ORIGINAL ARTICLE

Propensity-matched comparisons of factors negatively affecting research activities during the COVID-19 pandemic between nursing researchers working in academic and clinical settings in Japan

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Abstract

Aim: To determine the factors associated with reduced research activities during the COVID-19 pandemic in 2020 by comparing nursing researchers working in academic and clinical settings.

Methods: This was a secondary analysis of data collected by the Japan Academy of Nursing Sciences, which conducted a cross-sectional online survey when the pandemic began. We included respondents who worked in either academic or clinical settings and responded that the pandemic negatively affected their research activities. First, we computed a propensity score (PS) using a logistic regression model. Then we performed a one-to-one ratio matching between the groups based on the PS to control imbalances between the groups. We identified the factors negatively affecting research activities and who to consult about research concerns by comparing the groups using Chi-square or Fisher's exact tests.

Results: There were 1,532 participants, with a response rate of 16.1%. After PS matching, 214 participants (107 for each group) were included. We identified three significant factors associated with reduced research activities: (i) time required for learning new information and communication technology (ICT) skills; (ii) time required for supporting colleagues with ICT issues; and (iii) time required for

preparing and evaluating teaching materials. Approximately 20% of our participants in both settings had nobody to consult regarding research concerns.

Conclusion: We found that the time spent on ICT-related issues negatively affected the research activities of nursing researchers when the pandemic began in Japan. In such an emergency, nursing researchers needed an opportunity to share their difficulties as a part of a support service.

1 | INTRODUCTION

The first confirmed case of coronavirus disease-2019 (COVID-19) in Japan was announced on 16 January 2020 (Ministry of Health, Labour and Welfare, 2020). With this virus rapidly spreading throughout the country, restrictions on research activities in many areas were introduced, and subsequently numerous tertiary academic and research institutions, including colleges, universities, and research centers, were required to close (Prime Minister of Japan and His Cabinet, 2020). Nursing science was no exception to these restrictions. For instance, numerous nursing researchers were expected to work from home. In clinical settings, including hospitals and care facilities, they shifted to COVID-19-centered care by suspending research activities. These conditions led to the constraint to change the dates of research meetings or the delivery methods for research activities for the duration of the period of restrictions in Japan.

One of the web-based academic community sites for researchers and scientists, ResearchGate, surveyed about 16-million registered members online to assess the impact of the COVID-19 pandemic on their research activities, with responses received from more than 3,000 members (ResearchGate, 2020). The results showed that approximately 82% of the respondents said their research activities were affected by the pandemic (ResearchGate, 2020). Likewise, a national survey by the Australian Academy of Science Early- and Mid-Career Researcher (EMCR) Forum reported that the COVID-19 pandemic impacted about 89% of EMCRs in their working methods, hours, and productivity levels (Australian Academic of Science EMCR Forum, 2020). However, these online surveys included academic researchers from not only health science but also other fields, including engineering, basic science, and humanities. These results thus may not be directly applicable to nursing science.

In Japan, most nursing researchers work in academic settings and engage in research as well as teaching roles. The balance of these two roles varies depending on the circumstances. While nursing researchers have faced difficulties due to the closure, to date, only a few studies have investigated the effects of the COVID-19 pandemic on research activities in Japanese nursing. In a cross-sectional online survey by Yoshinaga et al. (2021), nursing researchers reported that their research activities were affected when the pandemic began in Japan. Specifically, they reduced the time they spent on research and instead used it in teaching (Yoshinaga et al., 2021). While this study provided a snapshot of the research situation during the closure period of the workplace, the sample of the study focused only on the nursing researchers who worked in academic settings, that is, Japanese universities. However, there are also nursing researchers in clinical settings in Japan. It is essential to reflect on the situation of nursing researchers in both areas to fully understand not only the differences in research situations between workplaces but also the necessary support in an emergency situation such as the COVID-19 pandemic. Nevertheless, few studies have investigated the effects of COVID-19 on research activities in clinical settings.

Therefore, this study aimed to determine the factors associated with reduced research activities during the outbreak of the COVID-19 pandemic in 2020 and compare the factors between nursing researchers working in academic and clinical settings in Japan.

2 | METHODS

2.1 | Study design and setting

This study was a secondary analysis of data collected by the Japan Academy of Nursing Science (JANS), which conducted a cross-sectional study using an online survey during the COVID-19 pandemic in Japan. Since the outbreak of COVID-19 in January 2020 in Japan, JANS has

been considering how they can support the academic community in nursing.

JANS is a public interest incorporated association established in 1981 under Japanese law and aims to (i) promote the development of nursing science, (ii) facilitate the exchange of knowledge in a broad range of relevant fields, and (iii) contribute to public health and welfare. As of 10 August 2020, JANS had 13 committees and 9,524 members.

2.2 | Online survey questionnaire created by JANS

We complied with the Checklist for Reporting Results of Internet E-Surveys (CHERRIES) statement (Eysenbach, 2004), as shown in Supplementary File 1 in the Supporting Information. The details of the online survey created by JANS are also provided as Supplementary File 2 in the Supporting Information. An overall summary using this survey is also publicly available. (https://www.jans.or.jp/modules/en/index.php?content_id=3#covid19committe) (Japan Academy of Nursing Science, 2020).

All members of JANS were recruited online between 1 July 2020 and 10 August 2020, after JANS explained the purpose of this study on their webpage (https://www.jans.or.jp/modules/committee/index.php?content_id=81#COVID-19B) (Japan Academy of Nursing Science, 2020). This was a closed survey, and the survey invitation was sent out through email with a link to the members by JANS staff. Those who agreed to voluntarily participate in this survey were required to access the members-only section on the linked JANS website, and submit an informed consent form before proceeding with the survey.

The survey questionnaire was originally developed by the members of the COVID-19 Nursing Research Countermeasures Committee in the JANS. A pilot survey was conducted among the JANS board members who willingly participated in confirming the appropriateness and efficiency of the questionnaire. It took approximately 25 minutes on average for them to complete the questionnaire. Based on the pilot survey, the questions were finalized.

This survey questionnaire was simple and self-reported through an online platform, with questions related to various research activities that could be affected by the pandemic. The online survey consisted of five sections: (i) factors that could affect research activities in the past three months; (ii) effective support methods; (iii) time allocated to various tasks when working in academic areas; (iv) research grants and their progress; and (v) characteristics of participants.

A total of 152 questions were included in the survey. Whilst 15 questions had a free response format encouraging the participants to express their opinions about research activities during the pandemic, 137 questions were either short answer or multiple-choice, asking about research process, research activities during the pandemic, grant applications and their progress, and future job security and career development. The questionnaire was not randomized or alternated. Participants were able to change their answers at any time before submission. Once submitted, however, they were unable to change their responses. The data were entered manually into a database by JANS staff.

2.3 | Data collection and pre-evaluation of the data

In this study, the following variables from the JANS data were used for the analysis to achieve our study aim:

1. Characteristics of participants: gender, age groups, workplace, job position, marital status, childcare status, long-term care status, and residential area under special alert for COVID-19 during the data collection period (i.e., the 12 prefectures of Hokkaido, Ibaragi, Tokyo, Saitama, Chiba, Ishikawa, Gifu, Aichi, Kyoto, Osaka, Hyogo, and Fukuoka).
2. Factors that could affect participants' research activities during the COVID-19 pandemic in Japan: For each question, the level or extent of effects was measured, with a five-point scale that ranged from 1 = not affected at all/much less to 5 = significantly affected/much more.
3. Presence of types of people to consult when faced with difficulties, concerns, or anxieties relating to research activities during the pandemic.

Before conducting the secondary data analysis, we pre-evaluated the data to ensure the reliability of the data source, data anonymity, and confidentiality of the survey data. We also confirmed that existing publications were not duplicated in our study. To date, the two following publications used these JANS data: (i) Yoshinaga et al. (2021); and (ii) Amano et al. (2021). The study sample by Yoshinaga et al. (2021) selected only university academic staff, and the study by Amano et al. (2021) used a qualitative method written in Japanese. In contrast, our study included all participants who provided valid answers.

Additionally, propensity score (PS) matching was performed to compare the two groups of academic versus clinical researchers, which were not used in these two

published studies. Lastly, we have extensively discussed with the JANS COVID-19 Nursing Research Countermeasures Committee and other research groups planning to use these JANS data in order to avoid segmented or salami publications. Specifically, in the discussions, we confirmed that all research groups held different aims, study subjects, outcomes, and methods, so as not to produce similar or duplicated studies. As a result, we obtained acceptance to undertake this study from the JANS committee. (https://www.jans.or.jp/modules/en/index.php?content_id=3#covid19committe) (Japan Academy of Nursing Science, 2020).

2.4 | Data analysis

After removing missing and incomplete data, we first categorized the participants into three groups based on their main workplace: (i) academic settings, (ii) clinical settings, and (iii) others (Figure 1). If it was uncertain whether a given workplace was classified as an academic or a clinical setting, a manual review was performed separately by three authors (MI, HT, and MM), and disagreement was resolved by consensus. Among the two groups of participants in academic and clinical settings, we selected those who had experienced negative effects on their research activities during the COVID-19 pandemic.
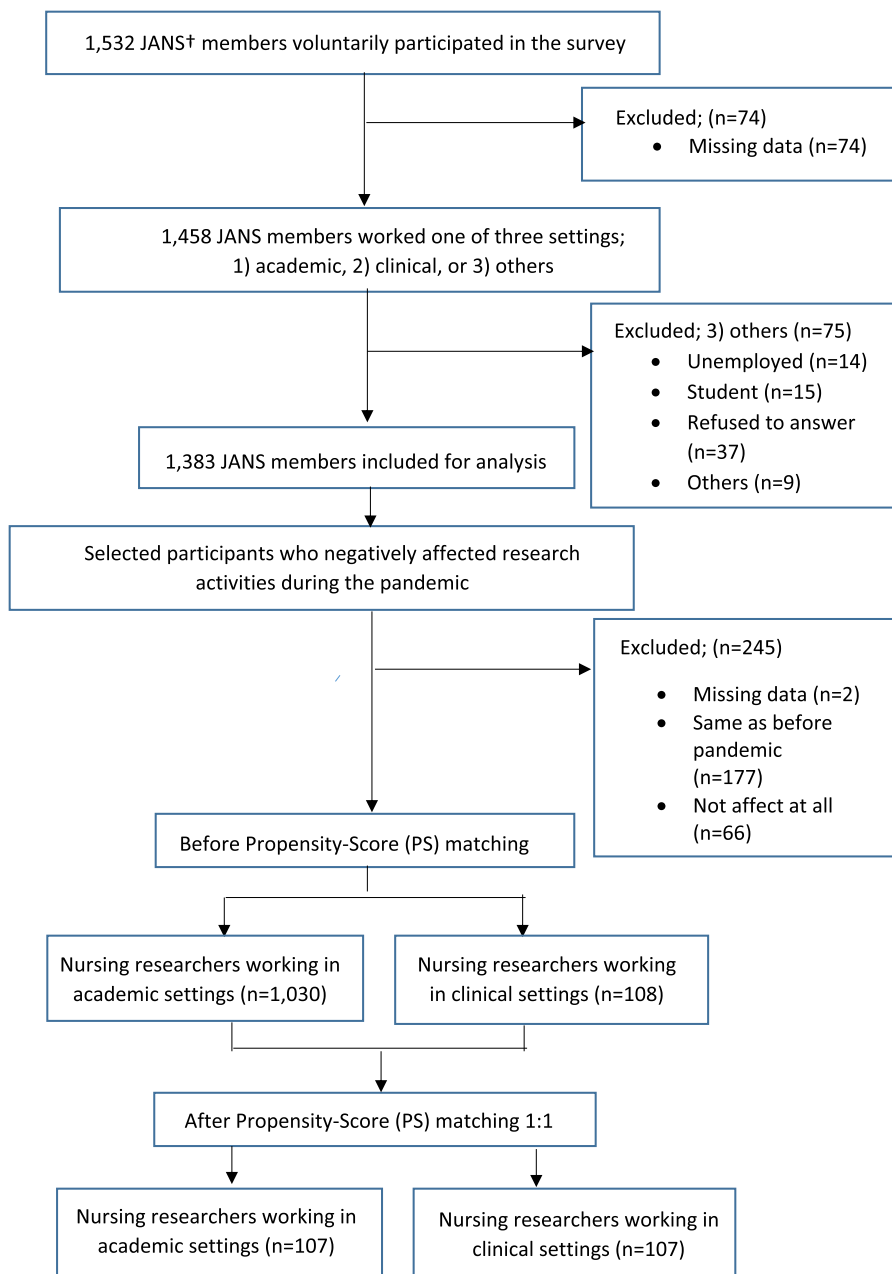

FIGURE 1 Flowchart of the participant inclusion process before and after PC score matching. JANS, Japan Academy of Nursing Science

†JANS= Japan Academy of Nursing Science

TABLE 1 Participant characteristics by workplace before and after propensity score (PS) matching

Covariate	Before PS matching (n = 1,138)			After PS matching (n = 214)		
	Academic settings (n = 1,030)	Clinical settings (n = 108)		Academic settings (n = 107)	Clinical settings (n = 107)	
	n (%)	n (%)	p-value	n (%)	n (%)	p-value
Gender						
Male	95 (9.3)	14 (13.3)	0.186	14 (13.5)	7 (6.6)	0.112
Female	924 (90.7)	91 (86.7)		90 (83.4)	99 (93.4)	
Unknown/ missing	9	2		3	1	
Age group						
35 or younger	70 (6.8)	15 (14.6)	**0.002**	15 (14.7)	8 (7.5)	0.391
36–45	260 (25.4)	31 (30.1)		31 (30.4)	38 (35.5)	
46–55	381 (37.2)	40 (38.8)		39 (41.1)	44 (41.1)	
56 or older	312 (30.5)	17 (16.5)		17 (15.9)	17 (15.9)	
Missing	7	5		5	0	
Marital status						
Yes	611 (62.7)	61 (61.0)	0.746	60 (60.6)	68 (67.3)	0.322
No	363 (37.3)	39 (39.0)		39 (39.4)	33 (32.7)	
Missing	56	8		8	6	
Childcare status						
Yes	353 (35.8)	24 (24.2)	**0.026**	24 (24.2)	33 (32.4)	0.214
No	632 (64.2)	75 (75.8)		75 (75.8)	69 (67.36)	
Missing	45	9		8	5	
Long-term care status						
Yes	163 (16.6)	11 (11.0)	0.156	11 (11.0)	10 (9.8)	0.821
No	820 (83.4)	89(89.0)		89 (89.0)	92 (90.2)	
Missing	47	8		7	5	
Reside under a special alert area						
Yes	653 (64.1)	77 (72.0)	0.111	76 (71.7)	77 (72.0)	1.000
No	365 (35.9)	30 (18.0)		30 (28.3)	30 (28.0)	
Missing	12	1		1	0	

Note: Comparisons were made excluding cases with missing data.

To identify these participants, we used a multiple-choice question of "How much did the COVID-19 pandemic impact your research activities?" in the survey. We included the participants who responded "Very much" or "Slightly" to this question.

Next, PS matching was adopted at a ratio of 1:1 using a logistic regression model to control the imbalance between groups, as this imbalance may be related to possible selection biases. First, we derived a logistic regression using the group as a dependent variable, that is, those in an academic or clinical setting, and participants' characteristics, including age, gender, marital status, childcare status, long-term care status, area of residence (a special alert area or not), as covariates. Then, participants were matched based on the propensity score computed from the logistic regression model. The match tolerance was set at 0.01. After PS matching was completed, we compared the characteristics between the groups using a Chi-square or Fisher's exact test to confirm that no significant imbalance existed between the groups. Finally, we compared the following two types of responses between the groups before and after PS matching by Chi-square or Fisher's exact tests: (i) factors that negatively affected research activities during the

TABLE 2 Comparisons of factors negatively affecting research activities during the COVID-19 pandemic between nursing researchers by workplace

Categorical variables	Academic setting (n = 107)		Clinical setting (n = 107)		p-value*
	n	%	n	%	
Conducting collaborative research					0.889
Affected	72	85.8	48	72.7	
Neither	11	11.6	9	13.6	
Not affected	12	12.6	9	13.6	
Missing cases	12		41		
Entering clinical facilities to collect the data					0.313
Affected	85	92.4	48	88.9	
Neither	5	5.4	6	11.1	
Not affected	2	2.2	0	0.0	
Missing cases	15		53		
Traveling to domestic locations to attend conferences and workshop					0.934
Affected	88	87.1	64	88.9	
Neither	9	8.9	5	6.9	
Not affected	4	4.0	3	4.2	
Missing cases	6		35		
Traveling to international locations to attend conferences and workshop					0.343
Affected	55	82.1	18	72.0	
Neither	11	16.4	6	24.0	
Not affected	1	4.0	1	1.5	
Missing cases	40		82		
Research productivity due to working from home					0.224
Affected	46	54.1	40	64.5	
Neither	24	28.2	10	16.1	
Not affected	15	17.6	12	19.4	
Missing cases	22		45		
Consultations regarding job insecurity, financial support, or mental health concerns with other staff, students, and colleagues					0.166
Affected	63	67.0	17	51.5	
Neither	25	26.6	11	33.3	
Not affected	6	6.4	5	15.2	
Missing cases	13		74		
Changing teaching delivery methods to online style (e.g. Lecture contents, evaluation)					**<0.001**
Affected	92	89.3	15	48.4	
Neither	5	5.8	41	32.3	
Not affected	5	4.9	6	19.4	
Missing cases	4		76		
Time to learn new information and communication technology (ICT) skills					**<0.001**
Affected	83	80.6	24	33.8	
Neither	7	6.8	22	31.0	
Not affected	13	12.6	25	35.2	
Missing cases	4		36		

T A B L E   2   (Continued)

Categorical variables	Academic setting (n = 107)		Clinical setting (n = 107)		
	n	%	n	%	p-value*
Providing support to colleagues with ICT issues					**0.019**
Affect	72	69.2	28	47.5	
Neither	14	13.5	16	27.1	
Not affect	18	17.3	15	25.4	
Missing cases	3		48		
Supervising research progress					0.454
Affected	45	58.4	15	45.5	
Neither	21	27.3	12	36.4	
Not affected	11	14.3	6	18.2	
Missing cases	30		74		
Research funding – inability to secure the required budget for research					0.071
Affecteed	29	37.2	10	25.0	
Neither	24	30.8	21	52.5	
Not affected	25	32.1	9	22.5	
Missing cases	29		67		

Note: p-value was obtained by Chi-square or Fisher's exact test. Comparisons were made, excluding cases with missing data.

COVID-19 pandemic; and (ii) persons to consult about concerns of research progress.

All statistical analysis was performed with SPSS version 26 (IBM, Armonk, NY, USA) with a p-value of 5% as significant. Univariate comparisons, including Chi-square tests or Fisher's exact tests, were conducted, presenting results with frequency and percentage.

2.5 | Ethics approval

This study was approved by the Research Ethics Committee of the University of Miyazaki (Approved Number: O-0733).

3 | RESULTS

3.1 | Characteristics of the participants

A total of 1,532 participants responded to this survey, with a response rate of 16.1%. After removing those with missing or incomplete data, 1,383 respondents remained, among which 1,138 respondents (n=1,138/1,532; 74.2%) answered that their research activities were negatively affected during the COVID-19 pandemic and were included in this study. Figure 1 shows the flowchart of

the participant inclusion process for PS matching. Among the included respondents, 1,030 (90.5%) worked in an academic setting, while 108 participants (9.5%) worked in a clinical setting. The majority of respondents were female (n=1,015/1,138; 89.2%). Those aged between 46 and 55 years (n=421/1,138; 37.0%) were most common. During the data collection period, 730 respondents (64.1%) resided in an area under a special alert. A total of 214 respondents were PS matched as pairs (107 respondents each from the academic and clinical groups). The characteristics of participants before and after PS matching are shown in Table 1. Age distribution and childcare status were significantly different between the groups before the PS matching, while no significant difference was identified after the PS matching (Table 1).

3.2 | Factors that negatively affected research activities during the COVID-19 pandemic in Japan

The results are presented in Table 2. The respondents who worked in academic settings were significantly affected by a change in the way teaching was delivered, from in-person to online style, compared to those who worked in clinical settings ($p < 0.001$). Likewise, the respondents working in academic settings consumed

TABLE 3 Comparisons of person to consult about issues relating to research activities between nursing researchers in academic and clinical settings

Categorical variables	Academic settings ($n = 107$)		Clinical settings ($n = 107$)		*p*-value
	n	% (95% CI)	*n*	% (95%CI)	
Supervisors/senior persons at the workplace					0.166
Yes	40	34.7	50	46.7	
Not applicable	67	62.6	57	53.3	
Colleagues at workplace/ex-school classmates					**<0.001**
Yes	61	57.0	31	29.0	
Not applicable	46	43.0	76	71.0	
Subordinates/junior persons at the workplace					0.060
Yes	14	13.1	6	5.6	
Not applicable	93	86.9	101	94.4	
Other than workplace					0.461
Yes	31	29.0	36	33.6	
Not applicable	76	71.0	71	66.4	
Nobody to consult					0.595
Yes	18	16.8	21	19.6	
Not applicable	89	83.2	86	80.4	

Note: *p*-value is obtained by Chi-square or Fisher's exact test.

more time learning new information and communication technology (ICT) skills than the respondents working in clinical settings (80.6% vs 33.8%). This extra workload significantly affected their research activities ($p < 0.001$). In addition, the respondents in academic settings significantly required more time not only to acquire ICT skills for themselves but also to support their colleagues with regards to ICT issues, compared to respondents in clinical settings ($p < 0.05$).

However, in regard to other aspects of research activities, including conducting collaborative research, entering clinical facilities for data collection, traveling to domestic/international locations, and supervising research progress, there was no significant difference between the two groups ($p > 0.05$).

3.3 | Person to consult about research concerns and progress

Table 3 shows the main person to consult about issues relating to research progress. For the respondents in academic settings, the primary category of person to consult over concerns about research progress was colleagues at work/ex-school classmates, followed by supervisors/senior persons at the workplace, and other people outside the workplace. In contrast, for the respondents working in clinical settings, this order was supervisors/senior

persons at the workplace, followed by other people outside the workplace, and colleagues/ex-school classmates. The most significant difference was observed in the percentage of the respondents who consulted with colleagues at the workplace or ex-school classmates. Approximately 57% of the respondents working in academic settings consulted regarding their concerns about research progress with their colleagues or ex-classmates, while only 29% of the respondents in clinical settings did so ($p < 0.001$). In both groups, 17% and 20% of the respondents working in academic settings and clinical settings had nobody to consult regarding these issues, respectively.

4 | DISCUSSION

In this analysis of the online cross-sectional survey, we identified three key factors that negatively affected research activities during the initial wave of the pandemic in Japan: (i) the time to learn ICT skills; (ii) time to support their colleagues who faced ICT issues; and (iii) time to prepare and evaluate teaching materials. Compared to the respondents working in clinical settings, these factors significantly affected the research activities of those working in academic settings. More than half of our respondents working in academic settings consulted about their research concerns with their colleagues or ex-

classmates, while only a third of them working in clinical settings did. Approximately 20% of our participants in both settings had nobody to consult with regarding their research concerns.

Our findings highlighted that the time management related to ICT use was significantly different between groups, even though the PS matching was applied to control for imbalance between the groups. Prior to the pandemic, nursing education in Japan focused primarily on in-person teaching and paper-based lectures in the classroom. When the outbreak of COVID-19 occurred, the teaching delivery methods for almost every subject urgently needed to be changed to an online basis. Our respondents working in academic settings may have spent time mastering new ICT skills and/or advanced levels of ICT knowledge by sacrificing their time for research. Similar to Japan, a cross-sectional study of 457 nursing academic staff using an online questionnaire in Egypt showed that only 39% actively used online applications for teaching before the pandemic (Ebrahim Essa et al., 2021). One of the biggest barriers to, and areas of support needed for, providing nursing education via an online basis could be the acquisition of practical ICT skills. Indeed, in a Japanese survey on utilizing ICT, nursing educators reported the lack of their own competence as an issue in adopting the use of ICT in the classroom (Sasaki, 2016). Moreover, our respondents working in academic settings were mostly female and slightly older than their clinical counterparts. Age and sex might also be factors posing a barrier to attaining new ICT skills. Some of our senior respondents were supported by their colleagues. Hayes et al. (2021) found that middle- to older females (>45 years) were more likely to perceive stress about their working styles with technology during the pandemic in their cross-sectional study. In a small Australian study with a cross-sectional design of 138 nurse educators, about 62% stated the most desirable area of future development in teaching was ICT skills (Oprescu et al., 2017). Based on our findings from this study, there is an urgent need to build an individual ICT support service system with specific targets, including the age, roles, or frequency of use.

Another factor that negatively affected research activities was preparing and evaluating online teaching materials, including lecture contents and practice units. This result is consistent with the study by Yoshinaga et al. (2021), which reported increased time spent on teaching. In nursing education of clinical skills, detailed observation by simulation-based education and demonstrations by an educator are often important for improving student skills (Kim et al., 2016). Our respondents may struggle with preparing online materials to obtain the same effects as when provided by in-person teaching. For example, to present quality demonstrations of technical skills online, a nursing educator needs to set up webcams in multiple directions, giving live performances and live commentary. However, these preparations may be difficult without advanced knowledge and skills in ICT. Accordingly, time must be consumed in mastering such new ICT knowledge and skills for preparation and evaluation of teaching materials. Kaup et al. (2020) discussed how clinical skills and competencies could be partially replaced by online teaching and simulation-based training applications; however, assessing the proficiencies of these skills online is still a challenge. The COVID-19 pandemic brought chaos to Japanese nursing education, but simultaneously our study has revealed the areas that need further support.

Another interesting finding was that about 20% of our respondents working in clinical settings did not consult with others regarding their concerns, distress, or confusion about their research progress during the pandemic. This result indicates a lack of support and understanding for nursing researchers working in clinical settings, contributing to emotional isolation. Yanagawa et al. (2014) stated that the ward-based nurses who are involved in research in Japan feel anxious and lonesome due to the lack of understanding on the part of their colleagues regarding the research process and their role in research. In Japan, nursing researchers working in clinical settings have usually engaged in research activities independently or in collaboration with researchers in other fields. At the same time, they need to care for patients as their primary role. Hill and MacArthur (2006) identified a sense of isolation and lack of peer support as one of the issues for nursing researchers working in clinical settings.

In contrast, our respondents working in academic settings might have more opportunities to communicate with their colleagues or other researchers regarding their research issues through online scientific conferences and workshops even during the pandemic. It is necessary for nursing researchers working in clinical settings to have a place to express their research issues in an emergency as a support system. This support system may further activate nursing research in clinical settings.

Our results may also suggest the need for a "clinical research nurse or clinical nurse research consultant" in Japan. These positions, although relatively new, are widely recognized in other countries, including the United States of America, England, and Sweden (Backman Lönn et al., 2019; Gibbs & Lowton, 2012; International Association of Clinical Research Nurses, 2012). A clinical research nurse usually has a research degree and works in clinical settings as a ward-based registered nurse by arranging collaborative projects, being responsible for aspects of the research process, including research ethics, governance, data

acquisition and analysis, and/or manuscript writing (Backman Lönn et al., 2019; Currey et al., 2011; Gibbs & Lowton, 2012; International Association of Clinical Research Nurses, 2012). Currently, there is a similar position in Japan, that is, a clinical research coordinator, which includes various healthcare professionals. For instance, these people can be nurses, pharmacists, or laboratory technicians, while they mainly deal with randomized controlled trial studies (Fujiwara et al., 2017). Any registered nurse working in a clinical setting has opportunities to be involved in clinical research in Japan. However, research knowledge seems to be limited in the general nursing community. A cross-sectional study investigated knowledge used in clinical research among 597 Japanese registered nurses (Yanagawa et al., 2014). The author of this study found that less than half of the participants understood the terms of the Declaration of Helsinki, ethical guidelines, Good Clinical Practice, institutional review boards, and ethics committees (Yanagawa et al., 2014). An increase in knowledge and understanding of research through the position suggested above would facilitate research in clinical settings in Japan. This position might also fill the gap in research knowledge and research activities between clinical and academic settings.

This study has limitations mainly related to the survey design. Our results may not be generalizable due to the cross-sectional study design with a low response rate. Cultural differences may also affect the results and thus they may not be applicable to nursing science in other countries. Further, this survey was conducted during the initial wave of the pandemic in Japan. Our findings might not be relevant to the subsequent waves of the COVID-19 pandemic because the situation is constantly changing in Japan. Nonetheless, the strength of our study is the use of PS matching to minimize possible selection bias arising from the groups. This method successfully eliminated differences in base characteristics between the groups.

5 | CONCLUSION

We found that the time spent on ICT-related issues negatively affected the research activities of nursing researchers when the pandemic began in Japan. While more than 50% of our respondents working in academic settings sought help from their colleagues, about one-fifth of them in both groups had no one to consult regarding their problems. In such an emergency as the COVID-19 pandemic, ICT support for their work and an opportunity to share their research difficulties were considered to be the most needed support for Japanese nursing researchers.

CONFLICT OF INTEREST
N/A

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