

Analysis on Sanitation Management Practices in Restaurants in Seoul using the Sanitation Grading System Evaluation Index

Hee-Su Kim, Ae Rang Lee¹, and Gun-Hee Kim*

Department of Food & Nutrition, Duksung Women's University, 419, Ssangmun-dong, Dobong-gu, Seoul, Korea

¹*Department of Food & Nutrition, Soongeui Women's College, 8-3 Yejang-dong, Jung-gu, Seoul, Korea*

ABSTRACT This study evaluates the effectiveness of the "Seoul Sanitation Grading System Evaluation Index" developed earlier and to analyze sanitation management practices in restaurants in Seoul, Korea. The categories evaluated were the food management standard, facilities/equipment standard, and essential checking items specified in the law. These items were graded and classified into A (100~90), B (89~80), C (79~70) and Score (less than 69) based on the criteria set by the present researchers. We randomly selected 56 restaurants in five local cities (Jung-gu, Seocho-gu, Jongno-gu, Songpa-gu and Yeongdeungpo-gu) and investigated each by actually visiting the site of business. The achievement rate for food management standard was 80.8%; as for the specific items in the category, it was the highest in food ingredients at 77.1% and the lowest in food storage at 62.1%. For the facilities/equipment standard, the achievement rate was 77.8%; as for the specific items in the category, it was the highest for vermin at 88.1% and the lowest for operation at 70.8%. The achievement rate for overall individual sanitary management was 70.7% and in the category, the lowest score was seen in hand washing at 57.1%. The overall average score of sanitation management practices using the Seoul Sanitation Grading System Evaluation Index in restaurants in Seoul was 73.7, which fell into the C category. As for the number of restaurants in each grade category, there were 10 (17.9%) in each category of A (100~90), B (89~80) and C (79~70) with 30 (53.6%) scoring higher than 70, whereas those scoring less than 69 included 26 (46.4%). The average scores for those restaurants designated by local governments (exemplary restaurants, general restaurants, best Korean restaurants in Seoul) were not significantly different; however, they were higher in franchises than those small restaurants ran by individuals.

KEYWORDS: Restaurants, Sanitation Evaluation, Sanitation Grading System, Sanitation Practice Analysis, Restaurants in Seoul

INTRODUCTION

Launched in the 1970's, the restaurant industry in Korea has grown significantly over the past with Korea hosting large international events and the penetration of overseas restaurants into the Korean market in the 1980's, in which the market size was increased from 18 trillion won in 1990 to some 51 trillion won in 2006. The number of restaurants also increased from 298,196 in 1990 to 600,233 in 2004 but decreased slightly to 546,504 in 2006. The industry also contributed significantly in job creation and the

overall national economy by employing 870,000 workers to 1.45 million workers. Despite this huge market size, most of restaurants in Korea are one-man owned small businesses so that the industry is very weak structurally (Kim 2004).

Furthermore, the number of people eating out is soaring with increased income in recent years with them having high expectation for food hygiene and safety; however, the risk of food borne illness from restaurants has also increased at the same time so that it is urgent for the central and local governments to come up with an advanced system for sanitation management in restaurants (Moon 2006). A study on food borne illness and food safety showed that people experienced food borne illness from eating out in restaurants the most at 37.2% (Bahk et al 2003). In another study that surveyed homemakers in Seoul and Pohang city, most respondents recognized that food borne illness was likely to occur outside home with 70.9% responding that it was likely to occur by eating out in restaurants (Yoon et al 2005). This

*Corresponding author
Tel: +82-2-901-8496
Fax: +82-2-901-8474
E-mail: ghkim@duksung.ac.kr

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negative perception would lead people into not trusting sanitation practices in the restaurant industry and would play a role in harming the growth of the industry. Hence, there has been the need for policy support by local governments to upgrade sanitation practices in restaurants to meet the international standard and change the negative perception of people on eating out.

Accordingly, the Seoul Sanitation Grading System Evaluation Index is an objective index developed to provide clean and safe food and boost the level of sanitation practices in restaurants, especially amid people eating out more frequently and the number of foreign visitors increasing. Seoul Sanitation Grading System Evaluation Index categories included were based on the sanitation evaluation report based on the Korean sanitation law (Kwak et al 2001; Kim 2006; Noh 2006; Park et al 2007) and the Retail Food Official Inspection Report from Los Angeles, the U.S. And this study uses in this Index to analyze sanitation management practices in restaurants in Seoul to evaluate the effectiveness of this evaluation tool. we also tried to compare an evaluation score along a designation system, management type, category of business and boroughs.

MATERIALS AND METHODS

Surveyed restaurants and period

Based on the list of restaurants in Seoul local governments provided by the city of Seoul, we randomly selected and

visited 56 sites (exemplary restaurants, general restaurants, best Korean restaurants in Seoul) in Jung-gu, Seocho-gu, Jongno-gu, Songpa-gu and Yeongdeungpo-gu. For objective evaluation, one trained surveyor and one sanitation monitor (from a consumer organization) surveyed each site. The period of investigation was from January 24 to February 5, 2009.

Surveyed contents and method

The Seoul Sanitation Grading System Evaluation Index included the food management standard, facilities/equipment standard, individual sanitary management and essential checking items specified in the law. The categories included were based on the sanitation evaluation report based on the Korean sanitation law (Kwak et al 2001; Kim 2006; Noh 2006; Park et al 2007) and the Retail Food Official Inspection Report from Los Angeles, the U.S. The food management standard included 18 subcategories including food ingredients, food storage temperature and cooking (Table 1). The facilities/equipment standard included 18 subcategories including equipment/facility, water/sanitizing, vermin and operation. The individual sanitary management included three subcategories including hand washing. Essential checking items specified in the law (although no penalty was given) included 6 subcategories including for provision of the place of origin, presence of health check-up records of the operator and employees, business registration card, the cooking licence for puffer fish if applicable. Extra

Table 1. General characteristics of the restaurants

Variable	Category	Frequency (N)	Percent (%)
Category of business	Korean-style restaurant	32	57.1
	Chinese-style restaurant	10	17.9
	Japanese-style restaurant	4	7.1
	Western-style restaurant	10	17.9
Grade	A	10	17.9
	B	10	17.9
	C	10	17.9
	Less than 69	26	46.4
Designation System	General restaurants	36	64.3
	Exemplary restaurants	7	12.5
	Best Korean restaurants in Seoul	8	14.3
	Exemplary restaurants & Best Korean restaurants in Seoul	5	8.9
Management Type	Private business	40	71.4
	Franchise	16	28.6
Boroughs	Seocho-gu	11	19.6
	Songpa-gu	11	19.6
	Yeongdeungpo-gu	11	19.6
	Jung-gu	12	21.4
	Jongno-gu	11	19.6

points were penalized at 5, 3 and 1 points for the risk of food borne illness and food safety.

Statistical analysis

The data collected were analyzed using SPSS 12.0 (Statistical Package for Social Sciences. SPSS Inc. Chicago. IL. USA). Frequency analysis was done to evaluate the achievement rate for each subcategories invested in each standard. ANOVA was used for operation, local government, operation type and the status of the restaurant (exemplary restaurants, general restaurants, best Korean restaurants in Seoul).

RESULTS AND DISCUSSION

General items

Table 2 shows the general items related with the restaurants investigated. Four categories of business included Korean (57.1%, 32 sites), Chinese (17.9%, 10), Japanese (7.1%, 4) and Western-style (17.9%, 10) restaurants.

We gave each restaurant a grade based on our own criteria and groped the score into A (100~90), B (89~80), C

(79~70), and less than 69 points (the score specified). The results showed that 30 scored higher than 70 with 10 (17.9%) each falling to A (100~90), B (89~80) and C (79~70). On the other hand, 26 (46.4%) scored less than 69. The sites that received higher than 90 points were 18%. These A grade included 6 Korean and 4 Western-style restaurants but none of the Japanese or Chinese style restaurants. Those that scored less than 70 (46.4%) included 17 Korean (30.4%), 6 Chinese (10.7%), 2 Japanese (3.6%), and 1 Western-style restaurant (1.8%).

Based on the designation system, most were general restaurants at 36 (64.3%), followed by Best Korean restaurants in Seoul at 8 (14.3%) and exemplary restaurants at 7 (12.5%). Five (8.9%) were Best Korean restaurants in Seoul as well as representative restaurants.

Based on operation type, 40 (71.4%) were privately owned business and 16 (28.6%) were franchises. The number of restaurants based on "gu" local administrative districts was 11 (19.6%) each in Seocho-gu, Songpa-gu, Yeongdeungpo-gu and Jung-gu and 12 (21.4%) in Jongno-gu.

Table 2. Seoul Sanitation Grading System Evaluation Index

Categories	Seoul Sanitation Grading System Evaluation Index	Demerit mark
1. Food Management Standard		51
Food ingredients	Processed food and packaging product has passed the expiration date	5
	No separate use of cutting board, knives and rubber gloves	5
	Food bears or containing any poisonous or deleterious substance that may render it impure or injurious to health	5
Food temperature	Holding of potentially hazardous foods (PHF)-immediate risk (10~60°C on storage) and check temperature of food at receiving-PHF (comminuted meat, meat, eggs, poultry, fish and pork)	5
Food ingredients	Unapproved Source	3
Food storage	Use of disapproval covered and container, too many elevated (warehouse)	3
	No separate storing of raw and cooked foods	3
	Ready-to-eat food exposed to possible contamination from raw meat/poultry/fish/eggs	3
	Use of disapproval covered and container, too many elevated (refrigerator, deep-freezer)	3
Food temperature	Incongruity of PHF temperatures (soybean curd, eggs, milk)	3
	No check the temperature of food when served (Cool dish: more than 10°C, Hot dish: less than 60°C)	3
Cooking	Use of disapproval cooling and thawing	3
	Risk for contamination-food prepared in unapproved area/food prepared or handled with bare hand	3
Food storage	Hazardous materials/Chemicals-storage and use in food warehouse	1
	No using the cover of food containers in storage	1
	No separate sanitizing vegetables and fruit and raw vegetables and fruit	1
	Food don't be stored at least 15 cm off the floor on approved shelving	1

Table 2. Continued

Categories	Seoul Sanitation Grading System Evaluation Index	Demerit mark	
2. Facilities/Equipment Standard		36	
Equipment/facility	No separate use of dish towel or uncleanliness of dish and utensils	5	
Vermin	Proofing of rodents/cockroaches/insects/flies	5	
Equipment/facility	Be contaminated kitchen utensils or food-contact surfaces	3	
Water/sanitizing	No inspection of ground water/Don't control temperature of water (hot/cold)	3	
Equipment/facility	No management of refrigerator temperature (refrigerator: more than 10°C, deep-freezer: more than -18°C)	3	
	Drain line/Supply line-unapproved discharge/installation/ materials/leaking	3	
Operation	Improperly sterilization method of utensils (dish, spoon, fork and cup)	3	
Equipment/facility	Uncleanliness of floor/inside wall/ceiling	3	
	Inadequate of kitchen lighting (less than 200lux)	1	
Vermin	No install of insect net/rodents net	1	
Equipment/facility	Hood-not clean/disrepair/missing filters	1	
Operation	Uncleanliness of food warehouse	1	
Equipment/facility	Uncleanliness of equipment, shelving and cabinet	1	
Operation	Soap/drying device-dispensers empty in rest room	1	
	No separate of toilets (woman/man)	1	
	Uncleanliness a garbage container	1	
3. Individual Sanitary Management		13	
Employee practices	Disease transmission-carrier/lesion/rash	5	
Hand washing	Employee did not wash hands/no supplies	5	
Employee practices	No Wearing hair nets/apron/uniform or wearing of jewelry/polish/artificial nails	3	
4. Essential checking items specified in the law		100	
Essential checking	Provision of the place of origin	O	X
	No unpackaged food that has been served shall be re-served	O	X
	Presence of health check-up records of the operator and employees	O	X
	Business registration card, the cooking licence for puffer fish if applicable	O	X
	Sanitation education	O	X
	Designation of a person responsible for sanitation management	O	X

Analysis of achievement rates

In the food management standard, the achievement rate was 80.8% with the food ingredient categories showing the highest rate at 77.1% (Table 3). For the facilities/equipment standard, it was 77.8% with the highest rate shown in the vermin subcategory at 88.1%. For individual sanitation management, it was 70.7%. Although no specific scores were given for the essential checking items with the items graded based on present or absent, the overall achievement rate was 74.7% and the average score of the evaluation index based on this category was 73.7 (C group).

In the food management standard, the achievement rate

for food storage was low at 62.1%, needing urgent improvement. In the facilities/equipment standard, the business operation subcategory showed the lowest rate at 70.8%. In the individual sanitary management, the rate was the lowest in hand washing at 57.1%. In the essential checking items, the subcategories included the provision of the place of origin, the presence of health check-up records of the operator and employees, the business registration card, the cooking licence for puffer fish if applicable, sanitation education, the designation of a person responsible for sanitation management, and full time work. The overall achievement rate for these items was 74.7%.

Table 3. Restaurants sanitation evaluation index (achievement rates)

Variable	Category	Allotting	Score	Areas(%)	Fields(%)
Food Management	Food ingredients	18	13.9	77.1	80.8
	Food storage	16	9.9	62.1	
	Food storage temperature	11	8.2	74.4	
	Cooking	6	4.4	73.2	
Subtotal		51	36.4		
Facilities/equipment	Facilities/equipment	12	9.1	75.4	77.8
	Water · sanitizing	11	8.4	76.2	
	Vermin	8	7.1	88.1	
	Operation	5	3.5	70.8	
Subtotal		36	28.1		
Personal hygiene of workers	Hand washing	5	2.9	57.1	70.7
	Individual sanitation practices	8	6.3	72.3	
Subtotal		13	9.2		
Essential Checking Items	Essential checking items	- ¹⁾	-	74.7	74.7
Total Score(100)				73.7	

¹⁾ -: No score**Table 4.** Sanitation status based on restaurant types

Category of business	Food Management Standard ¹⁾	Facilities/Equipment Standard ²⁾	Individual Sanitary Management ³⁾
Korean-style restaurant	36.16±6.46 ⁴⁾	28.41±5.03	8.88±3.27
Chinese-style restaurant	31.10±9.69	25.10±4.93	7.60±2.99
Japanese-style restaurant	33.50±10.63	24.00±5.83	10.25±3.77
Western-style restaurant	43.50±5.54	31.30±3.83	11.40±2.17
F(P)	5.16** (0.00)	3.67* (0.02)	2.85 (0.05)

* $p < 0.05$, ** $p < 0.01$.¹⁾ Food Management Standard total score: 51²⁾ Facilities/equipment standard total score: 36³⁾ Individual Sanitary Management total score: 13⁴⁾ Mean±SD.

Analysis on sanitation practices

When the differences in sanitation practices were evaluated, a significant difference was shown between the food management standard ($p < 0.01$) and facilities/equipment standard ($p < 0.05$); however, no significant difference was seen in individual sanitary management (Table 4). The highest rate was shown in Western-style restaurants in the food management standard at 43.50 ± 5.54 and the lowest in Chinese-style restaurant at 31.10 ± 9.69 . In the facilities/equipment standard, the rate was also the highest in Western-style restaurants at 31.30 ± 3.83 and the lowest in Japanese-style restaurant at 24.00 ± 5.83 .

A significant difference was shown in individual sanitation management when the category was analyzed according to each “gu” district ($p < 0.01$). The rate was the highest in Jung-gu at 11.45 ± 2.54 and the lowest in Songpa-gu at 6.55 ± 1.86 . No significant difference was seen in the

facilities/equipment standard based on each “gu” district (Table 5).

Based on operation types, sanitation practices were not significantly different in the food management standard, facilities/equipment standard, and individual sanitation management. However, the rates were higher in overall in food management, facilities, and individual management in franchise restaurants compared to those owned privately by individuals (Table 6). This result was probably because the headquarters of a franchise managed sanitation at each branch systematically and their food ingredients and cooking were standardized.

The food management standard, facilities/equipment standard, and individual sanitation management standard were not significantly different in those restaurants under the designation system (Table 7).

Table 5. Sanitation status based on “gu” administrative districts

Gu	Food Management Standard ¹⁾	Facilities/Equipment Standard ²⁾	Individual Sanitary Management ³⁾
Seocho-gu	35.00±11.44 ⁴⁾	27.27±6.03	9.72±3.32
Songpa-gu	33.09±2.30	30.36±2.23	6.55±1.86
Yeongdeungpo-gu	36.91±9.31	26.36±5.73	7.27±3.13
Jongno-gu	37.42±7.09	28.17±5.73	10.83±2.37
Jung-gu	39.36±7.35	27.91±4.95	11.45±2.54
F (P)	0.97(0.43)	0.88(0.48)	7.22**(0.00)

* $p < 0.05$, ** $p < 0.01$.¹⁾Food Management Standard total score: 51²⁾Facilities/equipment standard total score: 36³⁾Individual Sanitary Management total score: 13⁴⁾Mean±SD.**Table 6.** Sanitation status based on operation types

Management Type	Food Management Standard ¹⁾	Facilities/Equipment Standard ²⁾	Individual Sanitary Management ³⁾
Private business	35.20±8.30 ⁴⁾	27.38±5.33	8.93±3.14
Franchise system	39.31±6.92	29.63±4.73	9.88±3.50
F (P)	3.09(0.09)	2.17(0.15)	0.98(0.33)

¹⁾Food Management Standard total score: 51²⁾Facilities/equipment standard total score: 36³⁾Individual Sanitary Management total score: 13⁴⁾Mean±SD.**Table 7.** Sanitation status based on designated restaurants

Designation System	Food Management Standard ¹⁾	Facilities/Equipment Standard ²⁾	Individual Sanitary Management ³⁾
General restaurants	36.13±8.66 ⁴⁾	27.50±5.15	8.69±3.54
Exemplary restaurants	35.00±6.61	26.43±5.13	9.71±2.36
Best Korean restaurants in Seoul	38.50±8.37	28.63±5.95	10.25±2.82
Exemplary restaurants & Best Korean restaurants in Seoul	36.60±6.02	33.00±1.87	10.40±2.51
F (P)	0.25(0.86)	1.99(0.13)	0.85(0.47)

¹⁾Food Management Standard total score: 51²⁾Facilities/equipment standard total score: 36³⁾Individual Sanitary Management total score: 13⁴⁾Mean±SD.

DISCUSSION

We were able to evaluate sanitation practices in various restaurants by hiring sanitation monitors for the survey. As expected, Western-style restaurants showed better sanitation compared with other types with the poorest conditions in Chinese-style restaurants. As for the type of operation, franchise restaurants showed higher rates compared to other types. In occasion of this franchise restaurant, is thought that because is doing hygiene management for cooking and food ingredients of head office dimension.

The rates were higher in Jung-gu and Jongro-gu, which

are special tourists districts. However, unlike expected no significant difference was shown based on the designation system. This result simply shows that those designated restaurants including exemplary and best Korean restaurants in Seoul (except a few that scored high) do not have systematic sanitation management as other restaurants. It also shows that the restaurant sanitation grading system can be applied in diverse areas with exemplary and best Korean restaurants in Seoul are in the same level in sanitation management.

Categories that develop to preceding study was thought that because action relation categories' allotting points are

high than facilities, restaurant of low grade can induce to receive high grade later, given that can receive high grade through action change even if do not make equipments investment of expensive expense. So, we thought that Seoul Sanitation Grading System Evaluation Index was effectiveness.

Furthermore, this grading system can improve sanitation levels after it is applied in more districts and sanitation training is provided to owners and cooks. It could also minimize complaints of owners and the grading system can be introduced eventually by leading to changes in sanitation management practices.

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