

**The influence of education and training on food safety knowledge of catering employees
in petroleum companies**

*Alaa Mohammed
Rania Hafez Mahmoud*

*Mohamed Abou-Taleb Mohamed
Haitham Abdelrazek Elsawalhy*

Faculty of Tourism and Hotels, University of Sadat City

Abstract

Petroleum companies pay special attention to the health of their employees to improve the company's production and avoid inadequate conditions or legal accountability in terms of food safety. The purpose of this study is to identify the influence of educational level and the number of obtained training courses regarding the food safety knowledge level of catering employees. To achieve the aim of the study, a questionnaire was designed. A total of 140 questionnaire forms were distributed to catering employees in the oil fields of the Petroleum Company. A final sample of 130 was identified as valid for statistical analysis with a 93 % response rate. Statistical analysis SPSS version was used to analyze responses to questions. The study proved that there is a significant relationship between catering employees' education and training concerning food safety knowledge levels. The study also provided some recommendations, including the importance of training courses and educational levels in the field of petroleum companies to increase the employee's knowledge about food safety.

Keywords: Education; Training; Catering; knowledge; Food Safety.

Introduction

Adham (2001) notes that Egypt is a deeply rooted country in the oil industry and has pioneering experience in international oil relations and cooperation with other oil-producing countries. Since the 1950s, Egypt has been helping some friendly countries in many aspects of oil production. Petro, (2021) added that the world economy will depend on oil as its main source of energy for a long time into the next century. Oil is the basis of integrated development and will continue to play an effective and decisive role as the main source of energy for a long time to come. Providing 93% of Egypt's primary energy needs, while hydropower supplies only 7% of electricity generation, the role of the oil sector is not limited to the acquisition of foreign currency, but also to the income that leads to the state budget in the form of royalties and income taxes. Catering services can take many forms, such as Full-service catering, staff restaurants, fast food outlets, and cafes and can also include hospitality for occasional or regular events and conferences (Eastham et al., 2001). According to (Samur, 2002), food plays an important role in how employees feel at work. Eating at work is the use of food to maintain, protect and promote a healthy lifestyle among employees; A balanced meal provides nutrients for people's daily activities and requires a variety of food ingredients. Food safety is a major public health concern for all stakeholders along the food supply chain. Today, the need for a coherent approach to food safety management throughout the food supply chain, from farm to fork, is paramount. (Soman and Raman, 2016).

The main requirements for a food safety management system are specified in the international standard ISO 22000 and provide a systematic methodology for the processes of food product analysis, identification of potential hazards, and identification of critical control points and risks; These measures are necessary to prevent unsafe food from reaching consumers while there are effective basic requirements to ensure a clean health environment (Arvanitoyannis, 2009; Sheps, 2007).

Eating foods contaminated with food-borne pathogens and toxins produced by microorganisms causes death, illness, hospitalization, and economic loss; In developed countries, the percentage of the population suffering

from a foodborne illness (FFD) is estimated at 30% per year (World Health Organization (WHO), 2007). Bilalis et al (2009) confirmed that the implementation of ISO 22000 requirements at any catering facility can eliminate potential food-related risks through the use of a standardized language that creates effective communication between them and their stakeholders: customers, suppliers, retailers, and healthcare professionals. By examining the food safety knowledge of food service employees, it is possible to identify specific factors contributing to inappropriate food use and further suggest that management can provide on-the-job training to promote a more positive food safety culture (Buccheri et al., 2007). Early childhood food and nutrition education activities can effectively influence adolescent attitudes and improve the food safety knowledge and skills they need to understand current food safety issues (Lytle, 1995). This study aims to identify the impact of the level of education and the number of training courses completed on the knowledge of restaurant workers in the field of food safety.

Literature Review

The role of catering employees in implementing the food safety system.

The company's top management plays an important role in defining the quality guidelines for the system, providing recommended resources, and motivating the employees who implement the system (Sila and Ebrahimpur, 2002). According to Ansari-Lari et al. (2009), many studies have shown an association between food hygiene education and improvement in food hygiene behavior, only workers of food can improve the practices of food safety in the workplace if they are motivated; Food safety awareness among employees becomes a strategy to increase the overall effectiveness of the organization. The more employees are encouraged to complete food safety tasks, the greater the efficiency and success of the organization. Employees must be properly trained to improve their performance levels and adhere to standards that promote healthy, quality products. Awareness of the food risks in nature can lead the producer of food to underestimate the importance of food safety management. All company employees should participate in the development and training of the food safety system, and employees should also understand that they play an important role in the functioning of the system and the production of safe food (Clute, 2009). Human resource management has an important role to ensure the effectiveness of a food safety management system, and therefore ISO 22000 requires that the person conducting activities in the system know how the activities of the system contribute to food safety and, through education, training, skills, and experience of employees (Damikuka and Tsia, 2007).

Sila and Ebrahimpur (2002) confirmed the importance of employees feeling adequately supported in the implementation of a new food safety system. The leaders of the enterprise need to take the time to educate employees and make recommended preparations to ensure the successful implementation of the new system. Therefore, managers can play an important role in enabling workers in the industry to remind other workers of their organization's food safety practices. Therefore, the motivation of employees can be understood as a mechanism which able to increase employee participation in the process of improving the food safety system. Employees must continue to learn to maintain their knowledge and performance throughout the food safety system implementation process; therefore, food safety training is useful for achieving a high level of process safety management efforts, influencing the impact of food safety system implementation on individual and the enterprise (Benezech et al., 2001). Employees must learn continuously to maintain their knowledge and effectiveness throughout the food safety system implementation process; Therefore, food safety training is useful for achieving a high level of process safety management efforts and the impact of implementing a food safety system on the individual and the organization (Benezech et al., 2001).

A Background of Food Safety

Griffith et al (2010) suggested a definition of food safety culture as a set of dominant, relatively constant, acquired, and shared attitudes, values, and beliefs that enhance the hygienic behaviors used in the food handling environment. Personal hygiene, with a greater focus on hand washing as a vital issue is one of the

most important practices concerning positive food safety culture, poor hand hygiene is considered a significant indicator of the risk of spreading foodborne illness. In short, an organization's culture represents its beliefs, attitudes and values that employees encounter on a daily basis. For example, if an employee observes negative behavior on the part of a supervisor, such as being constantly late for work, it can lead the employee to believe that being late behavior is acceptable in that work environment. In other words, workplace culture is a workplace practice that shows some visible indicators of organizational culture and is subject to well planned changes, as illustrated by (Knowles, 2002). The food should not contain any physical harm or damage to the person consuming the food, on the contrary, the food should be safe and of great value for the consumer (Burlingame and Pineiro, 2007).

Food hazards can potentially be caused in various ways: microbial hazards such as bacteria and viruses, chemical hazards such as detergents and other chemical components, and physical hazards such as solid or foreign bodies that have come into contact with food. Therefore, catering companies respond to actual and perceived food safety threats by implementing various food safety management systems (FSMS) such as the HACCP system and the ISO 22000 system (Henson & Humphrey, 2010). Food safety is a vital issue that must be achieved through safe measures, including production, storage and handling, to avoid foodborne illnesses such as food poisoning, infectious diseases or other harmful effects. In principle, such diseases can be caused by agents of a biological, chemical or physical nature (Martin and Robert, 2018).

The Importance of Food Safety

Foods should be designed not only to satisfy hunger and provide essential nutrients but also to prevent food-related diseases and improve consumers' physical and mental well-being (Cohen, 1993). Food safety is a very important issue when it directly affects the health of consumers. A range of procedures should be in place and monitored to avoid various types of food hazards which are microbiological, chemical, and physical risks. Consumers have the right to expect those who deliver the food they buy to take all necessary precautions to produce products that do not harm them by taking strict precautions to protect the food from anticipated hazards. Regulators in the global food industry recognize this principle and pass laws accordingly. This confers a legal and moral duty, as well as an economic incentive, on all food activities to ensure that supplied food is as free from any hazards as practically possible. A food company that seeks to evade responsibility for food safety by planning, implementing, and monitoring its food safety system will not be able to stay in business for long (Lawley et al., 2008). WHO (2007) confirmed that foodborne illnesses are a widespread and growing public health problem worldwide in both developed and developing countries. However, this problem has more impact on the health and economy of developing countries.

Prerequisite preparations to Implement Food Safety System

All waste bins should be designed with pedals and placed in food handling and cooking areas in such a manner to avoid cross-contamination are at all times accessible and cleaned after each time changing it's containing by the steward or specialized person in the kitchen and under the control and supervision of hygiene responsible, finally these bins must be well maintained and continuously checked following standard as mentioned in IATA catering quality assurance program "ICQA", (2010). As mentioned in Codex (2009), an adequate supply of potable water, with appropriate facilities for supply storage, distribution, and temperature control, is vital and should be available whenever necessary to help ensure the safety and suitability of food. All cleaning facilities that comply with food safety rules and suitably designated should be available for cleaning food, utensils, and equipment. Such facilities should also have an adequate supply of hot and cold potable water where appropriate (Idaho (2005); Umoh et al., 2011)

Personal hygiene, with an emphasis on hand washing as an important issue, is one of the most important practices of a positive food safety culture. Poor hand hygiene is considered an important indicator of the risk of foodborne illness (Guzewich, 1995). Knowles (2002) added that the personal hygiene of everyone working in the hospitality industry is critical to reducing the risk of foodborne illness and maintaining high

standards. Bolton (2004) stated that kitchens and dishwasher rooms must have mechanical ventilation, with cooking equipment enclosed by a ventilation hood fitted with outlet grease filters. The light intensity should be adequate for the nature and size of the operation. Lighting fixtures should, where appropriate, be protected by plastic or glass cover to ensure that food is not contaminated by breakages, (Codex, 2009). Chmidit and Rodrick (2003) stated that kitchen; however, consideration should be given to specific storage requirements for the following types: 1) Dry products. 2) Chilled and frozen foods. 3) Fresh vegetables and fruits. 4) Returned and recalled foods. 5) Packaging supplies. 6) Cooking tools and equipment. 7) Equipment and chemicals used in the cleaning process. 8) The related clothing and other personal belongings of industry personnel. 9) Recyclable materials and garbage. 10) storage facilities must allow the safe retrieval of stored items.

Food Safety in Petroleum Companies

Page (1997) explained that the process of feeding an oil field of an oil company is carried out by a specialized contractor hired by the owner company. A contract between an oil-producing company and a specialized company that provides labor and raw materials for the preparation, preparation, and service of food to oil field workers. The choice of a contractor (catering company) is made through a tender at the headquarters of the owner company. Che et al. (2002) reported that work-related stress can affect safety and increase the likelihood of workplace accidents among oil rig workers. This is because mood affects employees' perception of risk. Food safety in an oil company's oilfields is an important part of the comprehensive health, safety, and environment (HSE) system that covers and monitors all activities in an oilfield, HSE department activities also include training employees on firefighting and other recommended precaution practices as a proactive action to avoid the accident before it occurs. HSE does however have a role in ensuring food machinery is designed and manufactured to standards that consider food hygiene and ease of cleaning. One of the most important activities of the HSE department is to perform an audit of the kitchen environment using a specific checklist prepared according to the company policy to make sure that the kitchen environment is healthy and that employees follow the safety policy of the company (One Petro, 2021). Schouwenaars (2008) documented several fatalities that occurred in the oil and gas industry between 1970 and 2008, indicating the need for a preparedness system to handle these cases and any other dangers expected for those working in the oil and gas industry.

In oil companies, it was noticed that the cleanliness level of the mess (the place where foods were prepared and served) was not acceptable in the oilfield, there were no standard receiving areas, and employees who receive food materials were not qualified and didn't have the recommended training concerning receiving sequence and material specifications in both survived oilfields, also Excessive and unorganized storage in dry stores, refrigerators, and freezers in both sites and As a result of not having garbage room waste were piled in cases and put in the street outside the field until the garbage truck comes and throw it away in the desert and fire them which may result in insect and flies gathering in front of the kitchen area and transfers the disease to foods as explained by Kamal (2016).

Food Safety Management System

Griffith et al. (2010) define a food safety management system (FSMS) as “all documented procedures, practices and operating procedures that influence food safety managers in the implementation and use of the system. As explained in ISO (2011) and Trafialek (2017), in the early 2000s, various private and national organizations around the world led to conflict situations as companies began to use their internal codes and procedures to audit suppliers. Various audit measures have made it nearly impossible for suppliers to meet all global market requirements. In this context, the International Organization for Standardization (ISO) began work on a standard for the Food Safety Management System (FSMS) in 2001. This international standard FSMS, known as ISO 22000, was finally published on 1 September 2005. It is a framework that brings together the previous programs, the HACCP principles, the implementation steps described by the Codex Alimentarius Commission, and the elements of the ISO 9001 standard. In two years, the food standard

has been adopted by organizations in more than 50 countries as an alternative to more than 20 food safety systems developed by all companies in the sector to verify their suppliers. ISO 22000 can be described as a well-known internationally recognized standard that defines the requirements that must be met by organizations directly or indirectly involved in the food chain and providing food services that may affect food safety or the health of consumers. Furthermore, Surak (2005) and Efstratiadis et al. (2000) agree that ISO is an internationally recognized standardization body that develops various standards, including standards for food production.

Research Hypotheses:

H1: There is a significant relationship between the level of catering employees' knowledge about food safety and their educational level.

H2: There is a significant relationship between the level of catering employees' knowledge about food safety and their obtained courses.

Methodology

The study methodology was quantitative and was used to facilitate a deductive approach to identify the influence of educational level and training courses on the food safety culture and the knowledge of catering employees in petroleum companies. A descriptive and analytical approach was followed, which described the phenomenon and then analyzed and interpreted, based on the collected data. A case study applied to one of the largest petroleum companies in Egypt that are already receiving food services in oilfields and have a large number of employees (6000) who get the food services was investigated. Khalda Petroleum Company (KPC), is a joint venture company between the Egyptian General Petroleum Corporation (EGPC) and the American partner Apache already has many employees. The study aims to identify the influence of educational level and training courses on the food safety culture and knowledge of catering employees in petroleum companies. A questionnaire was addressed to catering employees including chefs, assistant chefs, kitchen helpers, stewards, catering supervisors, storekeepers, etc. to assess their knowledge level about food safety. The employee questionnaire questions based on Critical Control Points of HACCP (CCP) during the oilfield of the food cycle of the petroleum company, divided into seven parts as follows: Demographic data, receiving food, food storage, food preparation and cooking of food, storage of cooked food, serving of cooked food, and personal hygiene. The questionnaire form includes seven main titles (35 questions) as follows: Demographic data (five questions) Receiving foods (four questions), Food storage (six questions), food preparation and cooking (eight questions), Storage of cooked food (three questions), serving foods (six questions) and finally personal hygiene (three questions). Saunders et al. (2007) demonstrated that sampling can be more accurate than the study of the whole population and more practical in many industries. Additionally, a smaller sample allows the researcher to spend more time developing data collection tools and allows for more detailed information to be gathered. The employee questionnaire was designed to make the answer agree or not agree the total number of questionnaires distributed was 140 (30% of the total number of catering employees "about 450 persons") form only 130 were valid. The sample represent all catering employees where the society is very homogenous.

Results

Validity and Reliability of Study Instrument

The definitions of reliability and validity in quantitative research have so far shown two aspects: First, concerning reliability, whether the result is reproducible. Second, in terms of validity, what measurement instruments are accurate and what they measure what they claim to measure (Golafshani, 2003). The reliability of the existing study was tested using the Cronbach alpha coefficient for the measurement of

internal reliability. The test values are ranging from 0 to 1 and higher values reflect a higher level of reliability, the study result was 0.82 as shown in table (1)

Table (1): Reliability coefficient of the questionnaire

Item	Cronbach's Alpha	Number of items
Employee's questionnaire	0.79	30

Reliability alone is not sufficient to consider that an instrument is adequate. Therefore, validity is required to validate the constructs. Before the distribution and completion of the questionnaire, the validity of its content had been examined by two consultants of food safety systems consultants with more than seven years of experience in catering premises and by two professors in the department of the hotel at the tourism and hotels faculty in the University of Sadat. The instruments were adapted according to their comments.

Analysis of respondents' demographic data

This part examines the demographics of the catering staff including age, education level, occupation, the total number of obtained training courses, and years of experience, this information was useful in understanding the background of the respondents. Results are presented in Table (2).

Table (2): Demographic Characteristics of Catering Employee Respondents

Demographic Characteristics of respondents		Frequency	Percentage (%)
Age	25 to less than 40 Years	64	49
	40 to less than 50 Years	55	42
	50 years and more	11	9
Educational level	Primary	21	16
	Secondary	79	61
	Bachelor	30	23
Occupation	Employees	102	78
	supervisors	28	22
Years of experience	From 1 to less than 5 Years	16	12
	from 5 to less than 10 Years	58	45
	10 years and more	56	43
Number of training courses obtained training courses per year	From 1 to 3 Courses	36	28
	From 4 to 6 Courses	74	57
	More than 6 courses	20	15

Concerning age, the analysis depicts that the age group between 25 and less than 40 years has an average score of 49%, this segment includes 64 people, while the age groups from 40 to less than 50 years, of which 55 people, have an average score of 42%. Finally, the age groups of 50 years and more, of which 11 people, have an average score of 9%. The analysis reflects a greater number of young employees who are considered a strong base to start the food safety system by training employees and involving their power in the system implementation. Regarding the level of education, it was found that the employees with a primary school education level are 21 people (16%), the employees with a secondary school educational level 79 people (61%), and the employees with a university degree are 30 people (23%). The analysis shows that most catering employees have only a secondary school level. Concerning the employee's occupation, Table (2) illustrates those employees in different departments of the kitchen are 102 (78%) persons, while supervisors 28 (22%) persons.

Concerning employees' years of experience, the results revealed that employees with 1 to less than 5 years of experience were 16 (12%) persons, while employees from 5 to less than 10 years of experience were 58 (45%) persons, and the rest of employees with 10 years and more of experience were 56 (43%) persons. The results reflect that most of the employees have between 5 and less than 10 years of experience. In terms of the number of obtained training courses, it was noted that most respondents, 74 (57%) persons, have food safety training courses between 4 and 6. while 36 (28%) of the respondents obtained from 1 to 3 courses and finally, 20 (15%) of the respondents obtained more than 6 courses.

Correlation Analysis

Table: (3) correlation between catering employee's education and their knowledgeable level

	Education	N	Mean Rank	Asymp. Sig.
Knowledgeable level of catering employees	primary	21	21.05	<0.001**
	Secondary	79	23.51	
	High	30	25.47	

**** Highly significant correlation (2-tailed)**

As illustrated in Table (3), a high statistically significant correlation between the employee's education and their knowledge level. The Spearman's correlation is positive. This means that as catering employees' educational level increases, this will lead to an increase in their knowledge of food safety. As shown in the table, primary education achieved the lowest mean rank (M = 21.05), while secondary school achieved a higher mean rank (M=23.51) and the high educational level came in the highest mean rank with M=25.47. This result supports (H1) which means that it is accepted. The result of this relationship strongly supports and helps in achieving the food safety system because ISO 22000 requires that the staff implementing actions in the system be aware of how the activities of the system contribute to the assurance of food safety and are competent based on employee's education, training, skills and experience of the employees, according to PN-EN ISO 22000:2006.

As illustrated in table (4) a high statistically significant correlation between the employee's number of obtained food safety training courses and their knowledgeable level. The Spearman's correlation is positive. This means that as the number of food safety training courses increases, their knowledge will increase. The knowledge of the catering employee increased by the increasing of training courses as follows: employees with 1 to 3 courses achieved the lowest mean rank (M = 21.44) while employees with 4 to 6 courses achieved a higher mean rank (M=23.66) and employees with more than 6 courses came in the highest mean rank with M=27.00.

Table (4): The correlation between catering employee training and their knowledgeable level

	Training courses	N	Mean Rank	Asymp. Sig.
Knowledgeable level of catering employees	From 1 to 3 Courses	36	21.44	<0.001**
	From 4 to 6 Courses	74	23.66	
	More than 6 courses	20	27.00	

Multiple regression analysis is used to establish the influence of education and obtained food safety training courses on knowledgeable level of catering employees among the petroleum companies. The findings are indicated in the table (5).

Table (5): Summary of correlations and regression

	Knowledgeable Level	
	r	p.value
Education	0.558**	<0.001
Training	0.802**	<0.001

As shown in Table (5), the overall regression model was significant and therefore a reliable indicator of the research findings. In terms of p values, the research indicated 0.001 which is less than 0.05 and therefore statistically significant.

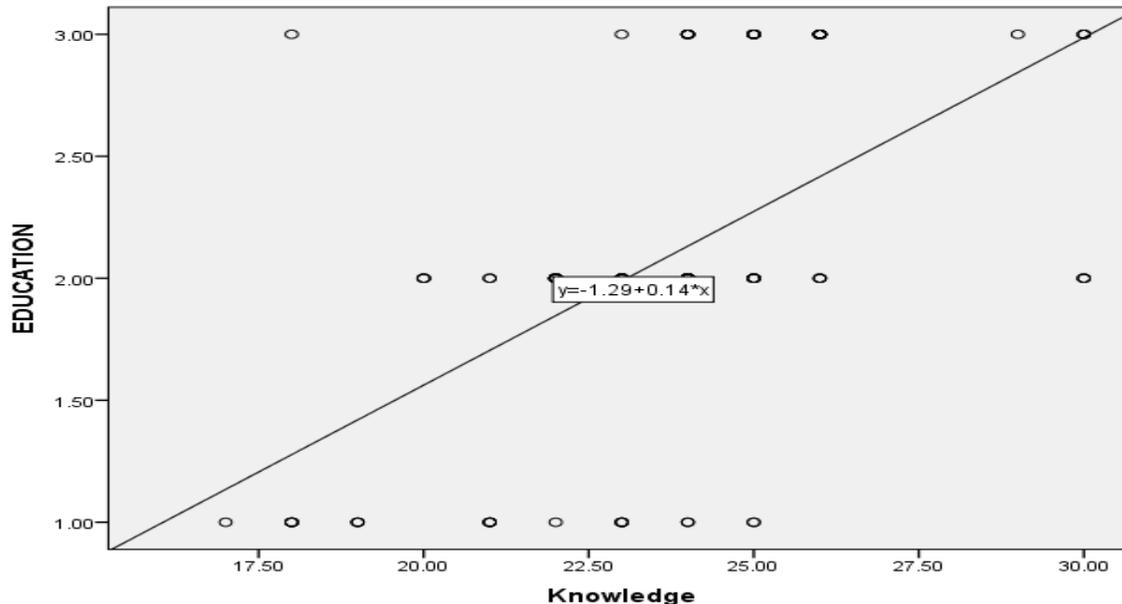
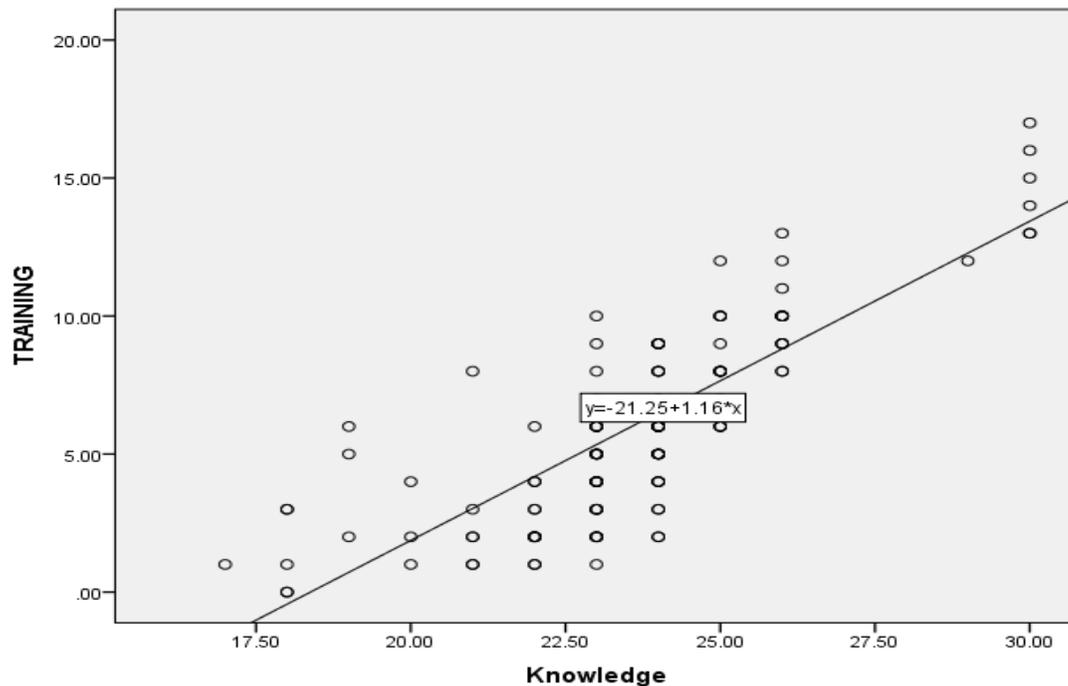


Figure (1): Regression summary of the correlation between education and knowledge

Figure (1) shows the resultant regression equation as follows: Y (regression coefficient) = 1.29 (Educational level) + 0.14 (knowledgeable Level)



Figure

(2):

Regression Summary of correlation between Training and Knowledge

Figure (2) shows the resultant regression equation as follow: Y (regression coefficient) = 21.25 (training level) + 1.16 (knowledgeable Level)

Discussion

According to Cohen (1993), the benefits of studying food safety systems and their implementation in food service establishments in terms of definition, relevance, and literature review have extended internationally, especially for academics and researchers. Foods should be designed not only to satisfy hunger and provide essential nutrients but also to prevent food-related diseases and improve consumers' physical and mental well-being. Indeed, higher safety practices achieve numerous organizational benefits, such as an improved employee attitude towards higher productivity and higher relative individual performance, with a significant impact on fostering a positive work culture. The research was carried out to identify the influence of the educational level and the number of training courses regarding the level of food safety knowledgeable level of catering employees in the petroleum companies, as a result, a questionnaire was designed in line with the requirements HACCP to assess the knowledge of employees. The study concentrates on the joint-venture petroleum companies in Egypt, it is conducted upon a sample of khalda Petroleum Company in the western desert of Egypt (Khalda Petroleum Company), which already offers food services and employs more than 6,000 people. Therefore, to ensure the effectiveness of the research, a sample of a petroleum company that has many employees in oilfields has been investigated. A questionnaire based on HACCP principles during the food cycle was designed to know the level of catering employees and used as a data collection tool in this study. The findings of the current study show that there is a significant positive relationship between the educational level and their knowledgeable level of knowledge of food safety educational level, the higher the educational level, the higher the score of the knowledge level. In addition, there is a significant positive relationship between the number of obtained food safety training courses obtained by employees and their level of knowledge, which confirmed what Adham (2001) said in her study of petroleum companies that training programs consider very important to increase the skills of the catering employee and help as a result to improve food quality and avoid any problems related to food safety. The study results provide advice for

petroleum company managers that are supposed to help them achieve company goals, it was clear from the study that education measurements are very important in choosing catering employees that will ensure a high level of knowledge according to their education and also the training importance to increase the knowledgeable level of employees and as a result improve the overall performance of operations.

Conclusion

Egypt is a country deeply rooted in the petroleum industry and has pioneering experience in international oil relations and cooperation with other oil-producing countries. The purpose of this study was to identify the influence of the educational level of catering employees and the number of food safety obtained training courses obtained at their food safety knowledge level in petroleum companies. For this purpose, a questionnaire derived from the HACCP principles was used to assess the existing food safety knowledge of catering employees in the oilfields of petroleum companies concerning their education and training obtained. The study revealed a significant positive relationship between the training and educational level and their level of food safety knowledge. Overall, the study provides petroleum companies' managers a vision to choose catering employees with extra attention to their education and design training courses to enhance their performance.

Recommendations

The findings of this study, when connected to the review of literature, resulted in major recommendations that have to be directed to petroleum company management in the area of food safety as follows:

- The management of the petroleum company must design and implement a specific system to choose the catering personnel according to the educational level that corresponds to each position.
- The oil company should encourage catering employees to complete their education and studies that will increase their level regarding their work especially food safety.
- Training programs especially in food safety should be designed with matching to the employee' needs and level of knowledge.
- Continuous evaluation of the training program should be performed to ensure its effectiveness.
- Additional financial resources should be allocated for the programs of food safety training and procedures that guarantee that catering employees have a reasonable education regarding their work.

References

- Adham, O.S. (2001). Hospitality Services in Oil Fields Site. Ph.D. Thesis. Hotel Management Department, Faculty of Tourism and Hotel Management, Helwan University.
- Ansari-Lari M., Soodbakhsh S. and Lakzadeh L. (2009). Knowledge, attitudes, and practices of workers on food hygienic practices in meat processing plants in Fars. Iran. *Food Control*, (21), 260.
- Arvanitoyannis, I.S., (2009). HACCP and ISO 22000: Application to foods of animal origin. Wiley-Blackwell., Oxford.

- Benezech, D., G. Lambert, B. Lanoux, C. Lerch and J. Loos-Baroin (2001). "Completion of knowledge codification: an illustration through the ISO 9000 standards implementation process." *Research Policy* 30(9), 1395-1407.
- Bilalis, D., Stathis, I., Konstantas, A. and Patsiali, S., (2009). Comparison between HACCP and ISO 22000 in the Greek organic food sector. *Journal of Food, Agriculture and Environment*, 7(2), 237-242.
- Bolton, D. J. (2004). Guidelines for Food Safety Control in European Restaurant. National Food Centre. Ireland. pp. 1-9.
- Buccheri, C., Casuccio A., Giammanco S., Giammanco M., Guardia M.L. and Mammina C. (2007). Food safety in hospital: knowledge, attitudes, and practices of nursing staff of two hospitals in Sicily, Italy. *BMC Health Services Research* 7: 45.
- Burlingame, B., and Pineiro, M. (2007). The essential balance: Risks and benefits in food safety and quality. *Journal of Food Composition and Analysis*, 20(5): 139-146.
- Chen, W., Huang, Z., Yu, D., Lin, Y., Ling, Z., and Tang, J. (2002). An exploratory study on occupational stress and work-related unintentional injury in off-shore oil production. *Chinese medical journal*. 23, 441-444.
- Chmudit, R.H., and Rodrick, G. E. (2003). *Food Safety Handbook*. John Willey and Sons, USA.
- Clute, M. (2009). *Food industry quality control systems*. USA, Boca Raton, FL: CRC Press.
- Codex Alimentarius Commission (CAC) (2009). *Food hygiene: Basic texts*. Food and agriculture organization of the United Nations and World Health Organization, Rome, pp.13-80
- Cohen, A. (1993). Organizational commitment and turnover. A meta-analysis. *Academy of Management Journal*, 39, 1140-1157.
- Cooper, R. and Schindler, M. (2006) *Marketing research*. McGraw-Hill, New York.
- Damikouka, I., Tzia K.C. (2007). Application of HACCP principles in drinking water treatment. *Desalination*, Vol 210, PP.138–145.
- Eastham, J., Sharpies, L., and Ball, S. (2001). *Food Supply Chain Management: Issues for the Hospitality and Retail Sectors*. Oxford. Butterworth-Heinemann. pp. 4-8.
- Efstratiadis, M. M., Karirti, A. C., and Arvaitoyannis, I. S. (2000). Implementation of ISO 9000 to the food industry: An overview. *International Journal of Food Sciences and Nutrition*, 51(6), 459-473.
- FAO & WHO (2006). *Regional Conference on Food Safety for Africa. National Food Safety System in Ethiopia, a Situation Analysis*. Harare, 3-6 October 2006, Zimbabwe.
- Golafshani, N. (2003). Understanding reliability and validity in qualitative research. *The Qualitative Report*, 8(4). [Internet], pp 597-606. Available from <<http://www.nova.edu/ssss/QR/QR8-4/golafshani.pdf>>. [accessed 17 April 2020].
- Griffith, C. J., K. M. Livesey, and Clayton, D., A. (2010). The assessment of food safety culture. *British Food Journal*, 112(4), 439–456.
- Guzewich, J. (1995). The anatomy of a glove rule. *Environmental news digest*, fall, pp. 4-13.
- Henson, S., and Humphrey, J. (2010). Understanding the complexities of private standards in global agri-food chains as they impact developing countries. *The Journal of Development Studies*, 46(9), 1628–1646.
- IATA Catering Quality Assurance Programme (ICQA) (2010). *Food Processing Safety Standards*. In collaboration with Medina quality assurance services, Version 3.1, pp. 29- 50.
- Idaho Food Safety and Sanitation Manual, (2005). *Keep it healthy: food safety employee guide to preventing foodborne illness*. [Internet], food protection program. 450 W State St Boise, ID 83720-0036. Available from <www.foodsafety.idaho.gov>. [Accessed 11 September 2020]
- ISO Organization. (2011). *ISO in brief: International standards for a sustainable world*. [Internet]. Retrieved from <http://www.iso.org/iso/isoinbrief2011.pdf>. [Accessed on 1 July 2020].
- Kamal, M.A. (2016). *Evaluating Food Safety Concerns in Petroleum Hospitality Sites*. Ms.D. Thesis. Hotel Management Department, Faculty of Tourism and Hotel Management, Helwan University.

- Knowles, T. (2002). Food safety in the hospitality industry. 1st edition. Butterworth-Heinemann, Oxford.
- Lawley R., Curtis L., and Davis J., (2008). The food safety hazard guidebook. Food safety info, London, UK. Published by The Royal Society of Chemistry, Thomas Graham House, and Science.
- Lytle L. (1995). Nutrition education for school-age children. *Journal of Nutrition Education* 27: 298
- Martin, R. and Robert, M., J. (2018). Fermentation and food safety. [Internet], Aspen Publishers, Inc. Gaithersburg, Maryland, pp. 2-7. Available < www.aspenpublishers.com>. [Accessed 11 May 2018]
- One petro. (2021). One Petro Magazine [Online]. Available from: https://onepetro.org/SPEHSE/proceedings-abstract/96HSE/All-96HSE/SPE_35838-MS/58245 [Accessed on 03-03-2021].
- PN-EN ISO 22000 (2006). Food safety management systems. Requirements for any organization belonging to the food chain (Food safety management system. Requirements for any organization in the food chain).
- Paige. T. (1997). United States V. Tom Paige Catering Co., Inc. and Valley Foods, Inc. USA pp. 1-9.
- Samur, G. (2002). The importance of nutrition in the development of workers and work productivity. *Kamu-Is*, 7(1), 1–8.
- Saunders. M., Lewis. P. and Thornhill. A. (2007). Research Methods for Business Students. 4th Edition. Essex. The UK. Pearson Professional Ltd. pp. 78-82.
- Schouwenaars, E. (2008). The Risks Arising from Major Accident Hazards: Lessons from the Past, Opportunities for the Future. Retrieved October 4, 2013 from World Wide Web: http://www.dnv.nl/Binaries/Paper%20Refining%20Management%20Forum%20Copenhagen_tcm141-311567. [Accessed 11 May 2019]
- Sheps, I. (2007). ISO 22000: The new international standard on food safety - A comparison to HACCP. *Journal of Environmental Protection and Ecology*, 8(4), 940-949.
- Sila, I. and Ebrahimpour, M. (2002). An investigation of the total quality management survey-based research published between 1989 and 2000. *International Journal of Quality & Reliability Management*, 19, 902-970.
- Soman, R., & Raman, M. (2016). HACCP system – Hazard analysis and assessment, based on ISO 22000:2005 methodology. *Food Control*, 69, 191– 195.
- Surak, J.G. (2005). ISO 22000: Requirements for food safety management systems. *ASQ World Conference on Quality and Improvement Proceedings*, (59), 211-215.
- Trafialek, J., Kolanowski, W. (2017). Implementation and functioning of HACCP principles in the certified and non-certified food business: A preliminary study, *British Food Journal*, 119 (4): 710- 728.
- Umoh, Nsikak J., Olufunmilayo, A., Maimuna, M., Ebrima, B, Aliu ,A., Hilton, W. (2011). Aetiological differences in demographical, clinical and pathological characteristics of hepatocellular carcinoma in The Gambia. *Liver International*, 31(2): 215–221.
- WHO. (2007). Effects of foodborne diseases on public health. World Health Organization, Geneva.

تأثير المستوى التعليمي والتدريب على المعرفة بسلامة الغذاء للعاملين بالتغذية بشركات البترول

علاء محمد عبد الستار محمد أبو طالب رانيا حافظ هيثم الصوالحي
كلية السياحة والفنادق، جامعة مدينة السادات

تعتبر صناعة البترول مصدر رئيسي للثروة على مستوى العالم، وبخاصة في الشرق الأوسط، يعاني العاملون بمواقع انتاج البترول من ظروف بيئية خاصة كوجود غازات سامة وانشطة العمل المختلفة بالإضافة الى ظروف الطقس الصعبة في بيئة العمل، الهدف الأساسي من هذه الدراسة هو التعرف على الفروق في المستوى المعرفي للعاملين بالتغذية في شركات البترول وعلاقته بالمستوى التعليمي وعدد الدورات التدريبية التي التحقوا بها في مجال سلامة الغذاء. لتحقيق الهدف من الدراسة، تم تصميم استبيان لقياس المستوى المعرفي للعاملين بالتغذية فيما يخص سلامة الغذاء وكانت الإجابة عليه بصيغة موافق / غير موافق لتسهيل الإجابة على العاملين وجعلها محددة وواضحة وتم التصميم وفقا لبنود نظام الهاسب على مراحل دورة الغذاء بمناطق انتاج البترول من استلام وتخزين الأغذية الى مرحلة الخدمة. تبين من نتيجة البحث ان هناك فروق معنوية كبيرة في المستوى المعرفي للعاملين فيما يخص المستوى التعليمي لهم وعدد الدورات التدريبية الحاصلين عليها حيث ان ارتفاع مستوى التعليم يؤدي الى زيادة المستوى المعرفي كما ان زيادة عدد الدورات التدريبية في سلامة الغذاء أيضا يؤدي الى زيادة المستوى المعرفي للعاملين. وهو ما يستدعي انتباه الإدارات العليا بشركات البترول لأهمية مراعاة المستوى التعليمي اثناء اختيار العاملين بالتغذية لان هذا سيوفر في تكاليف الميزانية المخصصة لتدريب العاملين ذوي التعليم الأقل كما يتطلب الامر من الإدارة تصميم برامج تدريبية مناسبة للعاملين لزيادة المستوى المعرفي لديهم وهو ما يؤدي في النهاية الى تحسين مستوي جودة وسلامة الغذاء المقدم للعاملين.

الكلمات الدالة: المستوى التعليمي، التدريب، التغذية، المستوى المعرفي، سلامه الغذاء