

**ASSESSMENT OF NUTRITIONAL STATUS OF
PRIMARY SCHOOL PUPILS IN TRIPOLI CITY
AT LIBYA**

By

LAILA ASHOUR KHALIFA HASHAD
B.Sc. Agric. Sci. (Nutrition), Fac. Agric., Tripoli Univ., 1985

THESIS

**Submitted in Partial Fulfillment of the
Requirements for the Degree of**

MASTER OF SCIENCE

In

**Agricultural Sciences
(Home Economics)**

**Department of Food Science
Faculty of Agriculture
Cairo University
EGYPT**

2016

APPROVAL SHEET

**ASSESSMENT OF NUTRITIONAL STATUS OF
PRIMARY SCHOOL PUPILS IN TRIPOLI CITY
AT LIBYA**

**M.Sc. Thesis
In
Agricultural Sciences
(Home Economics)**

By

LAILA ASHOUR KHALIFA HASHAD
B.Sc. Agric. Sci. (Nutrition), Fac. Agric., Tripoli Univ., 1985

APPROVAL COMMITTEE

Dr. OMNIA GALAL RAFAAT
Professor of Nutrition, Faculty of Home Economics, Helwan University

Dr. GHADA MOHAMEDY EL-KHERBAWY
Associate Prof. of Nutrition & Food science, Fac. Agric., Cairo University

Dr. MAGDA IBRAHIM HASSAN ABD-ELAAL
Associate Prof. of Nutrition & Food science, Fac. Agric., Cairo University

Dr. ENAYAT MAHMOUD HASSAN
Professor of Food & Nutrition, Fac. Agric., Cairo University

Date: / /

SUPERVISION SHEET

**ASSESSMENT OF NUTRITIONAL STATUS OF
PRIMARY SCHOOL PUPILS IN TRIPOLI CITY
AT LIBYA**

**M.Sc. Thesis
In
Agricultural Sciences
(Home Economics)**

By

LAILA ASHOUR KHALIFA HASHAD
B.Sc. Agric. Sci. (Nutrition), Fac. Agric., Tripoli Univ., 1985

SUPERVISION COMMITTEE

DR. ENAYAT MAHMOUD HASSAN
Professor of Food & Nutrition, Fac. Agric., Cairo University

DR. MAGDA EBRAHIM HASSAN
Associate Professor of Food & Nutrition, Fac. Agric., Cairo University

Name of Candidate: Laila Ashour Khalifa Hashad **Degree:** M.Sc.
Title of Thesis: Assessment of Nutritional Status of Primary School
Pupils in Tripoli City at Libya.
Supervisors: Dr. Enayat Mahmoud Hassan
Dr. Magda Ibrahim Hassan Abd-Elaal
Department: Food Science **Branch :**Home Economics
Approval: / / 2016

ABSTRACT

The present study aimed to assess the nutritional status of primary school pupils in Tripoli city in Libya. This study included 554 children from fifteen primary public school. They were selected from different areas the pupils were randomly chosen, divided into 2 groups according to their ages (6-8) & (9-12) years old. Data were collected through personal interview with pupils and their mothers in their school using especial questionnaire sheet. The most important results could be summarized as follows:

- The majority of pupils' parents were married (96.2%). More than two thirds of families were nuclear (87.7%).
- The highest percentages of both fathers and mothers (51.4 and 55.4%, respectively) were graduated. The majority of pupils' fathers (61.4%) were employee while more than fifty percent of pupils' mothers were housewives (55.3%).
- The percentage of fathers who had higher income (≥ 1000 LYD) was 18.2%, while the majority of pupils' mothers (44.9%) have no income.
- The majority of children (74.4%) were ranked between the first or third child.
- The highest percentage of studied pupils (63.5%) got daily expenses lower than 2 LYD.
- The majority of pupils spent 2 hrs weekly for practicing activities. About 37.7% of them practiced football while most of the surveyed pupils (85.6%) practiced sports at school.
- More than one third of the sample used to eat during watching TV or computer. The majority of them used to take snacks.
- The highest percentages of both groups (6-8) and (9-12) year's old monthly consumed liver and fish. The two studied groups showed highest percentages of weekly consumption of Coscos, rice and macaroni. About 73.4% of group (1) consumed dates daily. The majority of group 2 (9-12 years) daily consumed oranges.
- The mean macro and micronutrients intake, energy, fat and carbohydrates of both groups exceeded their recommended level. While a lower quantity of fiber intake was noticed. All minerals did not cover their needs except Na, Fe and Se. Vit.A and C in both groups were adequate while the mean value of vit D was lower than their recommended level. Less than fifty percent of groups 1 and 2 had normal weight. Less than one fourth of them were at risk of overweight (85^{th} - $< 95^{th}$) and one-third of each group were obese. High percentages of stunting were noticed among the studied children. All samples had normal hemoglobin values. As well as the majority of them recorded normal values of red blood & white cells and the platelets. The majority of children had normal serum levels of Ca, K, Mg, however, fifty percent of children exhibited low sodium value. The statistical analysis of data revealed a significant relation between BMI & BFP and food intake, magnesium, phosphorus and pocket money.

Key words: Food intake, Daily Recommended, BMI, Socio economic characteristics.

DEDICATION

I dedicate this work to whom my heartfelt thanks; to my husband Abd-Elatif, my sons Hesham and Haythem, and my daughters Shahed and Shaza for their patience, love, help, concern and pride. To my Father and my Mother for their prayers, love made an everlasting impression on my life, for all my family members for their help and support.

ACKNOWLEDGEMENT

In the name of “Allah”, most gracious, most merciful, all praise is to Allah, the lord of the universe, without whose bounty I would not have completed this work,

*I would like to express my profound gratitude and sincere appreciation to **Prof. Dr. Enayat Mahmoud Hassan**, Professor of Food & Nutrition, Food science Department, Home Economics Section, Faculty of Agriculture, Cairo University for her very kind supervision, invaluable guidance, generously given useful suggestions, indispensable help, continuous support throughout the achievement of this work during vital years of my life and revision the manuscript of this thesis.*

*Great thanks and appreciation are given to **Dr. Magda Ebrahim Hassan** Associate Professor of Food and Nutrition, Faculty of Agriculture, Cairo University, for her supervision, encouragement, ideas, advising, sincere support and helping me in crucial moments at all stages of my thesis.*

*I wish to express my deepest sincere appreciations to **Dr. Gawad Najaty Alsaraj** for his kind support and sincere help and **Dr. Ahmed Mohamed Al Shkshoki** for help me.*

I would also like to extend my gratitude to all staff members of Home Economics & Food Science Department; and the administration staff of the post graduate section in the Faculty of Agriculture, Cairo University; colleagues and friends who helped me throughout the present study.

LIST OF ABBREVIATIONS

(BFP)	body fat percentile
(BMI)	body mass index
(BSA)	body surface area
(CI)	cardiac index
(Cm)	centimeter
(CO)	cardiac output
(DGA)	dietary guidelines for Americans
(DRI)	dietary reference intake
(EDHS)	Egyptian Demographic & Health Survey
(EE)	energy expenditure
(EI)	energy intake
(EO)	eosinophils
(g)	gram
(Hb)	hemoglobin
(HCT)	hematocrit
(Kg)	kilogram
(LYD)	Libyan Dinar
(MCH)	mean content of hemoglobin

(MCHC)	mean concentration of hemoglobin in erythrocytes
(MCV)	mean volume of erythrocytes in cubic micrometers
(Mo)	monocytes
(MUAC)	mid upper arm circumference
(MVPA)	moderate to vigorous physical activity
(NAOS)	nutrition ,physical activity & prevention of obesity Survey
(NCD)	non communicable diseases
(NE)	neutrophils
(PA)	physical activity
(PAL)	physical activity levels
(PE)	physical education
(PLT)	platelets
(RBC)	red blood cells
(RDA)	recommended dietary allowances
(SD)	standard deviation
(SES)	socio-economic status
(WBC)	white blood cells
(WHO)	world health organization

CONTENTS

	Page
INTRODUCTION	1
REVIEW OF LITERATURE	6
1. Socio-economic characteristics of pupils' family	6
2. Lifestyle of pupils	12
3. Food Habits of pupils	16
4. Mother's of pupils awareness	23
5. Food consumption of pupils	24
6. Nutritional intakes of pupils	28
7. Anthropometric measurement	39
8. Blood analysis of pupils	45
MATERIAL AND METHODS	47
RESULTS AND DISCUSSION	55
1.Families distribution according to their socioeconomic characteristics	55
2. Pupils distribution according to their lifestyle	63
3. Pupils distribution according to their healthy history and their behaviour	67
4. Food habits and snacks consumption of pupils	68
5. Pupils distribution according to their frequent of consumed snacks and beverages daily	71
6. Mother's distribution according to their nutritional awareness level	74
7. Nutrition status of pupils in primary school at Libya	76
a.Pupils' distribution according to their food consumption pattern	76
(1) Pupils distribution according to their frequency consumption of meat, chicken , fish , eggs, milk and its products	76
(2) Pupils' distribution according to their frequency consumption of legumes	78
(3) Pupils' distribution according to their frequency of fats and oils	79
(4) Pupils' distribution according to their frequency consumption of different starchy food	80

(5) Pupils' distribution according to their frequency consumption of date juices and sweets	82
(6) Pupils' distribution according to their frequency consumption of cooked vegetables	83
(7) Pupils' distribution according to their frequency consumption of fresh vegetables	85
(8) Pupils' distribution according to their frequency of different fruits	86
8. The percentage of weakly frequency consumption of food groups	88
9. The mean ($\pm$SD) of daily macro and micronutrients intake according to their age	92
10. Pupils' distribution according to their nutrient intakes as percentages of their requirements	97
11. Pupils' distribution according to their daily minerals intake as percentage of DRI	101
12. Pupils' distribution according to their daily vitamins intakes as percentage of DRI	107
b. The anthropometric measurements	110
(1) Pupils' distribution according to weight /age, height / age, body mass percentile , mid upper arm and body fat percentile	110
(2) Weight for age z-scores for girls and boys aged (6-12y)	115
(3) Height for age z-scores for girls and boys aged (6-12y)	118
(4) Height for Height z-scores for girls and boys aged (6-12y)	120
c. Clinical signs deficiency of nutrients among the surveyed pupils	122
d. Blood analysis	127
(1) Blood hematological components of surveyed pupils	127
(2) Blood biochemical parameters surveyed pupils ..	130
e. The relation between some variables and nutritional status of the studied pupils	133
(1) The association between carbohydrate intake and some social-characteristics	133
(2) Relationship between weight/age and the pocket money of the pupils	136

(3) Relationship between times of daily meals and magnesium & phosphorus intake	137
(4) relationship between family type and Vit. B2 intake .	139
(5) relationship between gender and anthropometric measurements	140
(6) correlation matrix of some variables of the pupils under study	142
SUMMARY	145
REFERENCES	154
APPENDIX	
ARABIC SUMMARY	

LIST OF TABLES

No.	Title	Page
1.	Pupils distribution according to their schools' areas . .	47
2.	Distribution of families and pupils according to their socio economic	59
3.	Pupils' distribution according to their lifestyle	64
4.	Pupils' distribution according to their health history and their behaviour	68
5.	Food habits and snacks consumption of pupils	69
6.	Pupils' distribution according to their frequent consumed of snacks and beverages	72
7.	Pupils' distribution according to their frequency consumption of animal protein	77
8.	Pupils' distribution according to their frequency consumption of legumes	79
9.	Pupils' distribution according to their frequency consumption of fats and oils	80
10.	Pupils' distribution according to their frequency consumption of starchy food	81
11.	Pupils' distribution according to their frequency consumption of sweets	83
12.	Pupils' distribution according to their frequency consumption of cooked vegetables.	84
13.	Pupils' distribution according to their frequency consumption of fresh vegetables	86

14.	Pupils' distribution according to their frequency consumption of fruits	87
15.	The Percentage of weekly frequency consumption of food groups	90
16.	Mean ($\pm$ SD) of daily macronutrients intake according to their age	94
17.	Pupils' distribution according to their daily calories , protein, CHO and fiber intakes as percentage of RDA	98
18.	Pupils' distribution according to their daily minerals intake as percentage of DRI	102
19.	Pupils distribution according to their daily vitamins intakes as percentage of DRI	108
20.	Pupils distribution according to the anthropometric measurements percentiles	111
21.	Weight for age Z-scores for girls and boys aged (6-12 years) in Libyan schools	117
22.	Height for age Z-scores for girls and boys aged (6-12 years) in Libyan schools	119
23.	Weight for Height Z-scores for girls and boys aged (6-12 years) in Libyan schools	121
24.	Pupils distribution according to their clinical signs deficiency of nutrients	123
25.	Blood hematological parameters of pupils understudy	128
26.	Blood biochemical parameters of pupils under study .	131
27.	Association between carbohydrates intake and some social characteristics	134

28.	Relationship between weight/ age and pocket money of pupils	137
29.	Relationship between times of daily meal and magnesium & phosphorus	138
30.	Relationship between family type and vitamin B ₂	139
31.	Relationship between gender and anthropometric measurements	141
32.	Correlation matrix of some variables in the pupils under study	143

LIST OF FIGURES

No.	Title	Page
1.	Occupation status of fathers and mothers.	61
2.	Monthly income of mothers and fathers of pupils.	61
3.	Pupils' daily pocket money	62
4.	Type of physical activates of studied pupils	65
5.	The main meals intake of studied pupils	70
6.	Snacks and Beverages consumption among pupils under study	73
7.	Mother's awareness levels.	75
8.	Daily of calories, protein, fat , CHO and intake as percentage of RDA	99
9.	Daily minerals intake as percentage of DRI	104
10.	Daily minerals intake as percentage of DRI	105
11.	Anthropometric measurements percentiles	112