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## Difficulties and barriers for the implementing of HACCP and food safety systems in food businesses in Khartoum-Sudan

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### المستخلص:

هدفت هذه الدراسة الى تحديد مستوي تطبيق أنظمة سلامة الغذاء ومعرفة المعوقات والحوالز التي تعترض تطبيق نظام الهاسب على شركات الأغذية في ولاية الخرطوم وقد شمل هذا المسح خمسون موظفاً. أغلب الموظفين الذين تم مقابلتهم لم يتطبّقوا ممارسات سلامة الأغذية في شركاتهم حيث لم يسجل ( 24%) من المجيبين درجة الحرارة النهائية لجميع الأغذية و تركيز المطهر عادة لم يتم مراجعته في شركات الأغذية 14% وأفاد (30%) من العاملون في شركات الأغذية بأنهم لم يطوروا إجراءات تخزين الأغذية وبالإضافة الى ذلك فقد كان الذين سجلوا درجات حرارة التلاجات/الفريزرات (24%) والنظافة الشخصية 10% والتتظيف والتطهير 12%. كما أن (20%) لم يرسلوا عينات غذائية أو مسحات 28% الى المختبر لاختبار التلوث البكتيري. وأوضحت الدراسة الصعوبات والعوائق التي تحول دون تنفيذ نظم تحليل المخاطر ونقاط التحكم الحرجة ونظم سلامة الأغذية، قلة المعرفة حول نظام الهاسب (82%) والتكلفة (72%) وقلة الوقت (46%) وأيضاً لم يكن هنالك دعماً كافياً من السلطات (80%) وكان حجم الورق لدى الموظفين (56%) ولكن الذين كانوا بحاجة لتوجيهات ارشادية بسيطة (82%) في حين أن معظم الذين تمت مقابلتهم (92%) يرون قلة تدريب الموظفين. ختاماً تم تحديد قلة المعرفة حول نظام الهاسب وغيرها من برامج سلامة الأغذية من العوائق الرئيسية لسلامة الغذاء في شركات الأغذية .

### ABSTRACT:

The purpose of this study was to determine implemented level of food safety system and identify problems and obstacles that hinder the implementation of the HACCP system in food businesses in the Khartoum state, this survey was conducted involving fifty employees. The most of the interviewed employees did not implemented food safety practices in food businesses, where twenty-four percent of respondents not recorded end-point temperature of all foods; sanitizer concentration usually was not checked in food businesses (14%). Employees of food businesses reported that did not developing procedures for storing food (30%), In addition they were recorded refrigerator/freezer units temperature (24%), personal hygiene (10%), cleaning and disinfection (12%). Also they (20%) did not send food samples or swabs (28%) to the laboratory for testing bacterial contamination. The study indicated difficulties and barriers for the implementing of HACCP and food safety systems, lack of knowledge on HACCP (82%), lack of cost (72%) lack of time (46%). Also there was no enough support from the authority's (80%). The employees (56%) had volume paperwork, but they were needed simple guidelines (82%). While most of interviewers locking personnel training (92%). As a conclusion, lack of knowledge about HACCP and other

food safety programs were Identified as the main barriers for food safety in food businesses.

**Keywords:** HACCP, Khartoum state, food

### **Introduction**

Food safety is one of many attributes of food together with market value, nutrition, packaging and others'. The objective of improving food safety requires consideration of several issues, such as the definition and nature of food safety hazards, the optimal level of food safety and strategies for improvement. A food borne hazard can be a chemical, biological or physical agent that is likely to cause food borne illnesses or injury if it is not controlled. Consumer confidence in food safety in Canada has been negatively influenced by several major food safety crises in recent years. For example, a Listeriosis outbreak in September (2008) in deli meats in Canada, a Salmonella outbreak in June (2008) and an Escherichia coli O157:H7 outbreak in spinach in September (2006) in the United States received significant media attention. Food borne disease related to a range of microbiological, chemical and physical risks. However, in terms of incidence of disease and economic impact microbiological causes constitute the major risk. These food borne illnesses place a burden on national economies.

Hazard Analysis Critical Control Points (HACCP) has become the main safety intervention measure in the food processing sector. HACCP is defined as a logical system to identify hazards and/or critical situations and to produce a structured plan to control these situations. The seven components of a HACCP plan are: 1) conduct a hazard analysis, 2) identify critical control points, 3) establish critical limits for preventative measures, 4) establish monitoring requirements, 5) perform corrective actions, 6) establish a record keeping system and 7) verification procedures.

HACCP has been and is being mandated into law in many nations all over the world. In the EU, HACCP principles were adopted through the Directive 93/43 in 1993. In the US, HACCP was mandated for seafood in 1995, for meat and poultry in 1998, and for the juice industry in 2001. The Australian Food Standard Code required HACCP-based food safety programs From January 2003 onwards. In New Zealand, the Animal Products Act 1999 requires all primary animal products processing businesses to have a HACCP-based risk management program in place by November 2002.

Studies on the effectiveness of HACCP show a decline in food borne pathogens with the implementation of the program. The overall notion is that the benefits of implementing HACCP outweigh the costs of implementation.

The main objective of HACCP is to produce a safe product. HACCP is a safety program, not a quality program. Met fragments, microorganisms that cause illness and harmful chemicals are examples of some of the hazards that HACCP will attempt to reduce or eliminate. There will never be a process that is absolutely safe, but there must always be a constant effort to achieve zero defects. The aim of these papers was determine implemented level of food safety system and identify difficulties and obstacles that hinder the implementation of the HACCP system in food businesses in the Khartoum state.

### **Materials and Methods:**

#### **Businesses:**

This survey was conducted from May 2015 to January 2018 involving fifty employee from food businesses in Khartoum City - Khartoum state- Sudan.

#### **Questionnaire Design:**

The questionnaire consists of a first set of 4 demographic questions (age, sex, education level and training received), followed by 11 items related to food safety practices implemented in food businesses. Furthermore, the questionnaire was touched obstacles

that hampers the implementation of the HACCP system according to the opinion of employee's by 13 items. The design of survey questionnaire was inspired by the existing literature studying the process of HACCP implementation worldwide.

## RESULTS:

### Demographic characteristics:

A total of 50 employees were questioned the male and female participants with the ratio of 58% and 42%, respectively. Most participants were aged 21–40 and over 40 (88% and 12%, respectively).

Considering the participants terms of their education level, high school, Graduate, Postgraduate studies, with the ratio of 2%, 86%, and 12%, respectively. The participants 48% were received training on food safety and 52% did not ( Table 1).

### Food safety practices implemented in food businesses:

Table 2 showed the food safety practices implemented in food businesses. For taking and recording end-point temperature of all foods that only 76% of Employees always implemented. Sanitizer concentration usually was not checked in food businesses (14%). Employees of food businesses reported that did not developing procedures for storing food (30%), In addition they were taking and recording refrigerator/freezer units temperature (24%), personal hygiene (10%) and cleaning and disinfection (12%). Some of the employees of food businesses (20%) did not send food samples or swabs (28%) to the laboratory for testing bacterial contamination (Table 2).

### Barriers identified employees to implementing food safety systems:

Lacking of prerequisite (24%), or knowledge on HACCP (82%), or cost (72% ) and lacking of time (46%). Also there was no enough support from the authority's (80%). The employees (56%) had volume paper work, but they were needed simple guidelines (82%). While most of interviewers locking personnel training (92%) were the most common barriers in food businesses were recorded by the employers (Table 3).

### Discussion:

HACCP has become an international standard in food safety assurance and recommended or mandatory use of HACCP is found in the regulations of several countries, and governments, industries, and consumers are showing growing acceptance of the system. The Richmond Report in 1990 recommended that food safety control in all UK food premises be based on the principles of HACCP.

The system can be considered as an efficient tool for both industry and health authorities to prevent foodborne diseases if it is based on understanding and proper implementation, because it is not HACCP system itself which makes food safe, but its correct application.

In the present study, most participants were males. (28%) their age range was between 21-40 years, 86% of them Graduate, 48% Of the participants received training on food safety. This results in agreement with who reported that most participants their age under 40 years, graduated and received training on food safety system.

In our study the most of the interviewed employees did not implemented food safety practices in food businesses. Twenty-four percent of respondents not recorded end-point temperature of all foods. Sanitizer concentration usually was not checked in food businesses (14%). Employees of food businesses reported that did not developing procedures for storing food (30%). Some of the employees (20%) did not send food samples or swabs (28%) to the laboratory for testing bacterial contamination. The findings obtained from the study ofindicated the food safety practices implemented in food businesses. Taking and recording end-point temperature of all foods was the practice that only 16.5% of food business Employees always implemented. In addition,

only 29.6% of food business managers reported sending food product samples to a laboratory for bacterial testing. In a study, 55% of food employees received formal food hygiene training, and 63% of managers had under taken formal food hygiene training in UK food businesses.

The findings of our study indicated difficulties and barriers for the implementing of HACCP and food safety systems in food businesses in the Khartoum state. The main barrier was lack of personnel training also Lack of knowledge on HACCP, lack of cost, lack of employee motivation, staff turnover ,lack of time ,lack of prerequisite , lack of management, complicated terminology, Lack of physical conditions . Lack support from the authorities, Volume of paperwork, need for simple guidelines.

conducted a survey on difficulties and barriers for the implementing of HACCP and food safety systems in food businesses in Turkey. Lacking of knowledge on HACCP, lacking of employee motivation (complicated terminology (87.0%), and lack of personnel training were the most common barriers in food businesses. In addition,<sup>25</sup> identified constant turnover of employees as a barrier to the proper implementation of the HACCP system, as employees need time and training in order to fully comprehend and use the system. Time and money were identified as the greatest barriers to improve food safety.

Several studies have examined barriers to HACCP implementation in food businesses. Hwang, Almanza, and Nelson (2001) found that Indiana school foodservice managers identified time to establish a HACCP program, time to run the program, and labor costs as being the three biggest obstacles. In addition, “lack of training funds, time to get used to running the HACCP program, and union problems” were other identified obstacles. conducted a national study and found three types of barriers: resource management, employee motivation, and employee confidence.

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Legends to table:

Table1. Demographic characteristics of the food business employees.

Table 2. Food safety practices implemented in food businesses.

Table 3. Barriers identified to implementing food safety management systems.

Table 1: Demographic characteristics of the food business employees (n=50)

Characteristics	frequency(n=50)	Presents (%)
male	29	28%
female	21	42%
Age < 40	44	88%
Age > 40	6	12%
high school level	1	2%
Graduate	43	86%
Postgraduate studies	6	12%
received food safety training	24	47.6%
Untrained in food safety system	26	52.4%



Table 2: Food safety practices implemented in food businesses (n=50).

Food safety practices	yes		No	
	n	%	n	%
Take and record end-point temperatures of all cooked foods	38	76%	12	24%
Take and record temperature of food on the serving line	36	72%	14	28%
Check concentration of sanitizing solutions	43	86%	7	14%
Take and record food temperature upon receiving	38	76%	12	24%
All equipment and cutting boards are sanitized between uses	40	80%	10	20%
Take and record refrigerator/freezer units temperature	34	68%	16	32%
Developed food storage procedures	35	70%	15	30%
Developed personnel hygiene procedures	45	90%	5	10%
Developed cleaning and disinfestations procedures	44	88%	6	12%
Send food product samples to a laboratory for bacterial testing	40	80%	10	20%
Take swabs of food production equipment and counters to determine bacterial count	36	72%	14	28%

Table 3: Barriers identified to implementing food safety management systems (n=50).

Barriers	Yes		No	
	n	%	n	%
Lack of prerequisite programs	12	24%	38	76%
Lack of knowledge about HACCP	41	82%	9	18%
Cost	36	72%	14	18%
Time	23	46%	27	54%
Staff turn-over	30	60%	20	40%
Lack of management	25	50%	25	50%
Lack of physical conditions	31	62%	19	38%
Lack of employee motivation	33	66%	17	34%
Complicated terminology	12	24%	38	76%
Need for simple guidelines	41	82%	9	18%
Volume of paperwork	28	56%	22	44%
Lack of personnel training	46	92%	4	8%
Not enough support from the authorities	40	80%	10	20%