



Research article

A study of childcare worker exhaustion during the COVID-19 pandemic

Makoto Ota^{1,2}, Masami Tamada^{2,3}, Yuko Miki^{2,4}, Mamiko Koshiba^{1,2,5,6*},
Hidenori Watanabe^{2,7}, Hiroto Omameuda^{2,8}

¹ Graduate School of Sciences and Technology for Innovation, Yamaguchi University, Yamaguchi, Japan

² Association for Children's Environment, Tokyo, Japan

³ Meisei Gakuen School for the Deaf, Tokyo, Japan

⁴ Department of Nursing, Faculty of Medical Technology, Teikyo University, Tokyo, Japan

⁵ Division of Neonatal Medicine, Department of Pediatrics, Saitama Medical University Hospital, Saitama, Japan

⁶ Graduate School of Information Sciences, Tohoku University, Miyagi, Japan

⁷ Yuyu-no-Mori Nursery School and Day Nursery, Kohoku Kindergarten, Kanagawa, Japan

⁸ College of Education, Tamagawa University, Tokyo, Japan

Abstract

In the post-COVID19 era, studying what occurred in the child developmental environment during the pandemic is required for the purpose of intervening for any found problems and in order to protect against another pandemic that may occur in the future. This survey was conducted to ascertain the impact of the spread of the new coronavirus on the Japanese caregivers of nursery schools, kindergartens, and certified Child Centers in the Summer of 2020. 273 preschools across Japan voluntarily cooperated in completing the survey. The results highlighted the exhaustion of the caregivers in particular. To explore the factors highly relevant to the exhaustion of caregivers, we attempted to visualize quantitative suggestions with a heatmap cross based on the questionnaire data regarding key factors such as wearing masks, skin-ship, and social distance, as well as contacting the child's parents.

Keywords: coronavirus infection (COVID-19), childcare provider, exhaustion, stress

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1. Introduction

The new coronavirus reportedly originated in Wuhan, China in December 2019¹, and the first coronavirus case was reported in Japan on January 16, 2020². Since then, the virus has raged in Europe, the U.S., and other countries around the world, and Japan's first state of emergency was declared on April 7, 2020³, plunging the country's social economy into a state of panic worldwide. The issues caused by the critical impact of this coronavirus disaster have kept still serious in our current lives⁴. The educational services were closed in nursery schools, kindergartens, elementary, middle, high schools, and universities repeatedly and longitudinally⁵. Infants, children, students, parents, caregivers, and teachers were all placed in a state

of educational disaster. The severe damage to educational opportunities for infants, children, students, parents, caregivers, teachers, and others is still fresh in our minds⁶⁻⁹. A survey was planned and conducted to ascertain the impact of the unprecedented, unknown, and frightening spread of the pandemic on the children and their parents during the closure and voluntary suspension of preschool attendance at that time, 2020 Summer, as well as the issues that would arise after childcare resumed, and to share this information rapidly with all those involved in resolving the situation¹⁰. As something to do in the post-coronal era when calm has returned, this report explores retrospective visualization based on data from that research report and introduces confirmation of relevant factors to be focused on in preparation for a similar

¹Open Access paper (available freely at www.isbsjapan.org)

*Corresponding author: Mamiko Koshiba PhD. Address: Ube City, 755-8611, Japan. Phone: 81-(0)836-85-9817,

E-mail: koshiba@yamagu-chi-u.ac.jp.

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Table 1. Survey participation by prefecture

Region	Number of facilities	%	Type	Number of facilities	%	Type	Division	Number of facilities	%	Type	Division	Number of facilities	%
Hokkaido	2	0.7	Nursery school	149	54.6	Number of children	Less than 25	14	5.1	Number of employees	Less than 10	7	2.6
Tohoku	7	2.6	Kindergarten	51	18.7		25~50	13	4.8		10~15	10	3.7
KantoKoshinnetu	117	42.9	certified Child Center	70	25.6		50~100	84	30.8		15~20	55	20.1
Hokuriku	8	2.9	Unlicensed facility	2	0.7		100~200	117	42.9		20~40	145	53.1
Tyubu	5	1.8	Others	1	0.4		200~300	31	11.4		40~50	45	16.5
Kansai	8	2.9	Total	273	100.0		300~500	13	4.8		50~100	10	3.7
Tyugoku	63	23.1	Establishment type				More than 500	1	0.4		More than 100	1	0.4
Shikoku	1	0.4	Public	41	15.0		Total	273	100.0		Total	273	100.0
Kyusyu	62	22.7	Private	223	81.7								
Total	273	100.0	Others	9	3.3								
			Total	273	100.0								

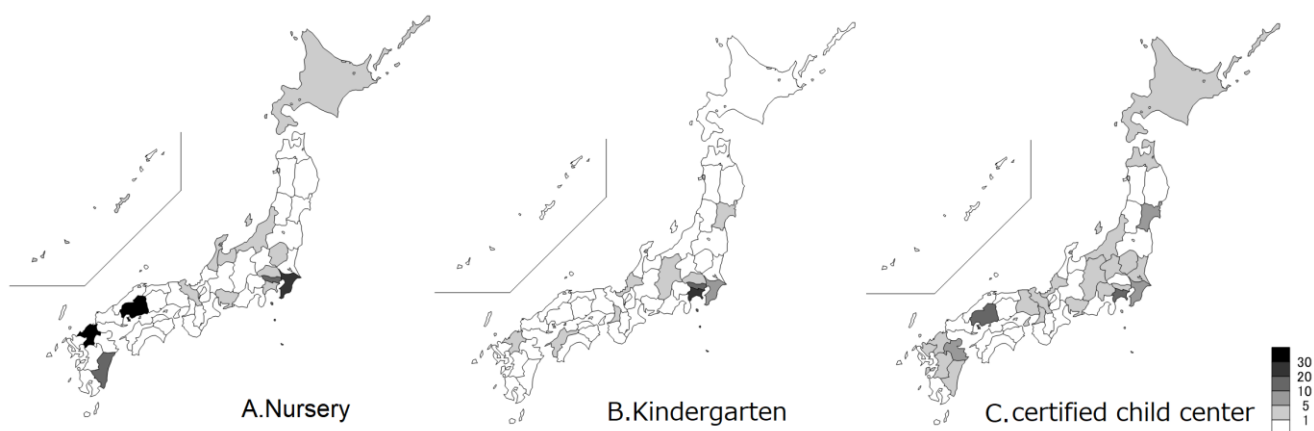


Figure 1. Prefectural distribution of early childhood education facilities that cooperated in the survey.

pandemic reproduction in the future ^{11,12}.

2. Method

2.1. Participation open questionnaire

This protocol was approved by the Institutional Review Board of the Association for Children’s Environment (2020-02). The questionnaire survey "Survey on the response to the closure and voluntary refraining from attending school at day-care centers, kindergartens, and certified childcare centers due to the Corona disaster situation and its impact on children" in Japanese was widely called for participation and cooperation toward the Japanese early childcare organizations via the website of the Association for Children's Environment from July 15 to August 15, 2020.

Since the new coronavirus infection was an unknown disease, no one knew how to respond to it in society, and educational institutions that prioritize children’s safety were at the mercy of different social pressures in different situations. To exchange live information at the field level on a national scale to solve the problem, 14 questions were posted on the website regarding the impact on children/ their parents and caregivers during the closure and voluntary suspension. The survey covered the concerns

and anxieties of children, parents, and educators, and how early child facilities, which are not allowed to be interrupted for continual support, have developed their systems and rules of operation to achieve them.

2.2. Applications for visualization

To visualize the participant facilities by prefectures in the regional origin bias, MANDARA (<https://ktgis.net/mandara/mapping/index.html>), a geographic information analysis support software distributed free of charge was used.

As another text mining visualization analysis in Japanese, KHcoder which is a free software for quantitative text mining (<https://kxcoder.net/>) was used to evaluate the co-occurrence of words with the Jaccard coefficient in free sentences in the survey response data.

Heat map visualization of ratio distribution by Excel supported to compare mutually in conditions.

The cross-statistical analysis of child caregiver’s exhaustion (yes or no: binominal summarization) and parental contact and engagement with parents (yes or no: binominal summarization) were evaluated by Pearson's chi-square test and independence test using the statistical software R.

Table 2. Response Summary 1

		Kindergartens	nursery schools	certified childcare centers
A Childcare policy (N=273)	①play-based	0.20	0.25	0.27
	②Both play and simultaneous	0.75	0.74	0.66
	③simultaneous	0.06	0.00	0.07
	④other	0.00	0.01	0.00
B References on COVID-19 (N=273)	①Nation	0.22	0.17	0.16
	②municipality	0.49	0.68	0.40
	③own decision	0.20	0.09	0.39
	④other	0.10	0.05	0.06
C Generous support in a small group (N=236)	①absolutely yes	0.45	0.18	0.24
	②yes	0.45	0.53	0.55
	③not much	0.05	0.27	0.21
	④NO	0.05	0.02	0.00
D Burden on contacting parents (N=273)	①absolutely yes	0.08	0.10	0.03
	②yes	0.39	0.36	0.41
	③not much	0.43	0.49	0.50
	④NO	0.10	0.05	0.06
E Burden on parents (N=273)	①absolutely yes	0.22	0.34	0.21
	②yes	0.43	0.38	0.50
	③not much	0.31	0.27	0.26
	④NO	0.04	0.01	0.03

3. Result

3.1. Basic attributes

The number of valid responses was obtained 273. The breakdown of each of these major facilities was as follows: nursery schools accounted for the largest number, 149 (54.6%); kindergartens, 51(18.7%); certified child care centers (25.6%), which have both nursery school and kindergarten functions 70; and others. **Table 1** addresses the summary of the basic attributes of the data. **Figure 1** describes their prefectural distribution. These nationwide respondents were further summarized by district, 117 (42.9%) from Kanto Koshinetsu, 63 (23.1%) from Chugoku, and 62 (22.7%) from Kyushu as the majority.

The size of the facilities by number of staff was 145 (53.1%) with 20 to 40 employees, 55 (20.1%) with 15 to 20 employees, and 45 (16.5%) with 40 to 50 employees.

The size of facilities by number of children was 117 (42.9%) with 100 to 200 children, 84 (30.8%) with 50 to 100 children, and 31 (11.4%) with 200 to 300 children (**Table 1**, **Figure 1**).

Table3. Response Summary 2

		Childcare worker exhaustion(N=273)			
		Absolutely yes	yes	not much	Absolutely no
A Exhaustion on contacting parents	①Absolutely yes	0.03	0.05	0.05	0.00
	②yes	0.21	0.32	0.19	0.01
	③not much	0.04	0.05	0.03	0.00
	④Absolutely no	0.00	0.00	0.00	0.00
B Exhaustion to deal with parents	①Absolutely yes	0.05	0.02	0.01	0.00
	②yes	0.15	0.20	0.05	0.00
	③not much	0.08	0.18	0.20	0.01
	④Absolutely no	0.00	0.02	0.01	0.01
C Methods to contact parents	Line	0.06	0.29	0.34	0.04
	Mail	0.00	0.02	0.03	0.00
	Telephone	0.05	0.23	0.32	0.04
	Online Video	0.04	0.26	0.27	0.05
	Video distribution	0.00	0.03	0.03	0.00
D generous childcare for small groups	①Absolutely yes	0.08	0.07	0.05	0.01
	②yes	0.11	0.20	0.12	0.01
	③not much	0.05	0.08	0.05	0.00
	④Absolutely no	0.00	0.01	0.01	0.00
	E Child Mask-wearing policy (ages 3 and up)	In principle, wear recommended	0.06	0.09	0.05
Parents' decision		0.05	0.06	0.05	0.00
Do not wear		0.11	0.15	0.08	0.00
		0.03	0.06	0.06	0.00
F Caregiver Mask-wearing policy	In principle, wear	0.15	0.19	0.11	0.00
	remove necessary	0.08	0.16	0.11	0.01
G Disinfection policy	Every time of use	0.07	0.07	0.05	0.01
	Regularly	0.07	0.13	0.08	0.00
	As needed	0.08	0.14	0.09	0.00
	Once a day	0.03	0.05	0.05	0.00
H Social Distance	Prohibit group play	0.01	0.01	0.00	0.00
	manage group size	0.05	0.04	0.03	0.00
	Caregiver's judge	0.15	0.23	0.14	0.01
	not control much	0.04	0.11	0.08	0.00
I Play Outdoors	Positive as before	0.15	0.23	0.16	0.01
	Positive but limited	0.12	0.16	0.11	0.00
	limited	0.01	0.02	0.00	0.00
	prohibited	0.00	0.00	0.00	0.00

3.2. Education policy, regulation, or burden by preschool

3.2.1. Childcare policy by facility category (Table 2A)

The most common type of preschool childcare policy by facility category was "2. play and simultaneous activities," confirmed at 74.5% of nursery schools, 74.5% of kindergartens, and 65.7% of certified childcare centers. Overall, "mainly simultaneous activities" appeared almost absent.

3.2.2. References for judgment of activities and daily life per facility category on COVID-19 (Table 2B)

The most common reference for judging preschool activities and daily life by facility category was "municipality" at 49.0% for kindergartens, 67.8% for nursery schools, and 40.0% for certified kindergartens. Certified child care centers showed a tendency to make their own decisions, with 38.5% saying "the school's policy" independently.

3.2.3. Generous support in a small group (Table 2C)

All facilities seemed to achieve the goal, the realization of generous support in a small group. The total of "strongly agree" and "agree" was high at 90.0% for kindergartens, 71.7% for nursery schools, and 79.0% for certified childcare centers.

3.2.4. Burden of contacting parents (Table 2D) and on parents (Table 2E)

Regarding the burden of contacting parents, the caregivers' responses appeared split between "yes" and "not much" in the three facilities (**Table 2D**) whereas Burden on parents suggested that the ratios of "absolutely yes" increased in nursery schools than other facilities (**Table 2E**). The response words with "Burden" could imply the caregivers' exhaustion.

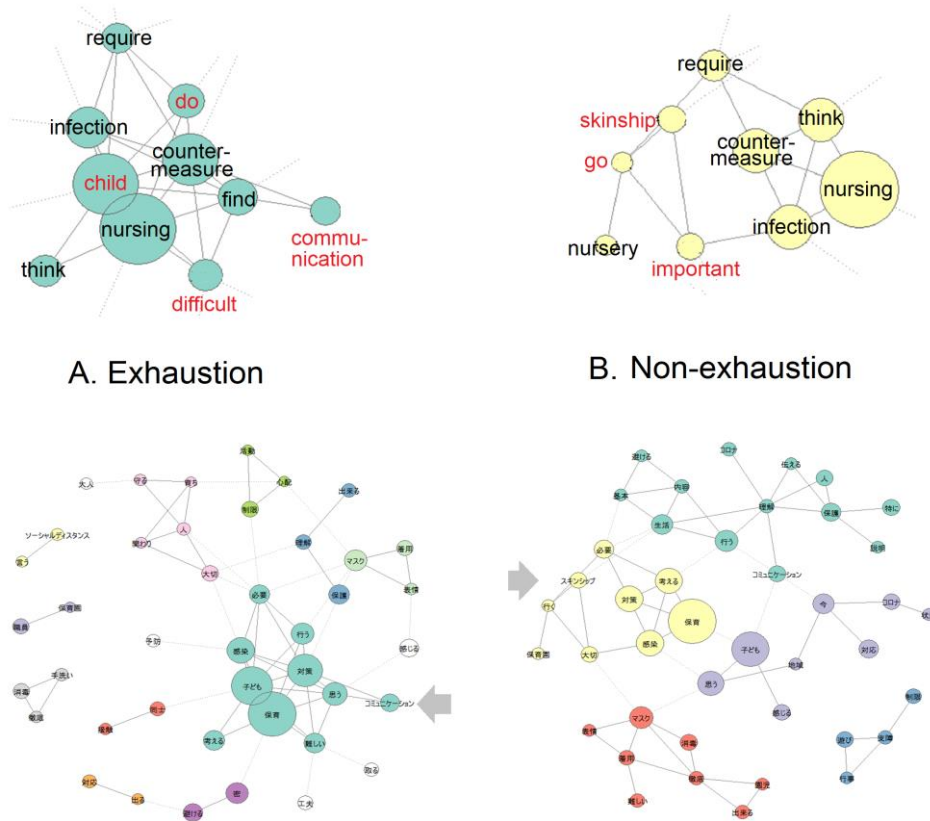


Figure 2. Text mining of co-occurrence of words with Jaccard function in Japanese.

The upper rows of A. Exhaustion and B. Non-exhaustion show the English translation labels for the word principle clusters extracted from the original resultant diagrams of the co-occurrence networks analyzed in Japanese in the lower rows. Both of the principle clusters contain the keyword "childcare" as the most central structure.

3.3. Relevant factors of caregivers' exhaustion

In nine kinds of questionnaire responses in **Table 3A** to **3I**, any relevantly altering factors of "yes (absolutely yes, yes)" or "no (not much, absolutely no)" about caregivers' exhaustion, were sought concerning heatmap colored patterns with intensity reflection.

3.3.1. "Methods of contacting parents (Table 3A)" or "Communication with parents (Table 3B)"

The response of Exhaustion on contacting parents expressed "yes" in any groups (**Table 3A**). The ratios of the methods to contact parents that seemed to be preferred "Line", "telephone", and "Online Video" (**Table 3C**) did not differ in "yes" or "no" each other (Chi-squared test: $p = 0.3287$). On the other hand, the response of Exhaustion to deal with parents modulated relative to "yes" or "no" significantly (Chi-squared test: $p = 0.00^*$) (**Table 3B**). In **Table 3E**, Child mask-wearing policies expressed higher intensity in the condition "Parents' decision" in the group of Exhaustion "yes".

3.3.2. The highest heatmap intensity of multiple factors expressed in rigid regulation or required caregiver's active judgment

Multiple kinds of protective regulation against COVID-19 infection consistently might express the highest heatmap intensity such as the caregiver's mask-wearing regularly (**Table 3F**), or the conditions the caregivers' active judgment required, supposedly sometimes out of the general criterion such as "Social Distance (**Table 3H**)" and "Play Outdoor positive as before (**Table 3I**)".

3.4. Text mining revealed general words in Exhaustion but proactive words in Non-exhaustion

We finally attempted to seek text features quantitatively by a co-occurrence analysis of words in the text response of the questionnaire, in particular, about the own adjustment between the ideal caregiving direction and treatment for anti-COVID-19 usually creating contradictions. **Figure 2** resulted in each of the main cluster networks of either Exhaustion or Non-exhaustion with different unique words. While the Exhaustion group sounded general words, the non-Exhaustion represented supposedly active verbal contents, "skin ship" and "go".

4. Discussion

In Japan, no lockdown of socio-economic activities was implemented. However, when the infection situation worsened significantly, a 'state of emergency' was declared. In daily life, a national and local government-led campaign to 'avoid the three densities' was recommended, calling for voluntary restraint in commuting to and from work and strict 'three-densities' in restaurants, public facilities, and public spaces. The term "three densities" refers to the three "densities" of "sealed", "dense" and "close" ^{13, 14}.

Corona countermeasures in kindergartens, nursery schools, and certified childcare centers in Japan were implemented in accordance with the aforementioned policy of avoiding the 'three densities' recommended by the national and local authorities. When a state of emergency was declared, the kindergartens were closed and children refrained from attending school. However, at that time, in the early stages of the new coronary disease epidemic, there were almost no cases of infection among children in Japan ¹⁵. This was a very fortunate situation, but it cannot be denied that such measures may have produced positive results. In fact, many cases of infection among children were reported in other countries. Thus, the fact that unified action was taken in many facilities, such as kindergartens, nursery schools, certificated childcare centers, etc., may have produced positive results ¹⁶.

With the spread of the new coronavirus infection, it was difficult to secure sufficient childcare staff at many facilities. However, most facilities appeared to provide generous childcare as usual ¹⁷.

On the other hand, the exhaustion of the childcare providers was described in this study ¹⁸. Firstly, they felt overburdened in dealing with their parents. This was due to the various inquiries and consultations received from parents. In addition, the exhaustion of childcare providers in the specific measures associated with the 'three dense' measures appears to have been caused by actions such as the wearing of masks only when necessary at the discretion of the childcare provider ¹⁹.

With regard to disinfection, the respondents felt burdened "as needed" and "regularly". In terms of ensuring social distance, it can be inferred that it was a considerable burden for caregivers to provide constant attention to children during active periods ²⁰.

Wearing a mask poses a significant problem for both the caregiver and the child, as it makes it difficult to see facial expressions. For this reason, many caregivers wear masks only when necessary, and it is assumed that this has led to a burden on the caregivers, including the appropriate decision-making process ²¹.

Although skin-to-skin contact was limited by paying attention to the number of children and the distance between them, the children as well as the caregivers felt a strong strain ²².

In terms of outdoor play, the majority of respondents were 'actively engaged' and 'limited but actively engaged', but interestingly, those caregivers who were less aware of the decrease in outdoor play conversely felt more burdened ²³. This can be explained by the fact that those who felt exhausted did not feel a decrease in outdoor play, while those who did not feel exhausted mixed in more outdoor play. This could mean that stronger caregivers who did not feel exhausted were more likely to encourage outdoor play

as usual ²⁴.

Finally, we suggest repeatedly the deficit in environmental factors brought by COVID-19 to developing infants in the high-sensitivity period ²⁵⁻³³ needs to be urgently reinforced.

Conflict of interest

The authors declare no conflicts of interest.

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