

## Original Article

# The relationship between parental mealtime behavior and subjective diet-related quality of life (SDQOL) of Japanese adolescents: A cross sectional study in Kumamoto prefecture

Miho Sakai RD<sup>1</sup>, Haruna Matsumoto RD<sup>1</sup>, Naomi Hayami PhD<sup>2</sup>, Tatsuaki Sakamoto PhD<sup>1</sup>

<sup>1</sup>Faculty of Environmental and Symbiotic Sciences, Prefectural University of Kumamoto, Kumamoto, Japan

<sup>2</sup>Graduate School of Human Life and Ecology, Osaka Metropolitan University, Osaka, Japan

**Background and Objectives:** Family meals favor adolescent dietary quality and mental health. The aim of this study was to explore the relationships between parental behavior during family meals, and the subjective diet-related quality of life (SDQOL) of Japanese adolescents. **Methods and Study Design:** Participants comprised 664 second-year junior high school students aged 13-14 years from Kumamoto Prefecture, Japan. Survey items included sex, age, family structure, parental behavior during mealtimes (frequency of warnings/listening to children), frequency of family meals (number of meals taken together), and SDQOL. Participants were divided into two groups (low and high) based on the median SDQOL score. Logistic regression analysis was performed to examine the relationships among parental behavior during meals, frequency of family meals, and SDQOL. The dependent variable was SDQOL; independent variables were parental mealtime behavior and family meal frequency. **Results:** The high-SDQOL group comprised 150 boys (45.3%) and 167 girls (51.1%). Compared to those who ate with family 0–5.5 times per week, those who did so 7–9.5 (OR: 2.56, 95% CI: [1.64-4.00]) or 11.5–14.0 (OR: 2.87, 95% CI: [1.83-4.50]) times per week had a better SDQOL. Those whose parents listened during meals on four or more days per week, compared with three days or less, had a better SDQOL (OR: 4.06, 95% CI: [2.76-5.98]). **Conclusions:** Eating together more than seven times a week and having parents listen to them during meals are associated with better adolescent SDQOL.

**Key Words:** subjective diet-related quality of life, eating habits, family meals, parents, Japanese adolescents

## INTRODUCTION

The frequency of family meals is associated with better diet quality, healthy meal patterns,<sup>1,2</sup> maintenance of appropriate body weight,<sup>3,4</sup> and good mental health.<sup>5,6</sup> Based on this evidence, in Japan, the Fourth Basic Plan for the Promotion of Shokuiku (food and nutrition education) sets the goal of increasing the number of times that people eat breakfast or dinner with their families to 11 or more times per week.<sup>7</sup> In addition, the first item in the Japanese dietary guidelines is to enjoy meals.<sup>8</sup>

Family communication during mealtimes is a crucial factor in making family meals enjoyable. In a qualitative descriptive study of families with at least one adolescent between the ages of 12 and 16 years, meal frequency and pleasant conversations were associated with the conviviality of family meals.<sup>9</sup> In addition, a study of 5th and 6th graders at an elementary school in Korea showed that the frequency of family meals, having more conversations, and a better atmosphere during family meals predicted fewer depressive symptoms in children.<sup>10</sup> An overview of these studies shows that conversations during meals may be an important component of a desirable family meal.

Likewise, studies have focused on the behavior of other

family members during family mealtimes. Creating a positive mealtime atmosphere between parents is a strong predictor of children's higher nutritional quality.<sup>11</sup> In addition, parents not using smartphones during mealtimes was associated with the enjoyment of meals by junior high students.<sup>12</sup> Another study reported that, even when the children and their parents used smartphones during mealtimes, subjective diet-related quality of life (SDQOL) scores were high for children who possessed good dietary behaviors, such as voluntary mealtime communication with the family.<sup>13</sup>

Adolescents' quality of life and well-being are related to family meals.<sup>14</sup> Family mealtimes are times of sharing between family members, contributing to an increase in

**Corresponding Author:** Dr Tatsuaki Sakamoto, Faculty of Environmental and Symbiotic Sciences, Prefectural University of Kumamoto, 3-1-100 Tsukide, Higashi-ku, Kumamoto 862-8502, Japan.

Tel: +81-96-234-6547

Email: sakamoto3@pu-kumamoto.ac.jp

Manuscript received 28 April 2022. Initial review completed 26 July 2022. Revision accepted 04 August 2022.

doi: 10.6133/apjcn.202212\_31(4).0021

communication and better family functioning.<sup>15</sup> Although several studies have focused on parental behavior during mealtimes, more information is needed on parental behaviors to improve family meals.

In this study, we aimed to clarify the relationships between parental behavior during mealtimes, the frequency of family meals, and children's SDQOL, which is a comprehensive evaluation of enjoyment and satisfaction with eating habits. We focused on two behaviors of parents during meals: frequency of warnings and angering children during meals and frequency of listening to children during meals. We hypothesized that a high frequency of shared meals and parents listening well and not becoming angry during meals would be associated with a good SDQOL.

## METHODS

### *Study design and participants*

The study design was cross-sectional. A self-administered questionnaire survey was conducted in September 2020 among public junior high school students in Kumamoto Prefecture, Japan, in five schools with the written consent of the respective principals. Further consent for the survey was obtained from the appropriate board of education before conducting the survey. When the survey was conducted, it was a COVID-19 pandemic, but students were attending school in Japanese public junior high schools with infection prevention.

The target grade was the eighth grade (the typical age of an eighth grader in Japan is 13-14 years old), considering that first-year junior high school students are enrolled in junior high school for a short period and that third-year junior high school students are in the examination period, making it difficult to conduct a survey.

In total, 746 students from among the 6,430 second-year junior high school students registered in Kumamoto city schools were invited to participate in the study. The reasons students did not participate in the study were as follows: (a) absent on the day of evaluation (60 students); (b) did not answer the study (22 students). A total of 664 students responded to the survey.

### *Survey procedure*

This survey was conducted in September 2020 in classrooms at each school, facilitated by classroom teachers, for approximately 15 minutes during the homeroom class. The survey was conducted anonymously. The survey procedure was standardized by creating a survey manual. First, the classroom teacher explained to the students that cooperation with the survey was voluntary, that there would be no disadvantage if they did not cooperate (i.e., it would not affect their grades), that they did not have to answer questions they did not want to answer, and that they would be considered to have participated in the survey if they answered the questions. Responses to the questionnaire were regarded as consent to participate.

The questionnaire was administered on paper and written in Japanese. The purpose of the survey was explained to the parents in advance, in writing. This study was approved by the ethics committee of the Prefectural University of Kumamoto (02-08).

## *Variables*

### **Dependent variable**

Participants completed the SDQOL questionnaire,<sup>16</sup> which has been validated for examining the association between comfort in life and satisfaction with life, to assess the diet-related quality of life in adulthood. The SDQOL comprises four items ("I enjoy mealtimes," "I am eager for mealtimes to come," "My meals are eaten in a positive atmosphere," and "I am satisfied with my daily diet"). Each item is rated on a 5-point scale ranging from "agree" (1) to "disagree" (5). For analytical purposes, responses were scored in an inverse direction (i.e., agree = 5 to disagree = 1) with a higher score indicating higher SDQOL. To confirm whether the scale for adults can be used for junior high school students, an exploratory factor analysis (main factor method, promax rotation) was conducted on the subjects in this study, with no fixed number of factors and an eigenvalue of 1 or higher. As a result, one factor (explained variance: 58.7%) was extracted, and all four items had factor loadings of 0.4 or higher. For SDQOL, Cronbach's alpha was 0.76, which was equivalent to that of previous studies (alpha = 0.72).<sup>16</sup> The reliability of the scale was confirmed.

The participants were divided into two groups according to the median SDQOL score (16 points) with those below the median constituting the low-SDQOL group and those above the median constituting the high-SDQOL group.

### **Independent variable**

We asked about two types of parental behavior during mealtimes: the frequency of warnings and angering children during meals and the frequency of listening to children during meals. The questions were as follows: "When you eat with your family, how often do your parents warn you or make you angry?" "How often do you feel your parents listen to you during mealtime?" Responses were given as "almost every day," "four or five times a week," "two or three times a week," "once a week," and "almost never." All of these questions were asked of middle school students.

The most common response for frequency of warning children during meals was "almost never." Those who answered "almost every day," "four or five days a week," "two or three days a week," and "about one day a week" were classified as the "more than one day a week" group, and those who answered "almost never" were classified as the "almost never" group. For frequency of parents listening to them during meals, participants were divided into two groups, "four or more days a week" and "three or fewer days a week," considering the distribution.

To assess the frequency of family meals (breakfast and dinner), participants were asked to report the number of days a week in response to the question, "How many days per week do you eat breakfast with the family?" and "How many days per week do you eat dinner with the family?" Responses to each question were given as "almost every day," "four or five times a week," "two or three times a week," "once a week," and "almost never." Responses of "almost every day" were defined as 7 times per week, "four or five days per week" as 4.5 times per week, "two or three days per week" as 2.5 times per week,

and “about once per week” as 1 time per week. The number of meals consumed per week, which was the sum of the number of meals consumed for breakfast and dinner (value range: 0–14), was used as a variable.

The Fourth Basic Plan for the Promotion of Shokuiku, Japan,<sup>7</sup> sets a target of “11 times per week or more” for the number of occasions of breakfasts or dinners with family members; therefore, the responses were divided into three groups: 11.5–14.0 times, 7–9.5 times, and 0–5.5 times.

### Other variables

We asked participants about their sex and age. For family structure, respondents were asked to indicate who they lived with (fathers, mothers, grandparents, and siblings).

### Data analysis

Of the 664 respondents, 658 (331 boys and 327 girls; valid response rate: 99.1%) were included in the analysis, excluding six who did not report gender and did not respond to the SDQOL questionnaire.

First, the characteristics of the participants according to sex were compared using the chi-square test. Next, parental behavior during mealtimes and frequency of family eating were examined in the low and high-SDQOL groups using the chi-square test.

We combined the data for girls and boys because analyses showed similar values for the associations between

both sexes, following logistic regression analysis conducted to examine the relationship between parental behavior during mealtimes, frequency of family meals, and SDQOL. The dependent variable was SDQOL, and the independent variables were frequency of parents warning and angering them during meals, frequency of parents listening to them during meals, and frequency of family meals. After calculating crude odds ratio (OR) and 95% confidence interval (CI), multivariate OR and 95% CI were calculated adjusting for sex, age and family structure. All variables were imputed simultaneously using the forced imputation method. The goodness of fit of the regression equation was confirmed using the Hosmer-Lemeshow goodness-of-fit test. All analyses were performed using IBM SPSS Statistics for Windows, version 27.0 (IBM Japan, Ltd., Tokyo, Japan). Statistical significance was set at  $p < 0.05$ .

## RESULTS

### Characteristics of participants

Table 1 presents the characteristics of the participants. There were no sex differences in age or number of family members living together. There was a sex difference in the frequency of parents listening to them during meals with more girls answering almost every day.

**Table 1.** Participant characteristics (N=658)

	Total (N=658)		Boys (n=331)		Girls (n=327)		<i>p</i> <sup>†</sup>
	n	(%)	n	(%)	n	(%)	
Age (years)							
13	335	(51.5)	164	(50.5)	171	(52.5)	0.611
14	316	(48.5)	161	(49.5)	155	(47.5)	
Family members who live together							
Father	520	(79.5)	259	(78.7)	261	(80.3)	0.616
Mother	628	(96.0)	314	(95.4)	314	(96.6)	0.442
Grandparents	100	(15.3)	51	(15.5)	49	(15.1)	0.880
Sibling	553	(84.6)	274	(83.3)	279	(85.8)	0.364
SDQOL							
Low-SDQOL group	341	(51.8)	181	(54.7)	160	(48.9)	0.140
High-SDQOL group	317	(48.2)	150	(45.3)	167	(51.1)	
Frequency of family meals (times/week)							
0–5.5	184	(28.0)	88	(26.6)	96	(29.4)	0.187
7–9.5	238	(36.2)	131	(39.6)	107	(32.7)	
11.5–14.0	236	(35.9)	112	(33.8)	124	(37.9)	
Frequency of warning and angering children during meals							
Almost every day	16	(2.4)	11	(3.3)	5	(1.5)	0.071
4–5 times a week	12	(1.8)	6	(1.8)	6	(1.8)	
2–3 times a week	61	(9.3)	31	(9.4)	30	(9.2)	
Once a week	85	(12.9)	53	(16.0)	32	(9.8)	
Almost never	484	(73.6)	230	(69.5)	254	(77.7)	
Frequency of parents listening to children during meals							
Almost every day	338	(51.4)	149	(45.0)	189	(57.8)	0.018
4–5 times a week	98	(14.9)	54	(16.3)	44	(13.5)	
2–3 times a week	103	(15.7)	58	(17.5)	45	(13.8)	
Once a week	38	(5.8)	20	(6.0)	18	(5.5)	
Almost never	81	(12.3)	50	(15.1)	31	(9.5)	

<sup>†</sup>Chi-square test.

Missing values are excluded for each variable.

### **Parental behavior during mealtimes and frequency of family meals by SDQOL**

Table 2 shows parental behavior during mealtimes and the frequency of family meals by low and high-SDQOL groups. Boys and girls in the high-SDQOL group more often ate together 11.5–14.0 times per week (boys and girls:  $p < 0.001$ ). In addition, the high-SDQOL group answered that parents listened to them during meals for more than 4 days (boys and girls:  $p < 0.001$ ).

### **Associations between parental behavior during mealtimes, frequency of family meals, and SDQOL**

Table 3 shows the associations between parental behavior during mealtimes, frequency of family meals, and SDQOL. Compared to those who ate with family 0–5.5 times per week, those who ate with family 7–9.5 (OR: 2.56, 95% CI: [1.64–4.00]) or 11.5–14.0 (OR: 2.87, 95% CI: [1.83–4.50]) times per week had better SDQOL. Compared to those who had parents listen during meals on three days or less, those who had parents listen during meals on four or more days per week had better SDQOL (OR: 4.06, 95% CI: [2.76–5.98]). There was no association between the frequency of parents warning and angering them during meals and SDQOL. The results of the Hosmer-Lemeshow goodness-of-fit test were good ( $p = 0.143$ ).

## **DISCUSSION**

In this study, we examined the relationships between parental behavior during mealtimes, the frequency of family meals, and junior high school students' SDQOL. Eating with family more than seven times a week and having parents listen to them during meals more than four days a week were associated with better SDQOL. On the other hand, frequency of parents warning and angering them during meals was not associated with SDQOL.

Eating with family more than seven times a week was associated with better SDQOL for both boys and girls. This result was similar to that of previous studies reporting an association between family meal and good health status.<sup>14,17</sup> As a sub-analysis, we conducted a logistic regression analysis based on the frequency of eating as a family 7–9.5 times per week as a reference. Significantly more participants who ate with the family 0–5.5 times per week had low SDQOL than those who ate together 7–9.5 times per week. However, no significant difference was found between those who ate as a family 11.5–14.0 and 7–9.5 times per week (data not shown). This suggests that good SDQOL among junior high school students is associated with the opportunity to eat as a family at least seven times a week.

In addition, having parents listen to children during meals for more than four days a week was associated with better SDQOL. It has been suggested that conversation during meals can have a positive impact on mental health,<sup>9,10</sup> and a nurturing attitude toward accepting and listening to children creates a congenial dining atmosphere. As a result of this attitude, conversations during meals may increase, and SDQOL may be enhanced. Adolescents who report frequent family meals also report that they feel they can talk to their parents about their concerns.<sup>14</sup> Family meals are associated with better emotional

health for parents.<sup>15</sup> Good communication between children and parents during meals may contribute to good mental health and good family relationships.

One of the new findings of this study is that, not only the frequency of family meals, but also parental behavior during mealtimes is associated with adolescents' SDQOL. Other parental behaviors during meals may also be associated with adolescents' SDQOL, and further research is needed.

This study has several limitations. First, as this was a cross-sectional study, we could not clarify a causal relationship, that is, whether more family meals affect SDQOL or whether SDQOL affects participation in family meals. Further studies are required to evaluate these mechanisms. Second, the participants were junior high school students in one region of Japan, and, thus, the generalizability of the results is limited. Third, this study was based on self-administered questionnaires, therefore parental behavior was based on the students' responses, which may differ from the actual situation. Given differences in perceptions between students and parents, parents may listen, but children may not feel that they are. Two types of parental behavior during mealtimes respectively, were evaluated with a single question. Further study is required, along with indicators that more accurately capture the behavior of parents. Fourth, SDQOL may be related to parents' nurturing attitudes, household income, meal details, and the nutritional status of the parents and participants. We were unable to assess these confounding factors in this study. Despite the above limitations, the results suggest that parents' attentive listening during meals and the frequency of eating together more than seven times a week are associated with a better SDQOL.

## **Conclusions**

Our findings indicate that the frequency of eating together as a family more than seven times a week and listening well during meals were associated with better SDQOL in adolescents. Depending on the family, it may be difficult to increase the number of family mealtimes because of parental work arrangements. Nevertheless, an awareness of the associations may encourage families to identify opportunities to operationalise these findings.

## **AUTHOR DISCLOSURES**

The authors declare that there are no conflicts of interest.

## **REFERENCES**

1. Larson NI, Nelson MC, Neumark-Sztainer D, Story M, Hannan PJ. Making time for meals: meal structure and associations with dietary intake in young adults. *J Am Diet Assoc.* 2009;109:72-9. doi: 10.1016/J.JADA.2008.10.017.
2. Lee SY, Ha SA, Seo JS, Sohn CM, Park HR, Kim KW. Eating habits and eating behaviors by family dinner frequency in the lower-grade elementary school students. *Nutr Res Pract.* 2014;8:679. doi: 10.4162/nrp.2014.8.6.679.
3. Larson N, MacLehose R, Fulkerson JA, Berge JM, Story M, Neumark-Sztainer D. Eating breakfast and dinner together as a family: associations with sociodemographic characteristics and implications for diet quality and weight status. *J Acad Nutr Diet.* 2013;113:1601-9. doi: 10.1016/J.JAND.2013.08.011

**Table 2.** Relationships among parental behavior during mealtimes, frequency of family meals, and SDQOL (N=658)

	Boys (n=331)				<i>p</i> <sup>†</sup>	Girls (n=327)				<i>p</i> <sup>†</sup>
	Low-SDQOL group (n=181)		High-SDQOL group (n=150)			Low-SDQOL group (n=160)		High-SDQOL group (n=167)		
	n	(%)	n	(%)		n	(%)	n	(%)	
Frequency of family meals										
0–5.5 times per week	64	(35.4)	24	(16.0)	<0.001	70	(43.8)	26	(15.6)	<0.001
7–9.5 times per week	66	(36.5)	65	(43.3)		46	(28.8)	61	(36.5)	
11.5–14.0 times per week	51	(28.2)	61	(40.7)		44	(27.5)	80	(47.9)	
Frequency of parents listening to children during meals										
3 or fewer days a week	94	(51.9)	34	(22.7)	<0.001	76	(47.5)	18	(10.8)	<0.001
4 or more days a week	87	(48.1)	116	(77.3)		84	(52.5)	149	(89.2)	
Frequency of warning and angering children during meals										
More than 1 day a week	56	(30.9)	45	(30.0)	0.853	43	(26.9)	30	(18.0)	0.053
Almost never	125	(69.1)	105	(70.0)		117	(73.1)	137	(82.0)	

<sup>†</sup>Chi-square test.

**Table 3.** Odds ratios and 95% confidence intervals for relationships between parental behavior during mealtimes, frequency of family meals, and SDQOL (N=658)

	Crude OR	(95% CI)	Adjusted OR	(95% CI)
Frequency of family meals				
0–5.5 times per week	1.00 (reference)		1.00 (reference)	
7–9.5 times per week	3.02	(2.00-4.56)	2.56	(1.64-4.00)
11.5–14.0 times per week	3.98	(2.62-6.03)	2.87	(1.83-4.50)
Frequency of parents listening to children during meals				
3 or fewer days a week	1.00 (reference)		1.00 (reference)	
4 or more days a week	5.07	(3.52-7.30)	4.06	(2.76-5.98)
Frequency of warning and angering children during meals				
More than 1 day a week	1.00 (reference)		1.00 (reference)	
Almost never	1.08	(0.50-2.30)	1.30	(0.55-3.10)

CI: confidence interval; OR: odds ratio

Adjusted OR were calculated using multiple logistic regression analyses adjusted for age, sex and family structure. An OR higher than 1 indicates good SDQOL.

4. Lee HJ, Lee SY, Park EC. Do family meals affect childhood overweight or obesity?: nationwide survey 2008–2012. *Pediatric Obesity*. 2016;11:161-5. doi: 10.1111/ijpo.12035.
5. Kameyama N, Morimoto Y, Hashimoto A, Inoue H, Nagaya I, Nakamura K, Kuwano T. The relationship between family meals and mental health problems in Japanese elementary school children: A cross-sectional study. *Int J Environ Res Public Health*. 2021;18:9281. doi: 10.3390/ijerph18179281.
6. Harrison ME, Norris ML, Obeid N, Fu M, Weinstangel H, Sampson M. Systematic review of the effects of family meal frequency on psychosocial outcomes in youth. *Can Fam Physician*. 2015;61:e96-106.
7. Ministry of Agriculture F and F. The Fourth Basic Plan for the Promotion of Shokuiku (Provisional Translation). Published 2021. [cited 2022/09/14]; Available from: <https://www.maff.go.jp/j/syokuiku/attach/pdf/kannrenhou-30.pdf>.
8. Ministry of Agriculture F and F. Main points of the revision of “Dietary guidelines for Japanese”. Published 2016. [cited 2022/09/14]; Available from: <https://www.maff.go.jp/j/syokuiku/attach/pdf/shishinn-10.pdf>.
9. de la Torre-Moral AL, Fàbregues S, Bach-Faig A, Fornieles-Deu A, Medina FX, Aguilar-Martinez A, Sanchez-Carracedo D. Family meals, conviviality, and the Mediterranean diet among families with adolescents. *Int J Environ Res Public Health*. 2021;18:1-17. doi: 10.3390/IJERPH18052499.
10. Kim YS, Lee MJ, Suh YS, Kim DH. Relationship between family meals and depressive symptoms in children. *Korean J Fam Med*. 2013;34:206-12. doi: 10.4082/kjfm.2013.34.3.206.
11. Knobl V, Dallacker M, Hertwig R, Mata J. Happy and healthy: How family mealtime routines relate to child nutritional health. *Appetite*. 2022;171:105939. doi: 10.1016/j.appet.2022.105939.
12. Sakamoto T, Hayami-Chisuwa N, Hosoda K. The relationship between junior high school students’ enjoyment of family meals and parents using smartphones during meals and family meal frequency. *Japanese Journal of Health Education and Promotion*. 2018;26:3-12. doi: 10.11260/kenkokyoiku.26.3.
13. Hayashi F, Sakaguchi K, Koizumi K, Takemi Y. Relationship between dietary behaviors, attitudes, and smartphone usage during meals and subjective diet-related quality of life of children. *Japanese Journal of Health Education and Promotion*. 2020;28:245-58. doi.org/10.11260/kenkokyoiku.28.245. (In Japanese)
14. Utter J, Denny S, Robinson E, Fleming T, Ameratunga S, Grant S. Family meals and the well-being of adolescents. *J Paediatr Child Health*. 2013;49:906-11. doi: 10.1111/JPC.12428.
15. Utter J, Larson N, Berge JM, Eisenberg ME, Fulkerson JA, Neumark-Sztainer D. Family meals among parents: Associations with nutritional, social and emotional wellbeing. *Prev Med*. 2018;113:7-12. doi: 10.1016/J.YPMED.2018.05.006.
16. Ainuki T, Akamatsu R, Hayashi F, Takemi Y. Association of enjoyable childhood mealtimes with adult eating behaviors and subjective diet-related quality of life. *J Nutr Educ Behav*. 2013;45:274-8. doi: 10.1016/j.jneb.2012.11.001.
17. Harbec MJ, Pagani LS. Associations between early family meal environment quality and later well-being in school-age children. *J Dev Behav Pediatr*. 2018;39:136-43. doi: 10.1097/DBP.0000000000000520.