	(9.5)	1129	(4.6)	394	(20.3)	827	(3.5)
Do not know	553	10	(1.1)	542	(2.2)	14	(0.7)	539	(2.3)
Not applicable	9119	459	(47.5)	8660	(35.3)	571	(29.4)	8548	(36.3)
Use of mask while visiting public places									
Always	21244	327	(33.9)	20917	(85.3)	1,578	(81.3)	19666	(83.5)
Sometime	2774	327	(33.9)	2448	(10.0)	300	(15.5)	2474	(10.5)
Never/Rarely	1464	312	(32.3)	1152	(4.7)	63	(3.2)	1401	(6.0)
Walking impairment									
No	21939	367	(1.7)	21572	(98.3)	1,062	(54.7)	20877	(88.7)
Yes	3543	598	(16.9)	2945	(83.1)	879	(45.3)	2664	(11.3)
Practice of substance abuse [Mean (Sd)]	7.0 (2.5)	11.4 (4.1)		6.9 (2.2)	<0.001	8.9 (3.5)		6.9 (2.3)	<0.001
Frequency of alcohol intake [Mean (Sd)]	1.1 (1.3)	0.8 (1.3)		1.1 (1.3)	0.211	0.9 (1.3)		1.1 (1.3)	0.223
Presence of symptoms associated with COVID-19 [Mean (Sd)]	0.9 (1.5)	2.4 (2.8)		0.8 (1.4)	<0.001	2.2 (2.1)		0.8 (1.4)	<0.001

Analyses were weighted to adjust the difference between participants in this internet survey and national representative samples. The analyses of this table were for the purpose of simple description only and did not account for multiple comparisons in the presentation of the p values. Description of all variables are presented in n and % except for continuous data which are presented in mean and standard deviation.

Abbreviations: AOR= adjusted odds ratio; CI = confidence interval, Sd = standard deviation

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2 218 Table 2 demonstrates the result of multivariable logistic regression analysis of the associated
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4 219 factors for physical and verbal abuse. Participants aged 40 and above were less likely to
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6 220 experience physical abuse compared to participants in their 20s (Adjusted Odds Ratio [AOR] =
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8 221 0.28; 95% Confidence Interval [CI] = 0.13 - 0.57). While widow/widowers were 8.72 times odd
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10 222 of experiencing physical abuse (AOR = 8.72, 95% CI = 2.69 - 28.21), unmarried and divorced
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12 223 participants were 3.77 times odd of experiencing verbal abuse (AOR = 3.77, 95% CI = 1.41 -
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14 224 10.06) compared to married participants. Moreover, participants whose income was decreased by
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16 225 more than 50% were 3.25 times odd of experiencing physical abuse (AOR = 3.25, 95% CI = 1.64
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18 226 -6.44). Similarly, participants who had symptoms related to COVID-19 were more likely to
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20 227 experience physical (AOR = 1.23, 95% CI = 1.10 - 1.36) and verbal abuse (AOR = 1.22, 95% CI
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22 = 1.14 - 1.28). Participants who were not wearing masks regularly in public places were more
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24 228 likely to experience both physical (AOR = 2.88, 95% CI = 1.76 - 4.70) and verbal abuse (AOR =
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26 229 1.76, 95% CI = 1.41 - 2.20).
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240 **Table 2: Factors associated with the physical and verbal abuse (N= 25,482)**

Variables	Physical Abuse			Verbal abuse		
	AOR	(95% CI)	P-value	AOR	(95% CI)	P-value
Age						
Below 20	1.00	(Reference)		1.00	(Reference)	
20-40	0.55	(0.26 - 1.12)	0.103	0.66	(0.33 - 1.30)	0.232
40-60	0.28	(0.13 - 0.57)	0.001	0.68	(0.35 - 1.30)	0.242
Above 60	0.10	(0.003 - 0.25)	<0.001	0.37	(0.15 - 0.87)	0.023
Marital Status						
With spouse	1.00	(Reference)		1.00	(Reference)	
Unmarried	1.56	(0.75 - 3.23)	0.234	5.20	(2.02 - 13.3)	0.001
Widow/Widower	8.72	(2.69 - 28.21)	<0.001	3.39	(0.80 - 14.38)	0.097
Divorced	0.96	(0.42 - 2.17)	0.92	3.77	(1.41 - 10.06)	0.008
Change in income						
Decrease by more than 50%	3.25	(1.64 - 6.44)	0.001	1.09	(0.63 - 1.89)	0.732
Decrease by less than 50%	1.68	(0.86 - 3.26)	0.123	0.86	(0.60 - 1.23)	0.426
Constant	1.00	(Reference)		1.00	(Reference)	
Increase by 50%	0.04	(0.00 - 0.58)	0.017	1.14	(0.65 - 1.98)	0.632
Increase by 100%	2.03	(1.03 - 4.00)	0.039	1.04	(0.77 - 1.40)	0.794
Perceived Health status						
Good	1.00	(Reference)		1.00	(Reference)	
Tolerable	0.94	(0.33 - 2.63)	0.911	2.27	(1.38 - 3.71)	0.001
Usual	0.94	(0.35 - 2.47)	0.901	1.17	(0.78 - 1.74)	0.450
Not so good	1.19	(0.39 - 3.60)	0.754	2.20	(1.55 - 3.12)	<0.001
Not good	0.03	(0.00 - 0.25)	0.001	12.41	(5.46 - 28.16)	<0.001
Relationship with spouse						
Better	0.56	(0.13 - 2.26)	0.416	2.01	(1.38 - 2.92)	<0.001
Constant	1.00	(Reference)		1.00	(Reference)	
Worse	3.56	(2.18 - 5.81)	<0.001	5.07	(3.56 - 7.23)	<0.001
Do not know	0.75	(0.26 - 2.15)	0.596	0.52	(0.26 - 1.05)	0.069
Not applicable	0.44	(0.20 - 0.96)	0.039	0.33	(0.12 - 0.89)	0.030
Use of mask while visiting public places						
Always	1.00	(Reference)		1.00	(Reference)	
Sometime	2.24	(1.41 - 3.54)	0.001	1.68	(1.44 - 1.95)	<0.001
Never/Rarely	2.88	(1.76 - 4.70)	<0.001	1.76	(1.41 - 2.20)	<0.001
Walking impairment						
No	1.00	(Reference)		1.00	(Reference)	
Yes	3.43	(2.22 - 5.30)	<0.001	1.88	(1.34 - 2.63)	<0.001
Practice of substance abuse						
Presence of symptoms associated with COVID-19	1.13	(1.07 - 1.18)	<0.001	1.12	(1.07 - 1.15)	<0.001

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243 Abbreviations: AOR= adjusted odds ratio; CI: confidence interval.

244 For each outcome, we constructed a weighted multivariable logistic regression model with SEs clustered at the

245 prefecture-level. Variables associated in the bivariate logistic regression were included in the multiple logistic

246 regression. The above model was adjusted for sex, education, no of people living together and work from home

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247 Discussion

248 The incidence of physical abuse and verbal abuse among the general population in Japan amid
249 COVID-19 was found to be 3.8% and 7.6%, respectively. The incidence of physical and verbal
250 abuse was higher among female participants. While widows/widowers were more likely to
251 experience physical violence, divorcees were more likely to experience verbal violence. Younger
252 participants and participants who had been abusing drugs were more likely to encounter both
253 physical and verbal abuse. Similarly, participants who had symptoms related to COVID-19, who
254 were not wearing masks regularly, whose income was reduced due to pandemic, and who did not
255 have a good relationship with their spouse were more likely to experience both physical and
256 verbal abuse.

257
258 The incidence of abuse reported in our study should be interpreted cautiously. Our study was a
259 web-based study that might have limited the accessibility of the survey to actual victims.

260 Decreased access to the internet and connections with services were hypothesized to be the
261 reason for under-reporting in some cases.³² However, there could be a chance of over-reporting
262 as well due to the nature of the self-reported survey. Nonetheless, data on the prevalence of
263 abuse among similar populations over similar time periods are not available, making it difficult
264 to quantify the changes in the incidence of the abuse.

265
266 The percentage of women experiencing physical and verbal abuse was higher in our study.

267 Previous studies have also underscored the higher incidence of abuse faced by female
268 participants globally.^{33,34} A longitudinal study conducted among 161 countries found that
269 approximately one in three women have been subjected to different forms of intimate
270 partner/non-partner or both abuse.³⁵ Women were found to experience higher rates of repeated

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2 271 abuse than males; and in most cases, males are found to be the perpetrator of the abuse.³⁶
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4 272 Moreover, crises and times of unrest have been linked to an increased rate of abuse among
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6 273 female participants.³⁷ However, from our study findings, we cannot claim women were more
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8 274 likely to experience abuse than men as sex was not associated in the multivariable analysis. Our
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10 275 study measured the incidence of abuse faced by people in the community (not only domestic
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12 276 abuse), unlike other studies which mainly focused on domestic abuse and violence. In addition, it
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14 277 has been found that both women and men are equally likely to initiate abuse and violence
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16 278 although men tend to become more aggressive and opt for physical abuse.³⁸ Evidently, in our
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18 279 study percentage of males experiencing verbal abuse was slightly lower than female participants
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20 280 with 44.5%. However, the incidence of physical abuse was distinctively higher among females
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22 281 with 73.3%.
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29 283 As expected, participants who did not have a good relationship with their spouses were more
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31 284 likely to experience abuse in our study. Restrictions and stay-at-home orders forced the
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33 285 individual to spend time with their spouse and family members most of the time, which turned
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35 286 out to be a catastrophic milieu for individuals whose relationships were already strained.
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37 287 Numerous studies have highlighted the incidence of domestic violence amid COVID-19. For
38
39 288 example, in China, the incidence of domestic violence tripled compared to the previous year;³⁹
40
41 289 similarly, a 36% increase in complaints of domestic abuse were reported in France;⁴⁰ in the UK,
42
43 290 there was a 25% increase in calls related to domestic violence.⁴¹ Furthermore, many countries
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45 291 reported an increase in homicide as a result of domestic violence.⁴¹ It seems plausible that
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47 292 strained relationships are more likely to cause conflict especially in times of crisis; however,
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49 293 when comparing participants by marital status, our study findings highlighted that
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51 294 widows/widowers and divorcees were more likely to experience abuse compared to married
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2 295 ones. Our findings align with the previous study which mentioned that incidence of physical,
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4 296 sexual, and emotional violence is common among those separated and whose partner has died
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6 297 compared to married ones.⁴² The condition of widows/widowers and divorcees, particularly
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8 298 women remains deplorable in society and often victimized because they are considered weak
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11 299 with low social support.⁴²
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15 301 Along with the sociodemographic characteristics, COVID-19-related consequences were more
16
17 302 likely to add the burden of abuse. Although we did not find a significant direct association
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19 303 between the state of emergency declaration and the incidence of abuse, other factors associated
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21 304 with the pandemic (e.g., change in income during the pandemic, COVID-19 symptoms, use of
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23 305 masks, etc.) were significantly associated. Unlike many other countries, Japan did not enforce a
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25 306 complete lockdown, and the government did not mandate a strong restriction to all areas.⁴³
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27 307 Many organizations and sectors operated in an almost normal manner. In such cases, the
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29 308 emergency declaration itself only might not have a significant impact on the overall change in
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31 309 the incidence of abuse.
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38 311 Moreover, economic repercussions due to COVID-19 were undeniable; the sudden and possibly
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40 312 long-term increase in unemployment has precipitate or exacerbates potential stressors. In our
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42 313 study, participants whose income was reduced drastically due to the pandemic were more likely
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44 314 to experience abuse. Findings align with the previous study where children born in families with
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46 315 low socioeconomic status were 14 times more likely to experience maltreatment than those in
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48 316 higher quartiles.⁴⁴ Furthermore, if a victim have adequate resources, they are more likely to
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50 317 escape from their abusers. For instance, if the spouse is the abuser, they can leave the
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52 318 relationship; if their landlord is the abuser, then they can move/settle elsewhere. Particularly
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2 319 during COVID-19, instances of abuse were noted for not being able to pay room rent and tuition
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4 320 fees,¹⁰ which needs to be addressed diligently.
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9 322 Similarly, participants who were not using masks regularly were more likely to experience
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11 323 abuse. This was also evident from the information presented in various news portals where
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13 324 people were abused for not using masks in public places.^{13,14,29} It is undeniable that people
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15 325 should be conscious about their health and mindful of their actions and that all individuals must
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17 326 make an effort to reduce transmission. However, in any case, abuse is not acceptable: one better
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19 327 approach may be educating another person and trying to be more empathetic in this crisis rather
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21 328 than directly attacking others without knowing the reason.
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27 330 Moreover, participants who had been using drugs were more likely to experience physical and
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29 331 verbal abuse. This finding can be interpreted in different ways. Due to the cross-sectional nature
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31 332 of the study design, findings might have been driven by reverse causality. Indeed, those who
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33 333 experienced abuse might have developed a habit of taking drugs. Another interpretation could be
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35 334 that participants who mentioned being abused might have actually perpetrated violence under the
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37 335 influence of the substance due to a loss of self-control. Nonetheless, the finding of our study is
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39 336 not sufficient to claim this notion. Currently, along with the emergency declaration, the Japanese
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41 337 government is singling out alcohol consumption in bars and restaurants to reduce the possibility
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43 338 of transmission⁴⁵. This rule was imposed considering the aftermath of having alcohol such as
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45 339 talking loudly on trains, lingering in public places, and resultantly being involved in arguments.
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52 341 The findings of our study should be interpreted in light of the following limitations. First, data
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54 342 were collected from an internet survey which might have limited the responses of a certain group
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2 343 of population. However, as described in the method section, this was adjusted to approximate the
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4 344 national representative sample. Second, due to the cross-sectional design of our study, some
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6 345 findings might have been driven by reverse causality. Lastly, since it was a self-reported survey,
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8 346 there might have been under or over-reporting of the incidence. However, information about
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10 347 confidentiality was explicitly mentioned. Despite these limitations, this is the first nationwide
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12 348 cross-sectional study conducted to explore the incidence of abuse amid COVID-19 during the
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14 349 restriction period. The findings of this study could be highly valuable for designing effective
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16 350 interventions to mitigate this problem amid crises.
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22 351 **Conclusion**

23
24 352 The incidence of verbal abuse was comparatively higher than physical abuse among the general
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26 353 population in Japan amid COVID-19. While physical abuse was highest among female
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28 354 participants, the incident of verbal abuse was almost similar among males and females. People
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30 355 who had the symptoms related to COVID-19 and who were not wearing masks regularly in
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32 356 public places were more likely to encounter both verbal and physical abuse. Furthermore,
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34 357 vulnerable people whose income was drastically reduced, whose relationship was already
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36 358 strained, who were widows, and divorcees were more likely to experience abuse. The findings of
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38 359 this study have reinforced important truths of existing inequalities among the general population
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40 360 which tend to be magnified during crises. Crises like COVID-19 do not inflict equivalent
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42 361 hardships to all people, rather exacerbate or spark diverse forms of abuse to vulnerable groups of
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44 362 population. Therefore, it is highly imperative to focus on those individuals and provide timely
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46 363 support.
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364 **Author Contribution**

365 DB conceptualized, analyzed the data, wrote the first draft, and revised the manuscript. AO, TS,
366 SS, YK, SH, MT, and TT reviewed and revised the manuscript. All authors read the final
367 manuscript and approved it for submission.

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376 **Conflict of Interest**

377 Dr. Akihiko Ozaki received personal fees from MNES Inc, outside the submitted work. All other
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Supplementary table (Unweighted)

Table 1: Characteristics of participants experiencing physical and verbal abuse (N= 25,482)

Variables	Total n (%)	Physical Abuse		P value	Verbal Abuse		P value	
		No	n (%)		Yes n (%)	No		n (%)
		24957 (97.9%)		525 (2.1%)		24043 (94.3%)		1439 (5.6%)
Age					<0.001			<0.001
Below 20	1,214 (4.8)		1144 (4.6%)	70 (13.3%)		1105 (4.6%)		109 (7.6%)
20-40	6,978 (27.4)		6730 (27.0%)	248 (47.2%)		6473 (26.9%)		505 (35.1%)
40-60	9,150 (35.9)		9001 (36.1%)	149 (28.4%)		8562 (35.6%)		588 (40.9%)
Above 60	8,140 (31.9)		8082 (32.4%)	58 (11.0%)		7903 (32.9%)		237 (16.5%)
Sex					<0.001			0.26
Female	12,673 (49.7)		12370 (49.6%)	303 (57.7%)		11978 (49.8%)		695 (48.3%)
Male	12,809 (50.3)		12587 (50.4%)	222 (42.3%)		12065 (50.2%)		744 (51.7%)
Education Level					<0.001			0.35
Junior High School	410 (1.6)		393 (1.6%)	17 (3.2%)		379 (1.6%)		31 (2.2%)
High School	7,201 (28.3)		7080 (28.4%)	121 (23.0%)		6813 (28.3%)		388 (27.0%)
College	5637 (22.1)		5533 (22.2%)	104 (19.8%)		5305 (22.1%)		332 (23.1%)
University/Graduate school	12172 (47.8)		11891 (47.6%)	281 (53.5%)		11487 (47.8%)		685 (47.6%)
Others	62 (0.2)		60 (0.2%)	2 (0.4%)		59 (0.2%)		3 (0.2%)
Marital Status					<0.001			<0.001
With spouse	15230 (59.8)		14980 (60.0%)	250 (47.6%)		14493 (60.3%)		737 (51.2%)
Unmarried	7806 (30.6)		7566 (30.3%)	240 (45.7%)		7222 (30.0%)		584 (40.6%)
Widow/Widower	844 (3.3)		833 (3.3%)	11 (2.1%)		813 (3.4%)		31 (2.2%)
Divorced	1602 (6.3)		1578 (6.3%)	24 (4.6%)		1515 (6.3%)		87 (6.0%)
Change in income					<0.001			<0.001
Decrease by more than 50%	1684 (6.6)		1596 (6.4%)	88 (16.8%)		1500 (6.2%)		184 (12.8%)
Decrease by less than 50%	4705 (18.5)		4576 (18.3%)	129 (24.6%)		4362 (18.1%)		343 (23.8%)
Constant	11441 (44.9)		11325 (45.4%)	116 (22.1%)		10998 (45.7%)		443 (30.8%)

Increase by 50%	642 (2.5)	620 (2.5%)	22 (4.2%)	592 (2.5%)	50 (3.5%)
Increase by 100%	7010 (27.5)	6840 (27.4%)	170 (32.4%)	6591 (27.4%)	419 (29.1%)
Number of people living together				0.001	0.083
Only one	4997 (19.6)	4886 (19.6%)	111 (21.1%)	4695 (19.5%)	302 (21.0%)
2-5 members	19856 (77.9)	19467 (78.0%)	389 (74.1%)	18764 (78.0%)	1092 (75.9%)
More than 5	629 (2.5)	604 (2.4%)	25 (4.8%)	584 (2.4%)	45 (3.1%)
Prefecture by level of Covid-19 infection				0.72	0.47
High	5125 (20.1)	5012 (20.1%)	113 (21.5%)	4843 (20.1%)	282 (19.6%)
Moderate	11546 (45.3)	11313 (45.3%)	233 (44.4%)	10908 (45.4%)	638 (44.3%)
Low	8811 (34.6)	8632 (34.6%)	179 (34.1%)	8292 (34.5%)	519 (36.1%)
Emergency declaration				0.87	0.28
Emergency declared prefecture	11,586 (45.4)	11344 (45.5%)	242 (46.1%)	10957 (45.6%)	629 (43.7%)
Specific alert prefectures	4,339 (17.0)	4254 (17.0%)	85 (16.2%)	4096 (17.0%)	243 (16.9%)
No specific restriction	9,557 (37.5)	9359 (37.5%)	198 (37.7%)	8990 (37.4%)	567 (39.4%)
Perceived Health status				<0.001	<0.001
Good	4939 (19.4)	4844 (19.4%)	95 (18.1%)	4760 (19.8%)	179 (12.4%)
Tolerable	8072 (31.7)	7937 (31.8%)	135 (25.7%)	7721 (32.1%)	351 (24.4%)
Usual	8910 (35.0)	8756 (35.1%)	154 (29.3%)	8473 (35.2%)	437 (30.4%)
Not so good	2913 (11.4)	2824 (11.3%)	89 (17.0%)	2562 (10.7%)	351 (24.4%)
Not good	648 (2.5)	596 (2.4%)	52 (9.9%)	527 (2.2%)	121 (8.4%)
Work from home				0.016	0.002
No	11637 (45.7)	11370 (45.6%)	267 (50.9%)	10923 (45.4%)	714 (49.6%)
Yes	13845 (54.3)	13587 (54.4%)	258 (49.1%)	13120 (54.6%)	725 (50.4%)
Type of work				0.5	0.12
Public servant	996 (6.4)	964 (6.4%)	32 (8.5%)	928 (6.4%)	68 (7.0%)
Agriculture	152 (0.9)	144 (1.0%)	8 (2.1%)	139 (1.0%)	13 (1.3%)
Industry	5102 (33.0)	4973 (33.0%)	129 (34.4%)	4799 (33.1%)	303 (31.4%)
Business	2920 (18.8)	2851 (18.9%)	69 (18.4%)	2733 (18.9%)	187 (19.4%)
Food and Beverage	480 (3.1)	467 (3.1%)	13 (3.5%)	438 (3.0%)	42 (4.3%)
Medical	1132 (7.3)	1100 (7.3%)	32 (8.5%)	1053 (7.3%)	79 (8.2%)
Welfare	673 (4.3)	658 (4.4%)	15 (4.0%)	631 (4.4%)	42 (4.3%)

Education	817 (5.2)	796 (5.3%)	21 (5.6%)		760 (5.2%)	57 (5.9%)	
Other (not classified elsewhere)	3182 (20.5)	3126 (20.7%)	56 (14.9%)		3007 (20.8%)	175 (18.1%)	
Relationship with spouse				<0.001			<0.001
Better	859 (3.4)	818 (3.3%)	41 (7.8%)		781 (3.2%)	78 (5.4%)	
constant	12543 (49.2)	12422 (49.8%)	121 (23.0%)		12139 (50.5%)	404 (28.1%)	
Worse	1069 (4.2)	981 (3.9%)	88 (16.8%)		842 (3.5%)	227 (15.8%)	
Do not know	461 (1.8)	453 (1.8%)	8 (1.5%)		446 (1.9%)	15 (1.0%)	
Not applicable	10550 (41.4)	10283 (41.2%)	267 (50.9%)		9835 (40.9%)	715 (49.7%)	
Use of mask while visiting public places				<0.001			<0.001
Always	21902 (86)	21579 (86.5%)	323 (61.5%)		20768 (86.4%)	1134 (78.8%)	
Sometime	2511 (9.9)	2405 (9.6%)	106 (20.2%)		2300 (9.6%)	211 (14.7%)	
Never/Rarely	1069 (4.2)	973 (3.9%)	96 (18.3%)		975 (4.1%)	94 (6.5%)	
Walking impairment				<0.001			<0.001
No	23085 (90.6)	22715 (91.0%)	370 (70.5%)		21959 (91.3%)	1126 (78.2%)	
Yes	2397 (9.4)	2242 (9.0%)	155 (29.5%)		2084 (8.7%)	313 (21.8%)	
Use of self-prescribed drug [Mean (Sd)]	6.7 (2.1)	6.7 (1.9)	8.0 (3.5)	<0.001	6.7(1.9)	8.0 (3.5)	<0.001
Frequency of alcohol intake [Mean (Sd)]	1.1(1.3)	2.0 (1.2)	2.2(1.3)	0.012	1.96 (1.1)	2.2(1.3)	<0.001
Presence of symptoms associated with COVID-19 [Mean (Sd)]	0.8(1.4)	0.8(1.3)	1.9(2.4)	<0.001	0.8 (1.3)	1.8 (2.1)	<0.001

Abbreviations: AOR= adjusted odds ratio; CI = confidence interval, Sd = standard deviation

STROBE 2007 (v4) checklist of items to be included in reports of observational studies in epidemiology*
Checklist for cohort, case-control, and cross-sectional studies (combined)

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	Page 2 [Line 31]
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	Page 2 [Line 24-49]
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	Page 4-6 [Line 63-109]
Objectives	3	State specific objectives, including any pre-specified hypotheses	Page 5-6 [Line 106-109]
Methods			
Study design	4	Present key elements of study design early in the paper	Page 6 [Line 113-123]
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Page 6 [Line 116-118]
Participants	6	(a) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up <i>Case-control study</i> —Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls <i>Cross-sectional study</i> —Give the eligibility criteria, and the sources and methods of selection of participants	Page 6 [Line 115]
		(b) <i>Cohort study</i> —For matched studies, give matching criteria and number of exposed and unexposed <i>Case-control study</i> —For matched studies, give matching criteria and the number of controls per case	Not applicable
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	Page 6-8 [Line 125-165]
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	Page 6-8 [Line 125-165]
Bias	9	Describe any efforts to address potential sources of bias	Page 8 [Line 173-177]
Study size	10	Explain how the study size was arrived at	Page 6 [Line 113-118]
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Page 8-9 [Line 167-189]
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	Page 9 [Line 182-184]
		(b) Describe any methods used to examine subgroups and interactions	Not applicable

		(c) Explain how missing data were addressed	Page 8 [Line 167-171]
		(d) <i>Cohort study</i> —If applicable, explain how loss to follow-up was addressed <i>Case-control study</i> —If applicable, explain how matching of cases and controls was addressed <i>Cross-sectional study</i> —If applicable, describe analytical methods taking account of sampling strategy	Not applicable
		(e) Describe any sensitivity analyses	Not applicable
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed (b) Give reasons for non-participation at each stage (c) Consider use of a flow diagram	Page 6 [Line 114-118] NA NA
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders (b) Indicate number of participants with missing data for each variable of interest (c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)	Page 9,10 [Line 191-205] NA NA
Outcome data	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time <i>Case-control study</i> —Report numbers in each exposure category, or summary measures of exposure <i>Cross-sectional study</i> —Report numbers of outcome events or summary measures	NA NA Page 9,10,11
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included (b) Report category boundaries when continuous variables were categorized (c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	Page 9-11 [Line 119-224] Page 7 [Line 133-141] NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	NA
Discussion			
Key results	18	Summarise key results with reference to study objectives	Page 12 [Line 229-237]
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	Page 16 [Line 322-327]
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	Page 16 [Line 333-344]
Generalisability	21	Discuss the generalisability (external validity) of the study results	Page 16 [Line 328-331]
Other information			

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Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Page 17 [Line 350-356]
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*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.
Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.

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BMJ Open

Physical and verbal abuse amid COVID-19: a nationwide cross-sectional survey in Japan

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Primary Subject Heading:	Public health
Secondary Subject Heading:	Public health, Mental health, Infectious diseases, Epidemiology, Sociology
Keywords:	PUBLIC HEALTH, EPIDEMIOLOGY, HEALTH SERVICES ADMINISTRATION & MANAGEMENT

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2 **1 Physical and verbal abuse amid COVID-19: a nationwide cross-sectional survey in Japan**
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22 **Abstract**

23 **Objectives**

24 The detrimental impacts of abuse on victims' well-being are well documented globally,
25 including Japan. The ongoing COVID-19 pandemic may increase the incidence of abuse in the
26 community, creating an additional burden amid the crisis. However, the incidence of abuse in
27 Japan during COVID-19 remains to be evaluated. Accordingly, our study aimed to assess the
28 incidence of physical and verbal abuse among the general population in Japan and to identify the
29 associated factors of abuse during COVID-19.

30 **Design and setting**

31 We used the data obtained from a nationwide, cross-sectional internet survey conducted in Japan
32 between August and September 2020. Sampling weights were used to calculate national
33 estimates, and multivariable logistic regression was performed to identify the associated factors
34 for physical and verbal abuse.

35 **Results**

36 Out of the total 25,482 participants, 965 (3.8 %) reported experiencing physical abuse and 1941
37 (7.6%) verbal abuse from April 2020 to September 2020. The incidence of physical and verbal
38 abuse was higher among female participants. Participants who lived in areas where the "state of
39 emergency" was enforced were more likely to suffer from physical abuse. Similarly, vulnerable
40 participants such as those below age 18, with low income, bad family relationships, and disabled
41 people were more likely to experience both physical and verbal abuse. Participants suffering
42 from COVID-19 related symptoms, who had poor health status and widows/divorcees were more
43 likely to be verbally abused. Furthermore, those who did not follow preventive behaviors such as
44 wearing masks in public places, abusing drugs, and drinking alcohol in high amounts were also
45 more likely to experience abuse.

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2 46
34 47 **Conclusion**

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6 48 The impact of abuse was found disproportionately greater in more vulnerable groups of the
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9 49 population. Pandemic has reinforced the existing social inequalities, which need to be addressed
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11 50 timely to prevent precarious repercussions.
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15 52 **Keywords:** physical abuse, verbal abuse, Japan, pandemic, social inequality, vulnerable
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18 53 population
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22 55 **Word count:** 3295
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27 57 **Strength and Limitation of the study**

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31 58 • This is the nationwide cross-sectional study exploring the incidence of abuse amid
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33 59 COVID-19.
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35 60 • An inverse probability weighting approach was employed to adjust the difference on the
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37 61 internet and the nationally representative sample.
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39 62 • Multivariable logistic regression was used to adjust for possible confounders and to
40
41 63 evaluate the association.
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43 64 • A cross-sectional design was used which limited our ability to establish causality.
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45 65 • Due to the self-reported nature of the survey data, there could be a chance of under- and
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47 66 over-reporting.
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68 Introduction

69 Abuse is a serious public health problem that fundamentally violates human rights. Globally, one
70 in three women and one in five men have been subjected to different forms of violence.^{1,2} In the
71 United States alone, 20 people per minute are physically abused by their partner, equating to
72 more than 10 million women and men in one year.^{3,4} Although the incidence of abuse is highly
73 prevalent among women, it is not limited to particular gender only. All people, regardless of their
74 races, cultures, or sexual orientations are exposed to abuse and have to deal with it in their
75 lifetime.⁵ Exposure to any kind of abuse is stressful whether it be physical abuse (infliction of
76 physical pain by hitting, punching, strangling, restraining, pushing, or slapping), verbal abuse
77 (demonstrating mental anguish by shouting and yelling), sexual abuse (threats of unwanted
78 sexual contact or forced sex), or emotional abuse.⁶

79
80 With the advent of COVID-19, the incidence of abuse has become more apparent than ever
81 before.⁷ Travel restrictions and stay-at-home orders adopted to curb the spread of the virus have
82 a profound impact on society leading to social, financial, and psychological repercussions.⁸
83 Stay-at-home orders have exacerbated the vulnerabilities of individuals whose lives are already
84 afflicted by domestic violence.⁹ Furthermore, business closures have significantly increased the
85 unemployment rate and economic strain; all this has negatively impacted the mental health of the
86 general population.^{10,11} Financial hardships, increased threats to physical health coupled with
87 their daily responsibilities have made people more violent and aggressive.¹² While hotlines have
88 been receiving complaints of domestic violence,^{13,14} multiple instances of abuse were also seen
89 outside the closed room among general people. Some instances include abusing health workers

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2 90 for spreading COVID-19,¹⁵ abusing people for not wearing masks,^{16,17} for not being able to pay
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4 91 room rents,¹⁸, etc.
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9 93 The consequences of such abuse are deleterious and can result in long-term damage to victims'
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11 94 physical and mental well-being.^{19,20} While physical abuse has direct effects on the physical body,
12
13 95 verbal abuse affects victims' thoughts and emotions. The immediate effects of physical abuse
14
15 96 include bruises, cuts, fractures, loss of teeth/hair, miscarriage, etc.²¹ Verbal abuse does not
16
17 97 manifest visible effects immediately; however, it directly affects the victims' self-esteem.
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20 98 Prolonged exposure to abuse can lead to various mental health problems, including depression,
21
22 99 anxiety, and posttraumatic stress disorder (PTSD).^{22,23} Victims are 1.7 to 4.6 times more likely to
23
24 100 develop an anxiety disorder, PTSD, or eating disorder.^{24,25} Similarly, the effects on physical
25
26 101 health include the higher age-adjusted mortality rates and various chronic health problems such
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28 102 as asthma, epilepsy, migraines, hypertension, etc.²⁶⁻²⁸. Under current stressful living conditions,
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30 103 the additional burden of abuse could take a heavy toll on people.
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36 105 In Japan, spousal, elderly, and child abuse have been noted from time to time. In 2019, more than
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38 106 80,000 cases of domestic violence consultations were reported.²⁹ Similarly, the prevalence of
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40 107 elder abuse was found to be 12.3%, with 2.6% experiencing physical abuse and 11.6%
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42 108 experiencing verbal abuse.³⁰ Furthermore, as mentioned above, COVID-19 has created a
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44 109 situation of widespread uncertainty and panic which might stimulate abuse in the community.
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46 110 Apparently, as mentioned on various news portals, multiple cases of abuse were reported among
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48 111 the general population in Japan.^{31,32} However, detailed study on this issue among the general
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50 112 population has not been done yet. Taken together, our study aimed to i) identify the incidence of
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2 113 physical and verbal abuse among the general population of Japan amid COVID-19 and ii)
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4 114 investigate factors associated with such abuses.
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10 116 **Methods**

13 117 **Settings and Participants**

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17 118 We used the data from Japan COVID-19 and Society Internet Survey study` (JACSIS) collected
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19 119 by a large internet research agency Rakuten Insight, Inc, which had approximately 2.3 million
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21 120 registered qualified panelists. JACSIS study was designed to recruit a “nationally representative
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23 121 sample” to calculate national estimates. Therefore, a large sample size of 28000 was determined
24
25 122 in advance according to the population distribution of Japan in 2019 and a response rate of
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27 123 12.5% (28000/224389). Regarding the sampling method, out of 2.2 million registered panelists,
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29 124 224389 panelists were invited using stratified random sampling by sex, age, and prefectures. The
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31 125 random selection was done using computer algorithms and then email invitations were sent to
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33 126 selected participants. The survey was terminated once the target number of respondents was
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35 127 reached for each category. Questionnaires were distributed from August 25, 2020, and were
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37 128 completed on September 30, 2020, after reaching a total target sample size of 28,000 participants
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39 129 from all 47 prefectures. The questionnaire used in this study was adopted from a previously
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41 130 validated questionnaire developed by Koga et al.^{33,34} Questionnaire was administered in the
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43 131 Japanese language and a link to the questionnaire is available on the JACSIS website.³⁵
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133 **Ethical approval**

134 The ethical approval was received from the Research Ethics Committee of the Osaka
135 International Cancer Institute (Approval No. 20084). Web-based informed consent was obtained
136 from the participants before providing access to the main questionnaire. Participants had an
137 option to discontinue at any time during the survey. Participants involved in the study were
138 provided with “e-points”, credit points that can be used for internet shopping.

140 **Patient and public involvement**

141 There were no patients involved in this study

142 **Outcome variable and assessment**

143 **Physical and verbal abuse:** Participants were asked whether they encountered any form of
144 physical or verbal abuse from April 2020 (from emergency declaration due to COVID-19) to the
145 data collection period. They were asked whether they were physically assaulted by anyone such
146 as being punched, kicked, thrown, or locked in the room. Similarly, they were asked if they were
147 verbally abused or ignored for a long time or encountered any self-esteem damaging behaviors
148 from others. Responses were measured in the binary outcome, “Yes” and “No” each.

150 **Exposure variables and assessment**

151 **Socio-demographic characteristics:** The demographics included age (categorized as: below 18,
152 18-40, 40-60 and above 60), gender, education levels (junior high school, high school, college,
153 university, and others), marital status (with a spouse, unmarried, widow/widower, divorced, job

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2 154 sector (public servant, agriculture, working in the industry, business, medical care, education,
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4 155 and other services), work from home since March or April (yes, no), and relationship with a
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6 156 spouse (better, constant, worse, do not know, not applicable). The crowding index was calculated
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9 157 by dividing the total number of residents in a household by the total number of rooms in the
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11 158 house (excluding the kitchen and bathroom). It was categorized into less than 1, 1-2, more than 2
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13 159 during analysis.³⁶ Similarly for annual household income, quartile was calculated and used for
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15 160 categorization (less than 3, 3-4 million, 4-7 million, higher than 7 million, and did not want to
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17 161 disclose).

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23 163 **Personal health status:** Participants were asked about their perceived health status, presence of
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25 164 walking impairment/disability, and presence of any COVID-19-related symptoms. Perceived
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27 165 health status was asked in the five-item Likert scale from “good” to “not good”. It was later
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29 166 recategorized into three categories (good, usual, and poor) for the analysis. Similarly, symptoms
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31 167 associated with COVID-19 were asked such as high fever, fatigue, sore throat, cough, nausea,
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33 168 smell disorder, etc. which were considered to have high sensitivity and specificity.³⁷ Responses
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35 169 were measured as binary options “Yes” (presence of any symptoms) and “No” (absence of any
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37 170 symptoms).

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43 172 **Prefecture-wise COVID-19 infection and Emergency declaration:** The number of COVID-19
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45 173 cases by prefecture was calculated from January 15, 2020, to September 30, 2020. They were
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47 174 divided by the population per prefecture based on the estimate on October 1, 2019. During
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49 175 analyses, the number of COVID-19 cases/prefecture was divided into three categories using
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51 176 quartile (lowest, medium, and highest).

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2 177 For the emergency declaration variable, three categories were created; category 1 included
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4 178 prefectures where the state of emergency was enforced, category 2 included the prefecture with
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6 179 specific alerts and category 3 included the remaining prefecture.
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11 181 **Personal Behaviors:** Personal behaviors were also included such as substance abuse, alcohol
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13 182 intake, and use of face masks in the public areas. The alcohol intake was measured in three
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15 183 categories –“increased”, “same/as usual”, and “decrease”. These categories were used to
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17 184 compare the change in the drinking habit before and after the COVID-19 pandemic. For
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19 185 substance abuse, participants were asked about the use of different kinds of harmful drugs
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21 186 (without any prescription from physicians). Responses were measured in “no”, “before but not
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23 187 now” and “yes”. Similarly, participants were asked about their practice of using facemasks while
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25 188 out in public. Responses were measured in three categories: “always”, “sometimes”, and
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27 189 “never/rarely”.
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33 34 191 **Data analysis**

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38 192 Out of 28,000 responses collected, 25,482 were included in the analysis after removing
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40 193 discrepancies and unnatural responses. Three criteria were used to detect such discrepancies; i)
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42 194 those who selected "yes" to all asked diseases listed ii) those who ticked wrong response to the
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44 195 verification question “Please choose the second from the bottom”, iii) those who selected all
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46 196 options for drug use behaviors, who were then removed from the analysis.
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49 197 First, we compared the socio-demographic characteristics and all other exposure variables among
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51 198 participants experiencing physical abuse and those who did not. The same procedure was applied
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53 199 for verbal abuse as well. As participants who participated in the internet-based survey might
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55 200 differ from the general population, we used an inverse probability weighting (IPW) approach
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2 201 throughout the analyses to adjust the difference of response between the current internet survey
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4 202 and the nationally representative survey. Propensity scores were calculated by logistic regression
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6 203 analysis using sex, age, and socioeconomic factors to adjust for differences between a current
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8 204 and population-based sample from the Comprehensive Survey of Living Conditions of People on
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10 205 Health and Welfare 2016. Detailed methods (e.g. participation rate and data management) are
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12 206 presented in the previous study.³⁸
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14
15 207 Second, we performed simple and multivariable logistic regression to identify the factors
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17 208 associated with physical and verbal abuse. For each outcome, we constructed two regression
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19 209 models to control for potential confounders. We considered all variables using the backward
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21 210 stepwise variable selection method ($p > 0.05$). Variables having categories with a small number of
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23 211 participants were regrouped as appropriate. Weighted multivariable logistic regression models,
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25 212 with standard error (SEs) clustered at the prefecture level, were used to account for the potential
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27 213 correlation of respondents within the same prefecture. A separate analysis was conducted for
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29 214 both physical and verbal abuse.
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35 **Results**

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38 216 Table 1 shows the characteristics of participants experiencing physical and verbal abuse.
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40 217 Analyses were weighted to adjust the difference between participants in this internet survey and
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42 218 national representative samples.
43
44 219 Of the total, 965 (3.8%) participants experienced physical abuse and 1941 (7.6%) encountered
45
46 220 verbal abuse. Both the incidence of physical and verbal abuse was highest among the female
47
48 221 participants and participants in the age group 18-40 years. Among participants experiencing
49
50 222 physical abuse, 209 (21.7%) mentioned having “poor” health status, 356 (36.9%) were working
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52 223 from home and 91 (9.5%) had the worst relationship with their spouse. Similarly, 339 (35.2%) of
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2 224 participants had increased their alcohol intake, 222 (23.0%) were abusing drugs, and 491
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4 225 (50.9%) experienced symptoms related to COVID-19. Among participants experiencing verbal
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6 226 abuse, 1,143 (58.9%) were working from home, 607 (31.3%) had an annual household income of
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8
9 227 less than 3 million, 710 (36.6%) had a “poor” health status, 583 (30.1 %) increased their alcohol
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11 228 intake, and 394 (20.3%) had the worst relationship with their spouse.
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Table 1: Characteristics of participants experiencing physical and verbal abuse (N= 25,482)

Variables	Total n	Physical Abuse				Verbal Abuse			
		Yes		No		Yes		No	
		n	%	n	%	n	(%)	n	(%)
		965	3.8	24517	96.2	1941	7.6	23541	92.4
Age									
Below 18	651	71	(7.4)	579	(2.4)	72	(3.7)	579	(2.5)
18-40	7541	691	(71.7)	6850	(27.9)	950	(49)	6591	(28.0)
40-60	9150	142	(14.7)	9008	(36.7)	558	(28.8)	8592	(36.5)
Above 60	8140	60	(6.2)	8080	(33.0)	360	(18.6)	7780	(33.0)
Sex									
Female	12673	708	(73.3)	11965	(48.8)	1,078	(55.5)	11595	(49.3)
Male	12809	257	(26.7)	12552	(51.2)	863	(44.5)	11946	(50.7)
Education Level									
Junior High School	1732	74	(7.6)	1658	(6.8)	108	(5.6)	1624	(6.9)
High School	9640	256	(26.5)	9385	(38.3)	454	(23.4)	9186	(39.0)
College	4928	101	(10.5)	4827	(19.7)	329	(17.0)	4599	(19.5)
University and others	9182	535	(55.4)	8647	(35.3)	1,050	(54.1)	8132	(34.5)
Marital Status									
With spouse	16100	257	(26.6)	15844	(64.6)	895	(46.1)	15205	(64.6)
Unmarried	6046	192	(19.8)	5854	(23.9)	452	(23.3)	5594	(23.8)
Widow/Widower	1949	504	(52.2)	1446	(5.9)	521	(26.8)	1428	(6.1)
Divorced	1387	13	(1.4)	1373	(5.6)	73	(3.8)	1314	(5.6)
Annual Household Income									
Less than 3 million	4712	255	(26.4)	4457	(18.2)	607	(31.3)	4104	(17.4)
3-4 million	2948	159	(16.4)	2789	(11.4)	272	(14.0)	2675	(11.4)
4-7 million	6512	110	(11.4)	6402	(26.1)	407	(21.0)	6105	(25.9)
Higher than 7 million	5716	354	(36.7)	5362	(21.9)	422	(21.7)	5294	(22.5)
Prefer not to disclose	5595	88	(9.1)	5508	(22.5)	233	(12.0)	5363	(22.8)
Crowding index									
Less than or equal to one	18728	557	(57.7)	18172	(74.1)	1,171	(60.4)	17557	(74.6)
One -Two	6228	274	(28.4)	5954	(24.3)	616	(31.7)	5612	(23.8)
More than two	526	135	(13.9)	391	(1.6)	154	(7.9)	373	(1.6)
Prefecture by level of Covid-19 infection									
High	3541	428	(44.3)	3113	(12.7)	148	(7.6)	3393	(14.4)
Moderate	8885	266	(27.6)	8619	(35.2)	880	(45.3)	8005	(34.0)
Low	13056	271	(28.1)	12785	(52.1)	913	(47.1)	12143	(51.6)
Areas under restriction due to COVID-19									
Restricted Areas/Emergency Declaration	7251	601	(62.3)	6650	(27.1)	671	(34.6)	6580	(28)
Specific alert only	3790	59	(6.1)	3731	(15.2)	158	(8.1)	3632	(15.4)
No restriction	14441	305	(31.6)	14137	(57.7)	1,112	(57.3)	13329	(56.6)

Perceived Health status									
Good	10249	332	(34.4)	9917	(40.5)	710	(36.6)	9539	(40.5)
Usual	11787	424	(44.0)	11363	(46.3)	521	(26.9)	11266	(47.9)
Poor	3446	209	(21.7)	3237	(13.2)	710	(36.6)	2736	(11.6)
Work from home									
No	12653	609	(63.1)	12044	(49.1)	798	(41.1)	11855	(50.4)
Yes	12829	356	(36.9)	12473	(50.9)	1,143	(58.9)	11686	(49.6)
Employment Sector									
Public servant	992	146	(15.1)	847	(3.5)	42	(2.1)	951	(4.0)
Agriculture	222	11	(1.2)	210	(0.9)	20	(1.0)	202	(0.9)
Industry	5212	214	(22.2)	4998	(20.4)	387	(20.0)	4824	(20.5)
Business	2773	54	(5.6)	2719	(11.1)	163	(8.4)	2610	(11.1)
Food and Beverage	502	10	(1.0)	492	(2.0)	55	(2.8)	446	(1.9)
Medical	1189	54	(5.6)	1,135	(4.6)	67	(3.4)	1122	(4.8)
Welfare	690	19	(1.9)	671	(2.7)	45	(2.3)	645	(2.7)
Education	937	10	(1.0)	927	(3.8)	163	(8.4)	774	(3.3)
Other (not classified elsewhere)	3245	298	(30.9)	2,946	(12.0)	339	(17.5)	2906	(12.3)
Not working	9722	149	(15.5)	9,573	(39.0)	660	(34.0)	9062	(38.5)
Relationship with spouse									
Better	935	26	(2.7)	909	(3.7)	303	(15.6)	632	(2.7)
Constant	13656	379	(39.3)	13277	(54.2)	659	(34.0)	12996	(55.2)
Worse	1221	91	(9.5)	1129	(4.6)	394	(20.3)	827	(3.5)
Don't know	553	10	(1.1)	542	(2.2)	14	(0.7)	539	(2.3)
Not applicable	9119	459	(47.5)	8660	(35.3)	571	(29.4)	8548	(36.3)
Wearing face mask while out in public									
Always	21244	327	(33.9)	20917	(85.3)	1,578	(81.3)	19666	(83.5)
Sometime	2774	327	(33.9)	2448	(10.0)	300	(15.5)	2474	(10.5)
Never/Rarely	1464	312	(32.3)	1152	(4.7)	63	(3.2)	1401	(6.0)
Walking impairment/Disability									
No	21939	367	(38.0)	21572	(88.0)	1,062	(54.7)	20877	(88.7)
Yes	3543	598	(62.0)	2945	(12.0)	879	(45.3)	2664	(11.3)
Practice of substance abuse									
Never	18,382	254	(26.4)	18,128	(73.9)	775	(39.9)	17,607	(74.8)
Before but not now	4,719	488	(50.6)	4,230	(17.3)	883	(45.5)	3,836	(16.3)
Yes	2,381	222	(23.0)	2,159	(8.8)	283	(14.6)	2,098	(8.9)
Alcohol intake after COVID-19									
Increased	2,416	339	(35.2)	2,077	(8.5)	583	(30.1)	1,833	(7.8)
Haven't changed/same	19,092	545	(56.5)	18,547	(75.6)	925	(47.7)	18,167	(77.2)
Decreased	3,974	80	(8.3)	3,894	(15.9)	433	(22.3)	3,541	(15.0)
Presence of COVID-19 related symptoms									
No	21,258	474	(49.1)	20,784	(84.8)	1,192	(61.4)	20,066	(85.2)
Yes	4,224	491	(50.9)	3,733	(15.2)	749	(38.6)	3,475	(14.8)

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2 229 Table 2 demonstrates the result of multivariable logistic regression analysis of the associated
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4 230 factors for physical and verbal abuse. Participants aged 40 and above were less likely to
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6 231 experience physical (Adjusted Odds Ratio [AOR] = 0.05; 95% Confidence Interval [CI] = 0.02 -
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8 232 0.16) and verbal abuse (AOR = 0.35; 95% CI = 0.16 - 0.79) compared to participants below age
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11 233 18. Unmarried, widows/widowers, and divorcées were more likely to experience verbal abuse
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13 234 compared to married ones. Moreover, participants with an annual household income of 4-7
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15 235 million were less likely to experience physical abuse (AOR = 0.53, 95% CI = 0.28-0.99)
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17 236 compared to participants with a household income of less than 3 million. Participants living in
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19 237 areas where the restriction was imposed due to COVID-19 were more likely to experience
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21 238 physical abuse (AOR = 2.61, 95% CI = 1.05-6.50) compared to those living in areas without
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23 239 restriction. Similarly, participants living in crowded households were more likely to experience
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25 240 physical abuse (AOR = 2.62, 95% CI = 1.00-6.83). Participants who were not wearing masks
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27 241 regularly in public places were more likely to experience both physical (AOR = 5.46, 95% CI =
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29 242 3.84- 7.76) and verbal abuse (AOR = 3.38, 95% CI = 1.83 – 6.23). Participants with increase
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31 243 alcohol intake and who have been abusing drugs were also more likely to experience both
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33 244 physical and verbal abuse. Participants with poor health status (AOR = 1.99, 95% CI = 1.36 –
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35 245 2.93) and who had symptoms associated with COVID-19 (AOR = 1.56, 95% CI = 1.21 – 2.03)
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37 246 were more likely to experience verbal abuse.
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251 **Table 2: Factors associated with the physical and verbal abuse (N= 25,482)**

Variables	Physical Abuse			Verbal abuse		
	AOR	(95% CI)	P-value	AOR	(95% CI)	P-value
Age						
Below 18	Ref			Ref		
18-40	0.10	(0.03 - 0.33)	<0.001	0.38	(0.17 - 0.89)	0.025
40-60	0.05	(0.02 - 0.16)	<0.001	0.35	(0.16 - 0.79)	0.011
Above 60	0.02	(0.00 - 0.08)	<0.001	0.20	(0.07 - 0.57)	0.003
Marital status						
With spouse	Ref			Ref		
Unmarried	0.73	(0.35 - 1.48)	0.379	3.90	(1.89 - 8.08)	<0.001
Widow/Widower	2.54	(0.78 - 8.29)	0.121	3.79	(1.32 - 10.85)	0.013
Divorced	0.42	(0.17 - 1.02)	0.056	2.73	(1.32 - 5.66)	0.007
Annual household income						
Less than 3 million	Ref			Ref		
3-4 million	1.15	(0.37 - 3.63)	0.807	0.77	(0.53 - 1.11)	0.166
4-7 million	0.53	(0.28 - 0.99)	0.048	0.77	(0.43 - 1.37)	0.373
Higher than 7 million	0.56	(0.19 - 1.64)	0.287	0.65	(0.31 - 1.36)	0.252
Prefer not to disclose	0.44	(0.23 - 0.83)	0.012	0.53	(0.35 - 0.79)	0.002
Crowding index						
Less than or equal to one	Ref			Ref		
One -Two	0.93	(0.64 - 1.37)	0.729	1.00	(0.79 - 1.27)	0.999
More than two	2.62	(1.00 - 6.83)	0.049	1.44	(0.82 - 2.53)	0.201
Areas under restriction due to COVID-19						
Restricted Areas/Emergency Declaration	2.61	(1.05 - 6.50)	0.039	1.37	(0.93 - 2.02)	0.108
Specific alert only	1.54	(0.59 - 4.00)	0.379	0.80	(0.57 - 1.12)	0.189
No restriction	Ref			Ref		
Perceived health status						
Good	Ref			Ref		
Usual	0.94	(0.60 - 3.66)	0.393	0.79	(0.57 - 1.10)	0.156
Poor	0.94	(0.32 - 4.79)	0.751	1.99	(1.36 - 2.93)	<0.001
Relationship with spouse						
Better	Ref			Ref		

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Constant	3.04	(0.60 - 15.46)	0.180	0.42	(0.27 - 0.66)	<0.001
Worse	6.33	(1.18 - 33.99)	0.031	2.09	(1.16 - 3.75)	0.013
Don't know	2.53	(0.39 - 16.33)	0.329	0.24	(0.11 - 0.48)	<0.001
Not applicable	2.68	(0.62 - 11.51)	0.186	0.14	(0.06 - 0.32)	<0.001
Wearing face mask while out in public						
Always	Ref			Ref		
Sometime	4.32	(2.65 - 7.03)	<0.001	0.97	(0.66 - 1.43)	0.871
Never/Rarely	5.46	(3.84 - 7.76)	<0.001	3.38	(1.83 - 6.23)	0.001
Walking impairment						
No	Ref			Ref		
Yes	2.33	(1.45 - 3.74)	<0.001	2.25	(1.48 - 3.43)	<0.001
Practice of substance abuse						
Never	Ref			Ref		
Before but not now	1.49	(1.05 - 2.10)	0.025	2.29	(1.29 - 4.05)	0.004
Yes	4.24	(2.43 - 7.41)	<0.001	2.27	(1.43 - 3.59)	<0.001
Alcohol intake after COVID-19						
Increased	Ref			Ref		
Have not changed/same	0.31	(0.18 - 0.53)	<0.001	0.49	(0.38 - 0.63)	<0.001
Decreased	0.32	(0.15 - 0.64)	0.001	0.80	(0.53 - 1.22)	0.302
Presence of COVID-19 related symptoms						
No	Ref			Ref		
Yes	1.32	(0.57 - 3.05)	0.512	1.56	(1.21 - 2.03)	<0.001

Abbreviations: AOR= adjusted odds ratio; CI: confidence interval.

For each outcome, we constructed a weighted multivariable logistic regression model with SEs clustered at the prefecture-level. The above model was adjusted for sex, education, employment sector, COVID-19 infection rate and work from home.

256 Discussion

257 The incidence of physical and verbal abuse among the general population in Japan amid COVID-
258 19 was found to be 3.8% and 7.6%, respectively. Both physical and verbal abuse was higher
259 among female participants. Participants living in the areas where the “state of emergency” was
260 imposed and those with low household income were more likely to experience physical abuse.
261 Similarly, participants with poor health status and those having symptoms associated with
262 COVID-19 were more likely to experience verbal abuse. Younger participants and participants
263 with strained relationships were more likely to experience both physical and verbal abuse.
264 Similarly, participants who had been abusing drugs, increasing their alcohol intake, not wearing
265 a mask in public places were also more likely to experience both kinds of abuse.

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267 The incidence of physical and verbal abuse can be considered high taking into account the
268 limited time of six months. However, due to the lack of data on the prevalence of abuse among
269 similar populations over similar time periods, it is difficult to exactly quantify the changes in the
270 incidence of the abuse. Nevertheless, previous studies have also highlighted the increased
271 incidence of child abuse, elderly abuse, and gender-based violence during crises such as
272 earthquakes, economic recession, etc. in Japan.^{39,40}

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274 The percentage of women experiencing physical and verbal abuse was higher in our study.
275 Previous studies have also underscored the higher incidence of abuse faced by female
276 participants globally.^{41,42} A longitudinal study conducted among 161 countries found that
277 approximately one in three women have been subjected to different forms of intimate
278 partner/non-partner or both abuse.⁴³ Women were found to experience higher rates of repeated
279 abuse than males; and in most cases, males are found to be the perpetrator of the abuse.⁴⁴

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2 280 Moreover, crises and times of unrest have been linked to an increased rate of abuse among
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4 281 female participants.⁴⁵ However, from our study findings, we cannot claim women were more
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6 282 likely to experience abuse than men as sex was not associated in the multivariable analysis. Our
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8 283 study measured the incidence of abuse faced by people in the community (not only domestic
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10 284 abuse), unlike other studies which are focused on domestic abuse and gender-based violence. In
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12 285 addition, it has been found that both women and men are equally likely to initiate abuse and
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14 286 violence although men tend to become more aggressive and opt for physical abuse.⁴⁶ Evidently,
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16 287 in our study percentage of males experiencing verbal abuse was only slightly lower than female
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18 288 participants with 44.5%. However, the incidence of physical abuse was distinctively higher
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20 289 among females with 73.3%.

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27 291 Globally, there was increasing concern about the heightened risk of abuse and violence during
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29 292 the lockdown period. In line with that concern, our study found out that people residing in areas
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31 293 where the “state of emergency” was enforced were more likely to experience physical abuse.
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33 294 Moreover, as expected, participants who did not have a good relationship with their spouses were
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35 295 more likely to experience abuse in our study. Restrictions and stay-at-home orders forced the
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37 296 individual to spend time with their spouse and family members, which turned out to be a
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39 297 catastrophic milieu for individuals whose relationships were already strained. Numerous studies
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41 298 have highlighted the incidence of domestic violence amid COVID-19. For example, in China, the
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43 299 incidence of domestic violence tripled compared to the previous year;⁴⁷ similarly, a 36% increase
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45 300 in complaints of domestic abuse were reported in France;⁴⁸ in the UK, there was a 25% increase
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47 301 in calls related to domestic violence.⁴⁹ Furthermore, many countries reported an increase in
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49 302 homicide as a result of domestic violence.⁴⁹ It seems plausible that strained relationships are
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51 303 more likely to cause conflict especially in times of crisis; however, when comparing participants
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2 304 by marital status, our study findings highlighted that widows/widowers and divorcees were more
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4 305 likely to experience verbal abuse compared to married ones. These findings align with the
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6 306 previous study where the incidence of violence was higher among single women who were
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9 307 separated or widows compared to married ones.⁵⁰ The condition of widows/widowers and
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11 308 divorcees, particularly women remains deplorable in society and often victimized because they
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13 309 are considered weak with low social support.⁵⁰
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18 311 Moreover, economic repercussions due to COVID-19 were undeniable; the sudden and possibly
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20 312 long-term increase in unemployment has precipitated or exacerbated potential stressors.⁹ In our
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22 313 study, participants who had low household incomes were more likely to experience abuse.
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24 314 Findings align with the previous study where children born in families with low socioeconomic
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26 315 status were 14 times more likely to experience maltreatment than those in higher quartiles.⁵¹
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28 316 Furthermore, if a victim has adequate resources, they are more likely to escape from their
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30 317 abusers. Particularly during COVID-19, instances of abuse were noted for not being able to pay
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32 318 room rent and tuition fees,¹¹ which need to be addressed diligently.
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39 320 Vulnerable participants such as those who had a poor health status, who were suffering from
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41 321 COVID-19 related symptoms, and physically impaired (disabled) people were more likely to
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43 322 experience verbal abuse in our study. Previous studies have also shown that disabled people are
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45 323 more likely to experience different forms of abuse in their normal daily life.⁵² During a stressful
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47 324 pandemic, abuse could further exacerbate the situation of physically challenged individuals,
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49 325 posing a threat to their mental and physical health. It is, therefore, crucial to pay special attention
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51 326 to those individuals.
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2 327 Apart from the socioeconomic factors, the practice of good personal behaviors is also equally
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4 328 important to prevent violence and abuse in society. In our study, participants who were not using
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6 329 masks regularly were more likely to experience verbal abuse. This was also evident from the
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9 330 information presented in various news portals where people were abused for not using masks in
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11 331 public places.^{16,17,32} Similarly, participants who had been abusing drugs and who were using
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13 332 alcohol higher amounts than normal were more likely to experience verbal abuse. This finding
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15 333 can be interpreted in different ways. Due to the cross-sectional nature of the study design,
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17 334 findings might have been driven by reverse causality. For instance, people who are exposed to
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19 335 abuse may later develop a habit of taking drugs and alcohol. Conversely, participants who
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21 336 reported being abused might have actually perpetrated violence under the influence of the
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23 337 substance due to a loss of self-control. Nonetheless, the finding of our study is not sufficient to
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25 338 claim this notion.
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32 340 The findings of our study should be interpreted in light of the following limitations. First, data
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34 341 were collected from an internet survey which might have limited the responses of a certain group
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36 342 of population. However, as described in the method section, this was adjusted to approximate the
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38 343 national representative sample. Second, due to the cross-sectional design of our study, some
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40 344 findings might have been driven by reverse causality. Lastly, since it was a self-reported survey,
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42 345 there might have been under or over-reporting of the incidence. However, information about
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44 346 confidentiality was explicitly mentioned to the participants. Despite these limitations, this is the
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46 347 first nationwide cross-sectional study conducted to explore the incidence of abuse among the
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48 348 general population amid COVID-19 during the restriction period. The findings of this study
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50 349 could be highly valuable for designing effective interventions to mitigate this problem amid
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351 **Conclusion**

352 The incidence of verbal abuse was comparatively higher than physical abuse among the general
353 population in Japan amid COVID-19. Physical abuse was positively associated with the state of
354 the emergency declaration during COVID-19. Furthermore, vulnerable people such as those with
355 low household income, who had bad family relationships, widows, and divorcees were more
356 likely to experience abuse. The findings of this study have reinforced important truths of existing
357 inequalities among the general population which tend to be magnified during crises. Crises like
358 COVID-19 do not inflict equivalent hardships to all people, rather exacerbate or spark diverse
359 forms of abuse to vulnerable groups of the population. Moreover, restrictions that force abusive
360 couples/family members to stay together would further contribute to violence and abuse in
361 society. Therefore, it is highly imperative to look at the problem from a holistic approach to
362 prevent the occurrence of other problems while trying to solve one.

363 **Author Contribution**

364 DB conceptualized, analyzed the data, wrote, and revised the manuscript. TT contributed to the
365 conceptualization of this study, funding acquisition, project administration, review, and revision
366 of the manuscript. AO, TS, YK, SS, SH, and MT contributed during the conceptualization,
367 review, and revision of the manuscript. All authors read the final manuscript and approved it for
368 submission.

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6 376 represent the official views of the research funders.
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10 377 **Conflict of Interest**

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12 378 Dr. Akihiko Ozaki received personal fees from MNES Inc, outside the submitted work. All other
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14 379 authors have declared that no competing interests exist.
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18 380 **Data availability statement**

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21 381 The data that support the findings of this study are available on reasonable request. The data of
22
23 382 this study are not available in a public repository because they contain personally identifiable or
24
25 383 potentially sensitive participant information. Based on the regulations for ethical guidelines in
26
27 384 Japan, the Research Ethics Committee of the Osaka International Cancer Institute has imposed
28
29 385 restrictions on the dissemination of the data collected in this study. If any person wishes to verify
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31 386 our data, they are most welcome to contact the corresponding author.
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STROBE 2007 (v4) checklist of items to be included in reports of observational studies in epidemiology*
Checklist for cohort, case-control, and cross-sectional studies (combined)

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	Page 2 [Line 31]
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	Page 2 [Line 24-49]
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	Page 4-6 [Line 63-109]
Objectives	3	State specific objectives, including any pre-specified hypotheses	Page 5-6 [Line 106-109]
Methods			
Study design	4	Present key elements of study design early in the paper	Page 6 [Line 113-123]
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Page 6 [Line 116-118]
Participants	6	(a) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up <i>Case-control study</i> —Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls <i>Cross-sectional study</i> —Give the eligibility criteria, and the sources and methods of selection of participants	Page 6 [Line 115]
		(b) <i>Cohort study</i> —For matched studies, give matching criteria and number of exposed and unexposed <i>Case-control study</i> —For matched studies, give matching criteria and the number of controls per case	Not applicable
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	Page 6-8 [Line 125-165]
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	Page 6-8 [Line 125-165]
Bias	9	Describe any efforts to address potential sources of bias	Page 8 [Line 173-177]
Study size	10	Explain how the study size was arrived at	Page 6 [Line 113-118]
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Page 8-9 [Line 167-189]
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	Page 9 [Line 182-184]
		(b) Describe any methods used to examine subgroups and interactions	Not applicable

		(c) Explain how missing data were addressed	Page 8 [Line 167-171]
		(d) <i>Cohort study</i> —If applicable, explain how loss to follow-up was addressed <i>Case-control study</i> —If applicable, explain how matching of cases and controls was addressed <i>Cross-sectional study</i> —If applicable, describe analytical methods taking account of sampling strategy	Not applicable
		(e) Describe any sensitivity analyses	Not applicable
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	Page 6 [Line 114-118]
		(b) Give reasons for non-participation at each stage	NA
		(c) Consider use of a flow diagram	NA
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Page 9,10 [Line 191-205]
		(b) Indicate number of participants with missing data for each variable of interest	NA
		(c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)	NA
Outcome data	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time	NA
		<i>Case-control study</i> —Report numbers in each exposure category, or summary measures of exposure	NA
		<i>Cross-sectional study</i> —Report numbers of outcome events or summary measures	Page 9,10,11
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Page 9-11 [Line 119-224]
		(b) Report category boundaries when continuous variables were categorized	Page 7 [Line 133-141]
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	NA
Discussion			
Key results	18	Summarise key results with reference to study objectives	Page 12 [Line 229-237]
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	Page 16 [Line 322-327]
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	Page 16 [Line 333-344]
Generalisability	21	Discuss the generalisability (external validity) of the study results	Page 16 [Line 328-331]
Other information			

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Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Page 17 [Line 350-356]
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*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.

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