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Assessment of Nutritional Knowledge, Eating Habits, and Body Mass Index Among Healthcare Workers in Selected Polyclinics in Benghazi.

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ABSTRACT

Nutrition knowledge plays an important role in improving the eating habits of individuals, families and communities. Consequently, poor nutritional knowledge especially among healthcare workers affects their ability to provide accurate and comprehensive nutritional advice to patients. This study is aimed to assess the level of nutritional knowledge and eating habits, and to determine the body mass index among healthcare workers in Benghazi, Libya. A descriptive cross-sectional study was conducted, with 177 participants from four randomly selected polyclinics between March and May 2025. Data were collected by self-administered questionnaire. Additionally, anthropometric measurements were recorded to calculate the body mass index. Data were entered and analyzed by SPSS. Chi-square ($\chi 2$) test was used to assess any significant associations, if $p<0.05$ was considered statistically significant. The study revealed a high nutritional knowledge score (73.4%) among respondents. However, knowledge regarding the daily serving sizes of major food groups was quite low. There was no any significant association between nutritional knowledge score and all socio-demographic variables. Furthermore, the majority of the participants (75.7%) scored poorly on eating habits characterized by frequent consumption of fast-foods, sugary beverages, alongside a high prevalence of overweight and obesity. The study revealed a significant association between occupation and eating habits($p=0.036$). Implementing in-service continuous nutrition education programs and training is essential to improve knowledge and translate it into dietary practices that improve nutritional status.

KEYWORDS: Body Mass Index, Eating habits, Healthcare workers, Libya, Nutrition knowledge level.

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1. INTRODUCTION

Nutrition is a fundamental determinant of health and development; the World Health Organization (WHO) emphasizes that enhanced productivity, reduced mortality, and improved overall quality of life are related to adequate nutrition. In contrast, insufficient nutrition can lead to malnutrition, hinder infant growth, weaken immune function, and increase incidence of chronic diseases1)). However, nutrition knowledge is one of the factors that affect the nutritional habits of individuals, families and communities (2). It encompasses an understanding of essential information regarding food and nutrients, alongside an awareness of their physiological impacts (3). According to the latest Dietary Guidelines for Americans (2020 to 2025), published by The U.S. Department of Agriculture (USDA) and the Health and Human Services (HHS), there are four core principles designed to maintain health and prevent chronic diseases throughout the lifespan: (I) following a healthy dietary pattern; (II) choosing the nutrient-rich foods; (III) achieving a balanced diet comprising all kinds of food groups and stay within calorie limits; (IV) restricting alcohol and limit foods and beverages rich in added sugar, saturated fat and sodium (4). Furthermore, unhealthy dietary habits result in increased mortality due to non-communicable diseases (NCDs) both imposing a greater burden in terms of health care demand and cost on the global economy (5). According to the study carried out in Libya, Benghazi (2022); which revealed that the presence of a significant association between prevalence of obesity and unhealthy eating habits among Libyan adults (6).

Primary health care is the first place people go for care, outside of hospitals. It usually involves one-on-one meetings between patients and health professionals. Additionally, the primary health care sector is a key source for dietetic consultations, and this area is growing quickly (7). Moreover, the healthcare workers (HCWs) are accessible to a large proportion of the population, they have a very important role to discuss nutrition-related issues, facilitate dietary behavior changes, and support patients in maintaining these changes over the long term (8). It is essential for all health care professionals to know and use nutrition knowledge and skills in all areas of patient care (9). According to larger cross-sectional study carried out by Wang et al. in Wuhan, China (2023); which included 21599, the study revealed that nutrition health knowledge scores were inversely associated with diabetes/hyperglycemia, hypertension, coronary heart disease, and stroke, as well as the number of chronic diseases in the whole population (10). Another study conducted in Palestine in (2023); the study found that inadequate knowledge was perceived as a barrier to effective nutrition care to the patient (11). additionally, it must necessary to identifying unhealthy behaviors in healthcare organizations and their effects on physical, mental and occupational performance provides crucial data for health policy and decision-makers to implement effective preventive and health promotion measures (12). Since there is no published data regarding the nutritional knowledge of healthcare workers in Libya. Therefore, this study aimed to investigate their nutritional knowledge and eating habits, as well as, the body mass index.

2. METHODOLOGY

2.1. Study Design and Setting

This is a cross-sectional study and the data was collected from four polyclinics randomly selected (Al-Sabri polyclinic, Bu atni Polyclinic, Al-Salawi polyclinic, and Ras Obeida polyclinic).

2.2. Study Period

The data was collected between March 2025 and May 2025.

2.3. Study Participants

A convenience sampling method was used; all healthcare workers available during the data collection period participated, resulting in an estimated sample size of 177 participants

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2.3.1. Inclusion Criteria

The study included all healthcare workers who provided informed consent for the study.

2.3.2. Exclusion Criteria

Employees who were on leave or absent during data collection period, as well as pregnant and lactating women, were excluded from the study.

2.4. Study Tools and Method of Data Collection

self-administered questionnaires were designed based on the previous studies with some of modification relevant to the objectives of the study (13,14,15,16). The questionnaire was divided into of four sections. The first section about socio-demographic characteristics, such as; age, gender, education level, type of occupation and duration of work experience. The second section regarding anthropometric measurements; assess weight and height to all participants, which were used to calculate Body Mass Index (BMI). Body mass index was calculated by weight in kilograms divided by the square of height in meters (kg/m^2). participants were then categorized according to World Health Organization (WHO) criteria for adult and defined as (17):

1. Underweight: If BMI <18.
2. Normal Weight: BMI between 18.5 to 24.9.
3. Overweight: BMI between 25 to 29.9.
4. Obese: If BMI ≥30.

The third section contained 17 questions about nutrition-related knowledge; which addressed topics on a balanced diet, the types and sources of nutrients, and some health benefits of the diet, and finally the fourth section regarding the eating habits.

2.4.1.Measurement of Nutrition Knowledge Scores

All correct answers related to knowledge-questions were allocated a score of +1, while incorrect answers were allocated a score of zero. Respondents' nutritional knowledge was categorized as high if they scored 50% or higher. Conversely, scores below 50% were classifies as poor or low nutritional knowledge.

2.4.2 Measurement of Eating Habits Scores

Respondents' eating habits were assessed according to their answers, participants received one point for each healthy response. Those who scored ≥50% of total answers were correct classified as having healthy eating habits, while those who scored below 50% classified as having unhealthy eating habits.

2.5 Statistical Analysis

Performed by Statistical Package Social Science (SPSS) version 23. Descriptive statistics were performed in the form of frequencies and percentages. Chi-square test (χ^2) were used to assess any differences between categorical variables, and statistically significance was set to 0.05 or less.

2.6 Ethics

Ethical clearance/approval for conducting this study were received from Faculty of Public Health at the Benghazi University. Permission was obtained from the managers of each polyclinic included. Furthermore, verbal consent was obtained from all participants.

3. RESULTS

A total of 177 respondents were interviewed. Majority of participants were female, aged from 30 to 49 years, and with higher education level (59.9% university or more). In terms of occupation; the predominant groups were nurses (29.9%), followed by doctors (18.1%). Approximately three quarters of participants (72.9%) fall into middle income level, and most of them had an experience ten years or more (Table 1).

Table (1): Socio-demographic characteristics of participants

Variable name	Variable specification	N (%)
Age (years)	20-29	12 (6.8%)
	30-39	85 (48%)
	40-49	56 (31.6%)
	50 or more	24 (13.6%)
Gender	Female	155 (87.6%)
	Male	22 (12.4%)
Education level	Primary	3 (1.7%)
	Secondary	68 (38.4%)
	University or more	106 (59.9%)
Occupation	Nurses	53 (29.9%)
	Doctors	32 (18.1%)
	Pharmacist	21 (11.9%)
	Lab. Technician	26 (14.7%)
	Dentists	18 (10.2%)
	Dietitians	8 (4.5%)
	Others	19 (10.7%)
Income (Monthly)	<1500	37 (20.9%)
	2000-3000	129 (72.9%)
	>3000	11 (6.2%)
Work experience	<5 years	27 (15.3%)
	5-10 years	44 (24.9%)
	>10 years	106 (59.9%)

Table (2): After measuring the height and weight to all participants to classify their BMI according to standard guidelines; the results indicate that the majority of participants have abnormal Body Mass Index values: (42.4% are obese), (38.4% are overweight), and (2.3% are underweight), while only 16.9% have a normal body weight

Table (2): Body Mass Index of participants

Classification of Body Mass Index	N (%)
Underweight	4 (2.3%)
Normal weight	30 (16.9%)
Overweight	68 (38.4%)
Obesity	75 (42.4%)

Tables (3): regarding to the participants' response to nutrition related knowledge questions; the results show few correct responses regarding the recommended daily servings of major food groups (whole grains, fruits and vegetables, and dairy products), in contrast, there is a higher percentage of correct answers related to type and source of nutrients, as well as regarding to health benefits of diets.

In terms of nutritional knowledge score; the study indicates the majority of respondents had a higher nutritional knowledge score (73.4%), while (26.6%) scored lower.

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Table (3): Nutrition-related knowledge of participants

Variable	Correct n (%)	Incorrect n (%)
Recommended daily servings of whole grains	5 (2.8%)	172 (97.2%)
Recommended daily servings of fruits and vegetable	29 (16.4%)	148 (83.6%)
Recommended daily servings of dairy products	47 (26.6%)	130 (73.4%)
Recommended daily salt intake	87 (49.2%)	90 (50.8%)
Beverages that reduce Iron absorption	131 (74%)	46 (26%)
Foods with the highest concentration of vitamin B_{12}	97 (54.8%)	80 (45.2%)
Protein-rich foods	164 (92.7%)	13 (7.3%)
Hydrogenated fats compared to unprocessed vegetable oils contain	76 (42.9%)	101 (57.1%)
Healthy fat is polyunsaturated fatty acids	97 (54.8%)	80 (45.2%)
Nutrients prevents neural tube defect in pregnant women	147 (83.1%)	30 (16.9%)
Skipping meals, a good way to lose weight	105 (59.3%)	72 (40.7%)
Omega 3 is beneficial to prevent thrombosis	82 (46.3%)	95 (53.7%)
Excessive of salt intake lead to high blood pressure	161 (91%)	16 (9%)
Is potassium necessary of regulating and maintaining normal blood pressure?	131 (74%)	46 (26%)
Soft drinks are harmful to health	167 (94.4%)	10 (5.6%)
Fast foods contain unhealthy additives	159 (89.8%)	18 (10.2%)
BMI value <25 indicate obesity	68 (38.4%)	109 (61.6%)
Total nutritional knowledge score: High nutritional knowledge score Low nutritional knowledge score	(73.4%) (26.6%)	

Although more than half of respondents correctly identifies number of main meals, a prevalence some of unhealthy eating habits remain clear. Furthermore, approximately three-quarters of respondents (75.7%) exhibit unhealthy eating habits, while less than half of them 24.3% maintain healthy eating habits, as shown in table (4).

Table (4): Eating habits of participants

Variable	Correct n (%)	Incorrect n (%)
Number of main meals per day	107 (60.5%)	70 (39.5%)
Consumption of fast-foods	37 (20.9%)	140 (79.1%)
Skip of main meals	37 (20.9%)	140 (79.1%)
Frequency of soft drinks consumption	63 (35.6%)	114 (64.4%)
Add sugars to hot drinks	71 (40.1%)	106 (59.9%)
Summary of eating habits: Healthy eating habits Unhealthy eating habits	(24.3%) (75.7%)	

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Table (5): examine the association between nutritional knowledge score and socio-demographic characteristics; there is no significant relationships between nutritional knowledge score and socio-demographic characteristics, because all *p* values are more than 0.05

Regarding to the association between eating habits score and socio-demographic variable, the result demonstrates that the occupation (p=0.036) is significantly linked to eating habits score as shown in table (6).

Table (5): Association between nutrition knowledge level and socio-demographic variables

Socio-demographics variables	Low nutrition knowledge score	High nutrition knowledge score	P value
Age			
20-29	(21.1%)	10 5.6%))	0.698
30-39	23 (13%)	62 (35.0%)	
40-49	17 (9.6%)	39 (22%)	
50 or more	5 (2.8%)	19 (10.7%)	
Gender			
Female	40 (22.6%)	115 (65%)	0.550
Male	(74%)	158.5%))	
Education level			
Primary	0 (0%)	3 (1.7%)	0.255
Secondary	22 (12.4%)	46 (26%)	
University or more	25 (14.1%)	81 (45.8%)	
Occupation			
Nurses	15 (8.5%)	38 (21.5%)	0.407
Doctors	6 (3.4%)	26 (14.7%)	
Pharmacist	6 (3.4%)	15 (8.5%)	
Lab. Technician	11 (6.2%)	15 (8.5%)	
Dentists	3 (1.7%)	15 (8.5%)	
Dietitians	1 (0.6%)	7 (4%)	
Others	5 (2.8%)	14 (7.9%)	
Work experience			
<5 years	4 (2.3%)	23 (13%)	0.320
6-10 years	13 (7.3%)	31 (17.5%)	
>10 years	30 (16.9%)	76 (42.9%)	

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Table (6): Association between eating habits level and socio-demographic variables

Socio-demographics variables	Unhealthy eating habits	Healthy eating habits	P value
Age			
20-29	12 (6.8%)	0 (0%)	0.090
30-39	63 (35.6%)	22 (12.4%)	
40-49	44 (24.9%)	12 (6.8%)	
50 or more	15 (8.5%)	9 (5.1%)	
Gender			
Female	118 (66.7%)	37 (20.9%)	0.728
Male	(169%)	63.4%))	
Education level			
Primary	2 (1.1%)	1 (0.6%)	0.792
Secondary	50 (28.8%)	18 (10.2%)	
University or more	82 (46.3%)	24 (13.6%)	
Occupation			
Nurses	38 (21.5%)	15 (8.5%)	0.036*
Doctors	25 (14.1%)	7 (4%)	
Pharmacists	18 (10.2%)	3 (1.7%)	
Lab. Technician	21 (11.9%)	5 (2.8%)	
Dentists	17 (9.6%)	1 (0.6%)	
Dietitians	3 (1.7%)	5 (2.8%)	
Others	12 (6.8%)	7 (4%)	
Work experience			
<5 years	22 (12.4%)	5 (2.8%)	0.748
6-10 years	33 (18.6%)	11 (6.2%)	
>10 years	79 (44.6%)	27 (15.3%)	

4. DISCUSSION

The present study aimed to explore nutritional knowledge, eating habits. In addition to, determine the BMI among HCWs. The result of the study revealed that the total nutritional knowledge score was relatively high among HCWs (73.4%). This finding was similar to the study conducted in Gulf Cooperation Council (GCC) countries that was published in 2023; which found that good nutrition knowledge score (18), and in line with study carried out in Nigeria by Banwat et al. (2018) (19), and agreed with study in Saudi Arabia in (2021) by Al Shammari et al. (20). Our findings were opposite to the result of Tanzanian study; which reported that 59.4% of HCWs had a low nutritional knowledge score (21). This may be explained by fact that the Tanzanian participants had fewer years of experience when compared to our study.

In terms of the statistical analysis; the present study indicated that there was no significant association between nutritional knowledge score and socio-demographics (all p-values greater than 0.05), with the dietitians had a higher nutritional knowledge score compared with other professionals. Additionally, participants with higher education level exhibited higher nutritional knowledge scores. This finding was different from the study by Munuo et al., that was conducted in 2016; which indicated that a significant association was found between occupation and nutritional knowledge score (21).

The World Health Organization (WHO) states that one of its recommendations for a healthy diet is to eat a variety of foods daily, including vegetables, fruits, legumes, nuts and whole grains in recommended portion to prevent malnutrition as well as range of non-communicable disease (22). In light of our findings, despite higher nutritional knowledge score, but certain areas showed a significant decline was observed in percentage of correct answers regarding the recommended daily servings of major food groups (2.8% for whole grains, 16.4% for fruit and vegetables, and 26.6% for milk and dairy groups). This could be attributed to the lack of nutrition awareness programs. This result was agreed with a cross-sectional study reported by Abouelezz et al. (2024) in Egypt; where half of participant did not adhere to the recommended amounts for the same main food groups (23), similar result reported by Utter et al. (2023) in Australia; which indicated that only 15% of HCWs meet recommended intake of fruits and vegetables (24).

Regarding the source of nutrient-related knowledge; the current study indicated that the most of participants correctly identified the source of vitamin B_{12}. In addition to this, a significant proportion agreed that potassium plays an important role in regulating blood pressure. The study's findings were similar to the result of multiple studies including; those reported by Al Shammari et al.20)), Naser et al. (25), and Al-Zahrani & Al-Raddadi (26). On the other hand, a study conducted in Croatia by Dumic et al. that was published in 2018; revealed that less than a quarter of participants (14%) correctly identified the most concentrated source of vitamin B_{12} (16). These differences may be due to lower nutritional knowledge scores observed in the Croatian study when compared to our study. Moreover, our findings revealed that the majority of respondents were aware of the protective roles of folic acid against neural tube defects, this finding was in line with other studies, such as by Alzaben et al. in (2023) (18), and by Al-Zahrani & Al-Raddadi in (2006) (26). These agreements between studies may be explained by the fact that the majority of participants in the mentioned studies were female; women generally exhibit greater awareness than men regarding the physiological importance of nutrition during the prenatal period, especially concerning folic acid.

According to BMI standards, the present study revealed that a significant proportion were categorized as overweight or obese as indicated in (table 2), this may be attributed to the fact that majority of them lacked awareness regarding recommended amounts of healthy foods, especially daily serving size of fruits and vegetables. These foods are high in fiber, which contributes to improving body weight. Additionally, more than half of the participants (61.6%) were unaware or exhibit incorrect response regarding the knowledge question about the BMI categories as shown in the results section, this result was consistent with previous studies in Palestine by Younis et al. (27), and in Kenya by Ondicho et al. (28). These similarities between previous studies and our result may be correlated with the fact that participants in the mentioned studies were mostly sampled from public healthcare facilities. These environments often offer limited healthy food choices, leading to unhealthy eating patterns among healthcare workers. While, these figures were inconsistent with findings reported in a study conducted in Turkey by Sari et al. (2023) (29). These differences may be related to variations in eating patterns among the study populations.

Furthermore, the current study found that approximately three-quarters of HCWs adopt unhealthy eating habits (75.7%). This could be due to unavailability or limited access of healthy food options at the workplace, and this further supported by the higher prevalence of overweight and obesity observed among the study population. This result was similar to Pakistani study by Bibi et al. (2024); which showed that only

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25% were exhibit healthy eating behavior (30). In addition to, this result was agreed with study conducted in Poland by Znyk & Kaleta in (2024) (31).

Regarding the statistical analysis; the present study showed that there was a significant association between occupation and eating habits (p=0.036), with dentists were more likely to follow unhealthy eating habits compared to other professionals, this finding was disagreed with other study carried out by Nnadozie et al. (2021) in Southeast Nigeria (32).

Breakfast is often considered a crucial meal, given its potential to stabilize energy balance and influence metabolic functions. Moreover, breakfast consumption patterns could provide economically viable approaches to prevent obesity, diabetes, cardiovascular diseases, and cognitive deterioration (33). Unfortunately, breakfast was the most frequently skipped meal in our survey. This may be related to a lack of breaks due to workload. Similar observations have also been reported in other studies conducted in Ghana (2021) by Nsiah-Asamoah et al. (34), and in South Africa (2017) by Kunene et al. (35).

5. CONCLUSIONS AND RECOMMENDATIONS

The current study revealed that high nutrition related knowledge score among HCWs personnel. Additionally, the knowledge about recommended daily serving sizes of main food groups was quite low. Regarding the eating habits; the findings indicated that a majority of participants demonstrated poorly scored. These poor scores were validated by the high prevalence of overweight and obesity within the study population. Occupation was significantly associated with eating habits, with dentists were more likely exhibit unhealthy eating patterns compared to other professionals. These findings highlight substantially unhealthy eating habits among participants; therefore, there is a need to design interventions aimed at improving eating patterns to promote better nutritional status. In addition to this, there is need further research to explore the gaps and barriers to following healthy eating patterns

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7. LIMITATIONS

Firstly, these findings were difficult to generalized to all general population, because this study was carried out among HCWs, therefore the finding can only be generalized to same group. Secondly, data collection was constrained, because number of major polyclinic including the Garyouns, Al-Fuwayhat, Al-Oroba, and Benghazi Al-Gadedah polyclinics which were undergoing extensive maintenance at the time of study.

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