

# The Effect of Children's Sports Activities on Life Habits: Sports Activities of Children in the Chikuho Region and Related Factors

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**Abstract** The present study investigated the life habits and level of sports activity of children in the Chikuho region. The results showed that approximately 50% of boys and 30% of girls participate in some after-school sports activities. Thus, about 50% of boys and 70% of girls do not participate in after-school sports activities. Children who play sports spend an average of  $2.6 \pm 5.4$  hours a week playing sports. Various life habits were compared between the children who play sports and those who do not. When compared to boys who play sports, those who do not play sports tended to not wash their faces in the morning, have irregular bowel movements, be younger, not have breakfast, not have a snack before dinner, and spend more time watching TV at night. When compared to girls who play sports, those who do not play sports tended to spend more time playing videogames at night, and were less likely to brush their teeth at night.

**Key words** Sports activities, Life habits, Chikuho region Fukuoka JAPAN

## I. Introduction

In accordance with the recent changes in living and social environments, the lifestyles of children have also changed. Such factors as the increased popularity of videogames, fewer playgrounds, and a smaller population of children, have reduced the opportunities for children of different ages to play outside together.

Furthermore, the overall level of physical activity among children, including physical education classes and after-school sports activities, is declining (Nakamura 1996). In fact, one study found that the amount of daily physical activity (measured in steps) has decreased over the last few decades, from 28,000 steps in 1979, to 19,000 steps in 1987, and to 14,000 steps in 1997 (Takahashi 1997). As a result, while today's children

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are bigger because of better nutrition, their physical fitness is poorer (Wakita 1996).

In children, physical fitness is correlated with exercise and sports. For example, when compared to children who exercise almost daily, the results of fitness tests are clearly poorer for children who do not exercise (Ministry of Education, Science, Sports and Culture Japan 1998). Therefore, when promoting physical fitness, it is necessary to increase daily physical activity. Another problem is that there are two contrasting levels of sports activity among today's children, with 40.2% of children exercising at least five times a week and 31.9% of children exercising less than once a week. Therefore, 72.1% of all children are polarized in terms of sports activities (Sasagawa Sports Foundation 2002). Furthermore, the percentage of children in Japan who play sports is lower than in other countries. According to the World Health Organization, among 11-year-old boys and girls in Japan, 37% and 27%, respectively, are physically active at least twice a week. These figures are lower than the minimum level established by a survey of 29 countries and regions (Sasagawa Sports Foundation 2002). Therefore, as mentioned above, a smaller percentage of children in Japan participate in sports, which is correlated with physical fitness, and a large majority of children either exercise very frequently or very rarely.

Furthermore, a low level of physical

activity among elementary and junior high school students not only reduces their physical fitness, but also affects their social and psychological development (Brown and Siegel 1988, Norris et al. 1992, Ishikawa and Kobayashi 1998, Uechi et al. 2000, Uechi et al. 2003). Previous research has indicated the following problems among children with low levels of physical activity or those without exercise habits : poorer health status in stressful situations (Brown and Siegel 1988); lower subjective stress and depression scores (Norris et al. 1992); impaired mechanisms for stress reduction (Uechi et al. 2000); and impaired acquisition of social skills and cognitive assessment of stressors (Uechi et al. 2003).

Therefore, when increasing the physical activity of children, it is necessary to identify related factors (Uechi et al. 2002b), and it is essential to consider children's living and social environments. The present research investigated the levels of physical activity among children in the Chikuho region, an area that was once prosperous because of a thriving coal industry, but has suffered economically in recent years. Similar to many other regions in Japan, children in the Chikuho region have few opportunities to receive the life experiences that are required for childhood development. Thus, their basic life habits, health, and physical fitness are negatively affected. Through collaboration between schools and community centers, Chikuho

has identified the promotion of cultural and physical activities as one of the important issues in the region (Tagawa Education Committee 2004).

When working to increase the level of physical activity among children, it is necessary to ascertain the current level of exercise and sports participation among local children and its affect on life habits. Therefore, the present study investigated the level of sports activity among elementary school children in the Chikuhō region and its affect on life habits.

## II. Methods

### A. Subjects

Subjects were 2,306 (1,156 male students, 1,150 female students) students (second grade or higher) from all ten elementary schools in Tagawa City. With the help of homeroom teachers in the schools, a questionnaire survey was conducted in order to ascertain the following : morning factors (wake-up time, face washing, appetite in the morning, breakfast consumption, and tooth brushing); school factors (thoughts about school, behavior during first period, behavior during fourth period, behavior during lunch, and behavior during noon recess); and after-school factors (friends, playing outside, and health and diet in the past week). Table 1 shows the distribution of gender and grade among the subjects.

### B. Statistical analyses

The questionnaire is shown in Appendix 1. Except for questions that were answered in real numbers, responses were indicated on a 2 - or 5 -point scale. With sports activity as an external criterion, discriminant analysis was conducted on questionnaire responses. Because a gender difference was observed in the level of sports activity, analysis was conducted separately for boys and girls. A stepwise analysis was conducted in order to investigate all questions using the step-up procedure to minimize Wilks'  $\Lambda$ . The F-value for all analyses was established at 3.84.

## III. Results

Table 2 shows the level of sports activity for each grade and gender. While 50.2% of boys participated in sports, 31.8% of girls participated in sports. Additionally, 49.8% of boys and 68.2% of girls did not participate in sports activities outside of school. Children participated in a wide variety of sports. Swimming, baseball, karate, soccer, and kendo were common for boys, while swimming, basketball, volleyball, karate, and ballet were common for girls. The average number of hours spent on sports activities for those who played sports was  $2.6 \pm 5.4$  hours per week.

The ratio of children in different grades who did not participate in sports ranged

Table 1 . Distribution of gender and grade

	Second grade	Third grade	Fourth grade	Fifth grade	Sixth grade	Total
Boys (n)	226	232	206	221	271	1156
Girls (n)	220	197	252	238	243	1150
Total	446	429	458	459	514	2306

from 43.4% to 56.2% for boys and from 62.7% to 72.8% for girls. Among children who play sports, the ratio of children who swim was high for second, third, and fourth grades, but low for fifth and sixth grades. The ratio of children who play baseball was low for second, third, and fourth grades, but high for fifth and sixth grades. No difference was observed in the ratio of children who trained in karate with respect to age.

Table 3 shows the results of the questionnaire for boys. Regarding as the relationship between sports and morning factors for boys, no marked differences were observed for morning factors with respect to sports. However, when compared to boys who did not play sports, boys who played sports tended to be older, less obese, more likely to eat breakfast, and more likely to brush their teeth.

Regarding as the relationship between sports and school factors for boys, no marked differences were observed for school factors with respect to sports.

Regarding as the relationship between sports and after-school factors for boys, except for videogame playing, no marked differences were observed for after-school factors between boys who played sports

and those who did not. The average length of time spent playing videogames for boys who played sports was approximately 20 minutes shorter than the length of time for boys who did not. Thus, between returning home from school and going to bed at night, boys spend a total of 4.6 hours (276.4 minutes) watching TV or playing videogames every day.

Regarding as the relationship between sports and health and diet factors in the past week for boys, while no marked differences were observed for the various health and diet factors with respect to sports, the bowel-movement score for boys who played sports was 0.3 points lower when compared to boys who did not play sports.

Table 4 shows the results of the questionnaire for the girls. Regarding as the relationship between sports and morning factors for girls, no marked differences were observed for morning factors with respect to sports. However, when compared to girls who do not play sports, girls who play sports tended to be less obese and more likely to eat breakfast.

Regarding as the relationship between sports and school factors for girls, no marked differences were observed for

Table 2 . Relationship of sports with gender and grade

Boys							
Grade	Second grade	Third grade	Fourth grade	Fifth grade	Sixth grade	Subtotal	
Do not playsports	127 (5.5)	128 (5.6)	103 (4.5)	96 (4.2)	122 (5.3)	576 (25.0)	
Ice hockey	(0.0)	(0.0)	(0.0)	1 (0.0)	(0.0)	1 (0.0)	
Aerobics	(0.0)	(0.0)	(0.0)	1 (0.0)	(0.0)	1 (0.0)	
Electrick eyboard	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	0 (0.0)	
Golf	(0.0)	1 (0.0)	(0.0)	(0.0)	(0.0)	1 (0.0)	
Soccer	(0.0)	10 (0.4)	7 (0.3)	11 (0.5)	19 (0.8)	47 (2.0)	
Swimming	4 (0.2)	8 (0.3)	(0.0)	(0.0)	1 (0.0)	13 (0.6)	
Skating	(0.0)	(0.0)	(0.0)	(0.0)	1 (0.0)	1 (0.0)	
Soft volleyball	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	0 (0.0)	
Softball	6 (0.3)	(0.0)	3 (0.1)	(0.0)	2 (0.1)	11 (0.5)	
Dancing	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	0 (0.0)	
Tae kwon do	3 (0.1)	(0.0)	1 (0.0)	1 (0.0)	(0.0)	5 (0.2)	
Tennis	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	0 (0.0)	
Basketball	4 (0.2)	3 (0.1)	4 (0.2)	13 (0.6)	11 (0.5)	35 (1.5)	
Badminton	(0.0)	(0.0)	1 (0.0)	(0.0)	1 (0.0)	2 (0.1)	
Cheerleading	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	0 (0.0)	
Ballet	1 (0.0)	(0.0)	(0.0)	(0.0)	(0.0)	1 (0.0)	
Volleyball	2 (0.1)	2 (0.1)	3 (0.1)	(0.0)	3 (0.1)	10 (0.4)	
Traditional martial art	(0.0)	(0.0)	1 (0.0)	(0.0)	(0.0)	1 (0.0)	
Plays ports							
Footsol	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	0 (0.0)	
Field hockey	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	0 (0.0)	
Karate	24 (1.0)	15 (0.7)	16 (0.7)	17 (0.7)	15 (0.7)	87 (3.8)	
Kendo	8 (0.3)	9 (0.4)	9 (0.4)	9 (0.4)	5 (0.2)	40 (1.7)	
Aikido	(0.0)	(0.0)	(0.0)	2 (0.1)	2 (0.1)	4 (0.2)	
Judo	1 (0.0)	(0.0)	(0.0)	2 (0.1)	2 (0.1)	5 (0.2)	
Shorinji Kempo	6 (0.3)	3 (0.1)	4 (0.2)	4 (0.2)	4 (0.2)	21 (0.9)	
Competitive swimming	27 (1.2)	36 (1.6)	32 (1.4)	24 (1.0)	24 (1.0)	143 (6.2)	
Practicing a baseball swing	(0.0)	(0.0)	1 (0.0)	(0.0)	(0.0)	1 (0.0)	
Calisthenics	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	0 (0.0)	
Taiko drums	(0.0)	(0.0)	1 (0.0)	(0.0)	(0.0)	1 (0.0)	
Gymnastics	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	0 (0.0)	
Table tennis	(0.0)	(0.0)	(0.0)	1 (0.0)	4 (0.2)	5 (0.2)	
Japanese martial art	(0.0)	(0.0)	(0.0)	(0.0)	1 (0.0)	1 (0.0)	
Japanese dance	(0.0)	(0.0)	1 (0.0)	(0.0)	(0.0)	1 (0.0)	
Baseball	13 (0.6)	17 (0.7)	18 (0.8)	36 (1.6)	54 (2.3)	138 (6.0)	
Dance	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	0 (0.0)	
Track and field	(0.0)	(0.0)	1 (0.0)	3 (0.1)	(0.0)	4 (0.2)	
Subtotal	99 (4.3)	104 (4.5)	103 (4.5)	125 (5.4)	149 (6.5)	580 (25.2)	
Total	226 (9.8)	232 (10.1)	206 (8.9)	221 (9.6)	271 (11.8)	1156 (50.1)	
Girls							
Grade	Second grade	Third grade	Fourth grade	Fifth grade	Sixth grade	Subtotal	
Do not play sports	150 (6.5)	133 (5.8)	158 (6.9)	166 (7.2)	177 (7.7)	784 (34.0)	
Ice hockey	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	0 (0.0)	
Aerobics	1 (0.0)	(0.0)	1 (0.0)	2 (0.1)	1 (0.0)	5 (0.2)	
Electric keyboard	(0.0)	(0.0)	(0.0)	1 (0.0)	(0.0)	1 (0.0)	
Golf	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	0 (0.0)	
Soccer	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	0 (0.0)	
Swimming	2 (0.1)	4 (0.2)	(0.0)	2 (0.1)	1 (0.0)	9 (0.4)	
Skating	(0.0)	(0.0)	1 (0.0)	(0.0)	(0.0)	1 (0.0)	
Soft volleyball	(0.0)	(0.0)	(0.0)	1 (0.0)	(0.0)	1 (0.0)	
Softball	(0.0)	(0.0)	1 (0.0)	(0.0)	(0.0)	1 (0.0)	
Dancing	(0.0)	(0.0)	1 (0.0)	(0.0)	(0.0)	1 (0.0)	
Tae kwon do	2 (0.1)	(0.0)	(0.0)	(0.0)	(0.0)	2 (0.1)	
Tennis	(0.0)	(0.0)	(0.0)	2 (0.1)	1 (0.0)	3 (0.1)	
Basketball	6 (0.3)	8 (0.3)	11 (0.5)	10 (0.4)	21 (0.9)	56 (2.4)	
Badminton	(0.0)	3 (0.1)	1 (0.0)	3 (0.1)	3 (0.1)	10 (0.4)	
Cheerleading	2 (0.1)	(0.0)	1 (0.0)	1 (0.0)	(0.0)	4 (0.2)	
Ballet	5 (0.2)	3 (0.1)	5 (0.2)	4 (0.2)	1 (0.0)	18 (0.8)	
Volleyball	8 (0.3)	2 (0.1)	5 (0.2)	4 (0.2)	6 (0.3)	25 (1.1)	
Plays ports							
Traditional martial art	(0.0)	(0.0)	(0.0)	1 (0.0)	(0.0)	1 (0.0)	
Footsol	1 (0.0)	(0.0)	(0.0)	(0.0)	(0.0)	1 (0.0)	
Field hockey	1 (0.0)	(0.0)	(0.0)	(0.0)	(0.0)	1 (0.0)	
Karate	3 (0.1)	6 (0.3)	6 (0.3)	2 (0.1)	5 (0.2)	22 (1.0)	
Kendo	2 (0.1)	2 (0.1)	1 (0.0)	8 (0.3)	(0.0)	13 (0.6)	
Aikido	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	0 (0.0)	
Judo	(0.0)	(0.0)	2 (0.1)	1 (0.0)	1 (0.0)	4 (0.2)	
Shorinji Kempo	1 (0.0)	1 (0.0)	(0.0)	(0.0)	2 (0.1)	4 (0.2)	
Competitive swimming	35 (1.5)	35 (1.5)	53 (2.3)	23 (1.0)	12 (0.5)	158 (6.9)	
Practicing a baseball swing	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	0 (0.0)	
Calisthenics	(0.0)	(0.0)	(0.0)	(0.0)	1 (0.0)	1 (0.0)	
Taiko drums	(0.0)	(0.0)	(0.0)	1 (0.0)	(0.0)	1 (0.0)	
Gymnastics	(0.0)	(0.0)	1 (0.0)	1 (0.0)	(0.0)	2 (0.1)	
Table tennis	(0.0)	(0.0)	1 (0.0)	2 (0.1)	(0.0)	3 (0.1)	
Japanese martial art	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	0 (0.0)	
Japanese dance	(0.0)	(0.0)	1 (0.0)	(0.0)	1 (0.0)	2 (0.1)	
Baseball	(0.0)	(0.0)	(0.0)	2 (0.1)	1 (0.0)	3 (0.1)	
Dance	1 (0.0)	(0.0)	1 (0.0)	1 (0.0)	2 (0.1)	5 (0.2)	
Track and field	(0.0)	(0.0)	1 (0.0)	(0.0)	7 (0.3)	8 (0.3)	
Subtotal	70 (3.0)	64 (2.8)	94 (4.1)	72 (3.1)	66 (2.9)	366 (15.9)	
Total	220 (9.5)	197 (8.5)	252 (10.9)	238 (10.3)	243 (10.5)	1150 (49.9)	

Table 3. Results of questionnaire for boys

Question	Play sports		Do not play sports		Total	
	Mean	SD	Mean	SD	Mean	SD
Relationship between sports and morning factors						
Grade	4.2	1.4	3.9	1.4	4.1	1.4
Degree of obesity	4.5	17.0	4.7	16.9	4.6	17.0
What time do you wake up in the morning? *	3.5	1.1	3.4	1.0	3.5	1.0
Do you wash (wipe) your face in the morning?	1.8	1.4	2.2	1.6	2.0	1.5
Do you want to eat breakfast?	1.3	0.9	1.3	0.9	1.3	0.9
Do you eat breakfast?	1.3	1.0	1.5	1.3	1.4	1.2
How soon do you have breakfast after getting up in the morning? (minutes)	15.5	18.7	15.5	15.2	15.5	17.0
Do you brush your teeth in the morning?	1.9	1.4	2.3	1.6	2.1	1.5
Relationship between sports and school factors						
Do you finish your school lunch?	2.0	1.1	1.9	1.0	1.9	1.1
Relationship between sports and after-school factors						
How often do you play outside?	2.5	1.4	2.5	1.6	2.5	1.5
How much time do you spend playing videogames at night? (minutes)	81.8	104.0	102.5	130.9	92.4	118.9
How much time do you spend watching TV at night? (minutes)	181.0	145.4	186.9	174.8	184.0	161.1
Do you have a snack before dinner?	3.1	1.5	3.3	1.7	3.2	1.6
Which do you prefer, snacks or dinner?	2.5	1.2	2.4	1.2	2.5	1.2
Do you buy food at a store on your own?	3.7	1.4	3.7	1.5	3.7	1.4
Do you eat dinner?	1.1	0.8	1.2	1.1	1.2	1.0
Do you have a snack after dinner?	3.8	1.5	3.8	1.5	3.8	1.5
Do you brush your teeth at night?	2.1	1.6	2.3	1.7	2.2	1.7
Do you help around the house?	3.5	1.8	3.3	1.8	3.4	1.8
Relationship between sports and health and diet factors in the past week						
Wake up refreshed	2.3	1.2	2.4	1.1	2.4	1.2
Have an upset stomach	3.2	1.2	3.1	1.2	3.2	1.2
Tire easily	2.6	1.4	2.7	1.6	2.7	1.5
Feel tired	2.8	1.5	2.8	1.5	2.8	1.5
Feel weak	3.0	1.4	3.0	1.5	3.0	1.5
Feel irritated	2.9	1.2	2.9	1.4	2.9	1.3
In a bad mood	3.2	1.3	3.1	1.3	3.2	1.3
Often catch a cold	1.9	1.1	2.0	1.2	2.0	1.1
Eat dinner while watching TV	1.4	1.0	1.4	1.1	1.4	1.1
Do not eat many vegetables	1.8	0.7	1.8	0.9	1.8	0.8
Only have snacks and do not eat dinner	2.0	0.5	2.0	0.7	2.0	0.6
Eat only what I like	1.8	0.8	1.8	1.0	1.8	0.9
Swallow food without chewing	1.9	0.3	1.9	0.5	1.9	0.4
Eat slowly (play with food)	1.8	0.8	1.8	0.9	1.8	0.9
Eat while talking with my family	1.4	0.9	1.4	0.8	1.4	0.8
Do things on my own	1.6	0.8	1.6	0.7	1.6	0.8
Is it important to eat everything?	1.2	0.6	1.2	0.7	1.2	0.6
How often do you poop?	2.0	1.3	2.3	1.5	2.1	1.4

\*: 1. Before 6:00, 2. Between 6:00 and 6:30, 3. Between 6:30 and 7:00, 4. Between 7:00 and 7:30, 5. Between 7:30 and 8:00, and 6. After 8:00

school factors with respect to sports.

Regarding as the relationship between sports and after-school factors for girls, except for playing videogames or watching TV, no marked differences were observed for after-school factors with respect to sports. When compared to girls who do not play sports, the average time spent playing videogames and watching TV for girls who played sports was about 12 minutes shorter for playing videogames and 13 minutes shorter for watching TV. Therefore, between returning home from school and going to bed at night, girls spend a total of 3.4 hours (204.6 minutes) watching TV or playing videogames every day. This figure was slightly shorter than that observed for boys.

Regarding as the relationship between sports and health and diet factors in the past week for girls, while no marked differences were observed for health and diet factors with respect to sports, the bowel-movement score for girls who played sports was 0.2 points lower when compared to girls who did not play sports.

Table 5 shows the positive standardized discriminant function coefficients for boys as assessed by discriminate analysis. Significant discriminant functions were observed (Wilks'  $\Lambda=0.959$ ,  $\chi^2(6)=44.808$ ,  $p<0.001$ ), and a predictive value of 58.2% was obtained. For boys, sports activity was related to face washing in the morning, frequency of bowel movement, grade,

breakfast, before dinner snacks, and watching TV and playing videogames at night. Therefore, boys who did not play sports tended to not wash their face in the morning, have less frequent bowel movements, be younger, not eat breakfast; not have snacks before dinner, and spend more time playing videogames at night.

Table 6 shows the positive standardized discriminant function coefficients for girls as assessed by discriminate analysis. Significant discriminant functions were observed (Wilks'  $\Lambda=0.986$ ,  $\chi^2(6)=15.013$ ,  $p<0.001$ ), and a predictive value of 49.9% was obtained. For girls, sports activity was related to playing videogames and brushing teeth at night. Therefore, girls who did not play sports tended to play videogames longer at night, and were less likely to brush their teeth at night.

#### IV. Discussion

The present study investigated the life habits and sports activities of children in the Chikugo region. The results showed that the most common after-school sports activity for boys was swimming, followed by baseball, karate, and basketball, respectively. For girls, swimming was also the most common sports activity, followed by basketball, volleyball, and karate, respectively. According to a national survey conducted by the Sasagawa Sports Foundation (2002), the three most

Table 4. Results of questionnaire for girls

Question	Play sports		Do not play sports		Total	
	Mean	SD	Mean	SD	Mean	SD
Relationship between sports and morning factors						
Grade	4.0	1.3	4.1	1.4	4.1	1.4
Degree of obesity	4.8	15.7	5.0	17.1	4.9	16.7
What time do you wake up in the morning? *	3.5	0.8	3.5	0.9	3.5	0.9
Do you wash (wipe) your face in the morning?	1.4	1.0	1.4	1.0	1.4	1.0
Do you want to eat breakfast?	1.2	0.4	1.2	0.8	1.2	0.7
Do you eat breakfast?	1.2	0.9	1.4	1.0	1.3	1.0
How soon do you have breakfast after getting up in the morning? (minutes)	13.5	13.5	13.9	12.7	13.8	13.0
Do you brush your teeth in the morning?	1.6	1.3	1.6	1.2	1.6	1.3
Relationship between sports and school factors						
Do you finish your school lunch?	2.1	1.0	2.1	1.0	2.1	1.0
Relationship between sports and after-school factors						
How often do you play outside?	3.1	1.4	3.1	1.4	3.1	1.4
How much time do you spend playing videogames at night? (minutes)	16.5	37.8	29.0	64.8	25.2	58.1
How much time do you spend watching TV at night? (minutes)	170.4	139.8	183.4	152.6	179.4	148.8
Do you have a snack before dinner?	3.1	1.5	3.2	1.5	3.2	1.5
Which do you prefer, snacks or dinner?	2.6	0.8	2.5	1.1	2.5	1.0
Do you buy food at a store on your own?	3.9	1.1	3.7	1.3	3.8	1.2
Do you eat dinner?	1.1	0.7	1.1	0.9	1.1	0.8
Do you have a snack after dinner?	3.9	1.4	3.9	1.3	3.9	1.4
Do you brush your teeth at night?	1.6	1.2	1.8	1.4	1.8	1.3
Do you help around the house?	2.7	1.8	2.7	1.7	2.7	1.7
Relationship between sports and health and diet factors in the past week						
Wake up refreshed	2.4	1.2	2.4	1.2	2.4	1.2
Have an upset stomach	3.0	1.2	3.0	1.1	3.0	1.1
Tire easily	2.5	1.3	2.5	1.4	2.5	1.4
Feel tired	2.8	1.5	2.7	1.2	2.7	1.3
Feel weak	2.8	1.4	2.9	1.4	2.8	1.4
Feel irritated	2.9	1.3	2.8	1.3	2.9	1.3
In a bad mood	3.2	1.3	3.1	1.2	3.1	1.3
Often catch a cold	1.8	0.9	1.8	0.8	1.8	0.8
Eat dinner while watching TV	1.4	0.9	1.3	0.9	1.3	0.9
Do not eat many vegetables	1.9	0.7	1.9	1.0	1.9	0.9
Only have snacks and do not eat dinner	2.0	0.2	2.0	0.6	2.0	0.5
Eat only what I like	1.8	0.7	1.8	0.5	1.8	0.6
Swallow food without chewing	2.0	0.7	2.0	0.4	2.0	0.5
Eat slowly (play with food)	1.8	1.0	1.8	0.7	1.8	0.8
Eat while talking with my family	1.2	0.6	1.3	0.9	1.2	0.8
Do things on my own	1.5	0.9	1.5	0.8	1.5	0.8
Is it important to eat everything?	1.1	0.5	1.1	0.6	1.1	0.6
How often do you poop?	2.2	1.5	2.4	1.4	2.4	1.5

\*: 1. Before 6:00, 2. Between 6:00 and 6:30, 3. Between 6:30 and 7:00, 4. Between 7:00 and 7:30, 5. Between 7:30 and 8:00, and 6. After 8:00



**Table 5. Positive standardized discriminant function coefficients for boys as assessed by discriminant analysis**

Step	Question	Coefficient
Step 1	Do you wash (wipe) your face in the morning?	0.354
Step 2	How often do you poop?	0.357
Step 3	Which grade are you in?	-0.441
Step 4	Do you eat breakfast?	0.340
Step 5	Do you have a snack before dinner?	0.338
Step 6	How much time do you spend playing videogames at night?	0.328

**Table 6. Positive standardized discriminant function coefficients for girls as assessed by discriminant analysis**

Step	Question	Coefficient
Step 1	How much time do you spend playing videogames at night?	0.814
Step 2	Do you brush your teeth at night?	0.524

popular sports for boys were soccer (28.9%), baseball (27.8%) and basketball (22.3%). For girls, badminton (21.1%), volleyball (17.7%) and basketball (14.7%) were most popular, followed by swimming (11.6%) and jump rope (10.0%). Since these two studies were conducted in the same year, there are regional differences in children's sports activities.

In addition, the results of the present study showed a correlation between age and the start of sports activities. While children began playing individual sports, such as, swimming and karate, in lower grades, they began to play group sports, such as baseball, basketball, volleyball, and soccer, starting in fifth and sixth grade. Therefore, there may be an optimal period for children to begin sports activities.

For both boys and girls, no significant differences were observed between children who played sports and those who did

not for morning, school, after-school, and health and dietary factors in the past week. However, the results of the discriminant analysis showed that, in addition to gender differences, playing sports is correlated with such life habits as eating (breakfast and snack), bowel movements, face washing, tooth brushing, watching TV, and playing videogames. Therefore, we believe that playing sports facilitates more regular life habits among children. The present study clarified that the amount of time spent watching TV or playing videogames was affected by whether or not children play sports after school. Between returning home from school and going to bed, children in the Chikuhō region spend several hours watching TV and playing videogames (mean, 276.4 minutes). No marked difference was observed between children who played sports and those who did not regarding bedtime. On days

without sports activities, the average bedtime for children who played sports was  $22:30 \pm 1.3$  hours and for children who did not play sports was  $22:36 \pm 1.2$  hours. On days with sports activities, the average bedtime for children who played sports was  $22:18 \pm 1.1$  hour and for children who did not play sports was  $22:12 \pm 1.0$  hour. Furthermore, in terms of the amount of time spent watching TV or playing videogames, there was approximately a 20-minute difference between boys who played sports and those who did not. As a result, there is approximately a 140-minute difference per week (2.3 hours/week). A 12-minute difference in the amount of time spent watching TV and a 13-minute difference in the amount of time spent playing videogames was observed between girls who played sports and those who did not. As a result, there was approximately a 175-minute difference per week (2.9 hours/week). These figures correspond with the amount of time children who play sports spend on sports activities per week, which is approximately 2.6 hours. Therefore, we conclude that playing sports reduces the amount of time boys and girls spend watching TV or playing videogames.

The results of the present study show that, even for children in the Chikuho region, participating in sports activities allows them to discover sports that they can enjoy throughout their lives, maintains and promotes physical fitness

and athleticism during their growth period, and facilitates more regular life habits by reducing the amount of time spent watching TV or playing videogames.

In the Chikuho region, only 41.0% of all children (50.2% of boys, 31.8% of girls) play sports. Shiraishi (1998) reported that 36% of elementary school students belonged to a sports team, such as a baseball or soccer team. While the results of the present study are higher than the figure observed by (Shiraishi 1998), they are not satisfactory. These results show that 49.8% of boys and 68.2% of girls do not play sports. As far as physical activities during and after school are concerned, girls tend to exercise less than boys, and fifth- and sixth-grade girls tend to talk more than play outside during recess (Dobashi 1990, Uechi et al. 2002a). Our findings confirm that the level of physical activity among fifth- and sixth-grade girls is low. Therefore, our children must be encouraged as early as possible to take part in lifelong sports activities. In other words, it is important to encourage children, especially girls, to play sports. Once children begin playing sports, it is necessary to provide support so that they will continue to play sports. We believe that it is essential for us to plan sports events and programs and to continue to organize and develop programs that suit the various interests and physical abilities of children in the Chikuho region.

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