



ORIGINAL ARTICLE

Gender differences in housework and childcare among Japanese workers during the COVID-19 pandemic

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Abstract

Objectives: Although gender stereotypes regarding paid work and unpaid work are changing, most wives are responsible for taking care of the family and home in Japan. It is unclear how time spent on housework and childcare has changed between working men and women during the COVID-19 pandemic in Japan. The purpose of this study is to investigate how working men and women's responsibilities for housework and childcare changed during the COVID-19 pandemic in Japan depending on work hours, job type, the number of employees in the workplace, and frequency of telecommuting.

Methods: A cross-sectional analysis ($N = 14,454$) was conducted using data from an Internet monitoring study (CORoNa Work Project), which was conducted in December 2020. A multilevel logistic model with nested prefectures of residence was conducted to estimate the odds ratio (OR) for change in time devoted to housework and childcare among men and women adjusting for age, household income, presence of spouse who work, work hours, job type, the number of employees in the workplace, frequency of telecommuting, and the incidence rate of COVID-19 by prefecture.

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Results: More women tended to perceive that their time of housework and/or childcare had been changed (increased housework: OR 1.92, 95% CI [1.71–2.16], $P < .001$; decreased workhours: 1.66 (1.25–2.19), $P < .001$; increased childcare: OR 1.58, 95% CI [1.29–1.92], $P < .001$; decreased childcare: 1.11 (0.62–2.00), $P = .719$).

Conclusions: The time spent by women on housework and childcare changed significantly compared to men during the COVID-19 pandemic in Japan.

KEYWORDS

childcare, COVID-19, gender differences, housework, Japan

1 | INTRODUCTION

Women tend to spend more time on housework than men. This is true in Japan, where the gender difference is greater than in other countries. Time spent on housework and childcare by husbands and wives with a child or children under six years old is 1.23 and 7.34 h per day, respectively.¹ Regarding hours spent exclusively on childcare per day, husbands spend 0.49 h and women spend 3.45 h each day.¹

In Japan, the participation of women in the labor force has increased in recent years; the employment rate of Japanese women in the working age population was 69.6% in 2018, which ranked 16th among 35 OECD countries.² According to the White Paper on Gender Equality 2020, for women aged 25–29, time devoted to housework, childcare, and caregiving has remarkably decreased over the past three decades, while work-related time has increased.³

In terms of work allocation between couples, husbands, especially men in their child-rearing years, overwhelmingly work longer hours than their wives.³ In a 2009 study examining employment and household tasks among Japanese couples, women who were employed full-time spent 21 h a week on housework, whereas their husbands only spent 5 h a week on such work.⁴

Multiple Japanese laws, such as the Childcare Leave Law and the Female Success Promotion Law, have been enforced since the 1990s with the aim of improving the balance between work and family, and of promoting gender equality. Owing to the legislation, the rate of men taking childcare leave is on the rise, reaching 12.65% in 2020. However, the provisions of the childcare leave system vary by industry and company size. More than 95% of companies in the electricity, gas, heat supply, water supply, financial, and insurance industries and the multi-service business have provisions for childcare leave, while only 60% of companies in the construction and manufacturing industries have them.⁵ Of the organizations with 500 or

more employees, 74.8% have introduced childcare leave, whereas only 57.4% of the organizations with 30 or fewer employees have done the same.⁵ Each business should have provisions for childcare leave to create a society where it is easy for men to take childcare leave.

During the COVID-19 pandemic, there has been a change in time spent on housework and childcare, which has been the subject of studies in several countries.^{6–8} In a UK study examining the impact of the COVID-19 lockdown on unpaid care work, researchers found that women spent significantly more time on housework and childcare duties than men, resulting in higher levels of psychological distress in women.⁹ In Japan, it has been reported that an increase in the amount of time spent on housework is associated with a worsening health status in the Corona disaster.¹⁰ However, the extent to which the burden of housework and childcare differs depending on work hours, job type, and company size is unknown. In the present study, we investigate gender differences in changes in time spent on housework and childcare after the start of the COVID-19 pandemic throughout Japan, considering work-related factors such as work hours, job type, number of employees at the workplace, and frequency of telecommuting.

2 | MATERIALS AND METHODS

2.1 | Study design and participants

This study used data from the Collaborative Online Research on the Novel-coronavirus and Work (CORoNa Work) Project, which was an Internet-based prospective cohort study of workers assigned by prefecture, job type, and gender conducted during December 2020 in Japan. December 2020, when this study was conducted, was the period when the second wave of coronavirus infections swept Japan, with the nation reporting around 1500 to 3500 new cases daily on average. The following

month, that is, in January 2021, a second state of emergency was declared in the country. Earlier, all elementary, junior high, and high schools nationwide had been closed from March to June 2020 following a notice issued by the Ministry of Education, Culture, Sports, Science and Technology (MEXT). The survey comprised of workers aged 20–65 years, and additional details of the CORoNa Work Project have been reported previously.¹¹ The protocol for the CORoNa Work Project was approved by the Ethics Committee of the University of Occupational and Environmental Health, Japan. The CORoNa Work Project collected data from 33,302 individuals. After excluding invalid responses, 27,036 individuals were included in the final data set. In our study, 14,454 individuals who live with their spouse were included. In addition, 4189 individuals who reported the presence of pre-school and/or elementary school children in the home were included in our analyses regarding childcare (Figure 1).

2.2 | Work-related factors

Work hours per week were calculated from the number of working days per week and working hours per day and classified into three groups: 1–39, 40, 41–49, 50–59, and 60 h or more. Job type was assessed with a question requiring the respondent to select the closest job description. Answer categories were as follows: mainly desk work (e.g., office work, computer work); mainly work involving talking with people (e.g., customer service, sales, etc.), and manual work (e.g., work at a production site, manual labor, nursing care, etc.). Respondents provided the number of employees in their workplace, by selecting one of

the following numerical ranges: 1 person (freelance), 2–4, 5–9, 10–29, 30–49, 50–99, 100–499, 500–999, 1000–9999, 10,000 or more. In our study, responses were divided as follows: 1–29, 30–99, 100–999, and >1000. Frequency of telecommuting was categorized into the following five groups: Four days a week or more, 2 days a week or more, more than 1 day a week, more than 1 day a month, almost never.

2.3 | Housework and childcare

The survey addressed the impact of the COVID-19 pandemic with the following set-up explanation: “We would like to ask you about the impact of the outbreak of COVID-19 on your social and living conditions.” Then, particular issues were addressed underneath. For “Time spent on housework,” the following answer options were presented: increased, stayed the same, and decreased. Similarly, for “Time spent on childcare,” the same answer options were presented: increased, stayed the same, and decreased.

2.4 | Other variables

Information on age (continuous), presence of pre-school and/or elementary school children (absence or presence), presence of spouse who work, and household income were also provided by survey respondents. In our study, household income (million yen) was categorized into the four following groups: 0.5–2.49, 2.50–3.74, 3.75–4.89, and 4.90 and higher.

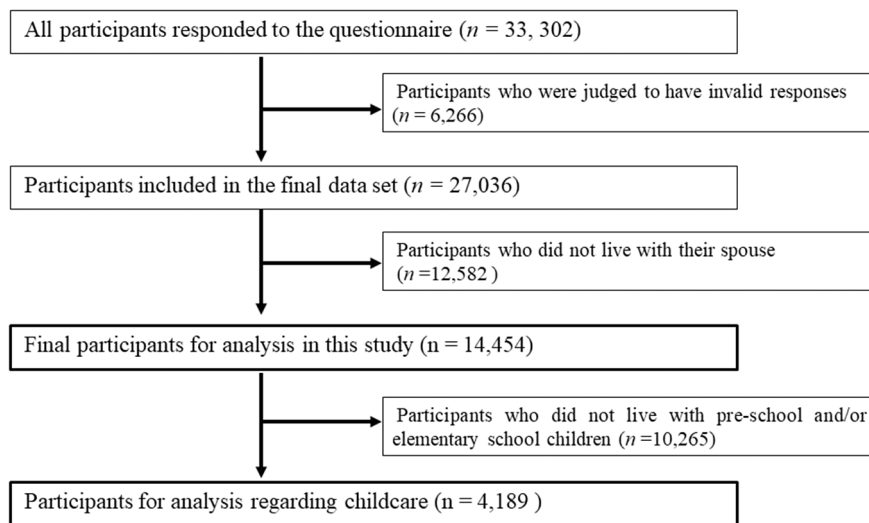


FIGURE 1 Flowchart for the inclusion of this study participants.

2.5 | Statistical analysis

This study evaluates changes in time spent on housework/childcare by gender and work-related factors. Multilevel logistic regression analysis was performed using the following factors: the prefecture of residence, adjusting for age, household income, presence of spouse who works, work hours, job type, number of employees at the workplace, frequency of telecommuting, and incidence rate of COVID-19 by prefecture. We examined the association between an individual's gender and change in time spent on childcare and housework. Additionally, we examined the association between the presence of preschool and/or elementary school-aged children and change in time spent on childcare and housework among men and women. Statistical analyses were conducted using Stata/IC 14.0 (Stata Corp, College Station, TX, USA). Statistical significance was set at $P < .05$.

3 | RESULTS

Table 1 shows the respondents' characteristics. The mean age of respondents was 49.3 ± 9.9 years old. Seventy-one percent of the participants had no preschool or elementary school-aged children. The percentages of respondents who reported their household income (in million yen) as 0.5–2.49, 2.50–3.74, 3.75–4.89, and 4.90 and higher were 17.5%, 24.0%, 28.1%, and 30.4%, respectively. The percentage of participants whose spouses were employed was high at 74.8%, and even higher at 81.1% for those with preschool or elementary school-aged children. The percentages of respondents whose working hours were 1–39, 40, 41–49, 50–59, and 60 h or more were 19.1%, 45.4%, 18.2%, 10.2%, and 7.1%, respectively.

When comparing men and women, it was observed that a higher percentage of women worked 1–39 h (women: 30% > men: 12.4%) and a higher percentage of men worked 50 h or more (men: 22.8% > women: 7.9%). According to job type, about half of respondents were engaged in desk work (51.4%). Respondents engaged in mainly talking to others or manual work were 25.4% and 23.2%, respectively. In terms of the number of employees in the workplace, 31.3%, 14.5%, 27.2%, and 27.1% of respondents worked in workplaces with 1–29, 30–99, 100–999, and >1000 employees, respectively. Regarding telecommuting, 78.2% of respondents reported they almost never telecommute.

Figure 2A displays the changes in housework during the pandemic by work-related factors and gender. Women tended to report increased time spent on housework across all work-related factors (work hours, job types, number of employees, and frequency of

telecommuting). In terms of work hours, the percentage of women who felt that they spent more time on housework was high for those with shorter working hours. In terms of job type, there was a tendency for women to report increased time spent on housework when talking to others than when doing manual labor. In terms of the number of employees, a higher percentage of women working in organizations with a large number of employees felt that they had more time for housework than women working in organizations with a small number of employees. In terms of frequency of telecommuting, men and women tended to feel that they spent more time on housework if they telecommuted than if they did not telecommute. In particular, workers who telecommuted two or three days a week tended to feel that they spent more time on housework.

Figure 2B displays the changes in childcare during the pandemic by work-related factors and gender among respondents with pre-school and/or elementary school children. Figure 2B shows changes in childcare during the pandemic for respondents with preschool and elementary school-aged children, by work-related factors and gender. A higher percentage of women than men felt that they spent more time raising their children for job type, work hours, number of employees, and frequency of telecommuting. The results for these items with regard to childcare time were similar to the results for these items in relation to housework time, except for work hours.

Table 2 shows the results of a multilevel logistic regression analysis of the association between gender and increased housework time during the pandemic. After adjusting for age, it was found that women were significantly more likely than men to report an increase in housework time (OR 1.91, 95% CI [1.73, 2.12]). After adjusting for age, household income, presence of spouse who work, work hours, job type, number of employees at the workplace, frequency of telecommuting, and COVID-19 incidence by prefecture, the association remained significant (OR 1.92, 95% CI [1.71–2.16]). Table 3 shows the results of a multilevel logistic regression analysis of the association between gender and decreased time spent on housework during the pandemic. Age-adjusted results showed no significant difference (OR 1.14, 95% CI [0.89, 1.47]), but the multilevel analysis showed that a higher percentage of women reported a decrease in housework time (OR 1.66, 95% CI [1.25, 2.19]). Similarly, Table 4 shows the results of a multilevel logistic regression analysis of the association between gender and increased childcare time during the pandemic. After adjusting for age, it was found that women were significantly more likely than men to report an increase in childcare hours (OR 1.51, 95% CI [1.27, 1.79]).

TABLE 1 Characteristics of the subjects

	All subjects			Subjects with pre-schooler and/or elementary school children		
	Total (n = 14,454)	Men (n = 9103)	Women (n = 5351)	Total (n = 4189)	Men (n = 2189)	Women (n = 2000)
Age, mean (SD)	49.3 (9.9)	52.8 (7.9)	43.4 (10.2)	41.2 (8.1)	45.2 (7.0)	36.8 (6.7)
Pre-school and/or elementary school children n (%)						
Absence	10,265 (71.0)	6914	3351			
Household income (million yen) n (%)						
0.5–2.49	2532 (17.5)	1721	811	772 (18.4)	457	315
2.50–3.74	3472 (24.0)	2278	1194	1428 (34.1)	805	623
3.75–4.89	4058 (28.1)	2464	1594	1285 (30.7)	592	693
4.90–	4392 (30.4)	2640	1752	704 (16.8)	335	369
Presence of spouse who work n (%)						
Yes	10,817 (74.8)	5792	5025	3398 (81.1)	1438	1960
No	3637 (25.2)	3311	326	791 (18.9)	751	40
Work-related factor n (%)						
Workhours/week						
1–39	2762 (19.1)	1129	1633			
40	6567 (45.4)	4112	2455			
41–49	2623 (18.2)	1786	837			
50–59	1471 (10.2)	1198	273			
60–	1031 (7.1)	878	153			
Job type						
Mainly desk work	7433 (51.4)	4826	2607	2019 (48.2)	1115	904
Mainly talking to others	3670 (25.4)	2101	1569	1158 (27.6)	532	626
Mainly physical work	3351 (23.2)	2176	1175	1012 (24.2)	542	470
Number of employees at workplace						
1–29	4518 (31.3)	2718	1800	1025 (24.5)	541	484
30–99	2097 (14.5)	1259	838	623 (14.9)	297	326
100–999	3927 (27.2)	2460	1467	1337 (31.9)	669	668
<1000	3912 (27.1)	2666	1246	1204 (28.7)	682	522
Frequency of telecommuting						
4 days a week or more	1352 (9.4)	857	495	313 (7.5)	178	135
2 days a week or more	881 (6.1)	615	266	233 (5.6)	140	93
More than 1 day a week	512 (3.5)	372	140	163 (3.9)	104	59
More than 1 day a month	401 (2.8)	299	102	128 (3.1)	86	42
Almost never	11,308 (78.2)	6960	4348	3352 (80.0)	1681	1671

The association remained significant after adjusting for age, household income, presence of a working spouse, work hours, job type, number of employees at the

workplace, frequency of telecommuting, and COVID-19 incidence by prefecture (OR 1.58, 95% CI [1.29, 1.92]). Table 5 shows the results of multilevel logistic regression

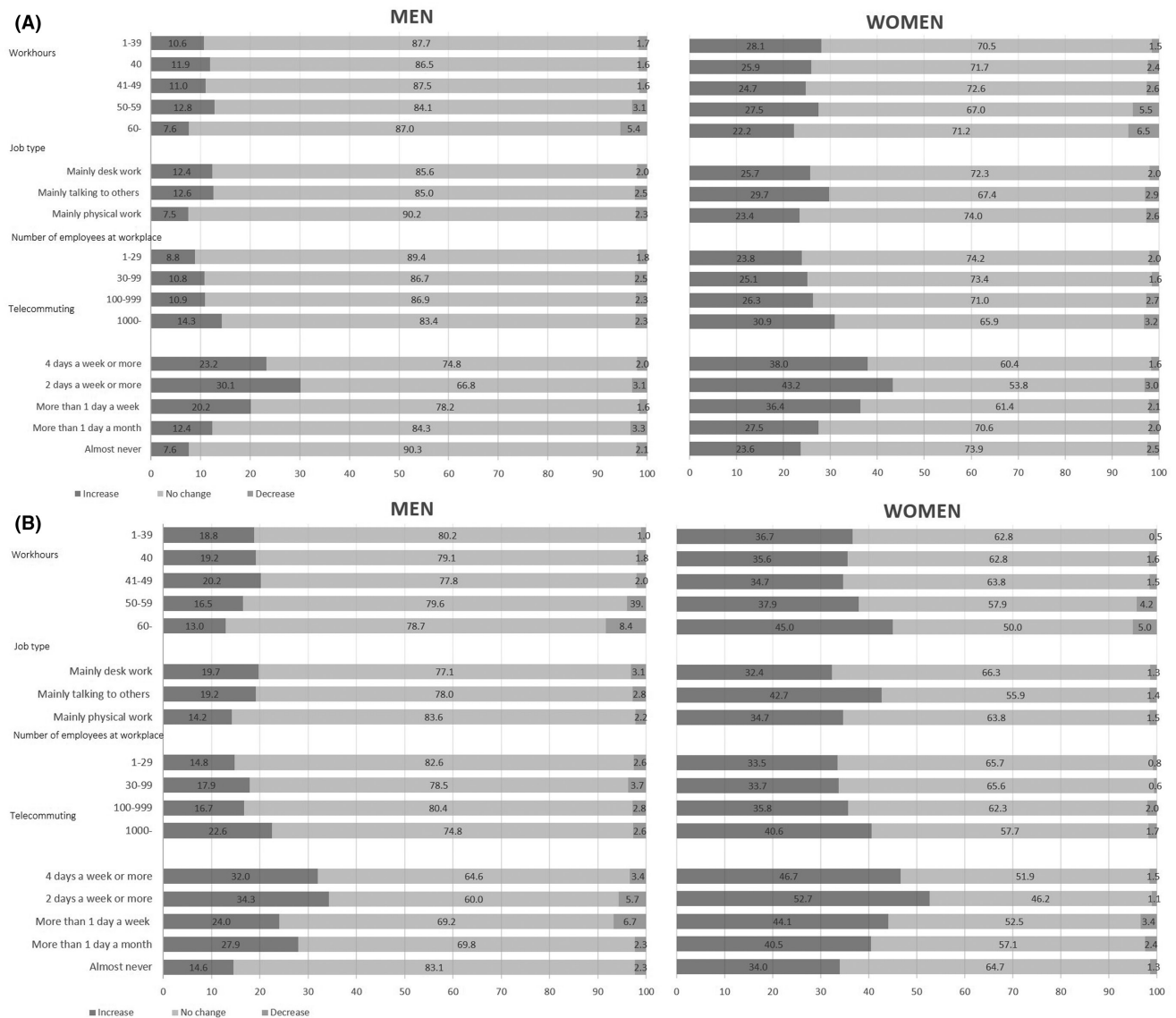


FIGURE 2 Change in time spent on housework and childcare during the COVID-19. (A) Change in time spent on housework among men and women. (B) Change in time spent on childcare among men and women.

analysis of the association between gender and decreased childcare time during the pandemic. No significant differences were found in the age-adjusted table (OR 0.64, 95% CI [0.38, 1.07]) or in the multilevel analysis results (OR 1.11, 95% CI [0.62, 2.00]).

Table 6 shows the association between the presence or absence of preschool-aged children and the increase in housework time. In Table 6, men and women in households with preschool-aged children were significantly more likely to perceive an increase in housework time (men: OR 1.78; 95% CI [1.49–2.12]; women: OR 1.37; 95% CI [1.18–1.60]). Table 7 shows the decrease in housework time with and without preschool-aged children. The percentage of men who felt that having preschool-aged children reduced their housework time

remained unchanged (OR 0.93; 95% CI [0.63–1.37]). The percentage of women who felt that they spent less time on housework was lower in families with pre-school-aged children than in those without them (OR 0.61; 95% CI [0.39–0.96]).

4 | DISCUSSION AND CONCLUSION

This study demonstrated that during the COVID-19 pandemic, women were more likely to perceive change of time spent on housework and/or childcare. Especially, the percentage of women who perceived that they spent more time on housework and childcare was significantly

TABLE 2 Results of multivariable analysis in the relationship between sex and increase of the time spent on housework during normal times vs during COVID-19 epidemic time

	No change (<i>n</i> = 11,693)	Increase (<i>n</i> = 2434)	Age adjusted		Multivariate ^a	
			OR (95%CI)	<i>P</i> -value	OR (95%CI)	<i>P</i> -value
Men	7881	1024	1.00 (Ref)		1.00 (Ref)	
Women	3812	1410	1.91 (1.73–2.12)	<.001	1.92 (1.71–2.16)	<.001

^aThe odds ratios (OR) were estimated by a multilevel logistic model nested in the prefecture of residence, adjusting for age, household income, frequency of telecommuting, presence of spouse who work, workhours, job type, number of employees at workplace and the incidence rate of COVID-19 by prefecture.

TABLE 3 Results of multivariable analysis in the relationship between sex and decrease of the time spent on housework during normal times vs during COVID-19 epidemic time

	No change (<i>n</i> = 11,693)	Decrease (<i>n</i> = 327)	Age adjusted		Multivariate ^a	
			OR (95%CI)	<i>P</i> -value	OR (95%CI)	<i>P</i> -value
Men	7881	198	1.00 (Ref)		1.00 (Ref)	
Women	3812	129	1.14 (0.89–1.47)	.303	1.66 (1.25–2.19)	<.001

^aThe odds ratios (OR) were estimated by a multilevel logistic model nested in the prefecture of residence, adjusting for age, household income, frequency of telecommuting, presence of spouse who work, workhours, job type, number of employees at workplace and the incidence rate of COVID-19 by prefecture.

TABLE 4 Results of multivariable analysis in the relationship between sex and increase of the time spent on childcare during normal times vs during COVID-19 epidemic time

	No change (<i>n</i> = 2977)	Increase (<i>n</i> = 1122)	Age adjusted		Multivariate ^a	
			OR (95%CI)	<i>P</i> -value	OR (95%CI)	<i>P</i> -value
Men	1728	399	1.00 (Ref)		1.00 (Ref)	
Women	1249	723	1.51 (1.27–1.79)	<.001	1.58 (1.29–1.92)	<.001

^aThe odds ratios (OR) were estimated by a multilevel logistic model nested in the prefecture of residence, adjusting for age, household income, frequency of telecommuting, presence of spouse who work, workhours, job type, number of employees at workplace and the incidence rate of COVID-19 by prefecture.

TABLE 5 Results of multivariable analysis in the relationship between sex and decrease of the time spent on childcare during normal times vs during COVID-19 epidemic time

	No change (<i>n</i> = 2977)	Decrease (<i>n</i> = 90)	Age adjusted		Multivariate ^a	
			OR (95%CI)	<i>P</i> -value	OR (95%CI)	<i>P</i> -value
Men	1728	62	1.00 (Ref)		1.00 (Ref)	
Women	1249	28	0.64 (0.38–1.07)	.091	1.11 (0.62–2.00)	.719

^aThe odds ratios (OR) were estimated by a multilevel logistic model nested in the prefecture of residence, adjusting for age, household income, frequency of telecommuting, presence of spouse who work, workhours, job type, number of employees at workplace and the incidence rate of COVID-19 by prefecture.

greater than that of men after adjusting for work-related factors, including work hours, job type, the number of employees in the workplace, and frequency of telecommuting. With regards to change of time spent on housework, significant differences between women and men. For increase, higher odds ratio was shown, after adjusting for several confounding factors. For decrease, no significant difference was found between men and women when only age-adjusted, but when several socioeconomic factors, including work-related factors,

were included, the change for women became apparent, which suggests that these socioeconomic factors could influence on the results as confounding factors. To interpret the phenomena appropriately, it is necessary to consider socioeconomical background, including work-related factors.

Now, we focused on why women were more likely to perceive that their housework and/or childcare had increased during the pandemic. One possible reason for this increase in women's housework is that men were unable

TABLE 6 Presence of pre-school and/or elementary school children and increase of the time spent on household

		No change	Increase	OR ^a	95%CI			P-value
Men (<i>n</i> = 8905)	Absence	6150	617	1.00				
	Presence	1731	407	1.78	1.49	–	2.12	<.001
Women (<i>n</i> = 5222)	Absence	2533	723	1.00				
	Presence	1279	687	1.37	1.18	–	1.60	<.001

^aThe odds ratios (OR) were estimated by a multilevel logistic model nested in the prefecture of residence, adjusting for age, household income, frequency of telecommuting, presence of spouse who work, workhours, job type, number of employees at workplace and the incidence rate of COVID-19 by prefecture.

TABLE 7 Presence of pre-school and/or elementary school children and decrease of the time spent on household

		No change	Decrease	OR ^a	95%CI			P-value
Men (<i>n</i> = 8079)	Absence	6150	147	1.00				
	Presence	1731	51	0.93	0.63	–	1.37	.706
Women (<i>n</i> = 3941)	Absence	2533	95	1.00				
	Presence	1279	34	0.61	0.39	–	0.96	.032

^aThe odds ratios (OR) were estimated by a multilevel logistic model nested in the prefecture of residence, adjusting for age, household income, frequency of telecommuting, presence of spouse who work, workhours, job type, number of employees at workplace and the incidence rate of COVID-19 by prefecture.

to adapt to domestic work during the spread of COVID-19. Even before the pandemic, there was a difference in the time men and women spent on housework and childcare.¹ Compared to men in Western countries, Japanese men spend less time on household chores, including “caring or nursing” and “childcare.”¹ In terms of household chores (taking out the trash, daily shopping, cleaning the room, washing the bath, doing the laundry, cooking, and cleaning up after meals), wives in Japan spend an average of 263 min on household chores, while husbands spend 37 min.¹² Awareness of stereotypes regarding gender roles has increased in Japan; the percentage of men and women who disagree with the idea that “husbands should work outside and wives should take care of their home” has increased in recent years.³ However, there is no change regarding “work-related time” spent by husbands; many men work 60 h or more per week. Thus, there seems to be a gap between awareness and reality in Japan. In recent years, several local governments have launched campaigns to promote the participation of men who are of child-rearing age in housework and childcare activities. One such initiative was launched by The Gender Equality Bureau, Cabinet Office to encourage men to learn cooking.¹³ Although men might want to participate more in housework, it is possible they do not know how to increase their participation, especially during the COVID-19 pandemic.

For women, employment changes during the pandemic may be linked to our findings. Globally, the COVID-19 pandemic has caused an increase in unemployment.¹⁴ In particular, women’s employment patterns have changed dramatically. In the Netherlands, inequality between men and women regarding paid work has widened during the pandemic compared to

before the lockdown.⁷ In Japan, by April 2020, when the state of emergency was declared, the number of employed persons and the number of employed people will have declined significantly for women.¹⁵ Zhou et al. reported that the average working hours of female workers have decreased more than that of male workers during the COVID-19 pandemic in Japan.¹⁶ The proportion of women who felt that they had more time for housework and childcare was significantly higher than that men, although “experience of leaving or changing jobs” and “change in working hours” were added as compounding factors (date not shown). Jobs involving face-to-face contact, such as those in the food service and retail industries, have been particularly affected by the COVID-19 pandemic.¹⁷ Our survey also found that women whose jobs involve mainly talking to others had a larger increase in time spent on housework and childcare than women whose jobs involve mainly desk work and mainly manual work. Thus, the increase may be because women spent more time at home during the pandemic due to job loss or a reduction in work hours. In the survey we conducted this time, the telecommuting rate was extremely low at 21.8%. Internationally, while China and the USA have more than 60% of their workforce telecommuting, Japan’s telecommuting rate is only 31%, lagging behind the rest of the world.¹⁸

Focusing exclusively on childcare, school closures throughout Japan impacted working mothers. The employment rate of women whose youngest child is not yet in school or is in elementary school has been declining since March 2020, and the percentage of women who have entered the non-labor force has been rising, indicating the

impact of school closures.¹⁵ When elementary schools and kindergartens closed due to COVID-19, children stayed at home. In Japan, the nuclear family has become the predominant family model,¹⁹ and the number of dual-income families has increased 1.7 times in the past 30 years.⁴ Mutually supportive relationships with parents will always be necessary, and while the percentage of people living together is decreasing, the percentage of people living close together is increasing.²⁰ The diversity of people who provide childcare support has decreased before and after the declaration of the state of emergency, and the percentage of children who ask their parents or parents-in-law to provide childcare support has decreased for 0-year-olds, 1-year-olds, and 2-year-olds.²¹ For working mothers who usually rely on their parents for childcare, that childcare option was eliminated because people were forced to avoid contact with people except for family members living together to prevent the spread of COVID-19. As a result, many women with young children changed the way they worked, including in terms of unpaid work. Consequently, during the pandemic, mothers tended to spend more time on childcare than before.

The Japanese government is accelerating efforts to encourage childcare leave.²² However, the type of job and the size of the company may impact whether it is easy to take leave.²³ In our study, we also found a larger increase in time spent on housework and childcare for men and women working for companies with a large number of employees.

Larger companies were more likely to have a telecommuting environment, and telecommuting workers were more likely to report that their time spent on housework and childcare had increased (data not shown). This is perhaps because telecommuting workers at larger companies (both men and women) tended to spend a lot of time at home. This perhaps led them to believe they spent more time on housework and childcare.

Encouraging fathers to take parental leave has been a challenge in many countries. In Norway and Sweden, the introduction of the “Papa Quota” (a period during which mothers cannot take childcare leave) has succeeded in increasing the participation rate of fathers in childcare.²⁴ In Japan, there is no period of time when men have to take care of their children, and childcare is not a personal matter for men. To change this situation, corporate executives and local governments in Japan are declaring themselves “Iku-boss” to support the careers and work-life balance of their subordinates.²⁵ It is expected to foster a society where men’s participation in childcare is the normal way of life. Generationally, the gender gap between wives and husbands in terms of childcare and housework is decreasing with age,²⁶ and sustained encouragement will be important in the future.

Increased time spent on unpaid work can affect paid work which can further affect the workers’ quality of life. We hope that the survey of workers’ unpaid work during the COVID-19 pandemic will stimulate discussions about workers’ unpaid work and lead to a better work-life balance for both men and women.

This study has several limitations. First, this study used a data set obtained from an online survey. Considering that the survey respondents were individuals who had access to the Internet and were interested in the survey, the results cannot be generalized.²⁷ Second, we did not conduct a time course analysis of the actual time spent on housework and childcare as this was a cross-sectional study. We plan to conduct a second and third survey in the future, and attempt/undertake a longitudinal analysis of actual housework/childcare hours. Third, the data did not contain detailed information about the respondents’ home situations. For example, it may be useful to examine the impact availability of close relatives, other family background information, and school status on changes in housework and childcare. Fourth, the survey did not obtain information about the partner’s work-related factors, such as work hours, job type, and frequency of telecommuting, which may impact housework and childcare. Fifth, the study does not trace how changes in time spent on housework and childcare affect health outcomes. We expect future research to focus on the physical and mental aspects of housework and childcare based on this baseline study.

In conclusion, regardless of work hours, job type, and the number of employees in the workplace, the time spent by women on housework and childcare changed compared to men; especially, increased housework should be focused, suggesting that the burden on women may be increasing during the COVID-19 pandemic. Future study is required to clarify the influence of change of time spent on housework and childcare on their health condition, which may be helpful to discuss the public health policy.

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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 in the form of 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.

AUTHOR CONTRIBUTIONS

TS and MT contributed to the study's conception; ST, AH, AO, MN, SM, and YF reviewed the article and provided advice; RT and MT analyzed the data; and TS, RT, and MT wrote the article.

DATA AVAILABILITY STATEMENT

Data not available due to ethical restrictions.

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