

## **A Suggested Test to Measure the Level of Nutritional Awareness among Hospitals Staff: A Case Study of Minia Hospitals in Egypt**

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### **Abstract**

This research aims to measure the level of nutritional awareness among hospital staff. Therefore, the methodology is a semi-experimental. The data collection tool is a questionnaire designed for the employees of the hospital nutrition department. This research was based on a simple random sample, which included about 170 out of 200 employees in 47 hospitals in Minia, Egypt. The results indicated that the average of nutritional awareness level is 32.73 out of 50 (0.655) with a high standard deviation (7.28). Therefore, the coefficient of variance is 0.22. Therefore, the level of nutritional awareness is medium. Also, this research has proposed a nutritional awareness level measurement (NALM) test, as its reliability level (0.810) is statistically acceptable. In addition, the level of nutritional awareness (Y) is closely related to food safety (= R = 0.856), therapeutic nutrition (R = 0.822), nutrients (r = 0.723) and menu planning (r = 0.563). Moreover, the regression models for the level of nutritional awareness are:  $Y = 18.969 + 2.127 \times \text{nutrients level}$ ;  $Y = 22.375 + 3.266 \times \text{menu planning level}$ ;  $Y = 4.316 + 1.814 \times \text{food safety level}$ ; and  $Y = 12.894 + 2.672 \times \text{therapeutic nutrition level}$ . Finally, this research presented a set of useful recommendations in the field of nutrition education.

**Key Words:** Nutritional Awareness, Food Safety, Therapeutic Nutrition, Menu Planning.

### **1. Introduction**

Nutritional awareness is defined as the knowledge of the nutritional elements, its importance and sources for planning meals to eat balanced meals (Badawi *et al.*, 2011). In general, the importance of nutritional awareness lies in improving the dietary habits (Traoré *et al.*, 2012). At the hospital level, this importance lies in helping employees to choose healthy foods, plan healthy meals for meeting the nutritional needs of patients and to improve their nutritional practices and hygiene level (Pepino, 2014). Nutritional awareness is an important factor for all employees in institutions that provide food and beverage services because it helps in maintaining health and preventing pollution and exposure to disease-causing microbes, which increase the ability to recover from diseases (Eze *et al.*, 2017). Despite this fact, the level of nutritional awareness is low in various institutions, whether it is hospitals (Laur *et al.*, 2016; Theilla *et al.*, 2016; Salama and Ismail, 2018; and Alammari, 2019), or restaurants (Rebouças *et al.*, 2017). In addition, a study has shown that there is no relationship between nutritional awareness and food safety (Akabanda *et al.*, 2017), and there is failure among employees to translate the nutritional knowledge into good health practices. Their nutritional knowledge level has reached 61.7% and the level of good nutritional practices has reached 60 % (Lee *et al.*, 2017).

In general, nutrition has a vital and important role in hospitals (Michel *et al.*, 2020), and healthy foods are appropriate and necessary for everyone (Rolfes *et al.*, 2020). Employees of the institutions that provide food and beverage services do some wrong practices that are an indication of a low level of nutritional awareness. These practices are eating a late breakfast, buying fast foods, drinking soft drinks daily (Eze *et al.*, 2017), ignoring to wear gloves while handling food, and tasting the foods with their fingers (Rebouças *et al.*, 2017). Regarding the study tools, most studies rely on questionnaires (Theilla *et al.*, 2016; and Laur *et al.*, 2016), medical examinations (Lee *et al.*, 2017) and nutritional education programs (Razzak *et al.*, 2016; and Saad *et al.*, 2018) for assessing the level of nutritional awareness in different institutions. However, there are very few studies dealing with the study of nutritional awareness in Egyptian hospitals. Therefore, this study aims to measure the level of nutritional awareness among the employees of the nutrition department at Minia hospitals in Egypt using a suggested test.

## **2. Literature Review**

### **2.1. Measuring Nutritional Awareness**

Nutritional awareness is a basic and important topic for all institutions that provide food and beverage services such as hotels, restaurants and hospitals. Given the importance of this topic, researchers addressed topics in assessing food awareness and nutritional practices in various institutions and countries. Therefore, this section presents the results of studies in these points. A study revealed that the nurses had a higher level of nutritional awareness, which varies greatly according to profession and years of experience (Laur *et al.*, 2016), while another study applied in hospitals differed with the previous result, which determined that the level of nutritional awareness was low among nurses. Also, this study identified factors that predict a decrease in the level of nutritional awareness represented by male nurses, internal medicine, country of origin, and untrained nurses (Theilla *et al.*, 2016). Using the nutrition education program, a study showed that there has been a marked improvement in the level of nutritional awareness after applying this program among adolescents from 13 to 16 years old (Razak *et al.*, 2016). In addition, the factors affecting the level of nutritional awareness among young people were gender, economic and social status, type of university, and exposure to heart disease, diabetes and obesity (Nasir and Tahir, 2017). By moving to other institutions, bank employees have a good level of nutritional awareness. Despite this, they found they had the wrong eating practices such as eating breakfast late, buying fast foods, and drinking soft drinks daily. Moreover, this study emphasized the importance of good eating habits for improving health and avoiding diseases (Eze *et al.*, 2017).

A study showed that the food providers failed to translate nutritional knowledge into good health practices; this indicates a low level of nutritional awareness for them. In addition, the level of nutritional knowledge has reached about 61.7%, the level of good nutritional practices 60% and the microbiological evaluation of workers 48% (Lee *et al.*, 2017).

In the field of hotels, the level of nutritional awareness has reached about 88% among staff and 69.6% among managers; this indicates a high level of nutritional awareness. Despite this, a set of misconduct practices such as not using gloves during food handling, and tasting the foods with their fingers. In addition, this study has revealed that there is no correlation between nutritional knowledge and best nutritional practices, but there is an association between best nutritional practices and job satisfaction. This indicates that satisfied staff has good nutritional behaviors (Rebouças *et al.*, 2017). Another study determined that food providers have the knowledge of food hygiene practices and have an average level of nutritional awareness. However, their awareness of food diseases is low. This study demonstrated that there is no relationship between nutritional awareness and food safety (Akabanda *et al.*, 2017). Using a training program for the staff of hospital kitchen, the program showed that the level of nutritional awareness and the practices related to dealing with food has improved greatly; this explains the importance of the training and education program for all employees in different workplaces (Saad *et al.*, 2018).

At the level of undergraduates, about 12% of students have a good awareness of nutrition, 12% have a low level of awareness, and the majority 76% have partial awareness. In addition, the main source of nutrition knowledge is the Internet. Finally, it is recommended that more attention be paid to nutritional education among students within universities (Salama and Ismail, 2018). According to a study, the level of nutritional awareness was low and there were statistically significant differences among students in the level of food awareness according to gender, age and level of education. In addition, male students were higher than females in the level of nutritional awareness (Alammari, 2019). Vegetarian students had better nutritional awareness than non-vegetarians. In spite of this, eating foods for vegetarians has not been proven to be of higher quality than non-vegetarians (Alkhady, 2019). Moving from college students to adolescents, a study evaluated the level of nutritional awareness among adolescents and concluded that about 57% of them in the city have a high nutritional knowledge, while 73% in the countryside have moderate nutritional knowledge (Deepika and Reddy, 2019). Finally, varied and healthy foods are useful for everyone (Rolfes *et al.*, 2020).

## **2.2.Nutritional Awareness and Its Component**

The knowledge of nutrients is the main focus of food awareness. Therefore, some studies have been conducted to determine the level of nutrients awareness. These studies have shown that obese individuals have low dietary awareness (Kayapinar and Savas, 2012), and managers have a good awareness of nutrients. In addition, food education and training are important for food service staff (Hema and Ani, 2015). In more detail, the people's knowledge of calcium sources was between 11.6 and 64.7%, the source of zinc between 12.8 and 16.7%, and meat as a source of iron between 50.9 and 46.5% in urban and rural areas, respectively. Also, there is a gap between knowledge and nutritional behavior (Heshmat *et al.*, 2016).

Almost 12% of medical students have a good nutritional awareness, 76% have an average level and 12% of them have a poor awareness of the main functions of nutrients. Universities can have an effective impact on improving the nutritional knowledge (Salama and Ismail, 2018). Hospital staff should be aware of the importance of nutrition in treating and caring for patients (Harney, 2009). In part, a study showed that the level of awareness of food safety among women was low, this negatively affected on the processes of food production (Gowri, 2010). Another study showed that the level of nutritional awareness reached 58.4% for nurses (Park *et al.*, 2011). The nutritional information for food service providers improved food hygiene and safety (Takanashi *et al.*, 2013). The mean estimation of the knowledge of therapeutic nutrition level for the nurses was  $49.44 \pm 10.95$ . Consequently, the low level of awareness leads to increased anxiety about malnutrition and diet therapy and its complications (Yalcin *et al.*, 2014).

Moreover, the hospital staff have poor knowledge of nutrition, especially in clinical nutrition. This study emphasized the importance of awareness of staff curative nutrition in achieving quality nutritional care for patients (Laur *et al.*, 2015). A research designed a system that allowed users to plan their food consumption on their mobile phones. The mobile food planning application helped the user to manage and monitor food intake, to calculate and choose balanced food suitable for their body (Salama and Esmail, 2018). The level of nutritional knowledge among food workers is moderate (61.7%) and the level of practices is 60%. In addition, the results showed that about 48% of workers have salmonella in their hands. This study confirmed that workers failed to translate knowledge into health practices (Lee *et al.*, 2017). On the restaurant's level, the highest level of nutritional knowledge was 88% among food providers, while it was 96.6% among chefs. Despite this, there are some mistakes by not using gloves during food handling practices and tasting food with their fingers. This study found an association between employee satisfaction and good nutritional practices, while no nutritional knowledge and good nutritional practices were linked (Rebouças *et al.*, 2017). It was found that 76.6% of the female food workers had knowledge about food hygiene and sanitation practices, while the level of awareness of food diseases was low. This study showed that food workers have nutritional awareness, but did not apply this knowledge during practices. It also showed no relationship between nutritional awareness and food safety (Akabanda *et al.*, 2017). In addition, one study has shown that meal planning is linked to a healthy diet and low obesity (Ducrot *et al.*, 2017). Menu planning also plays an important role in customer satisfaction (Omar *et al.*, 2018). Finally, there is a positive correlation between knowledge of the food pyramid and body mass index (Nasriah *et al.*, 2018).

### **3. Methodology**

The aim of this research is to measure the level of nutritional awareness. So, the research methodology is the semi-experimental approach, where a test was designed for measuring the nutritional awareness level and it was applied to the employees of nutrition departments in Minia hospitals in Egypt.

Therefore, the frame of the research population consists of all the employees of the nutrition departments (200 employees) in Minia hospitals (47 hospitals) in Egypt. The data collection tool is a questionnaire using a nutritional awareness test, where it consists of fifty questions regarding aspects of nutritional awareness. The level of nutritional awareness is calculated based on the degree obtained by the respondent in the test as a whole. If the respondent percentage is 80 % or more, then the level of nutritional awareness is very high, 70 -79.9 % is a low level, 60 - 69.9 % is a medium level, 50 - 59.9 % is a low level, and less than 50% is a very low level (Khalafy, 2013). The simple random sample was used and included about 170 out of 200 employees. Consequently, the response rate is 0.85, as shown in table (1).

**Table (1): Determine The Size of The Study Sample**

Determine Sample Size		Find Confidence Interval	
Items	Value	Items	Value
Confidence Level	0.95	Confidence Level	0.95
Confidence Interval	5	Sample Size	N
			%
Population	200	Population	200
Sample Size Needed	123	Confidence Interval	2.08

Source: <http://www.surveysystem.com/sscalc.htm>

For achieving the main aim, this research tests the following null hypotheses:

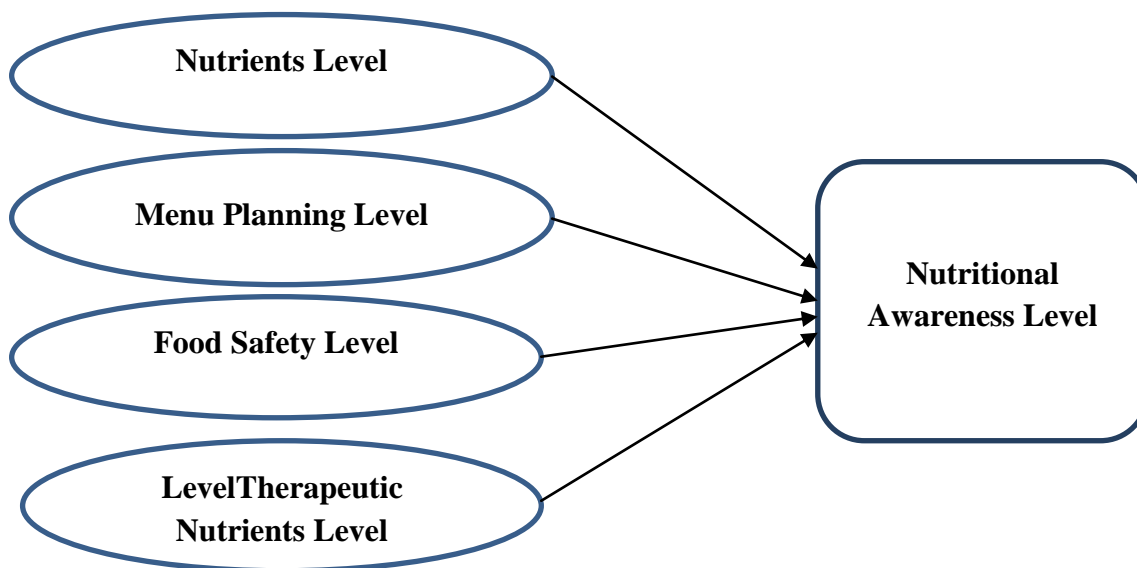
**H1:** There is no significant correlation between the nutritional awareness level and the knowledge level of nutrients in hospitals.

**H2:** There is no significant correlation between the nutritional awareness level and the menu planning level in hospitals.

**H3:** There is no significant correlation between the nutritional awareness level and the food safety level in hospitals.

**H4:** There is no significant correlation between the nutritional awareness level and the therapeutic nutrition level in hospitals.

Based on the study hypotheses, the study tests this model



**Figure (1): The Conceptual Framework of The Study**

#### 4. Data Analysis and Results Discussion

The following table (2) displays the demographic data for the employees of the nutrition departments in hospitals, which includes age, gender, marital status, and education level.

**Table (2): Demographic Data of Respondents**

No	Categories	Items	Frequency	Percent
1	Age	20-29	31	18.2
		30-39	69	40.6
		40-49	50	29.4
		50-59	20	11.8
2	Gender	Male	57	33.5
		Female	113	66.5
3	Marital Status	Single	42	24.7
		Married	99	58.2
		Widow	16	9.4
		Divorce	13	7.6
4	Education Level	Below Middle	21	12.4
		Middle Qualification	50	29.4
		Qualification above Middle	63	37.1
		High Qualification	33	19.4
		Postgraduate	3	1.8

It is clear from the table (2) that most employees are 40.6% at the age of 30-39 years, 66.5% are female, 58.2% are married, and 37.1% have higher-than-average qualifications.

**Table (3): Job Data of Respondents**

No	Categories	Items	Frequency	Percent
1	Job	Food Quality Controller	15	8.8
		Foods Receiver	10	5.9
		Food Store Officer	11	6.5
		Chef	2	1.2
		Food Safety Officer	16	9.4
		General Chef	3	1.8
		Head of the Kitchen Department	1	0.6
		Preparation Officer	54	31.8
		Chef Steward	25	14.7
		Nursing Staff	32	18.8
		Other	1	0.6
2	Job Satisfaction Level	Dissatisfied	7	4.1
		Neutral	27	15.9
		Satisfied	88	51.8
		Very Satisfied	48	28.2
3	Health Affairs Training	Yes	78	45.9
		No	92	54.1
4	Workplace Diversity	Yes	164	96.5
		No	6	3.5
5	Having a Health Certificate	Yes	161	94.7
		No	9	5.3

6	Hospital Type	Private	80	47.1
		Governmental	90	52.9
7	Continuity of the Medical Examination	Yes	54	31.8
		No	116	68.2
8	Duration of Experience	1-5	68	40
		5-10	54	31.8
		10-15	34	20
		15-20	9	5.3
		20 and More	5	2.9
9	Place of Residence	Village	78	45.9
		City	92	54.1
10	Menu Planning Training	Yes	38	22.4
		No	132	77.6

It turns out through the table (3) that 18.3% of the employees are chefs, 18.8% are nurses and the rest of the employees 67.4% are specialists in the nutrition process such as buying, receiving, storing, dispensing food and controlling it. It was also found that most of the employees, about 80%, have job satisfaction, 54.1% have not been trained in health affairs, and 77.6% have not been planning meal menus. About 96.5% worked in more than one hospital, 94.7% had a health certificate, 52.9% of employees worked in government hospitals, 68.2% of employees did not undergo medical examination.

**Table (4): The distribution of research data**

No	Variables	Test Statistic	Sig
1	Nutrients	0.099	0.000
2	Menu Planning	0.199	0.000
3	Food Safety	0.098	0.000
4	Therapeutic Nutrition	0.146	0.000
5	Nutrition Awareness Level	0.070	0.039

Through the table (4), the distribution of data on the level of nutritional awareness is not normal (Sig, 0.039). Also, the variables of the nutritional awareness test are distributed non-normal (Sig, 0.000).

**Table (5): The Reliability of Nutritional Awareness Level**

No	Items	Values
1	No. of Items	50
2	Cronbach's Alpha	0.810
3	Mean	32.73
4	Variance	52.956
5	Standard Deviation	7.277

Table (5) shows the level of reliability of the nutritional awareness test, and this level is statistically acceptable. This test consists of fifty questions, where the average scores (32.73) are equivalent to 65.46 % with a high standard deviation rate (7.277) and this level is considered weak and needs improvement.

**Table (6): The Descriptive Statistics of Nutritional Awareness Level**

No	Items	Sum	Mean	Std. Errors	Std	CV
1	There are no proteins in plant sources such as vegetables and fruits. <b>F</b>	90	0.53	0.038	0.501	0.95
٢	Animal fats are better than vegetable fats. <b>F</b>	113	0.66	0.036	0.473	0.72
٣	Fish are the main source of omega-three. <b>T</b>	131	0.77	0.032	0.422	0.55
٤	Carbohydrates are among the most important elements that work to protect the body from disease. <b>F</b>	105	0.62	0.037	0.487	0.79
٥	Dietary fibers cause great damage to the human body. <b>F</b>	99	0.58	0.038	0.495	0.85
٦	Vitamins and mineral salts provide the body with the necessary energy. <b>F</b>	99	0.58	0.038	0.495	0.85
٧	Vitamin C deficiency leads to anemia. <b>F</b>	111	0.65	0.037	0.477	0.73
٨	Vitamin D deficiency leads to rickets. <b>T</b>	124	0.73	0.034	0.446	0.61
٩	Fruits and vegetables are the main source of vitamins and minerals. <b>T</b>	119	0.70	0.035	0.460	0.66
١٠	Water is among the groups of nutrients. <b>T</b>	109	0.64	0.037	0.481	0.75
<b>Nutrients</b>		1100	6.47	0.190	2.474	0.38
١١	Fruits are rich in fat. <b>T</b>	91	0.54	0.038	0.500	0.93
12	It is best to eat whole grains to ensure that individuals have access to dietary fiber. <b>F</b>	108	0.64	0.037	0.483	0.75
١٣	Reducing fat is recommended when planning meals. <b>F</b>	111	0.65	0.037	0.477	0.73
14	Reducing the consumption of butter and butter when planning meals. <b>T</b>	109	0.64	0.037	0.481	0.75
15	A balance must be struck between the amount of food eaten and the daily exercise. <b>T</b>	120	0.71	0.035	0.457	0.64
<b>Menu Planning</b>		539	3.17	0.096	1.255	0.40
16	Man is a source of food contamination during the handling process. <b>T</b>	118	0.69	0.035	0.462	0.67
17	Microbes cannot transfer from uncooked food to cooked food. <b>F</b>	82	0.48	0.038	0.501	1.04
18	Food infection diseases are divided into bacterial infections and fungal diseases. <b>T</b>	116	0.68	0.036	0.467	0.69
19	Cholera is one of the food infection diseases. <b>T</b>	92	0.54	0.038	0.500	0.93
20	Dysentery is a bacterial infection. <b>F</b>	105	0.62	0.037	0.487	0.79
21	Salmonella is transmitted by poultry, eggs and milk. <b>T</b>	106	0.62	0.037	0.486	0.78
22	People are the main source of transmission of the microbe that causes typhoid. <b>T</b>	108	0.64	0.037	0.483	0.76
23	Ascaris is transmitted through fecal contaminated food. <b>T</b>	123	0.72	0.034	0.449	0.62
24	To diagnose food poisoning, it is necessary for symptoms to appear in a group of individuals. <b>T</b>	117	0.69	0.036	.465	0.67

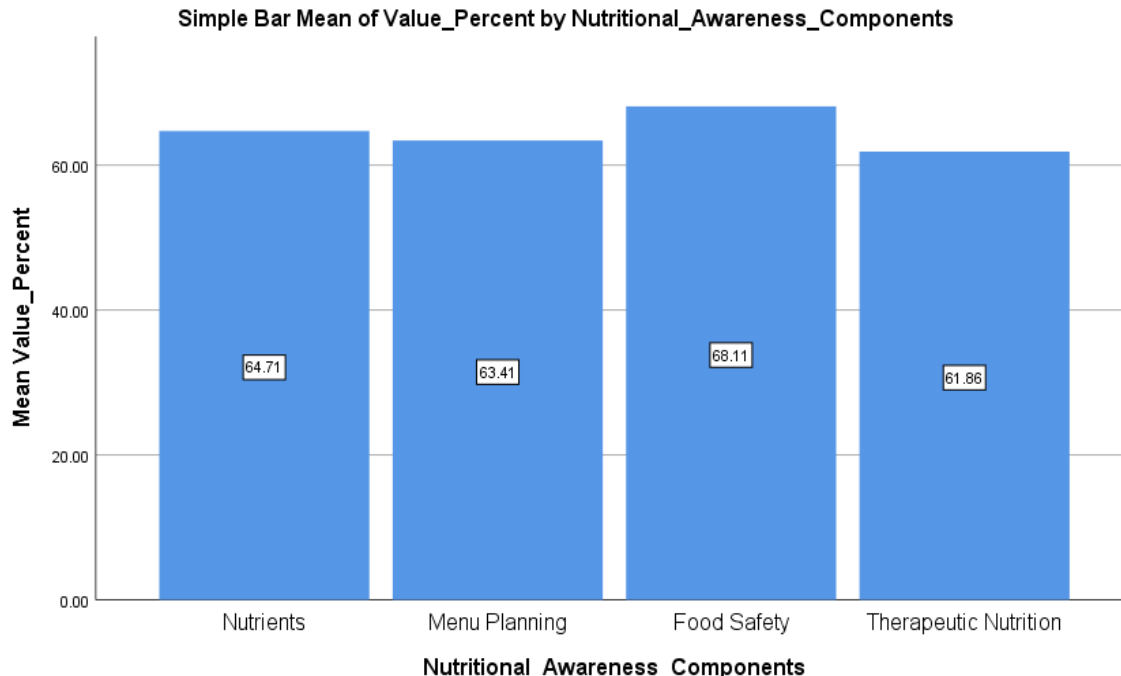


25	Leaving food for a long time in the room's atmosphere is one of the factors that help food poisoning. <b>T</b>	120	0.71	0.035	0.457	0.64
26	Heating at temperatures above 65 are among the factors that aid food poisoning. <b>F</b>	102	0.60	0.038	0.491	0.82
27	The surfaces that are used to prepare food are the only source for transmitting the microbes that cause food poisoning. <b>F</b>	110	0.65	0.037	0.479	0.74
28	The pH is one of the factors that helps the microbe to sort toxins into food. <b>T</b>	103	0.61	0.038	0.490	0.80
29	Salmonella is considered one of the microbes that causes food infection and does not cause food poisoning. <b>F</b>	91	0.54	0.038	0.500	0.93
30	Insecticides are a chemical poisoner. <b>T</b>	106	0.62	0.037	0.486	0.78
31	Exposure to mycotoxins is a cause of cancer. <b>T</b>	106	0.62	0.037	0.486	0.78
32	Food preservative containers can be a cause of food poisoning. <b>T</b>	128	0.75	0.033	0.433	0.58
33	Injured persons should be prohibited from working on preparing, preparing and handling food. <b>T</b>	153	0.90	0.023	0.301	0.33
34	Frozen food such as meat is kept at -18 ° C. <b>T</b>	129	0.76	0.033	0.429	0.56
35	Keep vegetables and fruits in refrigeration at 25 degrees. <b>F</b>	97	0.57	0.038	0.496	0.87
36	Raw meat cutting boards are required to be separated from cooked food. <b>T</b>	145	0.85	0.027	0.355	0.42
37	It is necessary to provide educational programs for workers periodically to ensure food safety. <b>T</b>	153	0.90	0.023	0.301	0.33
38	It is necessary for the hospital to make a periodic inspection of the employees of the Food and Beverage Department. <b>T</b>	153	0.90	0.023	0.301	0.33
<b>Food Safety</b>		2663	15.66	0.263	3.435	0.22
39	Increased potassium in the human body leads to high blood pressure. <b>F</b>	101	0.59	0.038	0.493	0.84
40	Obesity leads to hardening of the arteries and high blood pressure. <b>T</b>	121	0.71	0.035	0.454	0.64
41	Fat should be strictly prohibited for patients with bitterness. <b>T</b>	99	0.58	0.038	0.495	0.85
42	A symptom of anemia is paleness of the body color. <b>T</b>	109	0.64	0.037	0.481	0.75
43	Malnutrition is overeating or eating food. <b>T</b>	97	0.57	0.038	0.496	0.87
44	Iron deficiency causes anemia. <b>T</b>	109	0.64	0.037	0.481	0.75
45	Obesity is not considered a disease of malnutrition. <b>F</b>	95	0.56	0.038	0.498	0.89
46	Liquid and soft food is preferable to give patients after surgery and in the event of an imbalance in the digestive system. <b>T</b>	111	0.65	0.037	0.477	0.73
47	The nutritional needs of all patients are uniform. <b>F</b>	95	0.56	0.038	0.498	0.89

48	Lack of nutritional awareness is one of the factors leading to malnutrition. <b>T</b>	112	0.66	0.036	0.476	0.72
49	Do you eat vegetables and fruits daily? <b>T</b>	98	0.58	0.038	0.496	0.86
50	You drink a lot of water. <b>T</b>	115	0.68	0.036	0.469	0.69
<b>Therapeutic Feeding</b>		1262	7.42	0.172	2.239	0.30
<b>Nutritional Awareness Level</b>		5564	32.73	0.558	7.277	0.22

T = True, F = False

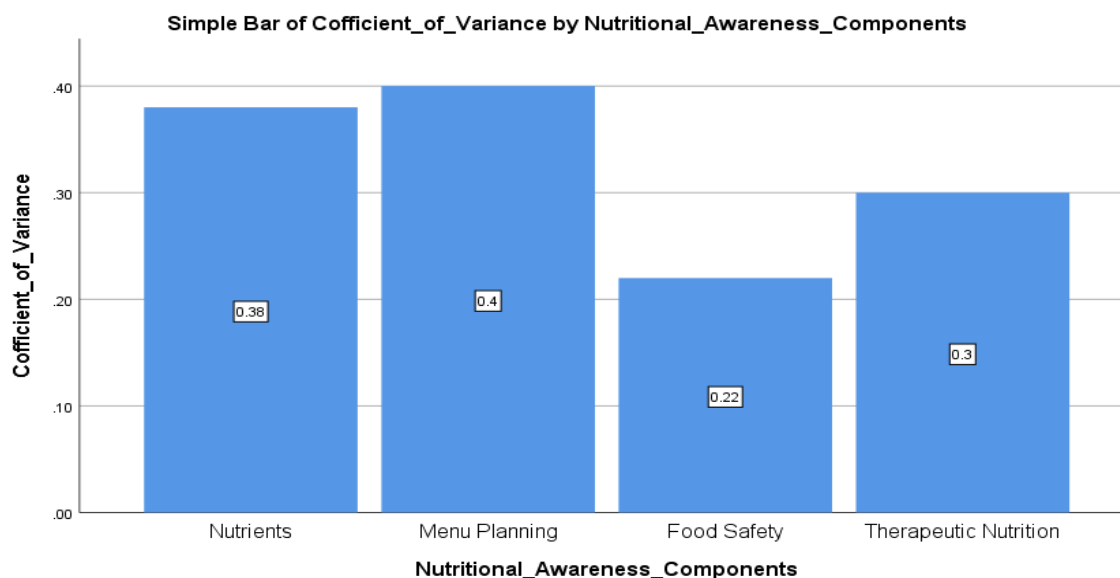
Table (6) reflects the descriptive characteristics of the nutritional awareness test, where the average level of nutritional awareness (32.73) was equivalent to 65.46% with a high standard deviation (7.28). Accordingly, the coefficient of variance equals 22 %. Also, the level of nutritional awareness is low and needs improvement. This result is consistent with a number of studies such as: Laur *et al.*, 2015; Theilla *et al.*, 2016; Lee *et al.*, 2017; Salama and Ismail, 2018; and Alammari, 2019. On the other hand, it differs with studies such as Laur *et al.*, 2016; and Saad *et al.*, 2018. With regard to the components of the nutritional awareness test, the average score for the food safety component was 15.66, equivalent to 71.18 %, with a difference rate of 22 %, the average score for the nutrients was 6.47, equivalent to 64.7 %, with a difference rate of 38 %, and the average score for the menu planning component was 3.17, equivalent to 63.4 % with a difference rate 40 %. Finally, the therapeutic nutrition component is 7.42, equivalent to 61.83 %, with a difference rate of 30 %. Thus, the components that need to be improved are menu planning, nutrients, therapeutic nutrition and food safety respectively.



**Figure (2): The Mean of Nutritional Awareness Components**

Figure (2) shows the average components of nutritional awareness as a percentage, as it is shown through this figure that the safety of food (68.11%) and nutrients (64.71 %) and the planning of menus (63.41 %) and therapeutic nutrition (61.86).

Accordingly, the therapeutic nutrition got the lowest degree, and this is considered a critical problem for the employees of the hospital nutrition section and negatively affects the achievement of hospital goals, because working in hospitals requires full knowledge of therapeutic nutrition.



**Figure (3): The Coefficient of Variance for the Nutritional Awareness Components**

Figure (3) shows the coefficient of variation for the nutritional awareness components as a percentage, as it is shown through this figure that menu planning (40 %) and nutrients (38 %) and therapeutic nutrition (30 %) and food safety (22 %). Accordingly, the coefficient of variation is high in relation to the planning of menus and nutrients, respectively, and this requires increased training in these aspects to reduce the level of variation and increase nutritional awareness level in general.

**Table (7): The Correlation Between Nutritional Awareness Level and Research Variables**

Variables		R	Sig
Independent	Dependent		
Nutrition Awareness Level	Nutrients	0.723	0.000
	Menu Planning	0.563	0.000
	Food Safety	0.856	0.000
	Therapeutic Nutrition	0.822	0.000

Table (7) presents the correlation coefficients between the components of nutritional awareness and the overall level of nutritional awareness, as all components were significantly correlated to the level of nutritional awareness. On nutrients, this result is consistent with a study of Hema and Ani, 2015, and it varies with a study of Reboucas *et al.*, 2017. With regard to food safety, the results of this research differ with the result of a study of Alkabanda *et al.*, 2017, which determined that there is no relationship between the level of health awareness and the level of knowledge of food safety.

In addition, The results of this research are consistent with the results of the studies Ducrot *et al.*, 2017, and Nasriah *et al.*, 2018. Moreover, according to the results of this research, the components of nutrition awareness were arranged as follows: food safety (r =0. 856), therapeutic nutrition (r = 0.822), nutrients (r = 0.723) and menu planning (r = 0.563).

**Table (8): The R Square of Regression Models among Research Variables.**

Research Variables		R	R <sup>2</sup>
Independent X	Dependent Y		
Nutrients	Nutrition Awareness Level	0.723	0.523
Menu Planning		0.563	0.317
Food Safety		0.856	0.733
Therapeutic Nutrition		0.822	0.676

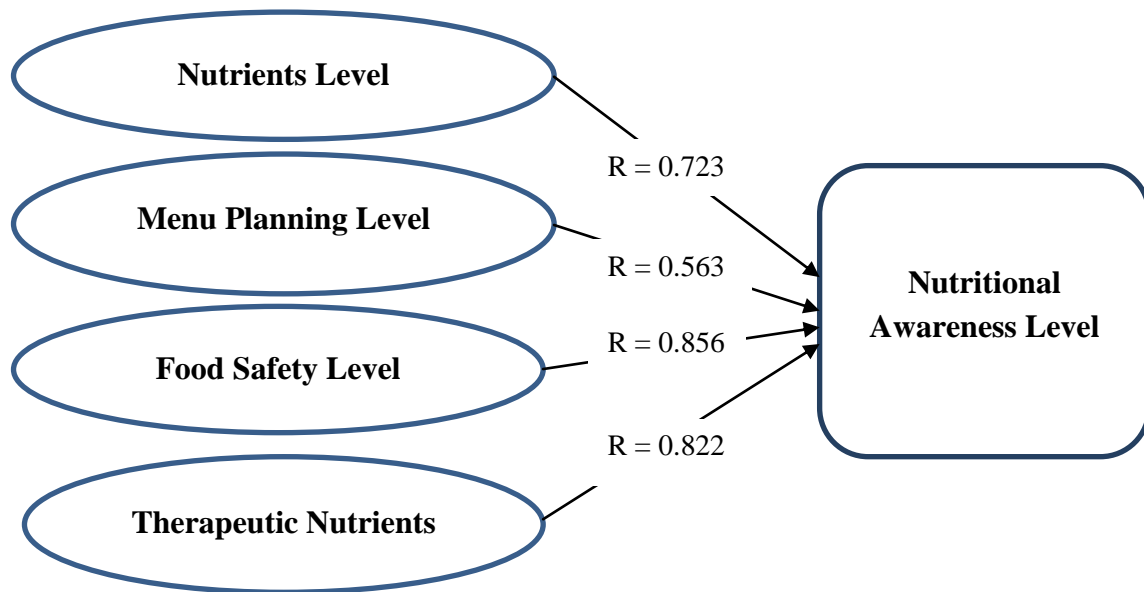
It is clear from the table (8) that the variation in the level of nutritional awareness is due to the nutrients (0.523), the menu planning (0.317), the food safety (0.733), and the therapeutic nutrition (0.676). Accordingly, food safety is the most important factor that affects the variation in the level of nutritional awareness, while menu planning is the least of the factors affecting the variation of nutritional awareness level.

**Table (9): The Regression Model Between The Nutritional Awareness Level and Research Variables.**

Variables		Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Indep. X	Dep. Y		B	Std. Error	Beta		
Nutrients	Nutrition Awareness Level	Constant	18.969	1.086	0.723	17.471	0.000
		Nutrients	2.127	0.157		13.563	0.000
Menu Planning		Constant	22.375	1.260	0.563	17.752	0.000
		Menu Planning	3.266	0.370		8.831	0.000
Food Safety		Constant	4.316	1.354	0.856	3.187	0.002
		Food Safety	1.814	0.084		21.475	0.000
Therapeutic Nutrition		Constant	12.894	1.106	0.822	11.657	0.000
		Therapeutic Nutrition	2.672	0.143		18.725	0.000

Table (9) shows the regression analysis between the level of nutritional awareness and its components, as it is significant at the level of 0.05. Below are regression models shown, where Y refers to the level of nutritional awareness;  $Y = 18.969 + 2.127 \times (\text{Nutrients})$ ;  $Y = 22.375 + 3.266 \times (\text{Menu Planning})$ ;  $Y = 4.316 + 1.814 \times (\text{Food Safety})$ ; and  $Y = 12.894 + 2.672 \times (\text{Therapeutic Nutrients})$ .

The study suggested the following model:



**Figure (4): The Research Model**

## 5. Conclusion

The aim of this research is to measure the level of nutritional awareness. So, the research methodology is the semi-experimental approach, where a test was designed to measure the level of nutritional awareness and it was applied to the employees of the nutrition departments in hospitals in Minia, Egypt. The frame of the research population consists of all the employees of the nutrition department in Minia hospitals. The data collection tool is a questionnaire for the nutrition department staff. The random sample was used which it included about 170 out of 200 employees in 47 hospitals. The results revealed that the distribution of data on the level of nutritional awareness is not normal (Sig, 0.039). Also, the variables of the nutritional awareness test were distributed no normal (Sig, 0.000).

The level of reliability for the nutritional awareness test is statistically acceptable. This test consists of fifty questions, where the average scores (32.73) are equivalent to 65.46 % with a high standard deviation rate (7.28). Accordingly, the coefficient of variance equals 22 %. Consequently, this level is considered a weak and needs improvement. With regard to the components of the nutritional awareness test, the average score for the food safety was 15.66, equivalent to 71.18%, with a difference rate of 22 %, the average score for the nutrients was 6.47, equivalent to 64.7%, with a difference rate of 38 %, and the average score for the menu planning was 3.17, equivalent to 63.4% with a variance rate 40 %, and finally the therapeutic nutrition 7.42, equivalent to 61.83 %, with a variance rate of 30 %. Thus, the components that need to be improved are menu planning, nutrients, therapeutic nutrition and food safety respectively.

The correlation coefficients between the components of nutritional awareness and the overall level of nutritional awareness are significantly correlated at the 0.05 level. The components were arranged as follows: food safety ( $r = 0.856$ ), therapeutic nutrition ( $r = 0.822$ ), nutrients ( $r = 0.723$ ) and menu planning ( $r = 0.563$ ). Moreover, the regression models between the level of nutritional awareness (Y) and its components as follows;  $Y = 18.969 + 2.127 \times$  (Nutrients);  $Y = 22.375 + 3.266 \times$  (Menu Planning);  $Y = 4.316 + 1.814 \times$  (Food Safety); and  $Y = 12.894 + 2.672 \times$  (Therapeutic Nutrition).

## **6. Recommendations**

Based on the results of this research and previous studies, the following recommendations can be proposed:

- The need to improve the level of nutritional awareness by holding training courses in the workplace.
- The necessity of monitoring the application of healthy food practices in hospitals.
- It is necessary to rely on those with higher qualifications who specialize in the field of food and beverages, instead of intermediate qualifications.
- The necessity of conducting training courses for workers in the bases of food and nutrition, planning of menus, the HACCP system, and food safety and health affairs.
- The necessity of conducting training courses for workers in the foundations of food and nutrition, planning of menus, the HACCP system, food safety, health affairs and curative nutrition.
- The necessity of paying attention to the components of nutritional awareness such as nutrients, planning of menus, food safety and therapeutic nutrition, as they are related to the level of food awareness.

## **7. Limitations and Future Researches**

This study was applied to the sample of employees in the nutrition departments in Minia hospitals. So, hospitality researchers are advised to apply a nutritional awareness test to a larger sample and include different places. Also, it is recommended that a comparison be made with the results of this study in order to confirm this test or make adjustments to it.

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## اختبار مقترح لقياس مستوى الوعي الغذائي لدى العاملين بالمستشفيات: دراسة حالة لمستشفيات المنيا في مصر

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### الملخص العربي

يهدف هذا البحث إلى قياس مستوى الوعي الغذائي لدى العاملين بالمستشفيات. لذلك، فإن هذا البحث يعتمد على المنهج شبه التجريبي. وأداة جمع البيانات عبارة عن استبيان مصمم للموظفين بقسم التغذية بالمستشفيات. لقد اعتمد هذا البحث على عينة عشوائية بسيطة، وتضمنت هذه العينة حوالي ١٧٠ من أصل ٢٠٠ موظف في ٤٧ مستشفى في المنيا في مصر. لقد أوضحت النتائج أن متوسط مستوى الوعي الغذائي هو ٣٢,٧٣ من أصل ٥٠ (٠,٦٥٥) مع انحراف معياري مرتفع (٧,٢٨). لذلك، فإن معامل التباين هو ٠,٢٢. لذلك، فإن مستوى الوعي الغذائي متوسط. أيضاً، اقترح هذا البحث اختبار قياس مستوى الوعي الغذائي (NALM)، حيث بلغ مستوى الثبات (٠,٨١٠) وبذلك فهو مقبول إحصائياً. بالإضافة إلى ذلك، يرتبط مستوى الوعي الغذائي (Y) ارتباطاً معنوياً بسلامة الغذاء (R = 0.856)، والتغذية العلاجية (R = 0.822)، والعناصر الغذائية (r = 0.723) وتخطيط قائمة الطعام (r = 0.563). علاوة على ذلك، فإن نماذج الانحدار لمستوى الوعي الغذائي هي كالتالي:

$$Y = 18.969 + 2.127 \times \text{Nutrients Level}$$

$$Y = 22.375 + 3.266 \times \text{Menu Planning Level}$$

$$Y = 4.316 + 1.814 \times \text{Food Safety Level}$$

$$Y = 12.894 + 2.672 \times \text{Therapeutic Nutrition Level}$$

وأخيراً، فقد قدم هذا البحث مجموعة من التوصيات الهامة في مجال التثقيف الغذائي.

الكلمات الرئيسية: الوعي الغذائي، سلامة الغذاء، التغذية العلاجية، تخطيط قوائم الطعام.