

Report

The Impact and Current Situation of Silent Eating during School Lunches in Aomori Prefecture, Japan, during the COVID-19 Pandemic

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ABSTRACT *Background and purpose.* This study examined the current situation of silent eating during school lunchtime in Aomori Prefecture, Japan, within the context of the globally impactful COVID-19 pandemic, focusing on the period after COVID-19-related restrictions were lifted. *Methods.* In August 2024, a self-administered questionnaire survey was distributed to children and class teachers at four public elementary schools. The children's perception of conversation during school lunchtime was assessed through a questionnaire. Class teachers were surveyed about the lunch location, desk arrangement, and silent eating guidance. This study examines the current situation during the normality after the COVID-19 pandemic and compares the findings with previous research. *Result.* Regarding "Conversation during Lunch," 66.7% of respondents reported that they "always" or "sometimes" engage in conversation during lunch. Regarding "Desire to Talk while Eating," 73.3% agreed with the statement. For "Enjoyment of Eating while Talking," 81.7% agreed. These findings show an increase in specific items compared to previous research. *Conclusion.* Revealed that conversation during lunchtime has increased, and the impact of the silent eating policy during the COVID-19 pandemic appears to have diminished significantly. Additionally, the need to enhance 'Social Skills' through food education for children who experienced the pandemic was identified.

Keywords: COVID-19, silent eating, children, school lunch, *shokuiku* (Food and Nutrition Education)

INTRODUCTION

I. Premise

1. School Lunch - The Nutritional and Educational Aspects of Japanese School Lunch -

1) Nutritional Standards in Japanese and Foreign School Lunch

In Japan, school lunch is planned and provided based on the school lunch Implementation Standards (1). This ensures that children receive a balanced intake of necessary nutrients. This framework is designed to ensure that school lunches provide children with the nutrients they need. In contrast, various countries have set nutritional standards and criteria for selecting ingredients in school lunch. The goal is to offer meals that meet certain nutritional requirements (2).

2) Food and Nutrition Education in Japan and Other Countries

In Japan, school lunches are not only about providing food but are also integrated into the educational system. The concept of "*Shokuiku*" (Food and Nutrition Education) has spread, where education is delivered through school lunch. Conversely, in many foreign countries, school lunch programs are more focused on nutritional supplementation. The educational aspect of Food and Nutrition Education is often not as emphasized as it is in Japan. While many foreign countries also promote measures for nutritional balance and health improvement, Food and Nutrition Education activities are not as systematically structured as in Japan (3).

3) Positioning of Food and Nutrition Education in Japanese School Lunch

In Japan, the Basic Law on Food and Nutrition Education was enacted in 2005. It positions Food and Nutrition Education as "fundamental to life and the foundation of intellectual, moral, and physical education." Thus, Japanese school lunch is expected to not only ensure adequate nutrition but also fulfill an educational role, including Food and Nutrition Education (4). While Food and Nutrition Education is conducted as part of the curriculum, mealtime also serves to foster social skills. Children learn to interact by sharing meals together in the lunchroom regardless of grade level. They also develop social skills by sitting face-to-face with classmates in the classroom.

II. Introduction

The impact of the COVID-19 pandemic (hereafter, 'the pandemic') has been reported to include changes in

children's nutrition and dietary habits. During the state of emergency, a decline in the consumption of nutritionally balanced meals was observed, particularly among children from lower-income households (5). It has been revealed that children with delayed wake-up and breakfast times during school closures were found to be at higher risk of developing unhealthy lifestyle habits (6). Furthermore, after schools reopened, intake levels of thiamine, vitamin B6, potassium, fruits, and dairy products increased. Meanwhile, consumption of sugars, sweets, and sugary drinks decreased (7). These findings suggest that the pandemic, especially during the state of emergency and school closures, had a significant impact on children's nutritional status and eating habits.

The pandemic also affected Food and Nutrition Education initiatives. The "*Guidelines for Food and Nutrition Education*," developed to enhance the promotion of Food and Nutrition Education in schools, outline six key perspectives for food-related instruction (8). Among them, the "Social Skills perspective (developing dining manners and interpersonal relationship-building skills through meals)" emphasizes the value of mealtime as an important opportunity for social interaction. It also highlights fostering an attitude of active engagement in communication.

In relation to children, however, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) issued a notification on November 22, 2021, titled "*Hygiene Management Manual for COVID-19 in Schools*" (9). It stipulated that during lunchtime in school cafeterias, students should avoid sitting face-to-face, refrain from speaking loudly, and eat alone. Consequently, the social function of mealtime as an opportunity for communication was significantly disrupted.

The "*Basic Policy for Countermeasures against COVID-19*" issued on November 25, 2022, removed the reference to "silent eating"(10). MEXT then notified local education boards that conversations during school lunchtime could be permitted, provided that appropriate infection control measures in place were implemented (11). Subsequently, on May 11, 2023, COVID-19 was officially reclassified from a "Novel Influenza Infection, etc." (equivalent to a Category II Infectious Disease) to a Category V Infectious Disease. Following this reclassification, only standard preventive measures—such as handwashing—were required unless an outbreak occurred (12).

Approximately two months after this transition, a study on school lunch revealed that many children perceived eating while conversing to be enjoyable. However, a noticeable reluctance to initiate conversation remained (13). This suggests that the psychological and behavioral effects of prolonged "silent eating" policies may persist even after the formal restrictions have been lifted.

Given these circumstances, it is essential to evaluate the long-term impact of silent eating policies more than one year after COVID-19 was classified as a "Class V Infectious Disease." Such evaluation is expected to contribute to more effective support strategies through food-related instruction provided during school lunch programs.

Based on this premise, the present study examines the current situation in Aomori Prefecture, Japan, a specific region. This description is given in the context of the globally impactful COVID-19 pandemic, focusing on the situation following the end of the normality after the COVID-19 pandemic. Additionally, changes in the situation from the period during the pandemic and normality after are discussed by comparing the current findings with those from previous research (13).

MATERIALS AND METHODS

1. D

1. Data for the study

		(b) Compare					
		Previous research (13)		(a) This study	Intervention study		
Months	and	Jul. 2022	Jul. 2023	Aug. 2024	Sep. 2024	Oct. 2024	Dec. 2024
Years							
Method				Baseline survey	Post survey	One-month post-survey	Three-month post-survey
		Self-administered questionnaire			Self-administered questionnaire		

Target Schools	Six elementary schools in Aomori Prefecture (A, B, C, D, E, F)	Four elementary schools in Aomori Prefecture (A, B, C, D)
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Fig 1. Summary Chart of Survey Data for this study

The data used for analysis in this study were cross-sectional observational data obtained from an intervention study ((Figure 1 (a)). The intervention study was conducted at the same elementary school as in previous research (13). The intervention study aimed to examine whether a school broadcasting system could be effectively utilized for nutrition education in elementary schools. It also aimed to explore its impact on students' conversations during lunchtime. A baseline survey, consisting of a self-administered questionnaire, was conducted in August 2024 (baseline survey). Following this, a one-month school broadcasting program was implemented in September 2024. After the program concluded, a post-program survey was distributed, and responses were collected. Subsequent surveys were conducted one month and three months after the completion of the broadcasting program. For the purpose of this study, the observational data obtained from the baseline survey were used as the primary outcome.

2. Characteristics of the Survey Area (14)

Aomori Prefecture is located in the northern part of Japan. It is bordered by the Pacific Ocean to the east and the Sea of Japan to the west. It has a cool climate characterized by short summers and long winters. The population of Aomori is approximately 1.2 million, which is smaller compared to other Japanese prefectures, and over 30% of the population is aged 65 or older, indicating an aging population. Its geographical features include being separated from Hokkaido to the north by the Tsugaru Strait, bordered by the Pacific Ocean to the east, and the Sea of Japan to the west. To the south Aomori shares borders on Akita and Iwate Prefectures. The total area of Aomori is 9,646 km² (the eighth largest in Japan), accounting for 2.6% of the country's total land area. However, the population density ranks 41st nationally, placing it in a region with vast, rich natural environments. The western part of the prefecture, benefiting from favorable temperatures and sunlight, is known for apple production, while the eastern region, taking advantage of its cool summer conditions, is active in vegetable farming and livestock production. As a result, local ingredients are actively used in school lunches, with the proportion of locally sourced products (based on monetary value) at 66.9%, which is higher than in other Japanese prefectures (15).

3. Participants

This study was conducted with the cooperation of six public elementary schools in Aomori Prefecture. Of these, four schools agreed to cooperate with the survey. The participants consisted total number of 150 children from grades 4, 5, and 6 enrolled in these four schools. Consent for participation was obtained from both the children's parents and the children themselves, resulting in 120 participants (61 boys and 59 girls). The remaining 30 participants either declined to participate or did not return the consent forms. Thus, the final sample size for the study was 120. Additionally, to understand the characteristics of the target schools, a self-administered questionnaire survey was conducted with eight class teachers.

4. Questionnaires

The scales for each question were set respectively based on previous studies (13).

To describe the conversation situation during school lunchtime, the question "Do you talk during school lunchtime?" was asked, with responses ranging from "Always" to "Never" on a four-point scale.

For the other related item, "Do you eat all your school lunch?" responses were collected on a three-point scale, ranging from "Always finish their meal" to "Always leave leftovers."

For the question "Is school lunchtime enjoyable?" responses were collected on a four-point scale, ranging from "Very enjoyable" to "Not enjoyable."

For the questions "Do you want to eat school lunch while talking with others?" "Do you think it is fun to eat school lunch while talking with others?" and "Do you think it is possible for everyone to eat school lunch while talking?" responses were collected on a four-point scale, ranging from "Agree" to "Disagree."

Additionally, class teachers responded to items regarding the lunch location, desk arrangement, and silent eating guidance.

5. Statistical analysis

The analysis was conducted on data from 120 participants who provided informed consent, including both the children and their guardians. Missing data were handled using listwise deletion on a per-item basis. To examine differences between male and female participants for each item, the Mann-Whitney U test was

employed for statistical comparisons. The analysis software used was EZR (16) Version 1.55 (Department of Hematology, Saitama Medical Center, Jichi Medical University), and the significance level was set at and the significance level was $p\text{-value} < 0.05$.

The results obtained in this study were compared with those from previous research (13) conducted by the authors (Figure 1 (b)). The previous studies, which targeted fifth-grade children from six elementary schools (A, B, C, D, E, F) in July 2022 and July 2023, were also conducted in these schools. In the present study, surveys were conducted in August 2024, targeting fourth, fifth, and sixth-grade children from four of the same elementary schools (A, B, C, D), where consent had been obtained.

The term "July 2022" in the text refers to the period during the seventh wave of the pandemic in Japan. During this time, the number of new cases exceeded previous waves (17). This period indicates the peak of the so-called "during the COVID-19 pandemic." "July 2023" refers to the situation approximately two months after the classification of COVID-19 was changed. The classification was changed from "Novel Influenza Infection, etc. (Equivalent to Class II Infectious Diseases)" to "Class V Infectious Disease" (effective from May 8, 2023) (18). This change represents the "after the COVID-19 pandemic" phase of the pandemic. "August 2024" refers to a period more than a year after COVID-19 was categorized as a "Class V Infectious Disease." This period marks the "normality after the COVID-19 pandemic," with no restrictions in place.

6. Ethical considerations

This study was conducted with the review and approval of the Ethics Committee of Aomori University of Health and Welfare (Approval No. 24047). The class teachers verbally explained the purpose, methods, and the voluntary nature of participation in the survey to the children. They ensured that there would be no disadvantage for those who chose not to participate. The parents were provided with written information detailing the research outline and ethical considerations. Written consent was obtained from both the parents and the children before the survey began.

RESULTS

1. Characteristics of the Target Elementary Schools (Table 1)

		Overall (n=8)	
		n	(%)
Lunch Location	Classroom	7	87.5
	Lunchroom	1	12.5
	Other	0	0.0
Desk Arrangement	Facing Each Other (Group Format)	1	12.5
	Same Direction	7	87.5
	Other	0	0.0
Silent Eating Guidance	Yes	4	50.0
	No	4	50.0

Regarding the lunch location, most children ate in their classrooms. Some schools had a designated lunchroom. As for the desk arrangement, most of the classrooms had children seated facing the same direction, but some were arranged in facing each other (group format). Regarding silent eating guidance, responses were evenly split between those who followed this practice and those who did not.

3. Conversation and Eating Behavior during School Lunchtime of children (Table 2)

Table 2. Distribution of Conversation and Eating Behavior during School Lunchtime of children

			Overall		Boys (n=61)		Girls (n=59)		p- value
			n	(%)	n	(%)	n	(%)	
Frequency of Food Leftover	Always finish their meal	Always finish their meal	64	53.3	35	57.4	29	49.2	0.452
		Sometimes leave leftovers	49	40.8	22	36.1	27	45.8	
		Always leave leftovers	7	5.8	4	6.6	3	5.1	
Conversation during Lunch	Always	Always	38	31.7	21	34.4	17	28.8	0.619
		Sometimes	42	35.0	21	34.4	21	35.6	
		Rarely	33	27.5	15	24.6	18	30.5	
		Never	7	5.8	4	6.6	3	5.1	
Enjoyment of Lunchtime	Very enjoyable	Very enjoyable	50	41.7	26	42.6	24	40.7	0.988
		Moderately enjoyable	60	50.0	29	47.5	31	52.5	
		Not very enjoyable	9	7.5	6	9.8	3	5.1	
		Not enjoyable at all	1	0.8	0	0.0	1	1.7	
Desire to Talk while Eating	Agree	Agree	88	73.3	46	75.4	42	71.2	0.654
		Somewhat agree	25	20.8	11	18.0	14	23.7	
		Somewhat disagree	6	5.0	4	6.6	2	3.4	
		Disagree	1	0.8	0	0.0	1	1.7	
Enjoyment of Eating while Talking	Agree	Agree	98	81.7	52	85.2	46	78.0	0.291
		Somewhat agree	16	13.3	7	11.5	9	15.3	
		Somewhat disagree	6	5.0	2	3.3	4	6.8	
		Disagree	0	0.0	0	0.0	0	0.0	
Ability to Eat while Talking	Agree	Agree	67	55.8	39	63.9	28	47.5	0.106
		Somewhat agree	28	23.3	11	18.0	17	28.8	
		Somewhat disagree	21	17.5	9	14.8	12	20.3	
		Disagree	4	3.3	2	3.3	2	3.4	

Mann-Whitney U test

Each item was compared between genders. The results showed no significant differences between males and females for any item, and thus, subsequent analyses were conducted with both genders combined.

Regarding the "Conversation during Lunch," 66.7% of respondents answered that they "always" and "sometimes" engage in conversation. Regarding "Desire to Talk while Eating," 73.3% answered "Agree." When asked, "Enjoyment of Eating while Talking" 81.7% answered "Agree."

DISCUSSION

1. Changes across Three Time Points (during the COVID-19 Pandemic, after the COVID-19 Pandemic, and Normality after the COVID-19 pandemic)

Notifications Related to Infection Control	Months and Years	Conversation during Lunch (%)	Target Schools	Target Children's (Grade)	Social Situation at the Time of the Survey	The COVID-19 Pandemic
Response to Eating Alone →	Nov. 2021					Pandemic
	Jul. 2022	21.5	Six elementary schools in Aomori Prefecture (A, B, C, D, E, F)	5th *Recalling 4th	The period during the 7th wave, when the number of new positive cases surpassed previous waves in Japan.	
Removal of Silent Eating Guidelines →	Nov. 2022					
Routine Infection Control Measures →	May 2023					Post-pandemic
	Jul. 2023	38.3	Six elementary schools in Aomori Prefecture (A, B, C, D, E, F)	5th	The period approximately two months after the COVID-19 was reclassified as a "Class V Infectious Disease" in Japan.	
	Aug. 2024	66.7	Four elementary schools in Aomori Prefecture (A, B, C, D)	4, 5, 6th	The period more than one year after the COVID-19 was reclassified as a "Class V Infectious Disease" in Japan.	Normality

"Conversation during Lunch (%)", answered "always" and "sometimes."

Fig 2. Comparison of Conversation during School Lunchtime in Previous Studies and the Present Study

After the COVID-19 pandemic, a notable increase was observed in conversation during school lunchtime (Figure 2) among the children. More children who found eating while talking enjoyable were also observed. Additionally, there was an increase in the number of children who wished to talk while eating. These changes indicate a gradual return to pre-pandemic norms, when silent eating was not enforced.

Compared with previous research (13), during and after the pandemic, children ate in their classrooms facing the same direction. Furthermore, during the pandemic, silent eating was enforced in all cases. In

comparison with previous research (13), the results for "Conversation during Lunch" at three different time points were as follows. During the pandemic, 21.5% answered "always" and "sometimes." After the pandemic, 38.3% responded this way. During the normality after the COVID-19 pandemic, the rate rose to 66.7%.

Regarding "Desire to Talk while Eating," 57.0% responded "Agree" during the pandemic, 60.7% after the pandemic, and 73.3% during the normality after pandemic phase. For "Enjoyment of Eating while Talking", 75.5% responded "Agree" during the pandemic, 77.6% after the pandemic, and 81.7% during the normality after pandemic phase.

Previous research (13) indicated that although children desired to talk while eating after the pandemic, few initiated conversations themselves. The effects of silent eating due to the COVID-19 pandemic still persisted. However, in the normality after the COVID-19 pandemic, approximately 70% of children wanted to talk while eating, and around 70% engaged in conversation during school lunchtime. This suggests that the gap between the desire to talk while eating and the ability to do so has narrowed. In other words, the effects of silent eating during the COVID-19 pandemic seem to have diminished in the normality after the COVID-19 pandemic. In elementary schools, the practice of silent eating has been gradually discontinued, and school lunchtime settings such as lunchrooms and Facing Each Other (Group Format) have become more common. On the other hand, children who experienced the pandemic may lack certain "Social Skills," including developing dining manners and interpersonal relationship-building skills through meals. These challenges, highlighted from a food and nutrition education perspective, may stem from the prolonged period of restricted interaction. This suggests a need for further development of the understanding that mealtime is an important opportunity for communication and fostering positive attitudes that encourage active communication during meals.

This report includes inferences based on the temporal context of the pandemic. It provides new insights into the post-pandemic period, particularly following the lifting of restrictions on conversation during school lunches. There are few reports that focus on the situation after such restrictions were lifted, making this finding a novel contribution.

There are three primary limitations in this study. First, since the research was conducted in a limited region of Aomori Prefecture, caution is needed when generalizing the results. To generalize the findings, it will be necessary to investigate whether similar trends are observed in other regions. Second, it is possible that Aomori Prefecture, with its relatively low population density, experienced a lesser degree of the COVID-19 impact compared to other regions of Japan. Third, the study did not compare exactly the same group of children. Although the research was conducted in the same schools as the previous study, two schools were excluded. The children sample included a broader range (grades 4, 5, and 6).

While the groups were not identical, capturing changes across three time points in response to silent eating provides significant insights. Despite these limitations, this study clarifies the current situation, where the impact of silent eating imposed during the COVID-19 pandemic has substantially diminished. It also contributes to the generation of new hypotheses for future strategies to support children. This applies to the normality after the COVID-19 pandemic, after the removal of restrictions.

In conclusion, it has been revealed that conversation during school lunchtime has increased. The impact of the silent eating policy enforced during the COVID-19 pandemic appears to have diminished significantly. On the other hand, the findings suggest the continued need for further enhancement of "Social Skills" from the perspective of food education for children who experienced the pandemic. This study has provided valuable implication to develop the post-pandemic strategies for supporting school lunch programs.

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