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Assess Sanitary Condition and Food Handling Practices of Restaurants in Jimma Town, Ethiopia: Implication for Food Born Infection and Food Intoxication

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Abstract
A descriptive cross sectional study was conducted to assess sanitary conditions and food handling practice of restaurants in Jimma town for the implication of food born infection and food intoxication. Out of 75 restaurants registered in the town forty of them were randomly selected by lottery method to have a representative sample. Two food handlers from each restaurant were selected for the questionnaire. Majority of the food handlers working in Jimma town restaurants were aged less than twenty years old (55%), elementary education (62.5%), service years less than two years (42.5%) and income below 500 birr (55%). Concerning the personal hygiene about 65%, 55%, 50%, 50% were not worn gown, had not hair cover, worn unclean gown and hair cover and not trimmed finger nails, respectively. Hand washing habits of food handlers before handling food was found poor. The study revealed that most of the food handlers about 87.5% had not taken any training on food hygiene and regular medical checkup. Majority (57.5%) of them were not heard about food borne disease, causes and mode of food borne diseases. Age, educational background, service years and absence of training may affect the knowledge of food handlers on food borne diseases. Latrine facility, solid and liquid waste disposal system, sanitary and physical condition of the kitchen and dining room were found poor. Awareness creation on food hygiene through training and regular follow up is important to increase the knowledge of food handlers. There should be also a guide line for the establishment of kitchen and dining room of restaurants.
Keywords: Restaurants, food handlers, food borne disease, Food Born Infection, Food Intoxication

1. Introduction

The term food borne diseases includes; food borne intoxications and food borne infections. Intoxication occurs when toxin produced by the pathogens cause food poisoning, while infection is caused by the ingestion of food containing pathogens. Food borne diseases covers illnesses acquired through consumption of contaminated food, and are also frequently referred to as food poisoning. The food borne illnesses result from consumption of food containing pathogens such as bacteria, viruses, parasites or the food contaminated by poisonous chemicals or bio-toxins (Butler and Martin, 2006; CDC, 2011; Musa et al., 2010; Sinell, 1995; Van de Venter, 2000; WHO, 2014). Among these the highest cause is due to bacteria which account 66%, then chemicals 26%, virus 4% and parasites 4% (CDC, 2011).

Food borne illness is a serious and underreported public health problem with high health and financial costs. Worldwide, food borne diseases are a major health burden leading to high morbidity and mortality. The most common clinical symptoms of food borne illnesses are diarrhea, vomiting, abdominal cramps, headache and nausea (Addis and Sisay, 2015). The global burden of infectious diarrhea involves 3-5 billion cases and nearly 1.8 million deaths annually, mainly in young children, caused by contaminated food and water. Especially developing countries are more vulnerable to food borne infection and intoxication. The population in developing countries is more prone to suffer from food borne illnesses because of multiple reasons, including lack of access to clean water for food preparation; inappropriate transportation and storage of foods; and lack of awareness regarding safe and hygienic food practices (WHO, 2014). Moreover, majority of the developing countries have limited capacity to implement rules and regulations regarding food safety. Also, there is lack of effective surveillance and monitoring systems for food borne illness, inspection systems for food safety, and educational programs regarding awareness of food hygiene (WHO, 2014).

Food can get contaminated from plant surfaces, animals, water, sewage, air, soil or from food handlers during handling and processing. Among the diverse sources of food contamination, food handlers serve as important source of food contamination either as carriers of pathogens or through poor hygienic practices (Käferstein, 2003). Several foods borne disease outbreaks are associated with poor personal hygiene of people handling foodstuffs. Lack of personal hygiene and environmental sanitation are among the key factors in the transmission of food borne diseases (Taulo et al., 2009; Zain and Naing, 2002).

Different preventive mechanisms of food borne disease are investigated and reported. Good food handling and sanitation practices, adequate food safety laws, strong regulatory systems, good financial resources to invest in safer equipment, and adequate education for food handlers are the most important to reduce food borne illness especially in developing countries. Food borne illness prevention system will depend on the extent of food safety control in place through food production, processing and distribution keeping food clean, separation of raw and cooked, and cooking thoroughly, keeping food at safe temperature and using safe water and raw materials are some of the important points especially for safety of food of humans (Addis and Sisay, 2015).

In absence of well-maintained and proper food handling practices mass catering establishments have the potential to impart disastrous effect on human health because of their scale and complexity. Food hygienic and safety issues in different catering (food sellers) centres are less practiced in developing countries like Ethiopia. Moreover, problems of growing population, urbanization, lack of resources to deal with pre-and post-harvest losses in food, and environment and food hygiene issues mean that food systems in the country continue to be stressed, adversely affecting the quality and safety of food supplies (Kalekidan et al., 2014). A study conducted in some part of Ethiopia showed that hygiene of food handlers, personal hygiene, sanitary facilities of food establishments, physical conditions of food catering establishments, disposal services, legal licensing and environmental hygiene was identified as the major sanitary deficiencies (Assefa et al., 2015; Haileselassie et al., 2012; Meleko et al., 2015). National Hygiene and Sanitation Strategy program of Ethiopia reported that about 60% of the disease burden was related to poor hygiene and sanitation in the country (MoH, 2005).

Jimma town is found in Oromia region, Ethiopia and it is a business center for the surrounding areas. Currently there is growing investment on the catering (food sellers) centres are available in the town. But there is lack of awareness of food handlers on the food hygiene and food borne disease as well as less monitoring on the sanitary conditions of restaurant's kitchens and dining room. The objective of the study is to assess the personal hygiene, knowledge of food handlers on food borne diseases, sanitary condition of the kitchen and dining room of restaurants in Jimma town with implication for food born infection and food intoxication.

2. Methodology

2.1. Study area and period

The study was conducted at Jimma town located at 352 km southwest Ethiopia. Its geographical coordinates are: 07°40' Latitude and 36°50' Longitude, at an altitude of 1700-1750 m above sea level. Around 75 amounts of restaurants were registered in Jimma town. About 472 of food handlers are currently working in the restaurants.

2.2. Study design

A descriptive cross-sectional study design was used to determine the hygiene practice of food handlers, food handler's knowledge on food borne disease, availability of water supply and toilet facility, sanitary conditions of the dining room and kitchens of the restaurants in Jimma town.

2.3. Source population

Food handlers working in the Jimma town restaurants were source of population.

2.4. Study population

Selected food handlers working in the restaurants of Jimma town were used.

2.5. Inclusion criteria

Food handlers who are engaged in food preparation, serving, and Cleaning were included.

2.6. Exclusion criteria

All those people who do not work in the restaurants and will not willing to participate in the study were excluded.

2.7. Sample size and sampling technique

A census from Jimma Town Cultural and Tourism Bureau indicate, about 75 restaurants were registered in Jimma Town. To have a representative samples 40 restaurants were enrolled through a simple random selection technique after a list of all food establishments was obtained from this Bureau. Then two food handlers were randomly selected using a lottery method from cooker, waiter and cleaner in the presence of one or more other food handlers in each restaurant. The non-response rate was zero.

Data Analysis

The questionnaire was coded and entered in to a statistical package SPSS version 20 which was used for data management and analysis. Data was summarized and presented in table form.

3. Results

3.1. Socio-demographic characteristics of food handler's

The result of socio-demographic data of this study is presented in Table 1. Among the food handlers (n = 80) included in the study, most food handlers were females 52 (65%), and about 28 (35%) were males. More than half 44 (55%) of the food handlers were aged less than 20 years old. Food handlers aged between 21 and 30 years old were 26 (32.5%), 31 and 40 years were 10 (12.5%). Sixty percent (60%) of food handlers were single, 26 (32.5%) were married and 6 (7.5%) were divorced. The majority 30 (37.5%) of the ethnicity of food handlers in Jimma town restaurants were Oromo, 16 (20%) were Dawuro, 12 (15%) were Kafa, 8 (10%) were Amhara, 8 (10%) were Gurage, 6 (7.5%) were others ethnic group including Sulte and Wolayita. About 34 (42.5%) were Orthodox, 28 (35%) were Muslim and 18 (22.5%) were protestant.

Most of their educational back ground about 50 (62.5%) were elementary, 26 (32.5%) were secondary or high school and few of them about 4 (5%) were had no informal education. Regarding their service years 38 (47.5%) were waiter, 34 (42.5%) were cookers and 8 (10 %) were cleaners. More than half 44 (55 %) of food handler's income or salary were below 500 birr. About 30 (37.5%) of the income range in between 5001 and 1000 birr, and few of them 6 (7.5%) were had more than 1001 birr.

3.2. Personal hygiene practices of food handlers

Majority 52 (65%) of food handlers were wears gown and about 28 (35%) were had no gown. Almost more than half 44 (55%) of them had not hair cover and about 36 (45%) were had hair cover. Concerning the cleanness of gown and hair cover about half 40 (50%) of them were worn unclean clothes and not trimmed their finger nails. About 48 (60%) were washed their hands with water and soap, 30 (37.5%) were washed their hand with water only, 2 (2.5%) were not washed their hands after toilet. About 28 (35%) of food handlers were had hand washing habit after touching dirty materials with water only and not washed, 24 (30%) were washed with water and soap. Almost 48 (60%) were not had hand washing habit before handling food, 22 (27.5%) wash with water only and few food handlers about 10 (12.5%) were washed with water and soap. Out of the total food handlers almost all of them about 70 (87.5%) were not had regular medical checkup and not trained about hygiene. A very few 10 (12.5%) of them were had regular medical checkup and have taken hygiene training. More than half 44 (55%) of food handlers were had rings and jewelries and whereas 36 (45%) were had not rings and jewelries.

3.3. Food Handlers' Knowledge on Food borne Diseases

Table 3 shows that food handlers' knowledge on the food borne diseases. Out of the total food handlers interviewed in the restaurants 46 (57.5%) were not heard about food borne diseases and 34 (42.5%) were heard about the diseases. Majority of them about 46 (57.5%) were not know the causes and mode of food borne diseases transmission, 44 (55%) also were not know reason for food contamination. Some of them 25% and 17.5% respondents believe that causes of food borne disease were through unhygienic food preparation and germs, respectively. About 17.5% food handlers believed that mode of food borne disease were contaminated food and water, 7.5% of them were responded that it's through Vectors like flies and cockroaches. Food handlers were responded that reason for food contamination were unclean/ dirty utensils (20%), dirty hands (10%), infected food handler's (7.5%) and dirty working area (5%).

3.4. Sanitary Conditions of Restaurants

Among 75 registered restaurants in Jimma town about 40 of them were assessed their sanitary conditions and related facilities. Almost all about 95% of the restaurants water supply were pipe private and only 5% were pipe shared. More than half, 22 (55%) of the restaurants latrine conditions were not properly managed whereas about 18 (45%) of them were had properly managed latrine facilities. About 52.5% of the restaurants were had proper solid waste storage receptacles, 42.5% of them had improper solid waste storage receptacles and only 5% of them were had no receptacles. The majority, 92.5% of the solid waste collection and disposal were into the municipal container whereas few of them about 7.5% the restaurants were done on site disposal.

3.5. Sanitary and physical conditions of kitchens and dining room of restaurants

An assessment of the sanitary conditions of kitchens and dining room in 40 restaurants were done in the town (Table 5). More than half (55%) of the restaurants kitchen wall, ceiling and floor were un-cleaned whereas the other 45% were cleaned. Also, most of the kitchens about 57.5% had openable windows, but 70 % of the kitchens restaurants were not had adequate ventilation.

Regarding the dining room facilities of the restaurants about 67.5% of them had inadequate ventilation, 50% of them were not cleaned the wall and ceiling, 50% had not openable windows, 45% of the restaurants were infested by vectors and rodent, and 40% the wall and ceiling had cracks. In another way 60% of the dining room ceiling and wall had no crack and 55% of them had no any infestation of vectors and rodent.

4. Discussions

This study deals with; the personal hygiene practices of food handlers, their knowledge on food borne diseases and sanitary conditions of the restaurants in Jimma town. The overall food hygiene practice of food handler working in most of Jimma restaurants like the cleanness of their gown, hand washing habit with soap and water after touching dirty materials and before preparing food were poor. Similar findings in different catering establishments in Addis Ababa city (Fisseha et al., 1999), Hawasa city (Mariam et al., 2000) and Mekele city (Kumie and Zeru, 2007), (Haileselassie et al., 2012) were found poor sanitation conditions and provide consumers with less hygienic food. This may be due to lack of adequate training on knowledge and standards of hygiene which determine the microbiological quality of food (Powell et al., 1997). Although hygiene training of food handlers could contribute significantly to improve knowledge and understanding of food-borne diseases and illnesses; since most outbreaks result from faulty food handling practices (Ehiri and Morris, 1996; Seaman and Eves, 2006).

However, the result had showed more than half of food handlers had no knowledge about food borne disease, causes, transmission and reason for the contamination. The reason is that the majority (87.5%) of the food handlers were not taken any training related to food hygiene. Their education level, age and service years may have also an impact on their knowledge on food safety system because most of their education was elementary (62.5%), aged less than twenty years (55%) and less than two years' service (42.5%). Education levels, age, and income level had significantly associated with knowledge, attitude regarding food safety and environmental hygiene of food service outlets (Baluka et al., 2015; Olumakaiye and Bakare, 2013).

Unhygienic practice food handler and less knowledge on food borne disease are among the causes of food borne infection and intoxication. Different findings were reported on the risk factors for food borne diseases that most outbreaks result from improper food handling practices (Baş et al., 2006; Ehiri and Morris, 1996). Lack of food safety practices among food handlers and unhygienic premises will pose a health risk to consumers (Medeiros et al., 2011). (Panchal et al., 2013) revealed that food safety knowledge gaps among restaurant food handlers may place restaurant consumers at risk for food poisoning. A study in USA suggested that improper food handling practices contributed to approximately 97% of food borne illnesses in food service establishments and homes (Howes et al., 1996).

The awareness behind food handlers working in Jimma town restaurants on food hygiene were less practiced. To reduce the risks of food borne diseases training on food hygienic practice like hand washing habit with water and soap before holding of food and after toilet as well as after touching dirty material, finger nail trimming, and wearing clean gown and hair cover should be given for food handlers. A lot of researches were reported that training increase knowledge and attitude of food handlers. Food safety training increased knowledge and improved attitudes about hand hygiene practices and overall food safety systems (Howes et al., 1996; Medeiros et al., 2011; Soon et al., 2012). (Soon et al., 2012) had revealed that refresher training and long term reinforcement of good food handling behaviors may also be beneficial for sustaining good hand washing practices. Study reported that improved knowledge will lead to behavioral changes involving better practices in handling of food and suggested that other factors including staff attitudes can limit the improvements of staff practices in food safety (Griffith, 2005).

Restaurants play an important role as source of food borne illness. The finding revealed that more than half of the kitchen as well as dining room wall and ceiling of the restaurants in the town were not cleaned. Also, the study showed that some of restaurants had no adequate ventilation and openable windows. Poor repair condition and poor ventilation of catering premises were problems in most the establishments, the unplanned and crowded housing situation, (as most establishments were residential housings which were later converted to business establishments without proper design) and the overall deterioration of their physical condition over the years, were some of the reasons for the observed poor conditions (Fisseha et al., 1999). The study in Hawasa town also had showed that the physical status of different establishments and adequacy of light and ventilation were not well looked in the town (Mariam et al., 2000). Good sanitary conditions of restaurants are important issue to prevent the risks of food borne disease.

The study identified the sanitary conditions or facilities of forty restaurants in Jimma town. The majority (95%) of the water source of restaurants in the town were from pipe private. More than half of the restaurants latrine were not properly managed and used dry pit latrine. Only 7.5% of the restaurants were not had latrine facility. Proper liquid and solid waste disposal have a lot merits in keeping environmental sanitation and food safety. But about 42.5% of the restaurants liquid wastes final disposal was open dumping area and uses improper receptacles for solid waste storages. This will lead risks for food borne disease and outbreaks. High rates of poor repair condition of premises, inadequate sanitary facilities, and improper waste storage and disposal were among the major problems public catering establishments in Addis Ababa (Fisseha et al., 1999) and Hawassa cities (Mariam et al., 2000).

5. Conclusions and Recommendations

5.1. Conclusions

In general, the study identifies that most of restaurants hygiene practices, structure of kitchen and dining rooms and overall sanitary facilities were found poor. Specifically, the neatness of food handler's gown, hand washing habit, finger nail trimming of food handlers was poor. More than half of food handlers were not heard about food borne disease, causes of food borne disease, mode of food borne disease and reason for food contamination. May be the reason is that majority (87.5%) of food handlers were not taken any training related to food hygiene. Most of their educational background, age, and service year were elementary, less than 20 years old and less than two years' experience, respectively. There are also limitations on regular medical checkup of food handlers were observed. Also, sanitary conditions including latrine, liquid and solid waste disposal were not properly managed.

5.2. Recommendations

The food hygiene procedures and practices in different food establishments should be improved to reduce food borne illness related to poor hygiene practices. Therefore, there should be guidelines for establishment of restaurants which include; the structure of dining and kitchen rooms, educational background of food handlers. Refresher training on food safety and hygiene should be given for the food handlers by the government, non-government and stakeholders. Regular medical checkup of food handlers also needed in the town. So, the government needs to give attention in implementing the quality standard regulations on the sanitation of the restaurants.

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Table 1 Socio-demographic characteristics of food handler's in Jimma town restaurants

Variables	Categories	Frequency (n = 80)	Percent
Sex	Male	28	35
	Female	52	65
Age	≤ 20 years	44	55.0
	21 – 30 years	26	32.5
	31 – 40 years	10	12.5
	≥ 40 years	-	-
Marital status	Single	48	60.0
	Married	26	32.5
	Divorce	6	7.5
	Widowed	-	-
Ethnicity	Oromo	30	37.5
	Amhara	8	10.0
	Gurage	8	10.0
	Dawuro	16	20.0
	Kafa	12	15.0
	Other	6	7.5
Religion	Muslim	28	35.0
	Orthodox	34	42.5
	Protestant	18	22.5
Education	No formal education	4	5.0
	Elementary	50	62.5
	Secondary/ highschool	26	32.5
	College and above	-	-
Job	Cook	34	42.5
	Waiter	38	47.5
	Cleaner	8	10.0
Service years	< 2 years	34	42.5
	2-4 years	34	42.5
	5-7 years	4	5.0
	≥ 8 years	8	10.0
Income	Below 500	44	55.0
	501 to 1000	30	37.5
	above 1001	6	7.5

Table 2 Personal hygiene practices of food handlers in Jimma Town at different restaurants

Variables	Categories	Frequency (n = 80)	Percent (%)
Food Handler wears gown	Yes	52	65.0
	No	28	35.0
Hair cover	Yes	36	45.0
	No	44	55.0
Cleanness of gown /hair cover	Clean	40	50.0
	Not clean	40	50.0
Finger nails status	Trimmed	40	50.0
	Not trimmed	40	50.0
Hand washing habit after toilet	With water and soap	48	60.0
	With water only	30	37.5
	Not washed	2	2.5
Hand washing habit after touching dirty materials	With water and soap	24	30.0
	With water only	28	35.0
	Not washed	28	35.0
Hand washing habit before handling food	With water and soap	10	12.5
	With water only	22	27.5
	Not washed	48	60.0
Regular medical checkup	Checked	10	12.5
	Not checked	70	87.5
Presence of rings/ jeweler	Yes	36	45.0
	No	44	55.0
Hygiene training	Trained	10	12.5
	Not trained	70	87.5

Table 3 Food Handlers' Knowledge of Food borne Diseases

Variables	Categories	Frequency (n = 80)	Percent (%)
Heard about food borne diseases	Heard	34	42.5
	Not heard	46	57.5
Causes of food borne diseases	Germs	14	17.5
	Unhygienic food preparation	20	25.0
	Not know	46	57.5
Mode of food borne disease transmission	Contaminated food	14	17.5
	Contaminated water	14	17.5
	Vectors like flies and cockroaches	6	7.5
	Not know	46	57.5
Reason for food contamination	Dirty hands	8	10.0
	infected food handler's	6	7.5
	Unclean/ dirty utensils	16	20.0
	Dirty working area	4	5.0
	Infestation of insects and rats	2	2.5
	Not know	44	55

Table 4 Sanitary Conditions of Restaurants at Jimma town

Variables	Categories	Frequency (n = 40)	Percent (%)
Water supply	Pipe private	38	95.0
	Pipe shared	2	5.0
	Pipe from neighbor	-	-
Latrine facility	Flush type	12	30.0
	Dry pit latrine	25	62.5
	Not available	3	7.5
Latrine condition	Properly managed	18	45.0
	Not properly managed	22	55.0
Liquid waste final disposal	Open area dumping	17	42.5
	To septic tank /latrine	23	57.5
Solid waste storage receptacles	Proper receptacle available	21	52.5
	Improperly stored	17	42.5
	Not available	2	5.0
Solid waste collection and disposal	Municipal container	37	92.5
	On site disposal	3	7.5

Table 5 Sanitary and physical conditions of kitchens and dining room of restaurants in Jimma town

Variables	Categories	Frequency (n = 40)	Percent (%)
Kitchen wall and ceiling	Clean	18	45.0
	Unclean	22	55.0
Kitchen floor	Clean	18	45.0
	Unclean	22	55.0
Openable window of kitchen	Yes	23	57.5
	No	17	42.5
Kitchen ventilation	Adequate	12	30.0
	Inadequate	28	70.0
Dining room wall and ceiling	Clean	20	50.0
	Not clean	20	50.0
Dining wall and ceiling	Have no cracks	24	60.0
	Have cracks	16	40.0
Openable windows of dining room	Yes	20	50.0
	No	20	50.0
Adequate light of dining room	Yes	22	55.0
	No	18	45.0
Adequate Ventilation of dining room	Yes	13	32.5
	No	27	67.5
Infestation of vectors and rodent	Yes	18	45.0
	No	22	55.0