Check for updates

Workplace infection control measures and romantic activities of workers during COVID-19 pandemic: A prospective cohort study in Japan

Yoshihisa Fujino[1]*, Makoto Okawara[1], Ayako Hino[2],
Keiji Muramatsu[3], Tomohisa Nagata[4], Kazunori Ikegami[5],
Seiichiro Tateishi[6], Mayumi Tsuji[7] and Tomohiro Ishimaru[1] for the
CORoNaWork Project

[1]Department of Environmental Epidemiology, Institute of Industrial Ecological Sciences, University of
Occupational and Environmental Health, Japan, Kitakyushu, Japan, [2]Department of Mental Health, Institute
of Industrial Ecological Sciences, University of Occupational and Environmental Health, Japan, Kitakyushu,
Japan, [3]Department of Preventive Medicine and Community Health, School of Medicine, University of
Occupational and Environmental Health, Japan, Kitakyushu, Japan, [4]Department of Occupational Health
Practice and Management, Institute of Industrial Ecological Sciences, University of Occupational and
Environmental Health, Japan, Kitakyushu, Japan, [5]Department of Work Systems and Health, Institute of
Industrial Ecological Sciences, University of Occupational and Environmental Health, Japan, Kitakyushu,
Japan, [6]Disaster Occupational Health Center, Institute of Industrial Ecological Sciences, University of
Occupational and Environmental Health, Japan, Kitakyushu, Japan, [7]Department of Environmental Health,
School of Medicine, University of Occupational and Environmental Health, Japan, Kitakyushu, Japan

Objective: Due to the COVID-19 pandemic, non-married people are at high risk of loneliness. With social interactions restricted, it is important for non-married people to acquire a new romantic partner for their mental health and quality of life. We hypothesized that infection control efforts in the workplace influence people's social interactions, including romantic activities.

Methods: We conducted an internet-based prospective cohort study from December 2020 (baseline) to December 2021, using self-administered questionnaires. Briefly, 27,036 workers completed the questionnaires at baseline, and when followed up after 1 year, 18,560 (68.7%) participated. A total of 6,486 non-married individuals with no romantic relationship at baseline were included in the analysis. At baseline they were asked about the implementation of infection control measures in the workplace, and at follow-up they were asked about activities they performed with a view to romantic relationships during the period from baseline to follow-up.

Results: Compared to workers in workplaces with no infection control measures, the odds ratio (OR) associated with romance-related activities for those in workplaces with seven or more infection control measures was 1.90 (95% CI: 1.45−2.48, $p <$ 0.001), and the OR associated with having a new romantic partner was 1.79 (95% CI: 1.20−2.66, $p =$ 0.004).

Discussion: Under the COVID-19 pandemic, the implementation of infection control measures in the workplace and the expressed satisfaction with those measures promoted romantic relationships among non-married, single individuals.

KEYWORDS

COVID-19, longitudinal studies, single person, spouses, workplace safety, social relationships

Introduction

Since it started in 2020, the global COVID-19 pandemic has drastically changed people's daily lives and work styles. As an infection prevention measure, it was recommended that people refrain from or limit normal social activities such as eating out and traveling, and respect physical distance from other people. In Japan, telecommuting was recommended because COVID-19 infections mainly occurred in people of working age, and reducing human contact was deemed important for preventing the spread of infection (1). Consequently, whereas 20% of companies in Japan used telecommuting before the COVID-19 pandemic, this figure rose to 57% after the pandemic occurred (2).

Loneliness is an emerging public health issue resulting from the COVID-19 pandemic situation (3, 4). Recommendations for physical distance and restrictions on social activity have reduced opportunities for people to interact. In particular, young people, people who are separated or divorced, and those with health issues have reported feeling more lonely during the pandemic (4). Loneliness is associated with reduced quality of life, physical health, and mental health (3–5).

From a public health perspective, it is important that non-married people, a high-risk group for loneliness, are able to establish new romantic relationships, because spending time with family can alleviate loneliness and help maintain good mental wellbeing (6). However, as physical distance is encouraged and social activities continue to be restricted for months or even longer, we considered that it was increasingly difficult for single people to find romantic partners. It is known that the COVID-19 pandemic has impacted romantic relationships in various ways (7, 8). However, little is known about factors and attributes that influence new romantic activities during the pandemic.

In April 2020, a state of emergency was declared for the first time in Japan. Subsequently, in winter 2020, the number of COVID-19 infected persons and deaths was much higher than in previous waves, and Japan was placed on maximum alert, called the third wave. Since many of those infected were of working age, many companies followed the government's voluntary request and promoted infection control measures within their companies.

Infection control in the workplace, which is where workers spend most of their time and therefore a major place of human contact, has been reported to affect not only infection prevention but also workers' mental wellbeing and performance (9–12). COVID-19 measures taken by Japanese employees include refraining from going to work when sick, measuring their body temperature, disinfecting the workplace, and teleworking. However, the extent to which the various control measures are implemented varies with the size of the company, the type of work, and other factors (13). Improved infection control measures in the workplace are expected to affect workers' perception of infection risk and influence their daily behavior and quality of life. Indeed, enhanced infection control measures in the workplace were also reported to be associated with individual preventive behaviors such as hand washing (10).

We hypothesized that infection control efforts in the workplace may encourage people's interactions, including romantic activities, during the COVID-19 pandemic.

Here, we conducted a prospective cohort study to specifically examine whether better infection control in the workplace influences workers' behaviors related to romantic relationships.

Methods

The study was conducted under a prospective cohort design between December 2020 and December 2021. Baseline and follow-up surveys were conducted using self-administered questionnaires *via* the Internet. All participants gave informed consent, and the study was approved by the ethics committee of the University of Occupational and Environmental Health, Japan (reference No. R2-079 and R3-006).

The protocol for the baseline survey has been described elsewhere (14). The target population included workers aged 20 to 65 years and in employment at the time of the baseline survey. Sampling was conducted taking into account geographic region, occupation, and sex. Regions were divided into five levels, covering 47 prefectures, according to the level of COVID-19 infection. Occupations were divided into office workers and non-office workers. Thus, a total of 20 blocks of five regions, two occupations, and two sexes was created, and each block was sampled in equal numbers. We planned to collect data from 30,000 people overall, aiming to reach at least 1,500 participants in each block.

The survey was commissioned to Cross Marketing Inc. (Tokyo, Japan). Of their 4.7 million pre-registered monitors with information such as sex, age, place of residence, and occupation, approximately 600,000 were sent an email request to participate in the survey. Of these, 55,045 participated in the initial screening, with 33,302 satisfying the final inclusion criteria. Of those 33,302 participants, 27,036 were included in the analysis, after excluding those judged as submitting untrustworthy responses. The following criteria were used to determine untrustworthy responses: extremely short response time (≤6 min), reporting extremely low body weight (<30 kg), reporting extremely short height (<140 cm), inconsistent answers to similar questions throughout the survey (e.g., inconsistency on questions about marital status and area of residence), and wrong answers to a question used solely to identify unreliable responses ("Choose the third largest number from the following five numbers").

The follow-up survey was conducted in December 2021, 1 year after baseline. A total of 18,560 (68.7%) participated in the follow-up. Finally, 6,486 individuals (2,779 men, 3,707 women) who were not married and who were not in a romantic relationship at baseline were included in the analysis. As the study is an internet-based survey, there are no missing values.

Evaluation of infection control measures in the workplace at baseline

Participants were asked to answer yes or no concerning whether the following measures had been implemented in their workplace: refraining from and restrictions on business trips; refraining from receiving and restrictions on visitors; refraining from meeting or recommending a limit on the number of people at social gatherings and dinners; refraining from or limiting face-to-face internal meetings; wearing masks at all times during working hours; installing partitions and revising the workplace layout; recommending daily temperature checks at home; encouraging telecommuting; prohibiting eating at the work desk; and requesting employees not come to work if feeling unwell.

The questionnaire also asked participants to rate their company's infection control measures, using the question: "Do you think your company has taken adequate infection control measures for its employees?" Participants responded on a four-point scale: "strongly agree", "agree", "disagree", "Strongly disagree".

Assessment of romantic relationship status

The subjects were asked about their activities in relation to developing romantic relationships during the period from baseline to follow-up (1 year). Participants who answered yes to either of the two questions: "Have you taken any action in the past year to find a romantic partner?" "Have you engaged in any marriage activities in the past year?" were classified as "taking action in a romantic relationship". Those who answered "yes" to the question: "Have you been in a new romantic relationship in the past year?" were classified as "having a new romantic relationship".

Other covariates

Information on the subject's characteristics were collected at the baseline. Participants answered the following questions about themselves in an online form: age, sex, prefecture of residence, marital status (unmarried, bereaved/divorced), job type (mainly desk work, mainly involving interpersonal communication, and mainly labor), number of employees in the workplace, educational background, income, smoking status, and alcohol consumption (6–7 days a week, 4–5 days a week, 2–3 days a week, <1 day a week, hardly ever).

Statistical analyses

Age-sex adjusted odds ratios (ORs) and multivariate adjusted ORs were estimated using a multilevel logistic model nested in the prefecture of residence to take account of regional variability. The ORs of the number of infection control measures in the workplace, and evaluation of those infection control measures associated with "taking action in a romantic relationship" were estimated. The model adjusted age, sex, marital status, job type, income, education, self-rated health, smoking, alcohol drinking, number of employees in the workplace, and the incidence rate of COVID-19 by prefecture at baseline. In addition, the ORs associated with "having a new romantic relationship" were also estimated.

A $p < 0.05$ was considered statistically significant. All analyses were conducted using Stata (Stata Statistical Software: Release 16; StataCorp LLC, TX, USA).

Results

Table 1 shows the baseline characteristics in relation to the number of infection control measures implemented in the workplace. In workplaces where no infection control measures were taken, 60% of the respondents were men. As the number of infection control measures increased, the percentage of women increased. Compared to workplaces with more infection control measures, workplaces with no infection control measures had lower incomes, more smokers, and were of smaller size.

Table 2 shows the ORs for the number of infection control measures and activities related to romantic relationships. Compared to workers in workplaces with no infection control measures, those in workplaces with seven or more measures were more likely to engage in romantic relationship-related activities (OR = 1.84, 95% CI: 1.42–2.47, $p < 0.001$). The multivariate adjusted model also showed this association (OR = 1.90, 95% CI: 1.45–2.48, $p < 0.001$). We also found a linear relationship between the number of infection control measures and activities in a romantic relationship (p for trend < 0.001).

Similarly, workers who perceived their company's infection control self-perception as adequate compared to those who considered it inadequate were more likely to engage in romantic relationship-related activities (OR = 1.68, 95% CI: 1.24–2.28, $p = 0.001$). This relationship was similar in the multivariate model (OR = 1.55, 95% CI: 1.13–2.12, $p = 0.007$). Furthermore, workers' perception of infection control in the workplace showed a linear relationship in the order of strongly disagree, disagree, agree, and strongly disagree (p for trend = 0.003).

Table 3 shows the ORs of participants who actually established a romantic relationship during the period between baseline and follow-up. The more infection control measures were implemented in the workplace, the more people started to have new romantic relationships. In the multivariate analysis, the OR for those who reported seven or more measures in the workplace compared to those who reported that no infection control measures existed was 1.79 (95% CI: 1.20–2.66, $p = 0.004$). There was also a linear relationship: the higher the number of measures, the greater the likelihood of starting a new romantic relationship (p for trend < 0.001). In addition, there was a non-significant tendency (p for trend < 0.081) for those who felt that the level of infection control in the workplace was adequate to establish a new romantic relationship.

Discussion

This study showed that greater implementation of infection control measures in the workplace is associated with more activities toward initiating romantic relationships. Furthermore, workers who expressed satisfaction with their company's infection control measures were more likely to be active in initiating a relationship than those who felt that their company's measures were inadequate. These results support the hypothesis that infection control efforts in the workplace influence workers' romantic activities during the COVID-19 pandemic.

Several explanations can be offered for the association between better infection control measures in the workplace and romantic activity. First, infection risk perception, wherein more controls and satisfactory controls may reduce risk and then increase likelihood of spending time with potential partners, then leading to romantic relationship formation. Second, perhaps people with more stringent infection control measures are more motivated to seek out romantic partners to compensate for lesser social contact at work. Third, perhaps workplaces that implemented restrictions on travel or were less opportunities to meet people outside the company due to their infection control measures simply afforded workers more opportunities to for people to interact with coworkers relatively

TABLE 1 Characteristics of subjects according to the number of workplace measures against COVID-19.

	Number of workplace measures against COVID- 19			
	0	1−3	4−6	7−10
	$n = 911$	$n = 1383$	$n = 1755$	$n = 2437$
Age, mean (SD)	47.8 (9.6)	46.2 (9.7)	45.0 (9.8)	45.4 (10.0)
Sex, men	548 (60.2%)	637 (46.1%)	691 (39.4%)	903 (37.1%)
Marital status				
Divorce history	176 (19.3%)	337 (24.4%)	381 (21.7%)	542 (22.2%)
Never married	735 (80.7%)	1046 (75.6%)	1374 (78.3%)	1895 (77.8%)
Job type, mainly desk work	474 (52.0%)	629 (45.5%)	788 (44.9%)	1354 (55.6%)
Income (million JPY)				
<300	358 (39.3%)	441 (31.9%)	424 (24.2%)	446 (18.3%)
300–499	278 (30.5%)	487 (35.2%)	641 (36.5%)	781 (32.0%)
500–799	182 (20.0%)	293 (21.2%)	455 (25.9%)	727 (29.8%)
>800	93 (10.2%)	162 (11.7%)	235 (13.4%)	483 (19.8%)
Education				
Junior high school	27 (3.0%)	36 (2.6%)	18 (1.0%)	29 (1.2%)
High school	321 (35.2%)	445 (32.2%)	465 (26.5%)	543 (22.3%)
Vocational school/college, university, graduate school	563 (61.8%)	902 (65.2%)	1272 (72.5%)	1865 (76.5%)
Self-rated health				
excellent	38 (2.8%)	35 (3.7%)	62 (2.5%)	43 (2.5%)
very good	103 (7.6%)	73 (7.7%)	217 (8.9%)	151 (8.7%)
good	424 (31.5%)	304 (32.1%)	766 (31.3%)	604 (34.6%)
fair	536 (39.8%)	376 (39.7%)	1,002 (40.9%)	706 (40.5%)
poor	247 (18.3%)	158 (16.7%)	401 (16.4%)	240 (13.8%)
Current smoker	276 (30.3%)	371 (26.8%)	400 (22.8%)	503 (20.6%)
Alcohol drinking				
6–7 days per week	182 (20.0%)	250 (18.1%)	243 (13.8%)	360 (14.8%)
4–5 days per week	45 (4.9%)	84 (6.1%)	100 (5.7%)	155 (6.4%)
2–3 days per week	94 (10.3%)	139 (10.1%)	215 (12.3%)	247 (10.1%)
Less than 1 day per week	130 (14.3%)	234 (16.9%)	328 (18.7%)	461 (18.9%)
Hardly ever	460 (50.5%)	676 (48.9%)	869 (49.5%)	1,214 (49.8%)
Number of employees in the workplace				
1–4	511 (56.1%)	398 (28.8%)	227 (12.9%)	178 (7.3%)
5–49	212 (23.3%)	499 (36.1%)	485 (27.6%)	315 (12.9%)
50–499	109 (12.0%)	331 (23.9%)	556 (31.7%)	817 (33.5%)
>500	79 (8.7%)	155 (11.2%)	487 (27.7%)	1,127 (46.2%)
My company has adequate infection control measures in place for its employees				
Strongly agree	79 (8.7%)	113 (8.2%)	227 (12.9%)	560 (23.0%)
Agree	314 (34.5%)	659 (47.7%)	1,036 (59.0%)	1,501 (61.6%)
Disagree	221 (24.3%)	367 (26.5%)	362 (20.6%)	292 (12.0%)
Strongly disagree	297 (32.6%)	244 (17.6%)	130 (7.4%)	84 (3.4%)
New romantic relationships	70 (7.7%)	160 (11.6%)	239 (13.6%)	364 (14.9%)

TABLE 2 Association between number of workplace measures against COVID-19 and activities in a new romantic relationship.

	Age-adjusted			Multivariate*		
	OR	95% CI	p	OR	95% CI	p
Number of workplace measures against COVID-19						
0	reference			reference		
1–3	1.46	1.08	1.97	0.015	1.43	1.07	1.90	0.016
4–6	1.63	1.22	2.17	0.001	1.53	1.19	1.97	0.001
7–10	1.87	1.42	2.47	<0.001	1.90	1.45	2.48	<0.001
				<0.001[†]				<0.001[†]
My company has adequate infection control measures in place for its employees						
Strongly disagree	Reference			Reference		
Disagree	1.15	0.85	1.56	0.362	1.12	0.82	1.53	0.481
Agree	1.28	0.98	1.68	0.069	1.25	0.95	1.65	0.116
Strongly agree	1.68	1.24	2.28	0.001	1.55	1.13	2.12	0.007
				<0.001[†]				0.003[†]

*The model included age, sex, marital status, job type, income, education, self-rated health, smoking, alcohol drinking, number of employees in the workplace, and number of workplace measures against COVID- 19. [†]p for trend.

TABLE 3 Association between number of workplace measures against COVID-19 and having a new romantic relationship.

	Age-adjusted			Multivariate*		
	OR	95% CI	p	OR	95% CI	p
Number of workplace measures against COVID-19						
0	reference			reference		
1–3	1.22	0.82	1.83	0.327	1.11	0.73	1.67	0.631
4–6	1.25	0.85	1.83	0.265	1.15	0.76	1.72	0.511
7–10	1.84	1.28	2.64	0.001	1.79	1.20	2.66	0.004
				<0.001[†]				<0.001[†]
My company has adequate infection control measures in place for its employees						
Strongly disagree	reference			reference		
Disagree	1.36	0.89	2.06	0.156	1.30	0.85	2.00	0.224
Agree	1.40	0.96	2.05	0.079	1.32	0.90	1.95	0.156
Strongly agree	1.78	1.16	2.71	0.008	1.53	0.99	2.36	0.057
				0.011[†]				0.081[†]

*The model included age, sex, marital status, job type, income, education, self-rated health, smoking, alcohol drinking, number of employees in the workplace, number of workplace measures against COVID- 19, and subjective assessment of whether the company has adequate infection control measures in place for employees. [†]p for trend.

to more lenient workplaces, thereby allowing other predictors of attraction such as similarity and familiarity to take place.

Pietromonaco et al. (8) proposed a conceptual framework for the impact of the COVID-19 pandemic on romantic relationships, based on the adaptive process from the perspective of relationship science. The adaptive process involve interaction in which couples respond to external stressors and difficulties by mutually supporting each other and functioning through their problems (8, 15). When subjected to an external stressor, COVID-19 being a good example, couples that have existing problems will experience a decline in their relationship. The co-presence of emotional factors such as anxiety and depression also results in a lack of supportive affection when couples need to support each other, resulting in negative interactions (16, 17). A positive association between adequate infection control

measures in the workplace and workers' mental health and anxiety has been reported (12). Infection control in the workplace may have a moderating effect on workers' feelings of vulnerability by alleviating anxiety, and thereby positively influence within-couple relationships.

Adequate infection control measures in the workplace may act as a deterrent to self-regulatory depletion in workers and promote the initiation and construction of romantic relationships. The theory of self-regulatory depletion has been proposed as a mechanism by which external stress can lead to decreased cooperation and satisfaction among partners (18). Because coping with external stress requires individual effort, it depletes self-regulatory capacity, leading to more negative behavior toward partners and inhibiting dyadic relationships (15, 18). Couples experiencing increased daily stress may show more criticism of their partner, which has been attributed to self-regulation

depletion (18). In the COVID-19 pandemic, various external stresses including economic problems, loneliness, employment instability, physical limitations, and limited social activities can make it difficult for couples to function in a complementary and supportive manner, and diminish romantic relationships. Working under a high perceived risk of infection can lead to negative attitudes toward one's partner or potential partner and a decline in the relationship, as one's self-regulatory capacity is depleted because of the effort required to avoid crisis. Adequate infection control measures in the workplace can alleviate the external stress and anxiety that COVID-19 brings to couples, including the anxiety that infection may be introduced to couples and families; they can help maintain good dyadic adjustment and psychological wellbeing, and thereby the quality of the relationship.

We chose socioeconomic factors related to marriage as confounding factors in this study because romantic activities are in some ways similar to those of marriage, albeit that the sociodemographic drivers of romantic activities are not clear. Even after adjusting for factors such as age, income, and health status, we found an association between workplace infection control and romantic activity. This result implies that the mechanisms underlying the association of adequate workplace infection control with romantic activity may depend on factors other than socioeconomic ones. It has been reported that infection control in the workplace is associated with workers' risk perception, individual preventive behavior, mental health, and stress (10, 12, 19). It seems likely that these factors can either promote or retard the intention to engage in romantic behavior. Nevertheless, this question warrants further examination.

Some limitations of this study can be mentioned. First, although we assessed romantic activities using self-reports, there is little reason to doubt participants' recollections about whether or not they started a romantic relationship. Also, as the study involved an anonymous survey *via* the Internet, there was little motivation for false reporting. Second, our operational definition of romantic activity might be questioned. The presence or absence of a sexual relationship, homosexuality, or multiple partners are unknown. However, we believe that any impact of not distinguishing between these factors was minimal in the context of this study. Third, it is not clear how participants found their romantic partners, whether at parties, or by social networking applications, for example. It is possible that social networking activities have become more prevalent during the COVID-19 pandemic (20–22), but any impact on this study remains unknown. Fourth, there is no theory or model that explains romantic behavior during an infectious crisis. Romantic behavior is a preliminary step leading to marriage that affects demographics. With social activities restricted by the COVID-19, elucidating the behavioral patterns related to people's romantic activities is an important future issue for public health.

Under the COVID-19 pandemic, implementation of infection control measures in the workplace and the degree of satisfaction with these measures promoted romantic relationships among non-married individuals who did not have a romantic partner. We propose that infection control measures at work facilitate romantic activities and the establishment of romantic relationships by alleviating anxiety and supplementing self-regulatory capacity depleted due to the external stress of COVID-19. Single people are at high risk for loneliness, and the latter has intensified during the COVID-19 pandemic. Meeting and establishing a relationship with a romantic partner may be an important factor in maintaining mental wellbeing, for as long as physical distancing continues to be recommended.

Data availability statement

The datasets presented in this article are not readily available because of ethical restrictions. Requests to access the datasets should be directed to YF, zenq@med.uoeh-u.ac.jp.

Ethics statement

The studies involving human participants were reviewed and approved by the Ethics Committee of the University of Occupational and Environmental Health, Japan. The patients/participants provided their written informed consent to participate in this study.

Author contributions

YF: conceptualization, methodology, software, formal analysis, investigation, data curation, writing—original draft preparation, project administration, and funding acquisition. AH, KM, and KI: investigation, data curation, and writing—review and editing. TN, ST, MT, and TI: investigation, data curation, writing—review and editing, and funding acquisition. All authors contributed to the article and approved the submitted version.

Funding

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

References

1. Ministry of Health Labour and Welfare, Japan. *Visualizing the Data: Information on COVID-19 Infections*. (2022). Available online at: https://covid19.mhlw.go.jp/en/ (accessed February 1, 2022).

2. Tokyo Metropolitan Government. Results of a Survey on Telework Adoption Rates. (2021). Available online at: https://www.metro.tokyo.lg.jp/tosei/hodohappyo/press/2021/01/22/17.html (accessed February 1, 2022).

3. Pai N, Vella S-L. COVID-19 and loneliness: a rapid systematic review. *Aust N Z J Psychiatry*. (2021) 55:1144–56. doi: 10.1177/00048674211031489

4. Groarke JM, Berry E, Graham-Wisener L, McKenna-Plumley PE, McGlinchey E, Armour C. Loneliness in the UK during the COVID-19 pandemic: cross-sectional results from the COVID-19 psychological wellbeing study. *PLoS ONE*. (2020) 15:e0239698. doi: 10.1371/journal.pone.0239698

5. Konno Y, Nagata M, Hino A, Tateishi S, Tsuji M, Ogami A, et al. Association between loneliness and psychological distress: a cross-sectional study among Japanese workers during the COVID-19 pandemic. *Prev Med Rep*. (2021) 24:101621. doi: 10.1016/j.pmedr.2021.101621

6. Fujii R, Konno Y, Tateishi S, Hino A, Tsuji M, Ikegami K, et al. Association between time spent with family and loneliness among Japanese workers during the COVID-19 pandemic: a cross-sectional study. *Front Psychiatry*. (2021) 12:786400. doi: 10.3389/fpsyt.2021.786400

7. Weber DM, Wojda AK, Carrino EA, Baucom DH. Love in the time of COVID-19: A brief report on relationship and individual functioning among committed couples in the United States while under shelter-in-place orders. *Fam Process*. (2021) 60:1381–8. doi: 10.1111/famp.12700

8. Pietromonaco PR, Overall NC. Applying relationship science to evaluate how the COVID-19 pandemic may impact couples' relationships. *Am Psychol*. (2020) 76:438–50. doi: 10.1037/amp0000714

9. Sasaki N, Kuroda R, Tsuno K, Kawakami N. Workplace responses to COVID-19 associated with mental health and work performance of employees in Japan. *J Occup Health*. (2020) 62:e12134. doi: 10.1002/1348-9585.12134

10. Kawasumi M, Nagata T, Ando H, Hino A, Tateishi S, Tsuji M, et al. Association between preventive measures against workplace infection and preventivebehavior against personal infection. *Ind Health*. (2021) 4:420–8. doi: 10.1101/2021.06.08.21258584

11. Kurogi K, Ikegami K, Eguchi H, Tsuji M, Tateishi S, Nagata T, et al. CORONA work project. A cross-sectional study on perceived workplace health support and health-related quality of life. *J Occup Health*. (2021) 63:e12302. doi: 10.1002/1348-9585.12302

12. Yasuda Y, Ishimaru T, Nagata M, Tateishi S, Eguchi H, Tsuji M, et al. CORoNaWork project. A cross-sectional study of infection control measures against COVID-19 and psychological distress among Japanese workers. *J Occup Health*. (2021) 63:e12259. doi: 10.1002/1348-9585.12259

13. Ishimaru T, Nagata M, Hino A, Yamashita S, Tateishi S, Tsuji M, et al. CORoNaWork Project. Workplace measures against COVID-19 during the winter third wave in Japan: Company size-based differences. *J Occup Health*. (2021) 63:e12224. doi: 10.1002/1348-9585.12224

14. Fujino Y, Ishimaru T, Eguchi H, Tsuji M, Tateishi S, Ogami A, et al. Protocol for a nationwide internet-based health survey of workers during the COVID-19 pandemic in 2020. *J UOEH*. (2021) 43:217–25. doi: 10.7888/juoeh.43.217

15. Karney BR, Bradbury TN. The longitudinal course of marital quality and stability: a review of theory, methods, and research. *Psychol Bull*. (1995) 118:3–34. doi: 10.1037/0033-2909.118.1.3

16. Davila J, Bradbury TN, Cohan CL, Tochluk S. Marital functioning and depressive symptoms: evidence for a stress generation model. *J Pers Soc Psychol*. (1997) 73:849–61. doi: 10.1037/0022-3514.73.4.849

17. Beck LA, Pietromonaco PR, DeBuse CJ, Powers SI, Sayer AG. Spouses' attachment pairings predict neuroendocrine, behavioral, and psychological responses to marital conflict. *J Pers Soc Psychol*. (2013) 105:388–424. doi: 10.1037/a0033056

18. Buck AA, Neff LA. Stress spillover in early marriage: the role of self-regulatory depletion. *J Fam Psychol*. (2012) 26:698–708. doi: 10.1037/a0029260

19. Smith PM, Oudyk J, Potter G, Mustard C. Labour Market attachment, workplace infection control procedures and mental health: a cross-sectional survey of canadian non-healthcare workers during the COVID-19 pandemic. *Ann Work Expo Health*. (2021) 65:266–76. doi: 10.1093/annweh/wxaa119

20. Gibson AF. Exploring the impact of COVID-19 on mobile dating: critical avenues for research. *Soc Personal Psychol Compass*. (2021) 15:e12643. doi: 10.1111/spc3.12643

21. Portolan L, McAlister J. Jagged love: narratives of romance on dating apps during COVID-19. *Sex Cult*. (2021) 26:1–19. doi: 10.1007/s12119-021-09896-9

22. Wiederhold BK. How COVID has changed online dating-and what lies ahead. *Cyberpsychol Behav Soc Netw*. (2021) 24:435–6. doi: 10.1089/cyber.2021.29219.editorial