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Health Status of Food Handlers and Associated Factors at Hotels and Restaurants in Adama Town, Ethiopia

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Abstract

Introduction: Foodborne diseases are a public health concern globally. Each year as many as 600 million, or almost 1 in 10 people in the world, fall ill after consuming contaminated food. However, there is limited information about the health status of food handlers in the study area. Thus, the study assessed the health status of food handlers and associated factors at hotels and restaurants in Adama town, Ethiopia from November 13 to December 12, 2017. By using a cross-sectional study design and simple random sampling technique, data collected from 422 sampled food handlers. Descriptive and logistic regression analysis used to describe the study population and identify associated factors. The study revealed food handlers with good health status found to be 160 (37.9%), and the rest categorized as poor. The study found that hand washing before/after food preparations (PV=0.001), hand washing after toilet visits/dirt (PV= 0.001), training (PV= 0.036), medical checkups (PV=0.001) and clean work uniforms (PV=0.001) were factors independently associated with the health status of food handlers. This study concluded that a large proportion (62.1%) of food handlers found to be poor in their health status. Therefore, washing hands before food preparation, after toilet/contacts dirt, wear of clean work uniforms, attending training and medical check-up are important actions in maintaining the good health status of food handlers.

Keywords: Food handlers; health status; Ethiopia.

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1. Introduction

Food is a key necessity for survival and a substantial basis for human beings both in health and diseases, but foods were accountable to be impure and subjected to contaminations by different disease-causing agents , coupled factors and determinants and the risk of food to be contaminated will largely depend on the health status of food handlers[1]. Moreover, the polluted hands of food handlers can undoubtedly transmit foodborne diseases through cross-contamination of products [2]. Despite concentrated hard work for numerous decades, foodborne diseases stay behind a foremost inclusive shared health back copy with considerable morbidity, mortality and were a challenge for both developed and developing countries, and because of so many illnesses and deaths [3]. Data on risk factors for foodborne diseases implies that, most outbreaks result from improper food handling practices, which contributed to approximately 97% of foodborne illnesses in food-service establishments [4]. Current statistics on foodborne illnesses in various industrialized countries showed that up to 60% of cases caused by poor food handling techniques and by contaminated food [5]. Limited research related to food safety, health status of food handlers, and food-handling practices in food businesses is an indication that food handling problems need to be addressed [6]. Hence, billions of food handlers have to be empowered to prevent foodborne diseases make safe or informed choices and have a voice to push for safer food supply [7]. Food can contaminated from plant surfaces, animals, and water, sewage, air, soil or food handlers during handling and processing. Food poisoning syndrome results from the ingestion of water and a wide variety of food contaminated with pathogenic organisms (bacteria, viruses, parasites, and fungi), their toxin and chemicals [8]. Contaminated hands of food handlers could easily transmit foodborne diseases through cross-contamination of food products and good knowledge in food safety is not indicative of food safety practice in the real world [9]. Infections caused by contaminated food have a much higher impact on populations and can easily lead to serious illness and death [10]. Besides, food handlers will also contribute to foodborne illness or outbreaks [11]. The spread of foodborne diseases via food handlers is a common and persistent problem worldwide [12]. Foodborne diseases are a public health concern globally, and according to World Health Organization (WHO) first, ever estimate of the global burden of foodborne diseases report, each year as many as 600 million, or almost 1 in 10 people in the world, fall ill after consuming contaminated food. Based on the report African and south-east Asia regions have the highest incidence and highest death rates; every year more than 91 million people are estimated to fall ill and 137 000 will die in Africa, and more than 150 million cases & 175, 000 deaths were occurring in southeast Asia from foodborne diseases [13]. A study done in India showed that health status and the level of personal hygiene of the food handlers in the eating establishments were found to be unacceptable.[9] Another study showed that 118(56.19%) were suffering from some illness and skin diseases were seen in (11.90%) of food handlers [14]. A study done in Malaysia suggested that contaminated hands of food handlers could easily transmit foodborne diseases through cross-contamination of food products [4]. A study done in Ghana showed that the presence of coliforms and Staphylococcus aurous in food in four out of the five hotels [17]. The study conducted in Ethiopia showed that skin infections on open surfaces, respiratory infections, eye, and nose discharges observed among food handlers working in 14.8% establishments [18]. Another study revealed that 49.6% of food handlers' hands were contaminated with one or more potential foodborne bacterial contaminants and 73(31.7%) were tested positive for enteric bacterial hand contaminants [19]. Another study showed that (25%) stool samples were positive for different intestinal parasites; Giardia lamblia was the most prevalent

parasites (11%) followed by Ascaris lumbricoides [20]. Moreover, according to a study done (33.68%) had one or more intestinal parasites and (12.4%) food handlers were diagnosed with mixed intestinal parasites; Ascaris lumbricoides was the most prevalent parasites 18(6.25%) followed by hookworm (5.9%) [21]. Moreover, the study advised that food handlers must receive medical check-ups, also receive information and informative resources that can increase their food handling practices [22]. Over all, health assessment of the food handlers is of enormous matter to be careful about maintaining a germ-free feature of foods served by them [21]. Hence, this study aims to assess the health status of food handlers and associated factors among food handlers at hotels and restaurants found in Adama town. The study discovered the latest information and findings on the health status of food handlers in the study area. Proper implementation of the proposed recommendations of the study will help food handlers to be in better health status than before and get more attention. Moreover, the study findings will help policymakers, regulatory bodies and all stakeholders to strengthen regulatory activities or services.

2. Methods and Materials

2.1. Study design, area and period

The cross-sectional study design used and study conducted in Adama town, Ethiopia, from November 12 to December 13/2017. Adama founded in 1916 with the preamble of the Addis Ababa to Djibouti railway line, located southeast of Ethiopia with a population of more than 356, 344; of whom 176,487 were males and 179,857 females. In Adama town, there are 688 hotels and restaurants. There are four hospitals (1 governmental and 3 private), five governmental public health centers, two private health centers, 84 clinics (all types), 158 drug vendors/pharmacies and one town health office.

2.2. Source population

The study population was all food handlers working in all hotels and restaurants. Food handlers who were satisfying inclusion criteria, i.e. those who were engaged in food preparations, food handling or serving selected from the study population.

2.3. Sample size determination and sampling technique

The sample size determined by using single population proportion formula, an estimate of a population prevalence 50% taken (to increase the power of the study), 95% confidence level (CL), 5% margin of error and 10% non-respondent rate was used. Therefore, the total sample size was 422 food handlers were participants. First, a total list of food and drinking establishments obtained from 688 hotels and restaurants composed of at least one food handler from Adama culture and tourism office. Then, to get the required amount of calculated number of participants, a total number of hotels and restaurants were listed and 422 hotels and restaurants were drawn from the total name list by simple random sampling (SRS) technique, at least one food handler assumed to be selected from each establishment.

2.4. Operational definitions

Food handler: is a person who directly engages in the handling, preparations and likely to come in to contact food in the food business.

Health status: in this study, the outcome variable which is health status of food handlers were assessed and measured by obtaining some proxies, such as their hygienic practices; like wear of work uniforms and its cleanness, practices of hand washings during the critical times (before/after food preparations or serving foods, after toilet visit or contacting dirt), their medical conditions (subjective feelings of their health or observable sign and symptoms of morbidity, their attendance of medical check-ups), and attendance of related training. Each measure given a value of one for the presence of health condition and zero for the absence. The sum of these conditions computed and the mean score of all observations was used as a cut-off point to categorize the health status of food handlers. Hence, food handlers with higher than the mean value 12.29 (≥12.29) were categorized under "good" and those scored less than the mean value 12.29 (≤ 12.28) were considered as "poor" in their health status.

Hotel: an establishment rendering a bedroom service (sleeping) other than serving foods, both alcoholic and non-alcoholic drinks, cakes, and recreational facilities.

Restaurant: establishment rendering food and drink services. It largely depends on both services: foods (breakfast, lunch, and dinner, alcoholic and non-alcoholic drinks).

2.5. Data collection tools and procedure

Interview based structured questionnaire and observational checklists adapted from different kinds of literature first prepared in English and then translated to local language; Afan Oromo and the next common language Amharic was used. Stool examination request slips and cups also used to collect stool samples for stool examination purposes. Three (3) health workers recruited for the collection of data using face-to-face interview-based questionnaires and observational checklists. Moreover, for stool examination (SE) purposes two (2) laboratory technologists deployed from the Adama health center (AHC) to collect stool samples and samples collected too. To ensure the quality of data; training on data collection and orientation was provided to the data collectors before the data collection period. During the data collection, period supervision of the data collection process maintained throughout the data collection time by assigning one supervisor and me (the principal investigator). The daily collected data checked every day for completeness, correctness and coded.

2.6. Data processing and analysis

All the collected data entered and analyzed by using statistical package for social science (SPSS) version 21 software and made ready for analysis. Descriptive analysis carried out using frequency distributions and percentages. Bivariate analysis made between dependent and independent variables, each variable selected one by one, entered and analyzed variables with a p-value less than 0.25 considered and selected as the candidate for multivariate analysis. To identify the association between dependent and independent variables multivariate logistic regression analysis used. A p-value of less than 0.05 considered for statistical significance. Results presented in text, tables, and figures and compared with the results of other studies.

2.7. Ethical consideration

Ethical clearance letter obtained from Jimma university ethical clearance board, permission letter obtained from Oromia regional health bureau (ORHB), support letter also received from Adama town health office and distributed to all relevant stakeholders. Moreover, the study participants and their managers informed about the purpose of the study and verbal consents obtained too.

3. Results

3.1. Socio-demographic characteristics of food handlers

In this study, 422 randomly selected food handlers participated with a response rate of 100 %. Among the participants, the majority of 318 (75.4%) were females. The minimum and maximum age of respondents was 14 and 50 respectively, and the mean age was 23.9 years. The job category of respondents showed that the majority of 237 (56.2%) were cookers. The educational level of food handlers showed that the majority of 254 (60.2%) were in grades 1- 8, and 23 (5.5%) were attended diploma or higher. The minimum income level of respondents per month was 300 Ethiopian Birr (ETB) and the maximum was 8000 (Table 1).

3.2. Assessment of health status of food handlers

A. The hygienic practice of food handlers

In the present study, the majority 387 (91.7%) had a practice of hand washing before/after food preparation, 354 (83.9 %) washes their hands before and after food intake and 319 (75.6%) washes their hands after toilet visits or contacting any dirt. Concerning dressing, 103 (24.5%) food handlers were wearing head covers or used hand gloves while distributing unwrapped foods, less than halve 195 (46.2%) were wearing work uniforms (gowns) during their work time and 93(22%) were with clean work uniforms (gowns).

B. Knowledge assessment of food handlers

Moreover, the majority of respondents 385(91.2%) had an information & heard about foodborne diseases; the majority 277 (65.6 %) mentioned contaminated hands as one way of foodborne diseases transmissions, more than halve 214 (50.7%) mentioned insects, below halve 202(48 %) responded to contaminated foods or drinks, and few 8 (1.9 %) mentioned other means like chemicals & dust.

Similarly, food handlers responded to favourable conditions for food contamination or intoxications and the majority 252(59.7%) mentioned use of dirty equipment's for storage, 247(58.5%) exposure to flies, 196(46.4%) mentioned keeping foods in contaminated surfaces or hands, and the rest 42 (10 %) said use of unclean or dirty water. On another hand, the training status of respondents showed that only a few 80 (18 %) were attended related training.

Table 1: Socio-demographic characteristics of respondents, Adama town, Ethiopia, 2017

Variables	Frequency	Percent
Sex		
Male	104	24.6%
Female	318	75.4%
Age category		
< 20	163	38.7%
20-29	187	44.3%
30-39	59	14.3%
40-49	9	1.9%
≥ 50	4	0.7%
Job category		
Cookers	237	56.2%
Washier	37	8.8%
Waiters	135	32%
Mixed	13	3.1%
Educational status		
Ill literate	18	4.3%
Grade 1-8	254	60.2%
Grade 9-12	127	30.1%
Diploma/higher	23	5.5%
Income category		
≤1000	331	78.4%
1001-3000	83	19.7%
3001-5000	4	0.9%
≥ 5001	4	0.9%

C. Medical conditions of food handlers

Medical conditions of respondents showed that 23 (5.4%) was sick and had diarrhoea, nausea or vomiting and currently taking medications, 21 (5 %) had visible cut or wound on their body surfaces or skin, and 121(28.7%) of them had taken medical check-ups in the last 6 months. On another hand, stool analysis result showed that among 94 (22.2%) food handlers tested; 14 (15%) were positive for one or more intestinal parasites or pathogens (8 were positive for cyst of amoebiasis, 1 for cyst of giardiasis, 2 for trophozoites of amoebiasis, and 3 for trophozoites of giardiasis). Overall, the health status of food handlers estimated based on proxies measurements related to hygienic practice, knowledge assessment and medical conditions of food handlers. Accordingly, food handlers with good health status found to be 160 (37.9%) and the rest found poor in their health status (Fig 2).

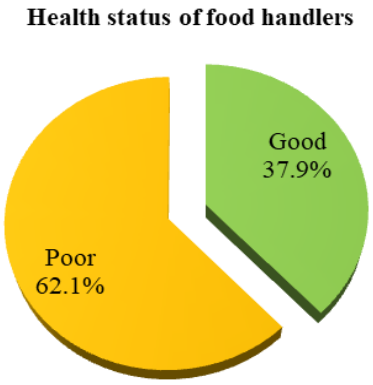

Figure 2: Percentage of the health status of food handlers, Adama town, Ethiopia, 2017 (n=422)

3.3. Associated factors of the health status of food handlers

Bivariate analysis result

Hence, variables like age, sex, marital status, education status, job categories, years of services and in-come status do not have any associations with the health status of food handlers. Whereas, variables like attending training, hand washing (HW) before food preparation, HW before/after food and after toilet visits/contact dirt, use of hand gloves/headcover, wear of work uniforms and medical checkups were selected (Table 2).

Multivariate analysis result

Multivariate analysis was done to identify independent variables associated with the outcome variable at a p-value of 0.05 and a 95% confidence interval of the adjusted odds ratio (AOR). Hence, in this study, food handlers who attended any pieces of training related to food hygiene or food handling were 2 times and more likely to be in good health status than their counterparts (AOR = 2.64, 95% CI; 1.07, 6.50; p-v=0.036). In this study, food handlers who practiced hand washing before/after food preparations were 5.5 times or more to be in good health status than those who failed to practice hand washing before/after food preparation. Food handlers who had hand washing after toilet visits or contact any dirt were 6 times and more to be in good health status than those who failed to practice it (AOR= 5.5, 95% CI; 2.24,13.51; p-v=0.001 and AOR= 6.9, 95% CI; 2.64, 18.1; p-v=0.001) respectively. In this study, food handlers who had taken medical checkups in the last 6 months were observed 12 times or more likely to be in good health status than those who did not attend it (AOR=12.62, 95% CI; 5.32, 29.9; PV=0.001).

Similarly, in the present study, food handlers who presented with clean work uniforms were 3.79 times and more likely to be in good health status than those with unclean work uniforms (AOR=3.79, 95% CI; 1.74, 8.26; PV=0.001) (Table 3).

Table 2: Bivariate analysis results of the health status of food handlers, Adama town, Ethiopia, 2017

Variables	Health status		COR	95% CI		P.V
	Good	Poor		Low	Up	
Hand washing before food preparation/serving						
Yes	151(39%)	236(61%)	1.85	0.84	4.05	0.125
No	9(25.7%)	26(74.3%)	RC			
Hand washing before /after food eat						
Yes	136(42.6%)	183(57.4%)	2.47	1.47	4.07	0.001
No	24(23.3%)	79(76.7%)	RC			
Hand washing after dirt/toilet visit						
Yes	144(40.7%)	210(59.3%)	2.23	1.22	4.06	0.009
No	16(23.5%)	52(76.5%)	RC			
Training						
Yes	43(53.8%)	37(46.3%)	2.24	1.37	3.67	0.001
No	117(34%)	225(66%)	RC			
Medical check-up						
Yes	92(76%)	29(24%)	10.87	6.61	17.87	0.001
No	68(22.6%)	233(77.4%)	RC			
Wear of work uniforms						
Yes	93(47.7%)	102(52.3%)	2.18	1.46	3.25	0.001
No	67(29.5%)	160(70.5%)	RC			
Clean work uniforms						
Yes	57(61.3%)	36(38.7%)	3.44	2.14	5.55	0.001
No	103(31.5%)	224(68.5%)	RC			

4. Discussion

Based on the study result, a large proportion of food handlers found poor in their health status (62.1%), similar study conducted in India (28) where the health status and level of personal hygiene of food handlers found poor. According to the present study, around three fourth (75.4%) were females which the finding was much higher than the study conducted in India (14) were (96%) of food handlers were males the difference maybe because of the study settings and other socio-demographic differences. The majorities (82.9%) were below 30 years of age and few (0.7%) were above 50 years of age, where the finding is almost the same with the study conducted in India (14) which (71.9%) of food handlers were below the age of 30 years.

Table 3: Multivariate analysis results of associated factors of the health status of food handlers, Adama town

Variables	Health status		COR (95%CI)	AOR (95%CI)	P-V.
	Good	Poor			
Hand washing before food preparation/serving					
Yes	151(39%)	236(61%)	1.85(0.84, 4.05)	5.50(2.24, 13.51)	0.001
No	9(25.7%)	26(74.3%)	RC	RC	
Hand washing after contacting dirt/toilet visit					
Yes	144(40.7%)	210(59.3%)	2.23(1.22, 4.06)	6.91(2.64, 18.10)	0.001
No	16(23.5%)	52(76.5%)	RC	RC	
Training					
Yes	43(53.8%)	37(46.3%)	2.24(1.37, 3.67)	2.64(1.07, 6.50)	0.036
No	117(34%)	225(66%)	RC	RC	
Medical Check-up					
Yes	92(76%)	29(24%)	10.87(6.61, 17.87)	12.62(5.32, 29.94)	0.001
No	68(22.6%)	233(77.4%)	RC	RC	
Clean work uniforms					
Yes	57(61.3%)	36(38.7%)	3.44(2.14, 5.55)	3.79(1,74, 8.26)	0.001
No	103(31.5%)	224(68.5%)	RC	RC	

RC= Reference Category, COR= Crude Odd Ratio, AOR= Adjusted Odd Ratio

In the present study, only (18%) attended any trainings related to food hygiene or food handling; attending training was significantly associated with the health status of food handlers; which the finding supported with other studies conducted in India (28), lower than other study done in Nigeria (25); where (32.1%) attended related training and these differences maybe because of the study set up or other socio-demographic factors. In this study, (91.7%) of food handlers had a practices of hand washings before/after food preparations; (83.9%) of them washes their hands after toilet visits or contact any dirt . Hand washing before/after food preparation and after toilet visit is significantly associated with health status of food handlers. Similar with other studies done in North India (24); where practice of hand washing after toilet visits showed significant association with health status of food handlers (AOR= 6.9, 95% CI; 2.64,18.1), Nigeria (25); where (89.3%) washes their hands after toilet visits, Ghana (17); where (98.7%) washes their hands as routine and were the predictors for their health status. In the present study, the majority (53.8%) of food handlers were with work uniforms which had significant association with health status of food handlers, which the finding was closer to other studies conducted in Ethiopia- Arba-Minch town (26) where (60.8%) were wearing unclean gowns, higher than other studies conducted in Jimma town (19) where (45%) were wearing unclean gowns respectively. Moreover, in the present study (28.7%) food handlers had taken medical checkups in the last 6 months and had significant association with their health status. Similar with other studies done in India (8) where (22.7%) had taken

medical checkups, much lower than study done in Jimma (19), Gondar (20), Nigeria (25); where (56.7%, 53.5%, and 71.4%) of food handlers had taken medical checkups respectively. However, higher than other study done in India (28) were (10.6%) of food handlers had taken it.

5. Conclusion and recommendations

This study found that a large proportion (62.1%) of food handlers were poor in their health status. Washing of hand before food preparation, after toilet/contacts dirt, wears of clean work uniforms, attending training and medical check-up has an important role in maintaining the good health status of food handlers in specific terms and good health status of the public in general. From these conclusions, the following recommendations made. All food handlers must practice hand washings during the critical times of food preparations, before serving foods, after toilet visits or contacting dirt. They should also wear clean work uniforms and encouraged to keep it clean always. Pre-employment and routine medical checkups must be routine and prerequisites in all food establishments at least twice a year. Moreover, food handlers should receive information, training and educational materials that can improve their food handling practices, knowledge, and overall health.

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