

Determining Predictors of Nutritional Awareness Level among Hospitality Students Using Logistic Regression: A Case Study of Minia University in Egypt

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Abstract

This research aims to determine the predictors of nutritional awareness level among the hospitality students using multinomial logistic regression. A total sample is 233 (35.8 %) student was selected using stratified random sampling for the students of the hotel management department at the faculty of tourism and hotels in Minia University in Egypt. The results revealed that the average nutritional awareness level is 16.61 out of 25, where this level equals 66.4%, which refers to an average level. In addition, the level of nutritional awareness is a significant difference according to the family size, the preference level of the food and beverage sector, and the importance level of nutritional awareness. Moreover, the results of multinomial logistic regression revealed that the students of the first, second and third stages are more conscious nutritionally than the fourth-year students by 2.094, 0.969, and 0.544 respectively, and the family with one and two individuals is less aware than the family of five and more, by 0.520, and 0.659 respectively. While the family with three members and four members are more aware of the family with five members by 0.276 and

1.005 respectively. Finally, the students who watch cooking programs are less aware than the students who do not watch these cooking programs by 0.981.

Keywords: Nutritional Awareness, Nutritional Awareness Importance, Nutritional Awareness Predictors.

1. Introduction

The nutritional awareness level is defined as self-perception of the importance assigned to eat balanced meals and classified as high, moderate, or of little importance (Alkerwi *et al.*, 2015). In addition, nutrition education as a potential tool in healthy activities allows for improved healthy eating patterns among college students (Yahia *et al.*, 2016). Therefore, the primary objective of the nutrition education process is to increase the level of knowledge associated with nutrition and healthy foods (Kyrkou *et al.*, 2016). Adequate nutrition is an important aspect of a healthy lifestyle for all individuals (Eze *et al.*, 2017). Subsequently, nutritional knowledge has a direct impact on the nutritional status of individuals and their habits and therefore has a positive effect on improving the quality of life and reducing the prevalence of some diseases (Ozdogan *et al.*, 2018). Moreover, a diet deficit in nutritive value can have a long-term

impact on health, and leading to diet-related disorders. This usually results in less productivity as physical output and capacity decrease, leading to economic loss on a macro level, directly affecting the development of an entire nation (Khanna, 2019).

Individuals with a high level of nutritional awareness lead to lower health complications and sudden deaths (Benjelloun *et al.*, 2002). Therefore, a healthy diet is one of the ways to prevent diseases around the world (Hassan *et al.*, 2015), especially obesity and non-communicable diseases such as diabetes (Kolb *et al.*, 2016). Furthermore, a healthy diet plays an important role in the life of college students, as it will gain physical and mental health and avoid many health problems (Patel *et al.*, 2018). Then, nutrition is a key component of a healthy lifestyle (UN, 2019). Thus, better nutrition is associated with a lower risk of developing non-communicable diseases such as diabetes and cardiovascular disease. Moreover, it increases the productivity of individuals in institutions (WHO, 2020). In general, good nutrition is a key component of an individual's health and well-being (HealthyPeople, 2020).

Being overweight and obese has become a global health problem due to the lack of nutritional awareness (Mensink *et al.*, 2013). In particular, university life is a critical period in regard to unhealthy changes in students' eating behaviors (Deliens *et al.*, 2014). So, the level of students' knowledge of healthy and unhealthy diet habits needs to be improved (Yahia *et al.*, 2015). The problem of nutritional awareness is that individuals do not have sufficient nutritional information and therefore they follow wrong eating behaviors and habits on a daily basis, which they affect physical activity negatively (Story *et al.*, 2002; Small *et al.*, 2012; Health, 2008; and Kyrkou *et al.*, 2018). In addition, there is a lack of commitment to healthy eating (Musaiger *et al.*, 2013; and Kolb *et al.*, 2016). Moreover, College students have unhealthy eating habits and do not have the ability to make informed food choices, which is a critical and worrying problem (Niba *et al.*, 2017). The lack of

nutritional knowledge leads to serious nutrition-based health problems (obesity, diabetes, cardiovascular, etc.) in the future (Omid *et al.*, 2018), and effects on the student's academic success negatively (Abraham *et al.*, 2018). Today, the world faces problems associated with malnutrition such as undernourishment, underweight, and obesity (WHO, 2020). In particular, about one in three adults (34.0%) and one in six children and adolescents (16.2%) are obese. However, obesity leads to heart disease, stroke, and diabetes, which ultimately leads to death (HealthyPeople, 2020).

According to a pilot study, the problem of this research is the lack of nutritional awareness among the hospitality students in the faculty of tourism and hotels in Minia university. Consequently, the lack of nutritional awareness is one of the dangerous matters in the hospitality industry, as the low level of nutritional awareness among these students, who have targeted employment for the hotels in the future, is a critical problem that may cause food poisoning cases for themselves and hotel guests. Therefore, it is necessary to ensure the highest level of nutritional awareness among these students. Building a generation of hospitality management students with a high level of nutritional awareness is a key success factor in the hospitality industry. Therefore, nutritional awareness is an important topic for the hospitality industry, because of the direct impact on the health of staff and guests. Clearly, determining the level of nutritional awareness and nutritional practices is the first step towards promoting the adoption of healthy eating habits (Salama & Ismail, 2018). Consequently, this study is concerned with measuring the nutritional awareness level and identifying the predictors of the high level of nutritional awareness among the hospitality students at the faculty of tourism and hotels at Minia University.

2. Literature Review

This section is concerned with reviewing the studies focusing on the topic of nutritional awareness. In this regard, proper nutrition contributes to the health of individuals,

especially in the stages of childhood and adolescence (Story *et al.*, 2002). In particular, botanical nutrition reduces the risk of most contemporary diseases. It receives increasing international acceptance (Leitzmann, 2014). So, more practices are required to increase healthy eating among students (Hassan *et al.*, 2015). In addition, nutrition education programs are not only necessary to obtain the correct nutritional knowledge, but also to improve the positive nutritional behavior to eat nutritious, balanced meals, and to bring about changes in the nutritional behavior (Ozdogan *et al.*, 2018).

Adults or adolescents' dietary choices do not comply with the recommended dietary guidelines for Americans. They are not obligated to eat three meals a day, and their diets are characterized by very high fat (Story *et al.*, 2002). In addition, individuals do not have sufficient nutritional information and therefore they follow wrong eating behaviors and habits on a daily basis, which they affect physical activity negatively. For example, 81.6% of adults and 81.8% of adolescents do not get the recommended amount of physical activity in the USA (Health, 2008). Moreover, most individuals have a very low intake of fruits, vegetables, and foods rich in calcium (Small *et al.*, 2012). This lack of commitment to healthy eating is due to a set of obstacles, which are the lack of information about healthy nutrition, the lack of motivation to eat healthy food, and the lack of time to prepare or eat healthy foods (Musaiger *et al.*, 2013).

Moreover, about 67.1% of men and 53% of women are overweight, while 23.3% of men and 23.9% of women are obese, especially young people (Mensink *et al.*, 2013). This reflects their lack of commitment to diet and achieves balanced health (NCBI, 2013). In addition, adjustments made to dietary patterns to promote healthy eating behaviors have a weak effect due to insufficient understanding of dietary habits between different age groups and gender (Naeni *et al.*, 2014). In particular, university life is a critical period in regard to unhealthy changes in students' eating behaviors (Deliens *et al.*, 2014). Therefore,

less than 50% of university students eat fruit, one out of four people eat vegetables daily, less than 10% of students eat five times a day, and more than one in three people do not eat breakfast regularly every morning (Waure *et al.*, 2015).

The level of students' knowledge of healthy and unhealthy diet habits needs to be improved (Yahia *et al.*, 2015). Where the unhealthy diet is because of eating saturated fats, trans-fats, cholesterol (Yahia *et al.*, 2016), the lack of healthy meals on campus, the high prices of healthy foods (Kolb *et al.*, 2016), and the high consumption of fast foods, snacks, and meats. In addition, the consumption of smoking and alcohol, and physical inactivity (Kyrkou *et al.*, 2018). Consequently, effective nutritional strategies for weight management are needed because obesity is so widespread among students. For example, fruits and vegetables could play an important role in weight management, as they increase the feeling of satiety and reduce hunger. Thus, there is a need to educate young people on the importance of fruits and vegetables in their diet (Asna *et al.*, 2019).

Over the past decades, there has been a steady increase in epidemiological research, where it provides essential insights into the dynamic relationship between diet, lifestyle, and health (Kyrkou *et al.*, 2018). Therefore, many researchers have studied the level of nutritional awareness in various institutions such as hospitality industry (Rebouças *et al.*, 2017, and Saad *et al.*, 2018), health (Pepino, 2014, Hoomans & Severens, 2014, Laur *et al.*, 2016, Theilla *et al.*, 2016, Eze *et al.*, 2017, and Alammari, 2019) and education (Salama & Ismail, 2018, Deepika & Reddy, 2019, Rolfes *et al.*, 2020). These studies have revealed that the level of nutritional awareness came between low and high, while others came at the average level. In addition, these studies displayed some wrong food practices.

Many studies determined the level of nutritional awareness among students in different schools and universities. The level of nutritional awareness among students specialized in food science is low (Petersen *et*

al., 2005). In addition, there is a lack of nutritional knowledge among students of the faculty of physical education at Jordan university. In light of these results, the researchers recommend the necessity of paying attention to the topic of nutritional culture and working to include it in the educational curricula in universities and doing similar studies of Jordanian university students (Mashaal *et al.*, 2012). The level of nutritional awareness is an average among university students (Sayed, 2014). In particular, 4% of the students have a very good nutritional knowledge, and most of them have satisfactory nutritional habits, with nearly half of the students reporting drinking two cups of milk and consuming two cups of fruits and vegetables daily (Yahia *et al.*, 2015). Furthermore, the prevalence of good nutritional knowledge among students is 74%, the behavior of good nutritional 80.3%, and the good nutritional practice 22% (Hassan *et al.*, 2015).

About 78.8% of students considered eating healthy foods are important, while all students adhered highly to the guidelines for unhealthy food groups, and moderately to healthy food groups. This is because they realized that poor eating habits were a public health concern (Ansari *et al.*, 2016). The adherence to students' diet was moderate due to exposure to bad eating habits (Arias *et al.*, 2017; Ozdogan *et al.*, 2018). Moreover, about 12% of the respondents had good awareness, 76% had a partial awareness, and 12% had poor awareness about the main functions of the nutrients. Thus, students have weak knowledge about the main function of nutrients, the sources of nutrients, the function of micronutrients, and the consequences of deficiencies in the proper nutrition (Salama & Ismail, 2018). Recently, the general level of nutritional knowledge among students has been insufficient (Badrasawi *et al.*, 2020).

Many factors have affected the level of nutritional awareness among individuals. These factors include the modification of eating patterns around the world very significant, which these modifications increase

the desire to eat fast food meals despite the wide knowledge of negative health consequences. Elderly and married couples have positive attitudes toward fast food consumption (Jonides *et al.*, 2002). In addition, moving away from the family home and taking responsibility for preparing and buying food for the first time affects nutritional habits (Papadaki *et al.*, 2007). Moreover, the location of living (on or off campus) did not explain any additional variation in positive trends towards dietary patterns (Small *et al.*, 2012). Finally, the behavior of meal preparation has been associated with higher diet quality among young people, while consumption of commercially prepared meals has been linked to poor diet quality (Thorpe *et al.*, 2013).

There are significant differences in the level of awareness towards the food safety, according to age, gender, level of education, marital status, place of residence, sector of work, place of shopping, and income. In addition, older persons had a higher probability of having awareness toward food safety by 18.8% and 16.8% in the second and third (older) category of age, women were more aware than men by 9.2%, and the higher education increases the probability. Likewise, the average level of income had the highest probability of having awareness by about 34.9% compared with low and high-income groups (Al-Mokadad *et al.*, 2014).

The level of nutritional awareness among university students varies statistically according to students' scientific specialization, while statistically does not differ according to the year of study (Sayed, 2014). In addition, the nutritional knowledge of high school students is higher than the primary school, and female students respectively. In particular, male students had a significantly less consumption of vegetables and fruits while they had a higher intake of carbohydrates, fats, and meat (Naeeni *et al.*, 2014). Moreover, students who live at home frequently consume vegetables, fruits, fish, meat, poultry, fresh fruits, eggs, bread, and grains; while students who live far away from home, depending on

ready-made and often packaged foods. Thus, their eating habits change and their weight differ from normal compared to students who live at home. Therefore, their diet is unhealthy (Lupi *et al.*, 2015). Furthermore, the gender, especially female is associated with good nutritional knowledge; and the factors of residence and food pyramid awareness are associated with the best position, while low family income is associated with good practice (Hassan *et al.*, 2015). Finally, the barriers to healthy eating might only affect specific subgroups, such as new students (Kolb *et al.*, 2016).

The nutritional knowledge has been associated negatively with fat and cholesterol intake. Despite, students with more nutritional knowledge consumed unhealthy fats and lower cholesterol (Yahia *et al.*, 2016). In addition, eating breakfast and snacking between the three meals per day predicted independently of overweight and obesity (Niba *et al.*, 2017). Moreover, there is a significant positive correlation between nutritional awareness and maternal education. In addition, there is a negative correlation has emerged between BMI and nutritional awareness (Salama & Ismail, 2018). The study of Ozdogan *et al.*, (2018) revealed that the nutritional knowledge is one of the factors that can influence a student's nutritional behavior, as this knowledge was rated 15.8 ± 4.9 (out of 20). Finally, there is a significant difference between males (14.2 ± 5.5) and females (16.6 ± 4.3) in the level of nutritional knowledge in favor of females.

The Kyrkou *et al.*, (2018) stated that understanding the impact of the budget, increased nutritional awareness, and social and cultural factors on healthy eating habits help to enhance the nutritional education and increase the effectiveness of health promotion campaigns. In addition, there are no statistically significant differences between males and females in the level of nutritional awareness. Moreover, there is no significant relationship between the level of nutritional awareness, the economic situation, the

education level, and the living area (Badrasawi *et al.*, 2020). Based on the foregoing, most studies focused on measuring nutritional awareness and identifying the wrong food practices. Therefore, this study is concerned with determining the predictors of the high level of nutritional awareness among hospitality students. This could help in developing the strategies of nutritional awareness.

3. Methodology

This research aims to determine the predictors of nutritional awareness among hospitality students using logistic regression. Therefore, the methodology depends on the descriptive approach. A total sample is 233 (35.8 %) students using the stratified random sampling of the students of the hotel management department at the faculty of tourism and hotels in Minia University in Egypt during the academic year 2019/2020 as shown in table (1). The data collection tool is a questionnaire using the instrument of nutritional awareness measurement that is designed by Sayed (2014) in order to measure the level of nutritional awareness. The results of this scale are interpreted according to the following percentages; 80% and above is a very high level of nutritional awareness, 70-79.9% a high level, 60-69.9% an average level, 50-59.9% a low level, and less than 50%, a very low level. For achieving the main aim, this research used multinomial logistic regression to determine the predictors of the highest level of nutritional awareness. Therefore, this research tests the following null hypotheses:

1. There is no significant difference among students in the level of nutritional awareness, according to gender.
2. There is no significant difference among students in the level of nutritional awareness, according to the year of study.
3. There is no significant difference among students in the level of nutritional awareness, according to residence place.
4. There is no significant difference among students in the level of nutritional

awareness, according to the student's total score.

5. There is no significant difference among students in the level of nutritional awareness, according to the level of nutritional awareness importance.
6. There is no significant difference among students in the level of nutritional awareness, according to income.
7. There is no significant difference among students in the level of nutritional awareness, according to family size.
8. There is no significant difference among students in the level of nutritional awareness, according to the preference level of the food and beverage sector.

Table (1): 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	233
Population	650		%	35.8
Sample Size Needed	242	Population	650	
		Confidence Interval	4.93	

4. Data Analysis and Results Discussion

About 242 questionnaires were distributed to the students of the hotel management department, 240 of them returned, and 233 are valid for the statistical analysis, which is 96.3 % of the sample sized needed. By analyzing the study data, the results of the study came as follows:

Table (2): The Frequency of Two Levels Factors

N	Factors	Items	Freq.	%
1	Gender	Male	154	66.1
		Female	79	33.9
2	Residence Place	City	130	55.8
		Village	103	44.2
3	Fast Foods Preference	Yes	141	60.5
		No	92	39.5
4	Smoking	Yes	77	33
		No	156	67
5	Foods Consumption Place	Home	182	78.1
		Restaurant	51	21.9
6	Cooking	Yes	141	60.5

	Programs Watch	No	92	39.5
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Table (2) shows the characteristics of the study sample, as most of the students are males (66.1 %), they live in the city (55.8 %), prefer fast foods (60.5 %), do not smoke (67 %), prefer eating meals at home (78.1 %), and watch cooking programs (60.5 %).

Table (3): The Frequency of Three and Four Levels Factors

N	Factors	Items	Freq	%
1	Year of Study	First	53	22.7
		Second	41	17.6
		Third	93	39.9
		Fourth	46	19.7
2	Family Total Income	Less Than 1000	65	27.9
		From 1000 To 5000	139	59.7
		From 5001 To 10000	23	9.9
		More Than 10000	6	2.6
3	Economic Level	Poor	38	16.3
		Average	169	72.5
		High	26	11.2
4	Nutritional Awareness Importance	Very Important	136	58.4
		Important	74	31.8
		Neutral	20	8.6
		Not Important	3	1.3

It is clear from the table (3) that most of the students are from the third and first years, and the total family income ranged between 1000 to 5000 pounds by 59.7 %, in which this income is considered an average level. In addition, most students had a nutritional awareness that was very important.

Table (4): The Frequency of Five Levels Factors

N	Factors	Items	Freq.	%
1	Student Total Score	Excellent	71	30.5
		Very Good	66	28.3
		Good	79	33.9
		Fair	16	6.9
		Poor	1	0.4
4	Family Size	One Member	13	5.6
		Two Members	25	10.7
		Three Members	24	10.3

5	F&B Job Preference	Four Members	40	17.3
		More	131	56.2
		Very High	63	27
		High	87	37.3
		Neutral	63	27
		Low	12	5.2
		Very Low	8	3.4

Table (4) shows some of the characteristics of the study sample, as most of the students' annual grades came in good, excellent, very good, fair, and poor levels respectively. In addition, their families consist of more than five individuals, and these students prefer working in the food and beverage sector at a high level.

Table (5): The Descriptive Statistics of Nutritional Awareness level

No	Tests		Value
1	Mean	Statistic	16.61
		Std. Error	0.199
2	95 % Confidence Interval for Mean	Lower Bound	16.22
		Upper Bound	17.01
3	Median		16
4	Maximum		25
5	Minimum		7
6	Range		18
7	Variance		9.247
8	Standard Deviation		3.041
9	Coefficient of Variance (%)		18.3
10	Nutrition Awareness Level	K-S	1.816
		Sig	0.003
11	The Validity of Nutritional Awareness Scale	No of Items	25
		Cronbach's Alpha	0.475

It is clear from the table (5) that the level of nutritional awareness among students is 16.61 out of 25, equivalent to 66.4 %, and indicates the average level of nutritional awareness. The standard deviation is estimated at 3.041; therefore, the coefficient of variance is 18.3 %. In addition, table (5) revealed that the distribution of the nutritional awareness level does not follow the normal distribution. Moreover, the validity level of the nutritional awareness level is 0.475 using Cronbach's alpha test. It differs from the level specified by

the author of this scale (Sayed, 2014) which was estimated at about 0.77. The level of nutritional awareness among hospitality students is agreed with the studies of (Sayed, 2014; Yahia *et al.*, 2015), while it differed with the studies of (Petersen *et al.*, 2005; Mashaal *et al.*, 2012; Arias *et al.*, 2017; Ozdogan *et al.*, 2018; Salama & Ismail, 2018; Badrasawi *et al.*, 2020), which determined that the level of nutritional awareness among university students is low.

Table (6): The Descriptive Statistics of Nutritional Awareness Scale

No	Items	Sum	%	Level
1	Proteins are the substances needed for building and renewing the cells (T)	231	99.1	Very High
2	Vegetables and fruits are rich in protein (F)	159	68.2	Average
3	Protein is low in red meat (F)	91	39.1	Very Low
4	The carbohydrates provide T. B. (Tuberculosis) patients with energy (T)	189	81.1	Very High
5	Vitamins enhance the protection against diseases (T)	207	88.8	Very High
6	Vitamin E is available in vegetable oils like corn oil and cottonseed oil (T)	149	63.9	Average
7	Vitamin K, which is found in green vegetables, has an important role in blood clotting (T)	169	72.5	High
8	Vitamin C is found in vegetable oils, especially the sesame oil (F)	120	51.5	Low
9	Drinking coffee or tea directly after meals help absorbing iron (F)	157	67.4	Average
10	Excessive consumption of foods high in	170	72.9	High

	sugar (carbohydrates) generally raises the glucose in the blood (T)			
11	Brown bread and vegetables are rich in nutritional fibers (T)	154	66.1	Average
12	Teething babies need milk (a source of calcium) (T)	179	76.8	High
13	The pregnant mother needs additional food (T)	187	80.3	Very High
14	Children need more proteins than adults (F)	154	66.1 9	Average
15	Pasteurization is suitable for preserving all kinds of food (F)	118	50.6 4	Low
16	Mental growth is related to nutrition (T)	166	71.3	High
17	Consuming a source of food rich in iron help building the blood hemoglobin (T)	179	76.8	High
18	Sea foods are rich in iodine (T)	174	74.7	High
19	Milk is an important source of iron (F)	145	62.2	Average
20	Foods preserved by the Sun dehydration have high nutritional value (F)	115	49.4	Very Low
21	Excessive consumption of carrots tans the skin yellow (T)	95	40.8	Very Low
22	Obesity is caused by consuming vegetables and fruits (F)	81	34.8	Very Low
23	Gout patients should cut down protein consumption (T)	170	72.9	High
24	The main source of the body energy is consumption of foods high in sugar	154	66.1	Average

	(carbohydrates) (F)			
25	Vitamin A deficiency means night-blindness (T)	158	67.8	Average
Mean		104.8	66.4	Average

T = True, F = False

Table (6) shows that the level of nutritional awareness among students is estimated at 66.4%, this level is considered average, and therefore it needs improvement to suit the requirements of work in the food and beverage sector. By analyzing the previous table, it is clear that students need to know the nutrients and their sources, especially protein, vitamins, and minerals, understand the processes of digestion and absorption of food, the nutritional needs of children and adolescents, and know the methods of food preservation as well as diseases resulting from malnutrition. This corresponds to studies that have determined that university students do not have enough the nutritional information and therefore they follow wrong eating behaviors and habits on a daily basis (Story *et al.*, 2002; Health, 2008; Mensink *et al.*, 2013; NCBI, 2013; Waure *et al.*, 2015). The lack of commitment to healthy eating is due to a set of obstacles, which are the lack of information about healthy nutrition, the lack of motivation to eat healthy food, and the lack of time to prepare or eat healthy foods (Musaiger *et al.*, 2013). In addition, university life is a critical period in regard to unhealthy changes in students' eating behaviors (Deliens *et al.*, 2014). Consequently, more practices are required to increase the healthy eating among students (Hassan *et al.*, 2015), and focus on the nutrition education programs which are not only necessary to obtain the correct nutritional knowledge, but also to improve the positive nutritional behavior to eat nutritious, balanced meals, and to bring about changes in the nutritional behavior (Ozdogan *et al.*, 2018).

Table (7): The T-Test between Nutritional Awareness Variables

Variables	t-test for Equality of Means		
	t	df	Sig.
Residence Place	-0.258	231	0.796
Smoking	-0.324	122	0.747
Gender	0.385	231	0.700
Fast Foods Preference	0.020	231	0.984
Foods Consumption Place	1.584	231	0.115

According to the table (7), a t-test revealed that there is no significant difference in the level of nutritional awareness, according to residence place, smoking, gender, fast-food preference, and the place of food consumption. Compared to previous studies, Al-Mokadad *et al.*, (2014) stated that the level of nutritional awareness is significantly differed according to the place of residence, and gender. While, Small *et al.*, (2012) revealed that the location of living (on or off campus) did not explain any additional variation in positive trends towards dietary patterns. In addition, Naeeni *et al.*, (2014) and Hassan *et al.*, (2015) stated that the level of nutritional awareness is higher for females than for males. On the contrary, Badrasawi *et al.*, (2020) stated that there is no significant difference between males and females in the level of nutritional awareness. Moreover, the students who live at home frequently consume vegetables, fruits, fish, meat, poultry, fresh fruits, eggs, bread, and grains; while students who live far away from home, depending on ready-made and often packaged foods. Thus, their eating habits change and their weight differ from normal compared to the students who live at home. Therefore, their diet is unhealthy (Lupi *et al.*, 2015).

Table (8): The One Way ANOVA among Nutritional Awareness Variables

Variables		Mean Square	F	Sig.
Year of Study	Between Groups	14.658	1.597	0.191
	Within Groups	9.176		
	Total			
Student Total Score		9.251	1.001	0.408
		9.247		
Family Size		37.465	4.281	0.002
		8.752		
The Preference of F&B		25.086	2.797	0.027
		8.969		
Family Total Income		11.432	1.240	0.296
		9.218		
Economic Level		3.560	0.383	0.682
		9.296		
Nutritional Awareness Importance		45.183	5.149	0.002
		8.776		

According to the table (8), One Way ANOVA revealed that there is no significant difference in the level of nutritional awareness, according to the educational stage, the student total score, the family total income, and the economic level. Moreover, there is a significant difference in the level of nutritional awareness, according to the family size, the preference of the food and beverage sector, and the importance level of nutritional awareness. The previous studies revealed that the barriers to healthy eating might only affect specific subgroups, such as new students (Kolb *et al.*, 2016). The average level of income had the highest probability of having awareness by about 34.9% compared with low and high-income groups (Al-Mokadad *et al.*, 2014). In addition, low family income is associated with good practice (Hassan *et al.*, 2015). Moreover, the level of nutritional

awareness does not differ according to the year of study (Sayed, 2014).

Table (9): Post Hoc Tests Among Nutritional Awareness Variables

Variables	Category		Mean Diff.	Std. Err.	Sig
Family Size	Two Members	Three Members	-2.780*	0.845	0.001
		Four Members	-2.880*	0.754	0.000
		More Than Four Members	-1.830*	0.646	0.005
The Preference of F&B Sector	Very Low	Very High	3.500*	1.124	0.002
		High	2.868*	1.106	0.010
		Neutral	2.563*	1.124	0.023
		Low	3.417*	1.367	0.013
Nutritional Awareness Importance	Very Important	Important	1.093*	0.428	0.011
		Neutral	-1.641*	0.709	0.022
	Important	Neutral	-2.734*	0.747	0.000

*The mean difference is significant at the 0.05 level.

It is clear from the table (9) that the level of nutritional awareness varies according to the factor of family size in favor of the family of four members, the factor of preference level of

food and beverage sector in favor of the very low level, and the factor of the importance level of nutritional awareness in favor of the middle level.

Table (10): The Predictors of Nutritional Awareness Level

Variables	Category	B	S.E.	Wald	df	Sig	Exp (B)	Cox & Snell R Square	Sig of Model
Year of Study ^a	Intercept	-0.629	0.310	4.123	1	0.042		0.034	.044
	First	1.129	0.420	7.242	1	0.007	3.094		
	Second	0.677	0.440	2.372	1	0.124	1.969		
	Third	0.434	0.373	1.355	1	0.244	1.544		
	Fourth	0 ^b			0				
Family Size ^a	Intercept	-0.076	0.175	0.191	1	0.662		0.053	.013
	Member	-0.735	0.626	1.378	1	0.241	0.480		
	Two Members	-1.076	0.500	4.636	1	0.031	0.341		
	Three Members	0.243	0.445	0.299	1	0.585	1.276		
	Four Members	0.695	0.375	3.443	1	0.064	2.005		
	Five and More	0 ^b			0				
Cooking Programs Watch	Intercept	0.307	0.211	2.114	1	0.146		0.019	.018
	Yes	-0.636	0.271	5.490	1	0.146	0.019		
	No	0 ^b			0	0.019			

- a. The reference category is Low Mean.
- b. This parameter is set to zero because it is redundant.

Table (10) shows the predictors of the nutritional awareness level using multinomial logistic regression. The results revealed that the students of the first, second, and third stages are more conscious nutritionally than the fourth-year students by 2.094, 0.969, and 0.544 respectively. In addition, the family with one and two individuals is less aware than the family of five and more, by 0.520, and 0.659 respectively. While the family with three members and four members are more aware of the family with five members by 0.276 and 1.005 respectively. Moreover, the students who watch cooking programs are less aware than the students who do not watch these cooking programs by 0.981.

According to the previous studies, the level of nutritional awareness does not differ according to the year of study (Sayed, 2014). In general, the stage of the university is a critical period in regard to unhealthy changes in students' eating behaviors (Deliens *et al.*, 2014). Therefore, less than 50% of university students eat fruit, one out of four people eat vegetables daily, less than 10% of students eat five times a day, and more than one in three people do not eat breakfast regularly every morning (Waure *et al.*, 2015). In addition, the barriers to healthy eating might only affect specific subgroups, such as new students (Kolb *et al.*, 2016).

Table (11): The Multinomial Logistic Regression of Nutritional Awareness Level

No	Effect	Model Fitting Criteria	Likelihood Ratio Tests		
		2-Log Likelihood of Reduced Model	Chi-Square	df	Sig
1	Student Total Score	23.194	5.807	4	0.214
2	Gender	12.196	1.905	1	0.167
3	Residence Place	10.565	0.155	1	0.694
4	Fast Foods Preference	10.606	0.227	1	0.634
5	Smoking	12.670	2.405	1	0.121
6	Foods Consumption Place	13.076	3.091	1	0.079
7	Economic Level	15.666	2.321	2	0.313

Table (11) shows the multinomial logistic regression to determine the predictors of the nutritional awareness level. The results revealed that the predictors in the table (11) were not significant for predicting the level of nutritional awareness. These factors are a student total score, gender, residence place, fast-food preference, smoking, the place of food consumption, and economic level. These results are disagreeing with the previous studies which stated that there is a significant difference in the level of nutritional awareness, according to gender, where women are more aware than men by 9.2% (Al-Mokadad *et al.*, 2014). In particular, male students had significantly less consumption of vegetables

and fruits while they had a higher intake of carbohydrates, fats, and meat (Naeeni *et al.*, 2014). Furthermore, the female is associated with good nutritional knowledge (Hassan *et al.*, 2015). There is a significant difference between males (14.2 ± 5.5) and females (16.6 ± 4.3) in the level of nutritional knowledge in favor of females (Ozdogan *et al.*, 2018). Finally, there is no significant difference between males and females in the level of nutritional awareness (Badrasawi *et al.*, 2020).

Smoking is one of the reasons for the unhealthy diet (Kyrkou *et al.*, 2018), and moving away from the family home and taking responsibility for preparing and buying food

for the first time affects the nutritional habits (Papadaki *et al.*, 2007). The location of living (on or off campus) did not explain any additional variation in positive trends towards dietary patterns (Small *et al.*, 2012). In addition, there is a significant difference in the level of nutritional awareness, according to the place of residence (Al-Mokadad *et al.*, 2014). Moreover, the students who live at home frequently consume vegetables, fruits, fish, meat, poultry, fresh fruits, eggs, bread, and grains; while students who live far away from home, depending on ready-made and often packaged foods. Thus, their eating habits change and their weight differ from normal compared to students who live at home. Therefore, their diet is unhealthy (Lupi *et al.*, 2015). The average level of income had the highest probability of having awareness by about 34.9% compared with low and high-income groups (Al-Mokadad *et al.*, 2014). In addition, low family income is associated with the good practice of nutrition (Hassan *et al.*, 2015). Finally, there is no significant relationship between the level of nutritional awareness, and the economic situation (Badrasawi *et al.*, 2020).

5. Conclusion

This research aims to determine the predictors of nutritional awareness among hospitality students using logistic regression. The total sample is 233 (35.8%) students of the hotel management department in the faculty of tourism and hotels at Minia University. The results revealed that the nutritional awareness level among hospitality students is 16.61 out of 25, equivalent to 66.4 % and this indicates to the average level. In addition, the coefficient of variance is high (18.3 %) among students. Therefore, the level of nutritional awareness among hospitality students needs improvement to suit the requirements of work in the food and beverage sector. Moreover, the

students need to know the nutrients and their sources, especially protein, vitamins, and minerals; to understand the processes of digestion and absorption of foods; to know the nutritional needs of children and adolescents, and to know the methods of food preservation as well as diseases resulting from malnutrition.

The level of nutritional awareness is a significant difference according to the family size in favor of the family of four members; the work preference level in the food and beverage sector in favor of the very low level, and the importance of nutritional awareness in favor of the middle level. Moreover, the predictors of the nutritional awareness level using the multinomial logistic regression include the students of the first, second, and third stages are more conscious nutritionally than the fourth-year students by 2.094, 0.969, and 0.544 respectively. In addition, the family with one and two individuals is less aware than the family of five and more, by 0.520, and 0.659 respectively. While the family with three members and four members are more aware of the family with five members by 0.276 and 1.005 respectively. Moreover, the students who watch cooking programs are less aware than the students who do not watch these cooking programs by 0.981. Finally, this study acknowledged that the level of nutritional awareness among hospitality students is average and this level is not appropriate for the students who work in the hospitality industry in order to provide food and beverage services to guests. Finally, this research stated the following hypotheses:

1. There is no significant difference among students in the level of nutritional awareness, according to gender (Sig. 0.700).
2. There is no significant difference among students in the level of nutritional

- awareness, according to the year of study (Sig. 0.191).
3. There is no significant difference among students in the level of nutritional awareness, according to the residence place (Sig. 0.796).
 4. There is no significant difference among students in the level of nutritional awareness, according to the student total score (Sig. 0.408).
 5. There is a significant difference among students in the level of nutritional awareness, according to the level of nutritional awareness importance (Sig. 0.002).
 6. There is no significant difference among students in the level of nutritional awareness, according to the income (Sig. 296).
 7. There is a significant difference among students in the level of nutritional awareness, according to the family size (Sig. 0.002).
 8. There is a significant difference among students in the level of nutritional awareness, according to the preference level of the food and beverage sector (Sig. 0.027).

6. Recommendations

This study recommends the following points:

- 1- The educational establishments of hospitality should improve the level of nutritional awareness among hospitality students using many methods such as lectures, researches, and tests in order to suit the requirements of work in the food and beverage sector in the hospitality industry.
- 2- The hospitality students need to know the nutrients and their sources, especially protein, vitamins, and minerals; understand the processes of digestion and absorption of foods; know the nutritional needs of children and

adolescents, and know the methods of food preservation as well as diseases resulting from malnutrition.

3- The educational establishments of hospitality or hotels must take into account the following factors during the measurement or the improvement of the level of nutritional awareness among students: family size, the preference level of food and beverage sector, and the importance of nutritional awareness.

4- The educational establishments of hospitality or hotels must take into account the predictors of the nutritional awareness level during the improvement process. These predictors include the students of the first, second and third stages are more conscious nutritionally than the fourth-year students; The family with three members and four members are more aware of the family with five members, and the students who watch cooking programs are less aware than the students who do not watch these cooking programs.

5- The hospitality establishments or hotels should focus on the level of nutritional awareness to select staff and make training courses to improve the level of nutritional awareness among staff to avoid contaminations and diseases.

7. Limitations and Future Researches

The main determinants of this research are the sample size that represents 233 students applying to the Hotel Management Department at the Faculty of Tourism and Hotels, Minia University. Therefore, the results cannot be generalized. Consequently, this research recommends hospitality researchers to study the nutritional awareness of students on a larger sample in different universities.

Reference

- Abraham, S., Noriega, B., and Shin, J., (2018) "College Students' Eating Habits and Knowledge of Nutritional Requirements", *J Nutr Hum Health*, 2 (1) 13-17, available at https://www.researchgate.net/publication/322925099_College_Students'_Eating_Habits_and_Knowledge_of_Nutritional_Requirements
- Alammari, H. (2019) "Assessing Healthy Nutrition Awareness among College Students and the Role of Health Education in Promotion", *College Student Journal*, 53(3) 360-368., available at <https://www.ingentaconnect.com/content/prin/cj/2019/00000053/00000003/art00010>
- Alkerwi, A., Sauvageot, N., Malan, L., Shivappa, N., and Hebert, J., (2015) "Association between Nutritional Awareness and Diet Quality: Evidence from the Observation of Cardiovascular Risk Factors in Luxembourg (ORISCAV-LUX) Study", *Nutrients*, 7 (4) 2823-2838, available at <https://www.mdpi.com/2072-6643/7/4/2823>
- Ansari, W., Suominen, S., and Samara, A., (2016) "Eating Habits and Dietary Intake: Is Adherence to Dietary Guidelines Associated with Importance of Healthy Eating among Undergraduate University Students in Finland?" *Central European journal of public health*, 23 (4) 306-313, available at https://www.researchgate.net/publication/292978000_Eating_Habits_and_Dietary_Intake_Is_Adherence_to_Dietary_Guidelines_Associated_with_Importance_of_Healthy_Eating_among_Undergraduate_University_Students_in_Finland
- Arias, J., Lorenzo, T., Lamas, A., Regal. P., Cardelle, A., and Cepeda, A., (2017) "Food patterns and nutritional assessment in Galician university students", *Journal of physiology and biochemistry* 74(02), available at https://www.researchgate.net/publication/318911786_Food_patterns_and_nutritional_assessment_in_Galician_university_students
- Asna, M., Mazlan, Rasmi, A., Sofea, A., Aziz, A., Farzana, Bahrin, M., (2019) "Factors influencing vegetable consumption and weight loss awareness among private university students", *Journal of Management & Science*, 17(2) 32-40. Available at <http://mymedr.afpm.org.my/publications/79193>
- Badrasawi, M., Hijeh, N., Amer, R., Allan, R., and Altamimi, M., (2020) "Nutrition Awareness and Oral Health among Dental Patients in Palestine: A Cross-Sectional Study", *International Journal of Dentistry*, Vol. 2020, No 3472753, available at <https://www.hindawi.com/journals/ijd/2020/3472753/>
- Benjelloun S. (2002) "Nutrition transition in Morocco", *Public Health Nutrition*, 5(1A): 135-40, available at <https://pubmed.ncbi.nlm.nih.gov/12027276/>
- Deepika, S., and Reddy, G. (2019) "Nutritional Awareness among Adolescent Girls in Mahbubnagar District in Telangana", *Journal of Krishi Vigyan*, 7 (special), 107-110, available at <https://www.indianjournals.com/ijor.aspx?target=ijor:jkv&volume=7&issue=special&article=023>
- Deliens, T., Clarys, P., Bourdeaudhuij, I., and Deforche, B., (2014) "Determinants of eating behaviour in university students: A qualitative study using focus group discussions", *BMC Public Health* 14(1):53, available at https://www.researchgate.net/publication/259805343_Determinants_of_eating_behaviour_in_university_students_A_qualitative_study_using_focus_group_discussions
- Eze, N., Maduabum, F., Onyeke, N., Anyaegunam, N., Ayogu, C., Ezeanwu, B., and Eseadi, C., (2017) "Awareness of food nutritive value and eating practices among Nigerian bank workers: Implications for nutritional counseling and education", *Medicine (Baltimore)*, 96(10), available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PM5348196/>
- Hassan, M., Ghazi, H., Umar, N., and Masri, N., (2015) "Knowledge, Attitude and Practice of Healthy Eating and Associated Factors among University Students in Selangor, Malaysia", *Pakistan Journal of Nutrition* 14(12):892-897, available at https://www.researchgate.net/publication/286265001_Knowledge_Attitude_and_Practice_of_Healthy_Eating_and_Associated_Factors_among_University_Students_in_Selangor_Malaysia
- Health, (2008) "Physical Activity Guidelines for Americans", U.S. Department of Health and Human Services and U.S. Department of

- Agriculture, 8th Edition, Washington, D.C., Available at <http://www.health.gov/PAGuidelines>
- Health, (2015) "2015-2020 Dietary Guidelines for Americans", U.S. Department of Health and Human Services and U.S. Department of Agriculture, 8th Edition, Washington, D.C., Available at <https://health.gov/dietaryguidelines/2015/guidelines/chapter-2/a-closer-...>
 - HealthyPeople, (2020) "Nutrition, Physical Activity, and Obesity", available at <https://www.healthypeople.gov/2020/leading-health-indicators/2020-lhi-topics/Nutrition-Physical-Activity-and-Obesity>
 - Hoomans, T., and Severens, H., (2014) "Improving patient care: The implementation of change in health care", *Implementation Science* 9(1) 168, available at https://www.researchgate.net/publication/269771632_Improving_Patient_Care_The_Implementation_of_Change_in_Health_Care_Second_Edition
 - Jonides, L., Bushbacher, S., and Barlow, E., (2002) "Management of child and adolescent obesity: psychological emotional and behavioral assessment", *Pediatrics*, 110(1): 215-21, available at <https://pubmed.ncbi.nlm.nih.gov/12093998/>
 - Khanna, V., (2019) "Nutrition Awareness, Why Is It Important?" the CSR journal, available at <https://thecsrjournal.in/nutrition-awareness-important/>
 - Kolb, J., Loerbroks, A., and Diehl, K., (2016) "Eating behavior of university students in Germany: Dietary intake, barriers to healthy eating and changes in eating behavior since the time of matriculation", *Appetite*, 109, available at https://www.researchgate.net/publication/310437216_Eating_behaviour_of_university_students_in_Germany_Dietary_intake_barriers_to_healthy_eating_and_changes_in_eating_behaviour_since_the_time_of_matriculation
 - Kyrkou, C., Tsakoumaki, F., Fotiou, M., Dimitropoulou, A., (2018) "Changing Trends in Nutritional Behavior among University Students in Greece, between 2006 and 2016", *Nutrients* 10(1) 64, available at https://www.researchgate.net/publication/322373062_Changing_Trends_in_Nutritional_Behavior_among_University_Students_in_Greece_between_2006_and_2016
 - Laur, C., Marcus, H., Ray, S., and Keller, H. (2016) "Quality Nutrition Care: Measuring Hospital Staff's Knowledge, Attitudes, and Practices", *Healthcare*, 4(4), 79, available at <https://doi.org/10.3390/healthcare4040079>
 - Leitzmann, C., (2014) "Vegetarian nutrition: Past, present, future", *American Journal of Clinical Nutrition*, 100(Supplement_1), available at https://www.researchgate.net/publication/262884091_Vegetarian_nutrition_Past_present_future
 - lupi, S., Bagordo, F., Stefanati, A., Grassi, T., Piccinni, L., Bergamini, M., and Donno, A., (2015) "Assessment of lifestyle and eating habits among undergraduate students in Northern Italy", *Annali dell'Istituto superiore di sanita* 51(2):154-161, available at https://www.researchgate.net/publication/279531810_Assessment_of_lifestyle_and_eating_habits_among_undergraduate_students_in_Northern_Italy
 - Mensink, G., Schienkiewitz, A., Haftenberger, M., and Lampert, T., (2013) "Overweight and Obesity in Germany. Results of the German Health Interview and Examination Survey for Adults (DEGS1)", *Bundesgesundheitsblatt - Gesundheitsforschung - Gesundheitsschutz* 56(5-6) 786-794, available at https://www.researchgate.net/publication/236908484_Overweight_and_Obesity_in_Germany_Results_of_the_German_Health_Interview_and_Examination_Survey_for_Adults_DEGS1
 - Musaiger, A., Al-Mannai, M., Tayyem, R., Al-Lalla, O., Ali, E., Kalam, F., Benhamed, M., Saghier, S., Halahleh, I., Djoudi, Z., and Chirane, M., (2013) "Perceived Barriers to Healthy Eating and Physical Activity among Adolescents in Seven Arab Countries: A Cross-Cultural Study", *The Scientific World Journal*, 2013(232164), available at https://www.researchgate.net/publication/258514976_Perceived_Barriers_to_Healthy_Eating_and_Physical_Activity_among_Adolescents_in_Seven_Arab_Countries_A_Cross-Cultural_Study
 - Naeeni, M., Jafari, S., Fouladgar, M., Heidari, K., Fakhri, M., Karami, P., and Omid, R., (2014) "Nutritional Knowledge, Practice, and

- Dietary Habits among school Children and Adolescents", *International Journal of Preventive Medicine*, 5(Suppl 2): S171–S178, available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4476009/>
- NCBI, (2013) "State Indicator Report on Fruits and Vegetables, Centers for Disease Control and Prevention, Atlanta, GA", *advances in nutrition*, 4(6) 665-666, available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3823512/>
 - Niba, L., Atanga, M., and Navti, L., (2017) "A cross sectional analysis of eating habits and weight status of university students in urban Cameroon", *BMC Nutrition*, 3 (10), available at https://www.researchgate.net/publication/318457333_A_cross_sectional_analysis_of_eating_habits_and_weight_status_of_university_students_in_urban_Cameroon
 - Omid G., Torabi R., Hojjati M., Ghanian M., Kitterlin M., (2018) "Factors influencing Iranian consumers' attitudes toward fast-food consumption", *British food journal*, 120(2): 409-23, available at https://www.researchgate.net/publication/318317460_Factors_Influencing_Iranian_Consumers'_Attitudes_toward_Fast-food_Consumption
 - Ozdogan, Y., Yardimci, H., and Ozcelik, A., (2018) "Assessment of Nutrition Knowledge among University Students in Ankara", *Journal of Scientific Research and Reports* 20(4) 1-8, available at https://www.researchgate.net/publication/328515625_Assessment_of_Nutrition_Knowledge_among_University_Students_in_Ankara
 - Patel, S., Upadhyaya, E., and Saikia, H., (2018) "A Study on The Eating Habits of The College Students Sarjoo Patel", *Remarking An Analisation*, 3 (9), available at https://www.researchgate.net/publication/337918706_A_Study_on_The_Eating_Habits_of_The_College_Students_Sarjoo_Patel
 - Pepino, S. (2014) "Nutrition, education and awareness rising for the right to adequate food, FAO.
 - Perlstein, R., McCoombe, S., Macfarlane, S., Bell, A., and Nowson, C., (2017) "Nutrition Practice and Knowledge of First-Year Medical Students", *Journal of Biomedical Education*, 2017(5013670), available at <https://www.hindawi.com/journals/jbe/2017/5013670/>
 - Petersen, P., Bourgeois, D., Ogawa, H., Day, S., and Ndiaye, C., (2005) "The global burden of oral diseases and risks to oral health", *Bulletin of the World Health Organization*, 83 (9), PP. 661–669, available at <https://www.scielo.org/article/bwho/2005.v83n9/661-669/en/>
 - Rebouças, T., Santiago, B., Martins, S., Rios Menezes, C., Araújo, M. da, N., Almeida, C. and de, C. (2017) "Food safety knowledge and practices of food handlers, head chefs and managers in hotels and restaurants of Salvador", *Brazil. Food Control*, 73 (B), 372–381, available at <https://www.sciencedirect.com/science/article/abs/pii/S0956713516304534>
 - Rolfes, R., Pinna, K., and Whitney, N. (2020) "Understanding Normal and Clinical Nutrition: Cengage Learning", available at: https://books.google.com.eg/books/about/Understanding_Normal_and_Clinical_Nutrit.html?id=J9BAxwEACAAJ&redir_esc=y
 - Saad, M., Mahmoud, F., and Mahmoud, H. (2018) "Training Program among Hospital Food Handlers' Regarding Food Borne Diseases", *Journal of Nursing and Health Science*, 7(4) 1–11, available at https://scholar.google.com/scholar?hl=ar&as_sdt=0%2C5&q=Training+Program+among+Hospital+Food+Handlers%E2%80%99+Regarding+Food+Borne+Diseases&btnG=
 - Salama, A., and Esmail, N., (2018) "Assessing Nutritional Awareness and Dietary Practices of College-aged Students for Developing an Effective Nutrition Educational Plan", *Canadian Journal of Clinical Nutrition* 6(2), available at https://www.researchgate.net/publication/325857355_Assessing_Nutritional_Awareness_and_Dietary_Practices_of_College-aged_Students_for_Developing_an_Effective_Nutrition_Educational_Plan
 - Sayd, A., (2014) "Nutrition Awareness Level of Al-Balqa Applied University Students", *Journal of Biology, Agriculture and Healthcare*, 4(2), available at <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.887.111&rep=rep1&type=pdf>
 - Small, M., Davis, L., Morgan, N., and Maggs, J., (2012) "Changes in Eating and Physical

- Activity Behaviors across Seven Semesters of College: Living On or Off Campus Matters", [Health Education & Behavior](#) 40(4), available at https://www.researchgate.net/publication/233900606_Changes_in_Eating_and_Physical_Activity_Behaviors_Across_Seven_Semesters_of_College_Living_On_or_Off_Campus_Matters
- Story M, Neumark-Sztainer D, and French S (2002) "Review Individual and environmental influences on adolescent eating behaviors", *Journal of the American dietetic association*, 102 (3) 40-51, available at <https://www.ncbi.nlm.nih.gov/pubmed/11902388/>
 - Theilla, M., Cohen, J., Singer, P., Liebman, C., and Kagan, I. (2016) "The Assessment, Knowledge and Perceived Quality of Nutrition Care amongst Nurses", *Journal of Nutritional Medicine and Diet Care*, 2(1) 2-12, available at <https://clinmedjournals.org/articles/jnmdc/journal-of-nutritional-medicine-and-diet-care-jnmdc-2-012.pdf>
 - Thorpe, M., Kestin, M., Riddell, L., and Keast, R., (2013) "Diet quality in young adults and its association with food-related behaviors", [Public Health Nutrition](#) 17(08) 1-9, available at https://www.researchgate.net/publication/250918673_Diet_quality_in_young_adults_and_its_association_with_food-related_behaviours
 - UN, (2015) "European Food and Nutrition Action Plan 2015–2020", available at http://www.euro.who.int/_data/assets/pdf_file/0003/294474/European-Food-Nutrition-Action-Plan-20152020-en.pdf?ua=1
 - UN, (2019) "The United Nations Decade of Action on Nutrition 2016–2025", available at <https://www.unscn.org/en/topics/un-decade-of-action-on-nutrition>
 - Waure, C., Soffiani, V., Poscia, A., and Teleman, A., (2015) "Nutritional habits in Italian university students", [Annali dell'Istituto superiore di sanita](#), 51(2) 99-105, available at https://www.researchgate.net/publication/27990957_Nutritional_habits_in_Italian_university_students
 - WHO, (2020) "Nutrition", available at <https://www.who.int/health-topics/nutrition>
 - Yahia, N., Brown, C., Rapley, M., and Chung, M., (2016) "Level of nutrition knowledge and its association with fat consumption among college students", [BMC Public Health](#), 16(1047), available at <https://bmcpublihealth.biomedcentral.com/articles/10.1186/s12889-016-3728-z>
 - Yahia, N., Wang, D., Rapley, M., and Dey, R., (2015) "Assessment of weight status, dietary habits and beliefs, physical activity, and nutritional knowledge among university students", [Perspectives in Public Health](#), 136(4), available at https://www.researchgate.net/publication/282944845_Assessment_of_weight_status_dietary_habits_and_beliefs_physical_activity_and_nutritional_knowledge_among_university_students

المراجع العربية

- مشعل مينا سميير ، الرحاحلة وليد أحمد، وبطانية معاذ فخري (٢٠١٢) "الحصيلة المعرفية للثقافة التغذوية ومستوى اللياقة الهوائية لدى طلبة كلية التربية الرياضية في الجامعة الأردنية"، *دراسات، العلوم التربوية، المجلد ٣٩، العدد ٢، ٢٠١٢* من متاح خلال <http://search.shamaa.org/FullRecord?ID=97788>
- المقداد فايز والجنادي أسامة ورفاعي أحمد (٢٠١٤) "قياس وعي المستهلك تجاه سلامة الغذاء والعوامل المؤثرة"، *مجلة جامعة دمشق للعلوم الزراعية، المجلد ٣٠، العدد ٢، الصفحات ٢٥٧-٢٧٠*، متاح من خلال