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ORIGINAL ARTICLE

Association between perceived organizational support and COVID-19 vaccination intention: A cross-sectional study

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Abstract

Objectives: We examined the association between perceived organizational support (POS) and COVID-19 vaccination intention as well as the influence of the implementation of workplace infection prevention measures.

Methods: We analyzed data from an Internet survey of workers aged 20–65 years conducted in December 2020, during a period of widespread COVID-19 infection in Japan.

Results: Of the 23 846 participants in this survey, 1958 (8%) reported very high POS. In the group with very high POS, 836 (43%) workers wanted the COVID-19 vaccination; in contrast 1382 (36%) workers in the group with very low POS wanted the vaccination. POS was associated with COVID-19 vaccination intention (odds ratio [OR] = 1.11). The OR decreased after additional adjustment for the number of workplace infection control measures (OR = 1.06). In the analysis with POS as a categorical variable, very high POS was associated with COVID-19 vaccination intention (reference: very low POS) (OR = 1.34). The OR decreased after additional adjustment for the number of workplace infection control measures (OR = 1.17). High POS was associated with COVID-19 vaccination intention

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(OR = 1.17) but not with vaccination intention after additional adjustment for the number of workplace infection control measures (OR = 1.05).

Conclusions: High POS during the COVID-19 pandemic increased employees' vaccination intention. The relationship between POS and vaccination intention was strongly influenced by implementation of workplace infection prevention measures. Implementing appropriate workplace infection prevention measures in the event of an emerging infectious disease outbreak may influence the vaccination behavior of employees, which may contribute to the acquisition of herd immunity in the community.

KEYWORDS

COVID-19, herd immunity, Perceived organizational support (POS), SARS-CoV-2, vaccination intention, workplace infection prevention measures

1 | INTRODUCTION

On March 11, 2020, the World Health Organization declared the outbreak of coronavirus disease 2019 (COVID-19)[1] to be a pandemic caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). It is important to implement preventive actions against emerging infectious diseases, and actions such as maintaining physical distance, wearing a face mask, and hand disinfection were recommended to help combat the spread of COVID-19.[2] In addition to these infection prevention measures, acquisition of herd immunity is important to end the pandemic.[3] However, given the small number of infected people in Japan at the time of a survey conducted in December 2020 by the Collaborative Online Research on Novel-coronavirus and Work study (CORoNaWork study), the reported antibody prevalence was only 1.35% among people in Tokyo, the city with the highest prevalence of COVID-19 infections.[4]

The newly developed COVID-19 vaccines are being administered in many countries with the aim of achieving herd immunity. Achieving herd immunity through vaccination is also important in Japan to protect people from severe disease and to help restore economic activities. In Japan, vaccination of approximately 40 000 health care workers began on February 17, 2021, and vaccination of older people (aged ≥65 years) began in April 2021.[5] However, many people remain hesitant to be vaccinated, and some even refuse vaccination.[6] This vaccine hesitancy is considered a major barrier to the acquisition of herd immunity against SARS-CoV-2 infection. Vaccines may cause adverse reactions, and there are ethical issues involved in mandating vaccination. Therefore, in most countries, vaccination against COVID-19 is voluntary and based on individual decision making.[7] The vaccination rate in Japan is lower than that in other countries, including vaccination against seasonal influenza[8]; influenza A (H1N1), which led to a pandemic in 2009[9]; and human papillomavirus owing to reports of side effects, although a causal relationship remains unclear.[10] As of 2021, affirmative survey response rates in Japan regarding whether "vaccines are safe" and "vaccines are effective" were lower than those of other countries.[11] Addressing vaccine hesitancy in Japan is therefore important to achieve herd immunity against COVID-19.[12]

Organizational factors such as leadership in health promotion and the workplace health climate have a considerable impact on health behaviors among workers.[13] In workplaces with a good health climate that supports employee health promotion and where infection prevention measures are actively implemented, the number of workers who are vaccinated may be higher than in other workplaces. Previous studies on organizational factors in the workplace and vaccination behavior have reported that the presence of organizational governance influences vaccination rates in health care organizations.[14]

An indicator related to such a health climate is perceived organizational support (POS). POS is defined as a general perception concerning the extent to which the organization values organizational members' contributions and cares about their well-being.[15] POS includes two logically different aspects: the positive evaluation of one's contribution by the organization, and the consideration of one's well-being by the organization. However, it is believed that working people integrate these two aspects to form a single perception.[16]

A previous study found that employees with a high POS were more likely to participate in wellness programs than those with a low POS.[17] Therefore, employees working in organizations with high POS may be more willing to be vaccinated to help prevent infection in the workplace. Furthermore, during the COVID-19 pandemic, employers

are expected to be proactive in adopting infection prevention measures in collaboration with their employees. This suggests that proactive infection prevention measures aimed at protecting the health of employees may increase POS. However, no previous studies have examined the relationship between POS in the workplace during an infectious disease pandemic or the status of infection control efforts in the workplace and vaccination intention among employees.

We, therefore, formulated two hypotheses: (1) Employees with a high POS have a higher intention to receive the COVID-19 vaccine and (2) The association between POS and vaccination intention is influenced by the implementation status of infection prevention measures in the workplace. We examined these hypotheses using data from an Internet-based survey conducted in Japan when COVID-19 vaccination was in the planning stage.

2 | MATERIALS AND METHODS

A research group from the University of Occupational and Environmental Health, Japan, conducted a prospective cohort study, known as the Collaborative Online Research on Novel-coronavirus and Work study (CORoNaWork study). The self-administered questionnaire survey was completed by a panel registered with the Internet survey company Cross Marketing Inc. (Tokyo, Japan). During the baseline survey (conducted during December 22–25, 2020), Japan was in the third wave of the pandemic in which the numbers of COVID-19 infections and deaths were markedly higher than those in the first and second waves; therefore, the country was on high alert.

We used baseline survey data from the CORoNaWork study to conduct the present cross-sectional study. The CORoNaWork study protocol, including the sampling plan and participant recruitment procedure, has previously been reported in detail.[18] Participants were aged 20–65 years, working at the time of the baseline survey ($N = 33\ 087$), and were stratified using cluster sampling by sex, age, region, and occupation. After excluding 6051 participants who provided invalid responses, we included data for 27 036 participants from the database. The exclusion criteria for the present study were: individuals who had been infected with COVID-19 or who had been in close contact with a person who was diagnosed with COVID-19 infection; self-employed workers; workers in small or home offices; and agriculture, forestry, and fishery workers. We finally analyzed data for 23 846 workers.

The present study was approved by the Ethics Committee of the University of Occupational and Environmental Health, Japan (reference No. R2-079). Informed consent was obtained through the CORoNaWork study survey website at the time the data were collected.

2.1 | Assessment of POS

POS was evaluated with the following item: "Your company supports employees in finding a balance between active, productive working and healthy living," based on a previous study.[19] Participants answered using a four-point scale: Strongly agree/Agree/Disagree/Strongly disagree. Responses were categorized as indicating very high, high, low, and very low POS. We also conducted an analysis with POS as an ordinal variable. We defined very high POS as a score of 4 points, high POS as 3 points, low POS as 2 points, and very low POS as 1 point.

2.2 | Assessment of COVID-19 vaccination intention and workplace infection control measures

To assess vaccination intention, participants were asked: "Please answer the following questions regarding COVID-19. If the COVID-19 vaccine becomes available, would you like to be vaccinated immediately?" (yes or no). Workplace infection control measures were evaluated using items covering nine specific measures: prohibition/restriction of business trips; prohibition/restriction of visitors; prohibition of holding or limiting the number of people participating in social gatherings or banquets; restriction of face-to-face meetings; always wearing masks during working hours; installation of partitions and change of workplace layout; recommendation for daily each body temperature checks; recommendation for telecommuting; and requesting that employees not go to work when feeling sick. These nine items were selected by the researchers according to discussions regarding infection control measures against COVID-19 in the workplace described in the guidelines of the Japanese government[20] and professional organizations.[21]

2.3 | Assessment of covariates

Covariates included demographic and socioeconomic factors, occupation, and number of employees in the workplace. Age was expressed as a continuous variable. Yearly equivalent income was classified into four categories: <2.50 million Japanese yen (JPY); 2.50–3.74 million JPY; 3.75–4.99 million JPY; and ≥5 million JPY. Education was classified into four categories: junior high school or high school, vocational school, junior college or technical

school, university, and graduate school. Marital status was classified into three categories: married; divorced or widowed; and unmarried. In the baseline survey, participants chose one of 11 options for their occupation: general employee; manager; executive manager; public employee, faculty member or non-profit organization employee; temporary/contract employee; self-employed; small office/home office; agriculture, forestry, or fishing; professional occupation (e.g., lawyer, tax accountant, medical-related); and other occupations. As noted above, three of these categories were excluded from this study, meaning the occupations were ultimately classified into seven categories. The number of employees in the workplace was classified into four categories: 1–9, 10–99, 100–999, and ≥1000 employees. Additionally, the cumulative incidence rate of COVID-19 infection determined in the prefecture of residence 1 month before the survey was used as a community-level variable. This information was collected from the websites of public institutions.

2.4 | Statistical analyses

The odds ratios (OR) for the association between intention to receive vaccination against COVID-19 and POS were estimated using a multilevel logistic model nested in the prefecture of residence to account for area variety. The multivariate model was adjusted for sex and age (Model 1), and then additionally adjusted for equivalent income (categorical), educational background (categorical), marital status, occupation, and number of employees in the workplace (categorical) (Model 2). Finally, the model was additionally adjusted for the number of workplace infection control measures implemented in the workplace (Model 3). All analyses used the incidence rate of COVID-19 by prefecture as a prefecture-level variable. A p-value $< .05$ was considered statistically significant. All analyses were conducted using Stata version 16 (StataCorp LLC, College Station, TX, USA).

3 | RESULTS

Table 1 shows participants' characteristics by POS category. Of the 23 846 participants, 1958 (8%) reported very high POS. In the group with very high POS, 836 (43%) workers wanted vaccination against COVID-19, and 1382 (36%) workers in the group with very low POS wanted vaccination.

Table 2 shows the association between POS (ordinal and categorical) and COVID-19 vaccination intention. In the analysis with POS as an ordinal variable, POS was associated with COVID-19 vaccination intention (Model 2: OR = 1.11, 95% confidence interval [CI]: 1.08–1.15, $p < .001$). The OR decreased after additional adjustment for the number of workplace infection control measures (Model 3: OR = 1.06, 95% CI: 1.02–1.09, $p < .001$). In the analysis with POS as a categorical variable, very high POS was associated with COVID-19 vaccination intention (reference: very low POS) (Model 2: OR = 1.34, 95% CI: 1.20–1.51, $p < .001$). The OR decreased after additional adjustment for the number of workplace infection control measures (Model 3: OR = 1.17, 95% CI: 1.04–1.31, $p = .010$). In contrast, high POS was associated with COVID-19 vaccination intention (Model 2: OR = 1.17, 95% CI: 1.09–1.27, $p < .001$), but high POS was not associated with vaccination intention after additional adjustment for the number of workplace infection control measures (Model 3: OR = 1.05, 95% CI: 0.97–1.13, $p = .276$).

4 | DISCUSSION

This study showed that the higher the POS among employed people in Japan, the higher the vaccination intention. The relationship between POS and vaccination intention was attenuated when adjusted for workplace infection prevention measures. POS is based on the social exchange theory, which suggests that in workplaces with higher POS, there may be a greater sense of responsibility toward the group and altruistic behavior toward organizational members, meaning vaccination intentions to prevent workplace infections may be increased.[22,23] Vaccination intention also includes the social benefits of vaccination. The 5C scale (confidence, complacency, constraints, calculation, and collective responsibility) has previously been used as an indicator to evaluate the complex factors related to vaccination intention. In the 5C scale, collective responsibility is positively correlated with both collectivist tendencies and community orientation and is considered important because it corresponds to the protection of others through herd immunity via one's own vaccination behavior.[24]

There are two possible reasons why the association between POS and vaccination intention was attenuated by adjusting for workplace infection prevention measures. First, if workplace infection prevention measures are a confounding factor, proactive infection prevention measures implemented during the COVID-19 pandemic are expected to increase employees' POS. Although POS does not increase with measures founded on laws and regulations or mandatory measures, POS is highly valued by organizational members when measures are based on the discretionary choices of the organization.[25] Additionally, proactive infection prevention measures may have increased the POS, which may have increased vaccination

TABLE 1 Participants' characteristics by category of perceived organizational support

	Perceived organizational support			
	Very high	**High**	**Low**	**Very low**
Number of participants	1958	11 683	6331	3874
Age, mean (SD)	45.8 (11.2)	46.8 (10.8)	46.2 (10.4)	46.7 (9.7)
Sex, men	878 (44.8%)	5880 (50.3%)	3136 (49.5%)	1951 (50.4%)
Equivalent income (million JPY)				
<2.50	316 (16.1%)	1965 (16.8%)	1265 (20.0%)	1027 (26.5%)
2.50–3.74	463 (23.6%)	3171 (27.1%)	1950 (30.8%)	1163 (30.0%)
3.75–4.99	493 (25.2%)	3004 (25.7%)	1608 (25.4%)	878 (22.7%)
≥5.00	686 (35.0%)	3543 (30.3%)	1508 (23.8%)	806 (20.8%)
Educational background				
Junior high or high school	460 (23.5%)	2913 (24.9%)	1762 (27.8%)	1257 (32.4%)
Vocational school, junior college or technical school	446 (22.8%)	2648 (22.7%)	1547 (24.4%)	1009 (26.0%)
University	946 (48.3%)	5383 (46.1%)	2725 (43.0%)	1427 (36.8%)
Graduate School	106 (5.4%)	739 (6.3%)	297 (4.7%)	181 (4.7%)
Marital status				
Married	1245 (63.6%)	6874 (58.8%)	3354 (53.0%)	1858 (48.0%)
Bereaved/divorced	185 (9.4%)	1099 (9.4%)	648 (10.2%)	525 (13.6%)
Unmarried	528 (27.0%)	3710 (31.8%)	2329 (36.8%)	1491 (38.5%)
Occupation				
General employee	893 (45.6%)	5673 (48.6%)	3559 (56.2%)	2249 (58.1%)
Manager	207 (10.6%)	1382 (11.8%)	585 (9.2%)	320 (8.3%)
Executive manager	148 (7.6%)	527 (4.5%)	119 (1.9%)	56 (1.4%)
Public employee, faculty member, or non-profit organization employee	225 (11.5%)	1532 (13.1%)	679 (10.7%)	334 (8.6%)
Temporary/contract employee	193 (9.9%)	1421 (12.2%)	793 (12.5%)	464 (12.0%)
Professional occupation (lawyer, tax accountant, medical-related, etc.)	196 (10.0%)	863 (7.4%)	466 (7.4%)	279 (7.2%)
Other occupation	96 (4.9%)	285 (2.4%)	130 (2.1%)	172 (4.4%)
Number of employees in the workplace				
1–9	362 (18.5%)	1577 (13.5%)	782 (12.4%)	688 (17.8%)
10–100	449 (22.9%)	3015 (25.8%)	1964 (31.0%)	1336 (34.5%)
100–999	491 (25.1%)	3443 (29.5%)	2015 (31.8%)	1076 (27.8%)
≥1000	656 (33.5%)	3648 (31.2%)	1570 (24.8%)	774 (20.0%)
Number of workplace infection control measures				
None	96 (4.9%)	590 (5.1%)	513 (8.1%)	617 (15.9%)
1–2	122 (6.2%)	844 (7.2%)	732 (11.6%)	719 (18.6%)
3–4	208 (10.6%)	1567 (13.4%)	1105 (17.5%)	725 (18.7%)
5–7	613 (31.3%)	4193 (35.9%)	2314 (36.6%)	1164 (30.0%)
8–9	919 (46.9%)	4489 (38.4%)	1667 (26.3%)	649 (16.8%)
Number of employees with the COVID−19 vaccination intention (Yes)	836 (42.7%)	4677 (40.0%)	2263 (35.7%)	1382 (35.7%)

Abbreviation: SD, standard deviation.

TABLE 2 Odds ratios for perceived organizational support (ordinal and each category) and COVID-19 vaccination intention in a multilevel logistic regression model

	Model 1				Model 2				Model 3			
	Odds ratio	95%CI	*p*-value	Odds ratio	95%CI	*p*-value	Odds ratio	95%CI	*p*-value	Odds ratio	95%CI	*p*-value
Perceived organizational support (ordinal variable ranged 1 to 4 points)	1.12	1.09	1.16	<0.001	1.11	1.08	1.15	<0.001	1.06	1.02	1.09	< .001
Perceived organizational support												
Very high	1.39	1.24	1.56	<0.001	1.34	1.20	1.51	<0.001	1.17	1.04	1.31	.010
High	1.21	1.12	1.30	<0.001	1.17	1.09	1.27	<0.001	1.05	0.97	1.13	.276
Low	1.01	0.93	1.10	0.742	0.99	.91	1.07	0.744	.93	0.85	1.01	.078
Very low	reference				reference				reference			

Note: Model 1: adjusted for age and sex.

Model 2: Model 1 + additionally adjusted for equivalent income (categories), educational background (categories), marital status, occupation, and number of employees in the workplace (categories).

Model 3: Model 2 + additionally adjusted for number of workplace infection control measures.

All analyses were conducted using multilevel logistic regression nested within the incidence rate of COVID-19 by prefecture.

Abbreviation: CI, confidence interval.

intentions. Conversely, even after adjusting for infection prevention measures, POS was associated with vaccination intention, suggesting that POS itself may have a direct effect on vaccination intention. Second, higher POS during the COVID-19 pandemic may have facilitated the implementation of workplace infection prevention measures. The presence of leadership support in workplace health promotion has been reported to increase POS,[17] and high POS in the workplace may increase employee participation in health behaviors.[26] The same is likely to be true for workplace infection prevention measures that are implemented with a collaborative understanding between employees and the company. As a result, the implementation of various workplace infection prevention measures may have increased understanding of vaccines and fostered a "norm of infection prevention" in the workplace, which may have been associated with vaccination intention.

Vaccination intention develops on the basis of the relative perception of the efficacy of vaccination and the risk of adverse reactions. In the present survey (conducted in December 2020), the intention to vaccinate against COVID-19 infection was 42.7%, which is lower than the 69.2% in another survey[27] conducted in October 2020. The reason for this may be owing to differences in the questions asked in each survey. In the October survey, responses to the question "If a vaccine for COVID-19 were available, would you be willing to be vaccinated? were "I very much want to receive the vaccine (30.2%)" and "I somewhat want to receive the vaccine (39.0%)," for a total of 69.2%. However, the December survey used the question "Please answer the following questions regarding COVID-19. If the COVID-19 vaccine becomes available, would you like to be vaccinated immediately?" The word "immediately" was included in the question. When the survey for the present study was conducted (December 2020), international information regarding vaccine trials and vaccination was still emerging, and it is unlikely that the public had sufficient and accurate information regarding COVID-19 vaccines. Therefore, when asked about their intention to be vaccinated "immediately," people who wanted to be vaccinated but wanted more time to think about it or wanted to make a decision after receiving sufficient information on the effectiveness and side effects of the vaccine may have answered "No."

Furthermore, it is possible that correct knowledge about the seriousness of COVID-19 obtained when enacting infectious disease prevention measures in the workplace during the present study period may have increased awareness about the need for vaccination. It has also been pointed out that vaccination behavior is affected by social norms, which may have influenced vaccination intentions.[28–31]

POS is rooted in the mutual relationship between an organization and its employees. The present results suggested that a good mutual relationship between the two on an ongoing basis may lead to appropriate responses aimed at protecting the health and life of the organization and its employees in the event of a crisis, such as the COVID-19 pandemic. Additionally, high POS has been associated with employees' work-related indicators, such as high organizational commitment, job performance, and lower turnover rates.[25] Conversely, it has been suggested that an organization that takes proactive actions to ensure the health and well-being of its employees during a crisis may have a positive impact on subsequent employee performance.

The question remains of what interventions can be considered to increase POS in the workplace. In prior research, three general categories of favorable treatment received by employees from their employer (i.e., fairness, supervisor support, and compensation and job conditions) have been shown to be positively related to POS. Of these three organizational treatment categories, when controlling for the other two categories, fairness showed the strongest relationship with POS (OR = 0.41, $p < .01$), supervisor support showed the second strongest relationship (OR = 0.32, $p < .01$), and compensation and job conditions showed the weakest relationship, although it was statistically significant (OR = 0.12, $p < .01$). Personality traits had a weak association with POS, and demographic variables had a very weak association.[25]

POS is also enhanced when employees believe that organizational rewards and favorable job conditions, such as salary, promotion, job enrichment, and influencing organizational policies, are the result of voluntary organizational actions rather than external pressures, such as union bargaining or government health and safety regulations.[16] Therefore, to increase POS, it is important for employees to perceive the human resources system, performance appraisal system, and organizational structure, as they relate to "fairness," "supervisor support," and "compensation and job conditions," to be voluntary activities on the part of the organization.

This study had several limitations that warrant mention. First, this was a cross-sectional study, so it was not possible to distinguish between cause and effect and to determine causality. A prospective cohort study is necessary to clarify a causal relationship. Second, the generalizability of the results is uncertain because this study was conducted using an Internet panel. However, we attempted to reduce bias in the target population as much as possible by sampling according to region, job type, and prefecture according to the infection incidence rate. Third, the timing of the survey might have affected the responses of the target population. Because the survey was conducted when Japan was experiencing a rapid increase in the number of COVID-19 infections, vaccination intention and the status of implementation of workplace infection prevention measures may have been affected. Additionally, the vaccination plan in Japan was undecided and it was unclear when vaccines would be available, which may have influenced responses regarding vaccination intention. Fourth, POS was evaluated using a simple question ("Your company supports employees in finding a balance between active, productive working, and healthy living" [Strongly agree/Agree/Disagree/Strongly disagree]), and the measurement validity of the original concept of POS was untested. Finally, we could not consider other potential confounders, such as workload and other socioeconomic factors.

The findings of the present study suggest that high POS during the COVID-19 pandemic increases employees' vaccination intention, and that the relationship between POS and vaccination intention is strongly influenced by the implementation of workplace infection prevention measures. Therefore, promoting the improvement of employees' well-being and implementing appropriate workplace infection prevention measures in the event of an emerging infectious disease outbreak may influence the vaccination behavior of employees. In turn, this may contribute to the acquisition of herd immunity in the community.

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DISCLOSURE

Ethical approval: This study was approved by the Ethics Committee of the University of Occupational and Environmental Health, Japan (reference No. R2-079 and R3-006). Informed Consent: Informed consent was obtained using the form on the website. Registry and the Registration No. of the study/Trial: N/A. Animal Studies: N/A. Conflict of Interest: The authors declare no conflicts of interest associated with this manuscript.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

AUTHOR CONTRIBUTIONS

YK: analysis and writing the manuscript; TN: creating the questionnaire, analysis, and drafting the manuscript; YF: overall survey planning, creating the questionnaire, and review of manuscripts; AH, ST, AO, MT, and SM: Review of manuscripts, advice on interpretation, and funding for research; KM: drafting the manuscript, review of manuscripts, and advice on interpretation.

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