

Diet and Lifestyle of Kindergarten Children in Gifu II

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Introduction

Recent changes in social and domestic environments have had a large effect on the lifestyles of children. There have been many reports of sleep and diet problems, and problems with the environment and content of play.¹⁾

In light of this situation, the Ministry of Education's Central Education Council has examined all lifestyle habits, including diet, rest, and sleep, and issued a report recommending that proper habits be instilled in children themselves.²⁾ And in 2001, the School Health Committee issued its *Statement on Children's Sleep Habits*, which states that sleep problems are a major concern among children's health issues.³⁾ Chapter two of the Kindergarten Teaching Procedures (revised in 2008)⁴⁾, which concerns the goals and content of kindergarten education, states that "The kindergarten should coordinate with families in instilling basic life skills and values through daily activities and lifestyle."

However, the Ministry of Education's 2010 white paper on *The Present State of Children's Life Habits*⁵⁾ reports that the basic lifestyle habits of children from infancy through the primary school years have become very irregular, and that this instability is one reason for the decline in physical strength, vigor, and interest in learning.

In a previous paper, the authors of this paper reported on the overall lifestyles and eating habits of kindergarten children. This paper concentrates on sleep problems in particular.

Methodology

1. Period and Subjects of the Study

This study was conducted in 2013, between the end of June and the beginning of July, at the Tokai Daiichi and Tokai Daini Kindergartens in Gifu City, Gifu Prefecture. An anonymous survey

was distributed to the families of 261 kindergarten children. The purpose of the survey was explained in advance, and parents agreeing to participate filled in and returned the questionnaires provided.

The response rate was 93.8%; the parents of 59 three-year-olds, 71 four-year-olds, 84 five-year-olds, and 27 six-year-olds completed the questionnaire, for a total of 241 responses.

2. Survey Questions

The survey used a questionnaire sheet, and parents selected the appropriate response from among several choices. The questions covered basic attributes, sleep habits, foods consumed and eating patterns, exercise, play, and TV and other media use, among other topics.

3. Statistical Analysis

The data collected was compiled and analysed with SPSS software. Where appropriate, the results were subdivided by sex or age.

Results

1. Sleep Patterns

The average wake-up time was 6:53 AM (± 35 minutes) on weekdays, and 7:19 AM (± 53 minutes) on weekends and holidays ($P < 0.01$). The average time for going to bed was 8:39 PM (± 47 minutes) on weekdays, and 8:10 PM (± 50 minutes) on weekends and holidays ($P < 0.01$). The average amount of time spent sleeping was 10 hours and 1 minute (± 1 hour and 9 minutes) on weekdays, and 10 hours and 4 minutes (± 1 hour and 25 minutes) on weekends and holidays ($P < 0.05$). These results show a significant difference between weekdays and holidays; the children rose and went to sleep later on weekends and holidays. There was no significant difference in the amount of time slept, however.

Fig.1 and 2 show the proportion of children at each age level who went to bed before and after 10

Table 1. Sleeping Times According to Age

	Weekdays			Weekends and Holidays		
	Wake-up time	Sleep time	Duration of sleep	Wake-up time	Sleep time	Duration of sleep
3-year-olds	6 : 49	20 : 36	10 : 11	7 : 15	20 : 55	10 : 12
4-year-olds	6 : 50	20 : 59	9 : 53	7 : 18	21 : 13	9 : 58
5-year-olds	6 : 59	21 : 04	10 : 03	7 : 22	21 : 18	10 : 11
6-year-olds	6 : 58	20 : 56	9 : 58	7 : 20	21 : 14	9 : 53
Total	6 : 54	20 : 39	10 : 01	7 : 19	21 : 10	10 : 04

(n=241)

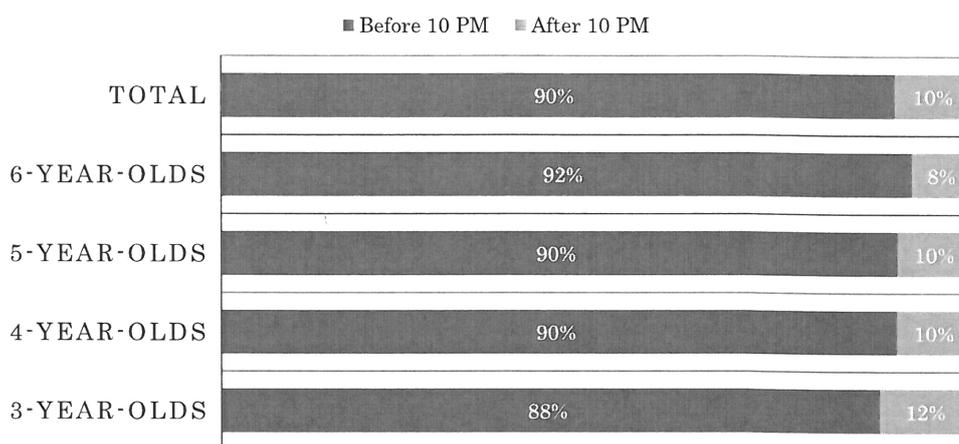


Fig.1. Proportion of Children Children Going to Bed Before and After 10 PM on Weekdays (n=241)

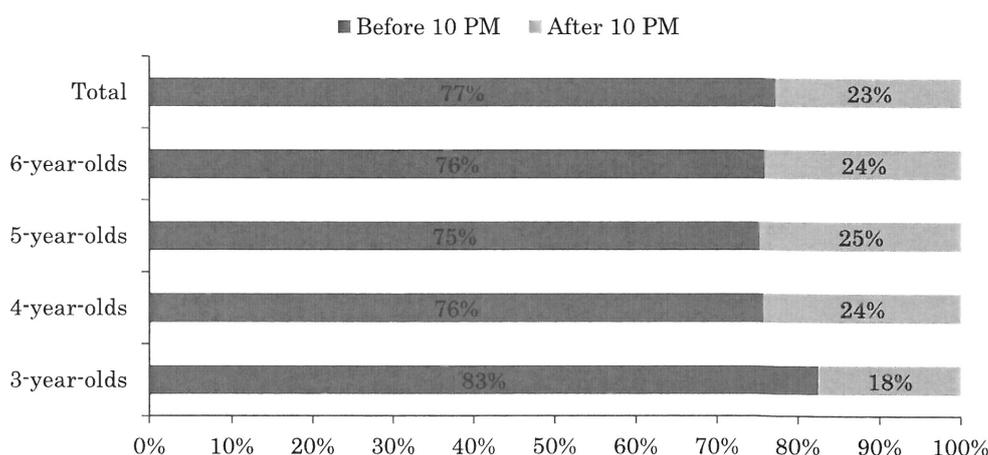


Fig.2. Proportion of Children Children Going to Bed Before and After 10 PM on Weekends and Holidays (n=241)

PM, on weekdays and holidays respectively. For each age group about 10% of the children went to bed after 10 PM, and on weekends that proportion rose to about 20% , which was significantly greater than on weekdays for all age groups ($P<0.05$). About 1.5% of the children stayed up until after 11 PM.

2. Statistically Significant Differences In Relation to Bedtimes Before and After 10 PM

Fig. 3 shows the number of times children ate snacks in relation to the time they went to bed on weekdays. Fig. 4 shows the regularity of snack times on weekdays, and Fig. 5 shows the times at which the snacks were eaten on weekdays.

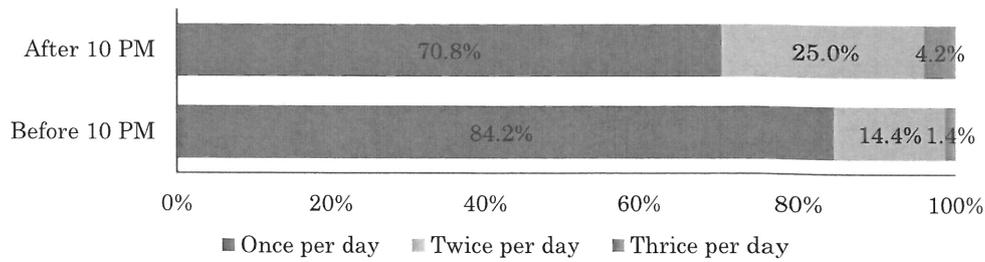


Fig.3. Number of Times Snacking in Relation to Bedtimes (Before and After 10 PM)

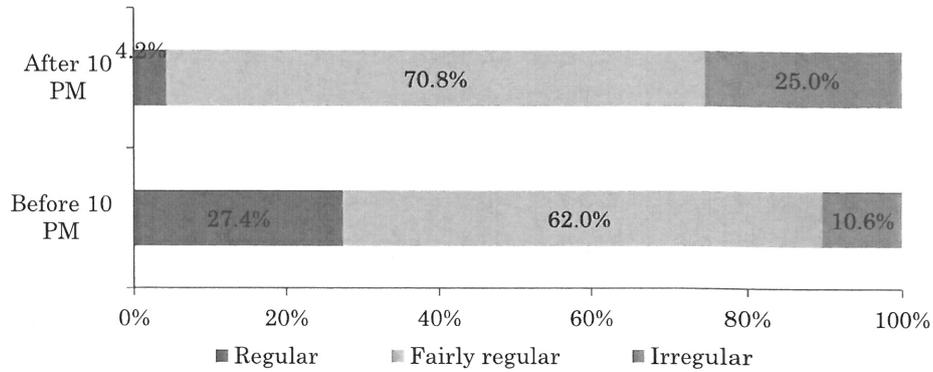


Fig.4. Regularity of Snack Times in Relation to Bedtime on Weekdays (Before and After 10 PM)

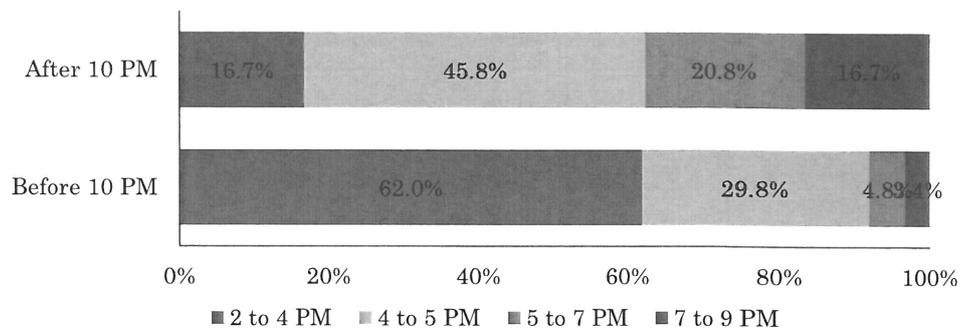


Fig. 5. Snack Times in Relation to Bedtime on Weekdays (Before and After 10 PM)

Children who went to bed after 10 PM on weekdays ate significantly more snacks ($P < 0.05$).

A significant portion of children who went to bed after 10 PM on weekdays ate their snacks at irregular times ($P < 0.05$).

It was also found that the times at which children ate snacks differed significantly according to bedtimes. The majority of children who go to bed before 10 PM (62%) ate their snacks between 2 PM and 4 PM, immediately after getting home from kindergarten. Many of the children who went to bed later ate snacks late in the afternoon (between 4 PM and 5 PM), and quite often just before or after dinnertime as well ($P < 0.01$).

Fig. 6. shows what children ate for snacks, and shows a significant difference between children who went to bed before and after 10 PM. The frequency of consumption of snack breads ($P < 0.05$), instant cup noodles ($P < 0.05$), and rice balls ($P < 0.05$) were significantly different.

Fig. 7 shows the difference in frequency of eating different types of vegetables in relation to weekday bedtimes.

It was found that children who went to bed after 10 PM ate green and yellow vegetables ($P < 0.01$) and other types of vegetables ($P < 0.05$) significantly less frequently than children who went to bed earlier.

Fig. 8 shows the difference in reported health

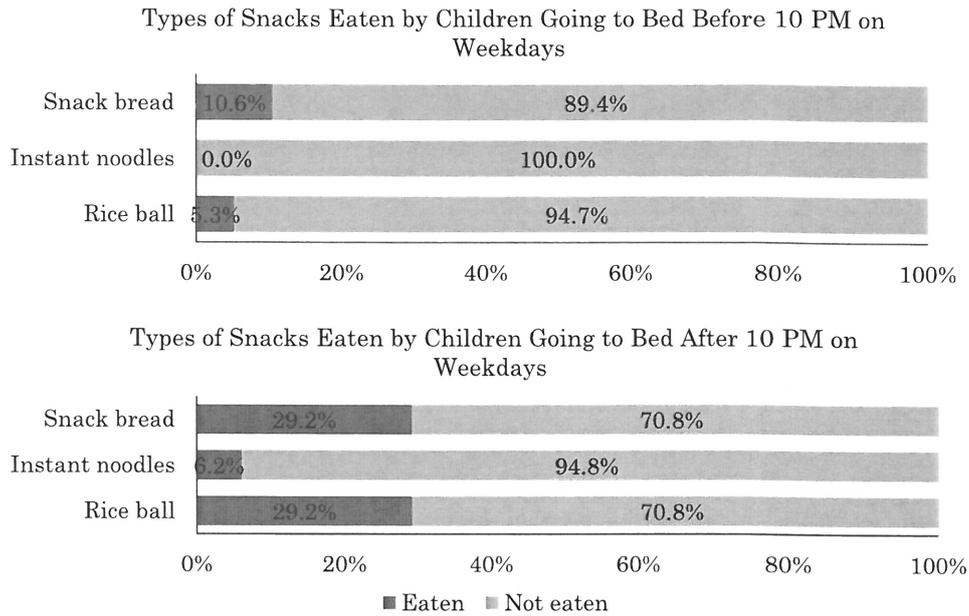


Fig.6. Content of Snacks Consumed in Relation to Bedtime on Weekdays (Before and After 10 PM)

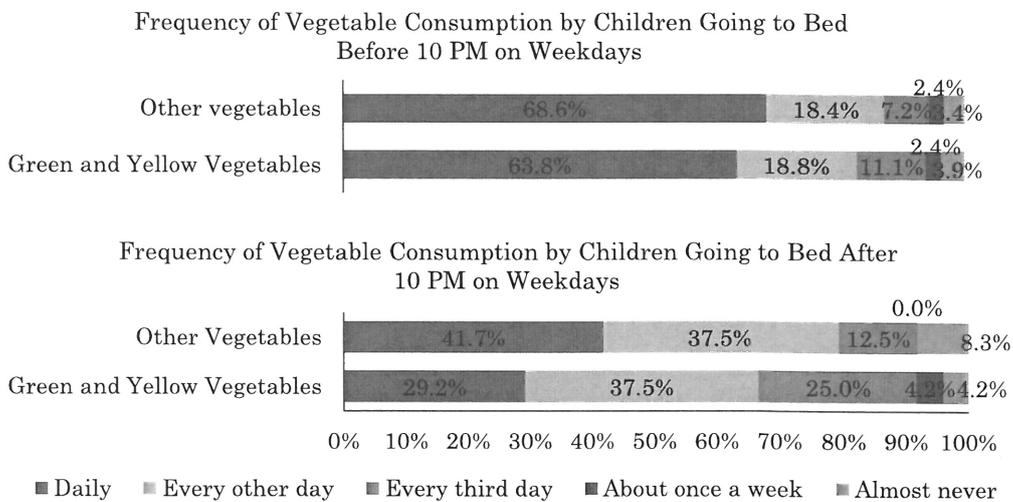


Fig.7. Frequency of Consumption of Vegetables in Relation to Weekday Bedtimes (Before and After 10 PM)

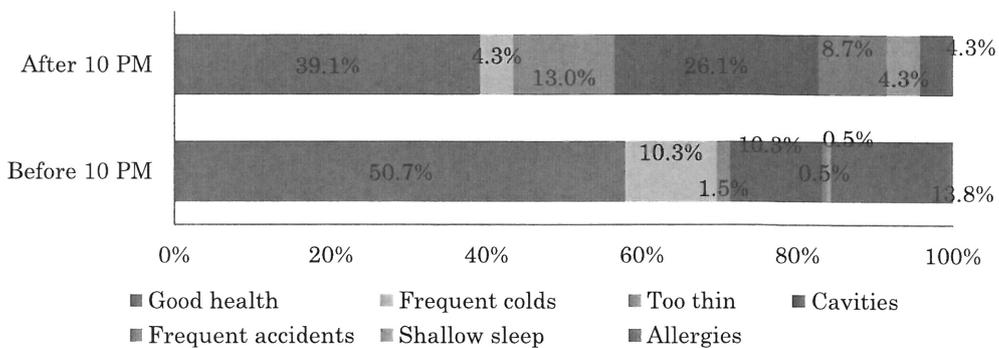


Fig.8. Relationship Between Weekday Bedtimes and Reported Health

condition between children who went to bed before and after 10 PM on weekdays. Children going to bed earlier reported good health in 50.7% of the cases, which was significantly higher than the 39.1% of children going to bed later ($P < 0.05$). In addition, the latter group reported the presence of cavities more often. Moreover, children going to bed after 10 PM reported significantly higher rates of accidents and shallow sleep ($P < 0.01$).

Discussion

The first years of childhood are a period of intense physiological, emotional, and intellectual development. It is also a time when children learn eating and lifestyle habits, and start to build basic social skills. It is therefore a very important period in life.⁶⁾ We began this study of kindergarten children's habits in light of the three basics of health (diet, rest, and sleep), with the purpose of finding information that would be useful in improving their lifestyles.

In this paper we focused on the effect of differences in sleeping habits. We found no significant difference between children of different ages and sexes, but we did find statistically significant differences when looking at the waking and sleeping times of children on weekdays and holidays. We also found that children tended to get up later and go to bed later on weekends and holidays, but without any difference in the amount of sleep time, which remained almost the same at about 10 hours.

10% of the children went to bed after 10 PM on weekdays, and this increased to 23% on holidays, which demonstrates a tendency to a more nocturnal lifestyle on weekends. The *Report on the Fourth Survey on Young Children's Lifestyles of 2010*⁷⁾ reported that 23.8% of the children surveyed stayed up past 10 PM (down from 39.0% in 2000 and 28.5% in 2005), and that 55.7% of the children rose before 7 AM (up from 37.3% in 2000 and 43.3% in 2005). In other words, children get up earlier and go to bed earlier than they did in previous years, which is in line with the Ministry of Education's policies. In our study the number of children who stayed up late was, by comparison, very small (10.0%), and the average wake-up time was well before 7 AM on weekdays.

The children at both kindergartens therefore had much better sleep habits than the national average.

It has been reported that the nocturnal lifestyles of parents, and viewing of television and videos are responsible for children staying up later.⁸⁾ The average amount of television watched by the children in this survey (one hour and forty minutes on weekdays) was quite a bit less than that of children in the Tokyo region in a 2010 study (two hours and seven minutes).⁸⁾ However, 48.7% of the children watched more than two hours of television on weekdays, which is much higher than the 30% national average. In addition, that percentage grew to 68.1% on weekends and holidays, with some children reporting watching more than six hours of television on weekdays and eight hours on weekends. And the children played electronic games for an average of 20 minutes on weekdays, which is considerably higher than the national average of 13.5 minutes.

Several aspects of the children's eating habits also displayed significant differences according to bedtimes. In particular, the numbers of children who skipped breakfast (discussed in the previous paper), the number, timing, and content of snacks, the consumption of vegetables, and general health were all significantly different for children who went to bed after 10 PM.

The Ministry of Health and Welfare's 2005 report on infant lifestyles⁹⁾ stated that the earlier children rose in the morning, the more likely they were to eat breakfast, and that later rising led to an increase in the rate of skipped breakfasts. This research also found that among children going to bed after 10 PM, the percentage who didn't eat breakfast, or rarely did, totaled 66.7%, as compared to the 8.4% among children going to bed before 10 PM. It was also found that children going to bed later ate snacks more often, ate them at less regular times, and ate them closer to evening meal times. The snacks eaten by this group included a large proportion of snack breads, instant noodles, and rice balls, which are high in carbohydrates and more meal-like. This suggests that the irregularity of their diet leads these children to eat when and as much as they want, to the detriment of their proper meals. Snacks near dinnertime are likely

causing them to eat less of that meal, and then be hungry for rice balls and noodles just before bedtime. The amount of vegetables consumed was significantly lower than for children going to bed earlier, probably for the same reason.

The proportion of children reporting good health was significantly lower among those going to bed later than 10 PM, and this group also reported much higher rates of accidents, cavities, and shallow sleep. Children staying up past 10 PM had much less stable life rhythms, and tended to have more accidents because they were less aware during daytime activities. Staying up late and eating just before bedtime also affected their sleep adversely.¹⁰⁾

In order to further assist the planning of kindergarten activities and advising parents on healthy lifestyles, the authors of this paper intend to work with the kindergarten principal, the nutritionist, the teachers, school pharmacist, and the school doctor and dentist in conducting further and more detailed studies of these findings.

Findings concerning the effects of missed breakfasts will be analyzed and presented in a separate paper.

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