

## Comparison of student's satisfaction on school food service environment by the eating place and gender\*

Jisook Jung<sup>1</sup>, Youngmee Lee<sup>1§</sup> and Yu-jin Oh<sup>2</sup>

<sup>1</sup>*Department of Food and Nutrition, Kyungwon University, Bokjeong-dong, Sujeong-gu, Seongnam, Gyeonggi 461-701, Korea*

<sup>2</sup>*Nutritional Education Program, National Institute of Health and Nutrition, Shinjuku-ku Tokyo, 162-8636, Japan*

### Abstract

The purpose of this study was to compare student's satisfaction with school food service environment to improve the quality of middle school meal service. A survey was conducted of 680 students (boys 246, girls 433) from 6 middle schools providing school meals from October to November 2007. The questionnaires were directly distributed to the subjects for comparison of satisfaction of school meals depending on the eating place. As for the quantity of food, classroom group (3.40) expressed significantly higher satisfaction than cafeteria group (3.16,  $P < 0.01$ ), but as for the satisfaction on hygiene, classroom group (2.76) showed significantly lower satisfaction than cafeteria group (3.03,  $P < 0.01$ ). About the satisfaction of school meal environment, classroom group showed more satisfaction on distribution time, eating place, eating atmosphere ( $P < 0.001$ ). The classroom group showed higher satisfaction than cafeteria group in cases of quantity, diversity of types of soup, dessert, and the cost of school meal. To improve eating place and hygiene of school meal, sufficient cafeteria space and pleasant environment is needed to be established.

**Key Words:** School meal, meal distribution, food service environment, satisfaction

### Introduction

Adolescents need a balanced nutrition intake because their physical development and activity are dramatically increasing (Kim, 2002). They prefer more tasty and trendy food, so they eat a lot of fast food and instant snacks, which is affected by food commercials and convenience (The Food and Drug Association, 2007). As a result of that, there are a lot of health problems caused from much intake of sugar, salt, fat, etc (Chung & Han, 2000). Therefore, in early 1997, the school meal program started to operate in all the primary schools, and expanded to high schools in 1999 and middle schools in 2002 (The Ministry of Education, 1999) to improve their body strength and dietary life by providing a healthy well-balanced lunch (Lee, 2003). Thanks to the school meal policy, the school meal service increased nationwide but there are many problems related to facility costs, securing financial resources and utilizing human resources in middle and high schools rather than in primary schools because of insufficient financial support (Kim & Lee, 2003; Lee *et al.*, 2002).

The Ministry of Education and Human Resources Department comes up with "comprehensive school meal improvement measures (2007~2011)" as a means of substantiating the school meal operation and making school meal facilities better. It is aimed at modernizing the school meal facilities, increasing the

rate of installing air cooling system and reducing the number of schools which don't have their own cafeterias. Particularly, it plans to reduce the rate of schools without their own cafeterias from 23.7% in 2006 to 20% in 2011. The rate of providing school meal service in urban areas is lower than rural area with only 51.5% (The Ministry of Education, 2007). Currently, schools without their own cafeterias are providing school meals in the classrooms, which have problems with a high risk of safety accidents in the process of moving the meals, improper meal temperature, unclean status of meal provision and providing uneven meal quantity to students (Kim & Lee, 2004). However, even if there is a cafeteria in a school, the space is small, waiting time for meals is prolonged making students unsatisfied (Lee, 2005). There are single-sex schools in Korea, and boys and girls might have different needs and satisfaction for the school meals. The satisfaction of school meals is related to improving the effects of school meals (Kim & Lee, 2003), so we need to improve the school meal services to enhance the students' nutrition status and health (Kim, 2005).

Satisfaction of school meals varies depending on the quality of meals, diversity of food, food hygiene and environment (Kim *et al.*, 2003), but the eating place of school meals is different from cafeterias to classrooms and gender of meal eater is different. Service is the most important factor to improve the satisfaction on school meals. We need to examine the satisfaction

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§ **Corresponding Author:** Youngmee Lee, Tel. 82-031-750-5971, Fax. 82-031-750-5971, Email. leeym@kyungwon.ac.kr

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on school meals by eating place and gender to improve the satisfaction of school meal. However, there was little research done on the comparison of satisfaction between eating places (cafeterias and classrooms) and gender (boy and girl) in school meals. We surveyed the satisfaction on school meals among middle school students in different eating places and gender; therefore, this study can provide basic data to improve the quality of school food service.

## Subjects and Methods

### Sample

The survey was conducted with 680 first to third grade students (boys 246, girls 433) in the 6 middle schools (Seongnam city in Gyeonggi province) from October to November 2007. They were surveyed after listening to the purpose and outline of the survey. The questionnaires were directly distributed to the students and retrieved immediately after completion, and students filled them by reading directions on their own.

### Measures

The questionnaire consisted of the subject's gender, eating place, school type and satisfaction of meal service. It was about school meals such as the place of getting school meals, a desired place to get school meals, satisfaction on a school meal environment (satisfaction over the eating place, atmosphere, the extent of disturbing of food and taking classes, etc), and satisfaction on the food in the meals (food temperature, the quantity of boiled rice and soup, diversity of types of soup, menu, the price of meals, food hygiene, etc). The questionnaires used 5 point Likert type scale (5: very much agree~1: totally disagreed) for satisfaction on the environment of eating place and satisfaction on food of school meals.

### Statistical Analysis

Statistical tests were performed using SPSS (ver.12.0) for Windows to analyze the data. Frequency and percentage was assessed for each item, and satisfaction on the environment of eating place of school meals and satisfaction on food of school meal service were compared using t-test by calculating standard deviation and average for each group of measured values by 5 point Likert type scales.

## Results

### Eating place of school meal and type of school

The eating place of school meal and type of school are

**Table 1.** Eating place of school meal and type of school

		Boy	Girl	Total (%)
Eating place	Classroom	89	324	412 (60.7)
	Cafeteria	157	110	267 (39.3)
School type	Boys' Middle School	119	-	119 (22.0)
	Girls' Middle School	-	315	315 (58.2)
	Coed school	127	119	107 (19.8)
Grade	1 <sup>st</sup>	141	84	225 (33.1)
	2 <sup>nd</sup>	144	79	223 (32.8)
	3 <sup>rd</sup>	149	83	232 (34.1)
Total		246	434	680 (100.0)

**Table 2.** Satisfaction on the food service environment by eating place

Variables	Classroom	Cafeteria	Total	t-value
Optimal temperature of food <sup>1)NS</sup>	3.48 ± 0.911 <sup>2)</sup>	3.51 ± 0.986	3.49 ± 0.940	-0.371
Satisfaction on eating places***	3.67 ± 1.111	3.02 ± 1.184	3.41 ± 1.182	7.270
Atmosphere***	3.41 ± 0.906	3.00 ± 1.073	3.25 ± 0.995	5.355
Optimal time***	3.36 ± 0.940	2.58 ± 1.082	3.05 ± 1.067	9.981
Sanitation <sup>NS</sup>	2.87 ± 0.933	2.98 ± 1.005	2.91 ± 0.962	-1.518
Easy to arrange a meal plate*	2.24 ± 1.028	2.40 ± 1.090	2.30 ± 1.055	2.014
Comfortable to study after lunch <sup>NS</sup>	2.49 ± 1.014	2.38 ± 1.203	2.45 ± 1.092	-1.290
Chance to expression of dissatisfaction on food services*	2.34 ± 1.152	2.16 ± 0.074	2.27 ± 1.180	1.984

<sup>1)</sup> 5 Likert scale (5:very satisfied-1:very dissatisfied)

<sup>2)</sup> Mean ± S.D

\*  $P < 0.05$ , \*\*  $P < 0.01$ , \*\*\*  $P < 0.001$ , NS : not significant

presented in <Table 1>. Among 680 participants, 434 participants were in middle schools (119 students in boys' school, 315 in girls' school) and 246 were in coed schools. Eating place was 412 in classrooms and 267 in cafeterias.

### Comparison of satisfaction depending on the eating places

#### 1) Satisfaction with the meal service environment by eating place

The results of satisfaction of meal service environment depending on the eating places (cafeteria, classroom) are as shown in <Table 2>. Satisfaction on the eating places (cafeteria 3.67 and classroom 3.02), atmosphere (cafeteria 3.41 and classroom 3.00) and satisfaction on the time of distributing meals (cafeteria 3.36 and classroom 2.58) presented that the students who eat school meals in their classrooms have significantly higher satisfaction than those in cafeterias ( $P < 0.001$ ). As for the cleanliness of eating environment, there was no significant difference between the two groups. As the easiness of plate arrangement, cafeteria group (2.40) showed significantly higher than classroom group (2.24) ( $P < 0.05$ ). As for the opportunity to express dissatisfaction over school food, classroom group (2.34) had better satisfaction than cafeteria group (2.16) with significantly different ( $P < 0.05$ ).

**Table 3.** Satisfaction on the meal by eating place

Variables	Classroom	Cafeteria	Total	t-value
Meal quantity <sup>1)**</sup>	3.40 ± 0.962 <sup>2)</sup>	3.16 ± 1.055	3.30 ± 1.005	3.017
Nutrition of menu <sup>NS</sup>	3.20 ± 0.851	3.28 ± 0.922	3.23 ± 0.879	-1.185
Diversity of soup <sup>NS</sup>	3.15 ± 0.954	3.11 ± 1.056	3.13 ± 0.994	0.457
Saltiness of meal <sup>NS</sup>	3.09 ± 0.895	3.11 ± 0.975	3.10 ± 0.925	-0.343
Diversity of dishes <sup>NS</sup>	3.08 ± 1.008	3.11 ± 1.079	3.09 ± 1.035	-0.320
Tasty of meal <sup>NS</sup>	3.01 ± 0.955	3.02 ± 0.998	3.01 ± 0.971	-0.150
Satisfaction of menu <sup>NS</sup>	2.95 ± 0.969	2.97 ± 1.014	2.96 ± 0.986	-0.271
Satisfaction of sanitary <sup>***</sup>	2.76 ± 0.967	3.03 ± 1.077	2.87 ± 1.018	-3.292
Harmony of meal color <sup>NS</sup>	2.80 ± 0.898	2.81 ± 0.973	2.80 ± 0.927	-0.025
Suitable charge for a school menu <sup>NS</sup>	2.82 ± 0.944	2.72 ± 1.080	2.78 ± 0.999	1.276
Number of dessert <sup>NS</sup>	2.77 ± 1.037	2.69 ± 1.146	2.74 ± 1.080	0.961

<sup>1)</sup> 5 Likert scale (5:very satisfied-1:very dissatisfied)<sup>2)</sup> Mean ± S.D\*  $P < 0.05$ , \*\*  $P < 0.01$ , \*\*\*  $P < 0.001$ , NS : not significant

## 2) Satisfaction of food in school meal by the eating place

The results of satisfaction of food in school meal depending on the eating place are shown in <Table 3>. As for the food temperature, there is no significant difference between cafeteria (3.51) and classroom (3.48). As for the quantity of food, classroom group (3.40) showed significantly higher satisfaction than cafeteria group (3.16,  $P < 0.01$ ), but classroom group (2.76) showed significantly lower satisfaction than cafeteria group (3.03,  $P < 0.01$ ) in hygiene. As for satisfaction on others such as balance of nutritional composition of meal, salinity, diversity of food, taste of food and harmony of food color, classroom group showed higher than cafeteria group but the difference was not significantly different. As for satisfaction on diversity of soup, the cost of meal, frequency of getting dessert, classroom group showed higher satisfaction but the difference was not significantly different.

*Comparison of satisfaction on the meal service environment depending on gender*

The results of satisfaction of meal service environment depending on gender difference are shown in <Table 4>. As for sanitation and atmosphere of eating place, the boy group showed less satisfaction than the girl group but there was no significant difference. As for distribution time (boy 2.80, girl 3.19;  $P < 0.001$ ), easiness of plate arrangement (boy 2.87, girl 2.98;  $P < 0.05$ ), comfortable for after lunch class (boy 2.51, girl 2.33;  $P < 0.05$ ) and opportunity to express dissatisfaction on school meal (boy 2.15, girl 2.35;  $P < 0.05$ ), girl group showed significantly higher satisfaction than boy group.

*Comparison of satisfaction on the food of school meal*

Comparison of satisfaction over the between genders is presented in <Table 5>. The results of satisfaction of food in school meal depending on gender differences are shown in

**Table 4.** Satisfaction on the food service environment by gender

Variables	Boys	Girls	Total	t-value
Optimal temperature of food <sup>1)NS</sup>	3.69 ± 0.974 <sup>2)</sup>	3.37 ± 0.901	3.49 ± 0.940	4.290
Satisfaction on eating places <sup>***</sup>	3.32 ± 1.287	3.47 ± 1.117	3.41 ± 1.182	1.470
Atmosphere <sup>***</sup>	3.18 ± 1.097	3.29 ± 0.930	3.25 ± 0.994	-1.296
Optimal time <sup>***</sup>	2.80 ± 1.194	3.19 ± 0.961	3.05 ± 1.067	-4.682
Sanitation <sup>NS</sup>	2.98 ± 1.034	2.87 ± 0.918	2.91 ± 0.962	3.683
Easy to arrange a meal plate <sup>*</sup>	2.23 ± 1.218	2.35 ± 0.949	2.30 ± 1.055	2.075
Comfortable to study after lunch <sup>NS</sup>	2.33 ± 1.292	2.51 ± 0.957	2.45 ± 1.092	1.402
Chance to expression of dissatisfaction about food services <sup>*</sup>	2.15 ± 1.253	2.35 ± 1.131	2.27 ± 1.180	-2.122

<sup>1)</sup> 5 Likert scale (5:very satisfied-1:very dissatisfied)<sup>2)</sup> Mean ± S.D\*  $P < 0.05$ , \*\*  $P < 0.01$ , \*\*\*  $P < 0.001$ , NS : not significant**Table 5.** Satisfaction on the meal by gender

Variables	Boys	Girls	Total	t-value
Meal quantity <sup>1)**</sup>	3.19 ± 1.118 <sup>2)</sup>	3.37 ± 0.931	3.30 ± 1.005	-2.220
Nutrition of menu <sup>NS</sup>	3.36 ± 0.923	3.16 ± 0.845	3.23 ± 0.879	2.940
Diversity of soup <sup>NS</sup>	3.22 ± 1.043	3.08 ± 0.962	3.13 ± 0.994	1.776
Saltiness of meal <sup>NS</sup>	3.22 ± 0.986	3.03 ± 0.883	3.10 ± 0.925	2.609
Diversity of dishes <sup>NS</sup>	3.21 ± 1.123	3.03 ± 0.976	3.09 ± 1.035	2.259
Tasty of meal <sup>NS</sup>	3.17 ± 0.926	2.92 ± 0.985	3.01 ± 0.971	3.153
Satisfaction of menu <sup>NS</sup>	3.07 ± 0.983	2.90 ± 0.983	2.96 ± 0.986	2.151
Satisfaction of sanitary <sup>***</sup>	3.06 ± 1.090	2.76 ± 0.960	2.87 ± 1.018	-0.338
Harmony of meal color <sup>NS</sup>	2.85 ± 1.009	2.78 ± 0.877	2.80 ± 0.927	0.957
Suitable charge for a school menu <sup>NS</sup>	2.80 ± 1.069	2.76 ± 0.959	2.78 ± 0.999	0.398
Number of dessert <sup>NS</sup>	2.70 ± 1.174	2.76 ± 1.024	2.74 ± 1.080	-0.656

<sup>1)</sup> 5 Likert scale (5:very satisfied-1:very dissatisfied)<sup>2)</sup> Mean ± S.D\*  $P < 0.05$ , \*\*  $P < 0.01$ , \*\*\*  $P < 0.001$ , NS : not significant

<Table 3>. As for the food temperature, boy group (3.69) showed significantly higher satisfaction than girl group (3.37,  $P < 0.001$ ). As for the quantity of school meal, the girl group (3.37) showed significantly higher satisfaction than the boy group (3.19) ( $P < 0.05$ ). However, the boy group expressed significantly higher satisfaction than the girl group on other factors such as nutrition (boy 3.36, girl 3.16;  $P < 0.01$ ), salinity (boy 3.22, girl 3.03;  $P < 0.01$ ), diversity of side dishes (boy 3.21, girl 3.03;  $P < 0.05$ ), tasty (boy 3.17, girl 2.92;  $P < 0.01$ ), satisfaction over menu (male students 3.07, female students 2.90;  $P < 0.05$ ) and sanitary (boy 3.06, girl 2.76;  $P < 0.001$ ). Therefore, in general, the boy group is more satisfied with overall school meal status than the girl group.

**Discussion**

This study was carried out to improve students' satisfaction for school meal service. We surveyed the satisfaction on school

meals among middle school students in different eating places and gender. To eat meals in classrooms, it needs to be conducted by transferring meals in large distribution server with student meal servers by dumbwaiter to the classroom. Then, students in charge or helpers distribute the meals to each student (Chyun *et al.*, 1999). On the other hand, eating school meals in the cafeteria, students take food as they want and meal helpers distribute food in the designated area, which makes the school food distributed with warmth and cleanliness, managed with hygiene. Also, students can have their meals in a pleasant and hygienic place. However, school cafeterias take a lot of space, and small space provokes dissatisfaction on prolonged distribution time (Lee, 2005). Since there are benefits and defects in both distribution methods, we need to examine student's preference in eating place and satisfaction of school meal service, so we can improve meal distribution methods and efficiency depending on the characteristics of each school.

A comparison of satisfaction on school meal environment presented those students who eat school meals in their classroom showed more satisfaction on meal distribution time, eating place, eating atmosphere ( $P < 0.001$ ). As for satisfaction on food of school meals, classroom group showed higher satisfaction than cafeteria group (in quantity, diversity of types of soup, the cost of school meal, dessert). As for hygiene, cafeteria group has higher satisfaction than that of classroom, but waiting time for meal distribution, classroom group has higher satisfaction than that of classroom because students prefer to have meals at their seats due to convenience (An, 2008), and eating meal in classroom has faster service than cafeteria distribution (Lee & Lyu, 2005). In this study, the reason that cafeteria group showed more dissatisfaction on meal plate arrangement and disruption to studying after having meal than class room distribution group ( $P < 0.05$ ) is considered that cafeteria distribution takes more meal distribution time than that of classroom and requires plate management without help. In case of hygiene, the cafeteria group showed higher satisfaction than the classroom distribution group because kitchen employees distribute meals in the cafeteria, so the management of school meals is convenient and hygienic. The classroom group showed significantly greater satisfaction than cafeteria group ( $P < 0.05$ ) because meal distribution in the cafeteria is usually self-controlled by students. Particularly, in the research about the students' preferred eating place (Lee & Jang, 2005), students preferred to eat meals in cafeteria due to inconvenience of transferring meal plates and unsanitary environment of classroom, but at the same time they preferred classroom distribution due to the long waiting time for meal distribution and inconvenience of going to the cafeteria. Therefore, it needs to try various methods to reduce waiting time such as differentiating meal time in each grade and installing many distributing counters.

Comparison over school meal satisfaction between gender showed that boys were satisfied with overall food of school meal, but they thought the meal time was not proper ( $P < 0.001$ ) and

the school meal disrupted the 5<sup>th</sup> period class study after lunch ( $P < 0.05$ ). On the other hand, girls were dissatisfied over meal temperature ( $P < 0.001$ ) and hygiene ( $P < 0.05$ ). Therefore, the differentiating school meal service depending on gender is recommended. In boy's school, it should be considered to reduce waiting time such as installing many distributing counters. In girl's school, it should be considered to manage hygienic factors and maintain warmth or coolness of food such as equipping with containers for maintaining temperature of food and reducing interval time between cooking and distribution. Though conversion of eating place from classroom to cafeteria is very much in need, there is some difficulty toward it. Therefore, schools that do not have a cafeteria for eating meals should secure safe distributing cart to maintain proper food temperature, and conduct student education for proper self-distribution.

As the results of this research, there were differences of satisfaction on school meal service by eating places and gender. The satisfaction on school meals is related to improving the effects of school meal (Kim & Lee, 2003), so we should serve the school meal in different methods by different in eating place and single sex-schools. To get more information about meal satisfaction in school service, a further research need for the preference menu by eating place and gender.

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