

# ASSESSMENT OF SANITARY CONDITIONS AND FOOD HANDLERS' PRACTICES OF PUBLIC AND PRIVATE HIGH SCHOOL CANTEENS IN EASTERN VISAYAS, PHILIPPINES

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## Abstract

The aim of this study was to evaluate the sanitary conditions and food handlers' practices of 22 high school canteens from five major cities of Eastern Visayas, Philippines. Fifteen public and seven private schools in Tacloban, Ormoc, Catbalogan, Baybay and Maasin City which adopted the "cook-serve" method were selected and assessed based on food service checklist that was formulated in compliance with the Philippine Code of Sanitation (1976) for food establishments. Results have shown that six (40%) out of 15 public schools have medium sanitary conditions while 9 (60%) of these schools were classified under poor sanitary conditions. In private schools, one (14%), four (57%) and two (29%) schools have good, medium and poor sanitary conditions, respectively. Results have also indicated that public schools may have an overall lower sanitary conditions as compared to private schools based on the higher numbers of public schools classified under poor sanitary conditions. Considering the criterion on food handlers' hygiene, both public (6.25) and private schools (6.25) scored low indicating poor hygiene practices. From this study, it can be suggested that aspects of the acquisition of permits and certificates, improvement of facility design and strict implementation of hygiene practices should be given careful consideration by the school administrators, including the local government units. An example of intervention that should be done includes training targeting food handlers to increase their awareness on good manufacturing practices (GMPs). Quantification of microbial contents of food and water is also warranted.

**Keywords:** school meals, school canteens, food handlers, food safety, food service operation

## I. INTRODUCTION

Food is indispensable to all human beings but very often we come across illnesses attributed to ingestion, of contaminated food. Food surrounds us every day that we tend to overlook the fact that it can also be dangerous once it is mishandled

and not prepared accordingly. In developed and developing countries alike, foodborne diseases are extensive. In the year 2014, 1.8 million people died from diarrhea, one of many foodborne diseases (World Health Organization, 2007). In Japan, there were at least 18,826 cases of foodborne diseases which involved 12 deaths from *Escherichia*

*coli* O157:H7 infection from May and December 1996. (Michino & Otsuki, 2000). BRASIL, 2005 as cited by Santana, Almeida, R., Ferreira, and Almeida, P (2009) also noted that in 2005, schools account for 11.6% of foodborne diseases occurring in Brazil. In the Philippines, there were at least seven major outbreaks which involved 200 morbidities and 27 mortalities from March to April 2005 alone (Azanza, 2004). It is for this reason that in recent years the public has become more aware of foodborne diseases.

Young students are particularly defenseless against foodborne diseases since they are naïve to these types of diseases. They simply buy the food sold to them in their schools. According to Pew Health Group and Center for Foodborne Illness Research & Prevention (2011), approximately half of the reported foodborne diseases occur in children. Hence, the responsibility to provide not only healthy and delicious foods to children but also safer ones falls on the school canteen staff. According to Article 24 of the Convention on the Rights of the Child adopted by the United Nations (UN) in 1989, it is the right of children to be provided with safe drinking water, healthy food and clean environment (UN, 1989 as cited by Marzano and Balzaretti, 2013). Food service staff should therefore practice and be trained properly regarding proper food handling and personal hygiene habits to guarantee the safety of children against foodborne diseases.

Food handlers play a vital part in the final stage of the prevention of foodborne diseases. Necessary steps must be taken by them to reduce the pathogenic microorganisms found in food (Medeiros et al., 2004). Furthermore, in spite of the food handlers' knowledge on proper food preparation; handling errors are still inevitable and are related to some food poisoning incidents. Hence, food handlers' practices should be given serious attention and evaluation of sanitary conditions of school canteens is necessary.

This study assessed the canteens of both public and private high schools in big cities in Eastern Visayas like Tacloban, Ormoc, Catbalogan, Baybay, and Maasin City. Specifically, the study evaluated the sanitary conditions of the different canteens through its facility-design, utensils and equipment-maintenance, employee hygiene practices, quality of raw and ready to eat food, production flow, and quality control; and to categorize the different canteens into excellent, good, medium, poor and very poor based on the levels of safety and sanitary practices.

## II. METHODOLOGY

The initial survey was conducted on randomly selected public and private high school canteens in major cities in Eastern Visayas. The survey was used to identify school canteens in both private and public high schools in the vicinity of Tacloban, Catbalogan, Ormoc, Baybay and Maasin City adopting the "cook-serve" method. From the initial survey, a total of 22 high schools consisting of 15 public and seven private schools following the "cook-serve method" were selected and assessed according to the checklist applied by Santana *et al.* (2009) with slight modifications. The modifications on the checklist were made in compliance with the provisions stated in the Philippine Code of Sanitation (1976) for food establishments (Appendix I). Letters were sent to the participating schools to formally ask their involvement. The identity of the participating schools was kept confidential.

The checklist consists of six parts, namely: part one on permits and certificates (K=5); part two on facility design (K=15); part three on utensils and equipment-maintenance (K=15); part four on personal hygiene (K=25); part five on quality of raw and ready to eat food (K=20); and finally, part 6 of production flow and quality control (K=25). The formula by Santana *et al.* (2009)

was used in computing the score of the six different parts.

$$P = (TS/\Sigma_1-\Sigma_2) \times K$$

Where TS represents the total points obtained;  $P_1$  represents the total number of "yes" points obtained;  $P_2$ , represents the total number of "not applicable" points obtained; and K is a constant ( $\Sigma K = 100$ ). The individual scores of the six parts were then calculated using the formula  $(P_1 + P_2 + P_3 + P_4 + P_5 + P_6/10)$  to get the mean of the scores. Based on this score, the canteens was then classified into Excellent: 9.1–10; good: 7.0–9.0; medium: 5.0–6.9; poor: 2.0–4.9; and very poor: 0–1.9.

### III. RESULTS AND DISCUSSIONS

#### 3.1 Public Schools

Of the fifteen participating public schools, six (40%) were classified having medium sanitary conditions with scores ranging from 5.10-5.45 while nine (60%) were classified having poor sanitary conditions with scores ranging from 3.24-4.87 (Table 1).

For permits and certificates, only one (7%) school scored 1.66 (A7) while 14 (93%) of these schools scored 0. This finding can be translated that majority of the canteens in selected high public schools do not possess health cards so as business and sanitary permits. Where permits are available, these are either out of date or not tangible within the canteen premises. It was also observed that health cards issued to some of the food handlers were not worn at all times. Based on the personal interview, it was learned that majority of the schools do not oblige their canteens to acquire the above-mentioned documents. This urges schools to carefully review its existing rules and regulations regarding canteen operations and to modify/upgrade these to include this aspect. Involvement of the local government unit is

also deemed necessary to assure implementation of a rigid monitoring system of food service operations.

On facility and design, highest score attained was 5.86 (A14) while lowest was 1.37 (school A3). Common problems observed were the lack of proper vermin control, poor ventilation, the absence of toilet facilities (including cloakroom) and often, uncovered trash bins. These problems were also identified by Santana *et al.* (2009) as the most common problems encountered in public schools in Salvador, Brazil.

On utensils and equipment maintenance, highest score attained was 10.20 (A12) while lowest was 3.60 (A8). Common problems observed were improper storage of utensils and equipment (i.e. utensils were not placed in clean, dry places) and open dish racks that are easily invaded by vermin and roaches.

On personal hygiene, the majority of the public schools scored very low. The highest score was 12.50 (13% of the schools) while lowest was 6.25 (74% of the schools). Common problems observed were the improper dress code (e.g. wearing of dangling body accessories and at times, untrimmed or dirty fingernails) and lack of proper washing area where food handlers can wash their hands before food preparation. Wearing of rings and other hand accessories also present a major culprit as findings of Trick *et al.* (2003) showed that ring wearing contributes to hand contamination.

On the quality of raw and ready-to-eat foods, highest score attained was 10.00 (93% of the schools) while lowest was 3.33 (7% of the schools). Common problems observed were improper storage temperature of both raw and ready-to-eat (RTE) foods. A report in literature identified meat-containing dishes as the common source of foodborne diseases (Azanza 2004). Furthermore, improper storage of raw

Table 1. Classification of sanitary conditions of different public high schools in Eastern Visayas.

School	Part 1 K=5	Part 2 K=10	Part 3 K=15	Part 4 K=25	Part 5 K=20	Part 6 K=25	Mean of Scores	Classification
A6	0.00	3.62	7.20	6.25	3.33	12.03	3.24	Poor
A3	0.00	1.37	6.00	6.25	10.00	12.96	3.65	Poor
A8	0.00	2.24	3.60	6.25	10.00	17.39	3.94	Poor
A11	0.00	4.13	7.20	6.25	10.00	17.39	4.49	Poor
A9	0.00	4.65	7.20	6.25	10.00	17.77	4.58	Poor
A1	0.00	2.06	9.60	6.25	10.00	19.56	4.74	Poor
A2	0.00	4.82	6.00	6.25	10.00	20.65	4.77	Poor
A10	0.00	3.96	7.20	6.25	10.00	20.65	4.80	Poor
A4	0.00	3.79	7.80	6.25	10.00	20.37	4.82	Poor
A13	0.00	3.10	6.00	6.25	10.00	20.65	5.10	Medium
A14	0.00	5.86	9.60	9.37	10.00	16.66	5.14	Medium
A12	0.00	4.48	10.20	6.25	10.00	21.73	5.26	Medium
A15	0.00	4.13	9.60	12.5	10.00	17.39	5.36	Medium
A5	0.00	4.65	7.20	12.5	10.00	19.56	5.39	Medium
A7	1.66	4.48	8.40	9.37	10.00	20.65	5.45	Medium

Part 1 = permit and certificates

Part 2 = facility-design

Part 3 = utensils and equipment-maintenance

Part 4 = personal hygiene

Part 5 = quality of raw and ready to eat food

Part 6 = flow production/handler/serve and quality control

Excellent = 9.1–10

Good = 7.0–9.0

Medium = 5.0–6.9

Poor = 2.0–4.9

Very poor = 0–1.9.

foods is reported to cause contamination with RTE foods and therefore, microbial analysis of both raw and RTE foods served in these canteens is necessary.

On flow production in public schools, highest score attained was 21.73 (school A12) while lowest was 12.03 (school A6). It was observed that most schools do not have linear production flow thus, increasing the tendency of contamination of cooked food by raw food ingredients. In most cases, canteens do not monitor cooking and holding temperatures of foods.

### 3.2 Private Schools

A small number of private schools participated in this study as most of the principals and school canteen managers that were approached were rather hesitant to participate. Overall, one (14%), 4 (57%) and 2 (29%) were classified having good,

medium and poor sanitary conditions, respectively (Table 2).

Failure of acquisition of permits and certificates as previously mentioned for public schools were also observed in private schools. Out of the 7 schools, 6 (86%) scored 0 while 1 (14%) scored 5. On the facility design, the highest score was 6.72 (school B4) while lowest was 2.75 (school B5). On the maintenance of utensils and equipment, the highest score was 15 (school B4) while lowest score was 6 (school B5). On personal hygiene of food handlers, the highest score was 15.62 while lowest was 6.25. The lowest score was similar to what was previously reported in the public schools.

On the quality of raw and RTE foods, the highest score was 20 (school B4) while the rest scored 10. Finally, in the production flow, the highest score was 22.82 (school B4) while lowest was 15.21 (school B5).

Table 2. Classification of sanitary conditions of different public high schools in Eastern Visayas.

School	Part 1 K=5	Part 2 K=10	Part 3 K=15	Part 4 K=25	Part 5 K=20	Part 6 K=25	Mean of Scores	Classification
B5	0.00	2.75	6.00	6.25	10.00	15.21	4.02	Poor
B2	0.00	4.48	7.20	6.25	10.00	18.51	4.64	Poor
B7	0.00	4.65	7.20	7.81	10.00	20.37	5.00	Medium
B6	0.00	3.27	7.80	12.5	10.00	17.59	5.11	Medium
B3	0.00	5.34	12.60	6.25	10.00	19.56	5.37	Medium
B1	0.00	5.51	13.20	12.50	10.00	19.56	6.07	Medium
B4	5.00	6.72	15.00	15.62	20.00	22.82	8.51	Good

Part 1 = permit and certificates

Part 2 = facility-design

Part 3 = utensils and equipment-maintenance

Part 4 = personal hygiene

Part 5 = quality of raw and ready to eat food

Part 6 = flow production/handler/serve and quality control

Excellent = 9.1–10

Good = 7.0–9.0

Medium = 5.0–6.9

Poor = 2.0–4.9

Very poor = 0–1.9.

#### IV. CONCLUSIONS

Most public and private high school canteens in Eastern Visayas obtained poor to medium ratings regarding sanitary conditions and food handler's hygienic practices. The majority of the canteens that were rated poor came from the public schools. Areas contributing to the poor level of safety and sanitary practices among canteens were the absence of sanitary permits, poor hygienic practices among personnel, improper storage of utensils and equipment and inferior facility design. The different schools also have inadequate policies on their canteen operations. As mandated, food services should follow the Code of Sanitation of the Philippines to ensure safer foods serve to consumers. This implies that aspects of an acquisition of permits and certificates, improvement of facility design and strict implementation of hygiene practices should be given careful consideration by the school administrators, including the local government units. An example of intervention that should be done includes training targeting food handlers to increase their awareness on good manufacturing practices (GMPs). Quantification of microbial contents of food and water is also warranted.

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Appendix I.  
Food Service Checklist

Checklist	Nature of Compliance		
	Yes	No	NA
<b>1. Permits and certificates</b>			
1.1- Available Sanitary permit from the local health office	(4)	(0)	(4)
1.2- All workers are with health certificates issued from the local health office	(2)	(0)	(2)
<b>2. Facility-Design (Layout)</b>			
2.1–Suitable localization: area free of unsanitary condition; absence of trash, old objects, pets, insects, animals, rodents.	(2)	(0)	(2)
2.2–Access suitable: direct and independent; not the same to other uses (house)	(2)	(0)	(2)
2.3–Suitable floors:			
2.3.1–Smooth, resistant and impermeable material, ease to clean and in good maintenance	(1)	(0)	(1)
2.3.2–In perfect conditions of cleanliness	(1)	(0)	(1)
2.4–Ceiling/suitable roof:			
2.4.1–Smooth finish, impermeable, washable, light color and good maintenance	(1)	(0)	(1)
2.4.2–In perfect conditions of cleanliness	(1)	(0)	(1)
2.5–Wall/suitable division:			
2.5.1–Smooth finish, impermeable, washable, light color and good maintenance	(1)	(0)	(1)
2.5.2–In perfect conditions of cleanliness	(1)	(0)	(1)
2.6–Suitable doors and windows: Smooth surface, impermeable, washable, ease to clean and good maintenance	(1)	(0)	(1)
2.7–Presence of the protection against insects and rodents	(4)	(0)	(4)
2.8–Suitable illumination to development activity, without overshadow, strong reflection, shadows and excessive contrast	(1)	(0)	(1)
2.9–Suitable ventilation, comfort of temperature and free environment of yeast, gas, smoke and steam abridgement	(1)	(0)	(1)
2.10– Suitable toilet facility:			
1.10.1–Separate by gender, with toilet and washbasin in suitable number. Without communication with work room	(2)	(0)	(2)
1.10.2–Perfect conditions of hygiene and cleanliness: With suitable products to hands antiseptis	(4)	(0)	(4)
2.11– Suitable cloakroom:			
2.11.1–Separate by gender, with anti-room, proper area for 1 (one) locker by employee, bath or shower	(1)	(0)	(1)
2.11.2–Perfect conditions of hygiene, cleanliness and organization: With suitable products for personal hygiene	(2)	(0)	(2)
2.12– Washbasin in the manipulation area:			
2.12.1–Presence of washbasin with tap water in strategic position concern to production flow and service	(2)	(0)	(2)
2.12.2– Perfect conditions of hygiene and cleanliness. With soap, scrubbing-brush for hands, paper tower	(4)	(0)	(4)
2.13– Supply pure water. Connected to public system or certified by official form (six months validity)	(8)	(0)	(8)
2.14– Water tank and hydraulics facilities:			
2.14.1–With suitable volume and pressure. With lid and in good maintenance – free of leak, infiltration, and peeling	(4)	(0)	(4)
2.14.2– Perfect conditions of hygiene and cleanliness. Free of waste on the surface or in the depths	(8)	(0)	(8)
2.15– Suitable destination of the waste:			
2.15.1–Domestic trash inside the facility in continent with lid, clean and sanitized constantly	(4)	(0)	(4)
2.15.2–Other waste (solid and gassy) proper treatment and lunched without causing any damage to the neighbourhood	(2)	(0)	(2)

<b>3. Utensils and equipment-Maintenance</b>			
3.1- Utensils and Equipment			
3.1.1– Equipments with smooth surface, easy cleanliness and disinfection. Good maintenance and working order	(2)	(0)	(2)
3.1.2– Perfect condition of cleanliness	(4)	(0)	(4)
3.2–Suitable utensils:			
3.2.1– Smooth utensils, in non infected material, with size and shape that allows easy cleaning. In good maintenance	(2)	(0)	(2)
3.2.2– Perfect condition of cleanliness	(4)	(0)	(4)
3.3– Furniture (tables, benches, window):			
3.3.1–In sufficient number, resistant, smooth and impermeable material, with integrity surface (without wrinkled and cracks). In good Maintenance	(2)	(0)	(2)
3.3.2– Perfect condition of cleanliness	(4)	(0)	(4)
3.4–Equipments for protection and holding in proper refrigeration:			
3.4.1–Equipments with proper quality, with smooth parts and surfaces, impermeable and resistant. With thermometer	(8)	(0)	(8)
3.4.2– Perfect condition of cleanliness	(8)	(0)	(8)
3.5–Suitable cleanliness and disinfection:			
3.5.1–Utilization of detergent and disinfectant products registered and approved	(8)	(0)	(8)
3.6–Storage of utensils and equipment in safe and protected area against contamination	(8)	(0)	(8)
<b>4. Personal hygiene (employee hygiene practice)</b>			
4.1–Suitable cloths:			
4.1.1– Use of proper apron or dungarees with light color, proper shoes and caps that involve the hair; in good maintenance	(2)	(0)	(2)
4.1.2– Strictly clean	(8)	(0)	(8)
4.1.3–Suitable personal hygiene: Body cleanly, clean hands, short nail; without nail- polish and adornment	(8)	(0)	(8)
4.1.4–Suitable hygiene habits: Hands washing before manipulation procedure and after the use of the toilet	(4)	(0)	(4)
4.2–Control of the health:			
4.2.1– Absence of skin infection, sore and discharge, absence of respiratory infections, gastroenteritis	(8)	(0)	(8)
4.2.2– Realization of periodic exams	(2)	(0)	(2)
<b>5. Quality of raw and ready to eat food</b>			
5.1–Control of the origin: raw foods and other products to sale from authorized caterer, packing, label	(4)	(0)	(4)
5.2–Normal sensorial characteristics: raw foods with color, taste, flavor, consistence and appearance without adulteration	(8)	(0)	(8)
5.3–Suitable conservation: time/ temperature conditions of the raw foods conservation and/or products with safety quality	(4)	(0)	(4)
5.4–Suitable packing and identification: integrity packing and visible identification. Shelf life observed	(8)	(0)	(8)
<b>6. Flow production/handler/serve and quality control</b>			
6.1–Suitable flow:			
6.1.1–Linear flow in one direction, avoiding cross-contamination:	(4)	(0)	(4)
6.1.2–Minor handling and hygiene	(8)	(0)	(8)
6.2–Protection against contamination:			
6.2.1–Foods protected against waste, spit, insects and rodents	(4)	(0)	(4)
6.2.2–Hazard substance such as insecticide, detergent and disinfectants identified storage and used safety	(4)	(0)	(4)
6.3–Suitable storage:			
6.3.1–Percible foods storage in freezer (below – 2°C), refrigeration (-2°C to 8°C), or up to 65°C	(8)	(0)	(8)
6.3.2–Foods storage in separate by type or group; on proper pallet, absence of stranger, ruined or toxic material	(8)	(0)	(8)
6.4–Immediate elimination of the food scrap	(4)	(0)	(4)
6.5–Foods ready-to-eat with normal sensorial characteristic/products to sale: Color,	(4)	(0)	(4)

flavor, consistence and appearance			
6.6–Foods ready to eat with suitable packing and identification/products to sale	(2)	(0)	(2)
6.7–Suitable quality control of the raw foods, finished products and products to sale	(4)	(0)	(4)
6.8–Person qualified: worker with proper training for activity	(2)	(0)	(2)
6.9–Laboratorial analysis with proper frequency; all the batches produced in the establishment should be analyzed	(2)	(0)	(2)
6.10–Suitable transport protected and clean	(2)	(0)	(2)