

شبكة المعلومات الجامعية







شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



شبكة المعلومات الجامعية

# جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

# قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها على هذه الأفلام قد أعدت دون أية تغيرات



يجب أن

تحفظ هذه الأفلام بعيدا عن الغبار في درجة حرارة من ١٥-٥٠ مئوية ورطوبة نسبية من ٢٠-٠٠% To be Kept away from Dust in Dry Cool place of 15-25- c and relative humidity 20-40%



# بعض الوثائـــق الإصليــة تالفــة



# بالرسالة صفحات لم ترد بالإصل

## AN EPIDEMIOLOGIC STUDY OF NUTRITIONAL ANEMIA AMONG SCHOOL ADOLESCENTS IN ALEXANDRIA

#### A Thesis

Submitted to the High Institute
of Public Health in Partial Fulfillment of the
Requirements for The Degree of
Doctor of Public Health
(Epidemiology)

#### By Nahla Khamis Ragab Ibrahim

M.B, Ch.B MPH (Epidemiology)

High Institute of Public Health
Alexandria University

7

(1998)

#### SUPERVISORS

#### From Epidemiology Department:

Prof. Sunny A. Sallam
Prof. of Epidemiology & Vice Dean
High Institute of Public Health

Alexandria University

From Nutrition Department:

Dr. Fikrat El-Sahn
Prof. Nutrition
High Institute of Public Health
Alexandria University
Fikrat El-Sahn

Prof. Aly A. Hassab

Head of Epidemiology Dept. High Institute of Public Health

Alexandria University

Harr

From Family Health Department:

Assi Prof. of School Health

High Institute of Public Health

Alexandria University

Dr. Moustafa A. Arafa

Lecturer of Epidemiology

High Institute of Public Health

Alexandria University

#### **ACKNOWLEDGMENT**

First of all, I thank GOD for helping me to accomplish this work.

My deepest thanks, sincere indebtedness and appreciation to *Prof.*Sunny sallam, professor of Epidemiology and Vice Dean for her whole hearted guidance, valuable instructions, enormous support, great advice & very ready cooperation at any time throughout the whole work and above all for choosing the topic of this work.

I would like to express my deepest appreciation to *Prof. Aly Hasab* head of epidemiology department for his kind guidance and support throughout whole work.

No words can adequately express my deepest gratitude and great appreciation to *Prof. Fikrat El-Sahn* professor of nutrition for her valuable guidance, fruitful efforts, continuous encouragement & endless help that made the accomplishment of this work possible.

I wish express my deepest thanks to *Dr. Kholoud Tayel* Assoc. professor of school health for her kind and endless cooperation and cnormous support.

I would like to express my deepest appreciation to *Dr. Moustafa*Arafa lecturer of Epidemiology for his infinite patience, kind guidance, precious advice which helped me to overcome many obstacles & deserve my unlimited gratitude.

I would to express my deepest thanks to *Dr. Mohamed Hussein*Prof. of biostatistics for his infinite patience during analysis of the results.

I wish express my deepest thanks to *Prof. Moustafa Abd El Attee* head of HIO North West Delta branch, *Dr. Mediha Shokry* supervisor of school health at HIO, and all doctors, health visitors, laboratory technicians of HIO for helping me during the field work.

Last but not least I express my gratitude to the students for their collaboration.

# **DEDICATION**



#### CONTENTS

Chapter	Title	Page
i	List of tables.	
ii	List of figures.	
iii	List of abbreviation.	
I	Introduction	1
	Health problems of adolescents.	3
	Nutritional anemia.	6
	IDA.	6
	* Magnitude of the problem.	9
	* Aetiology.	11
	* Clinical features and complications.	22
	* Laboratory diagnosis.	31
	* Prevention and control	34
	Megaloblastic & other types of anemia.	44
	School health program.	48
II	Aim of The work	54
III	Material and methods	55
IV	Results	70
V	Discussion	147
VI	Conclusions	165
VII	Recommendations	166
VIII	Summary	168
IX	Reference	173
•	Appendices	
	Arabic Summary	

#### LIST OF TABLES

Table No.	Content	Page
I	Hb levels indicative of anemia in populations	7
	living at sea level	
II	Grades of anemia	8
III	Epidemiologic criteria for assessing severity	8
	of IDA in a population.	
IV	Major determinants of iron absorption.	13
V	Approximate ascorbic acid content of selected	36
	fruits and vegetables.	
VI	Percentage and amount of iron in some	38
	commonly used iron tablets	
VII	Selected sample from preparatory and	58
	secondary school students according to the	
	total number by district.	
VIII	Distribution of the sample by age and sex.	71
IX	Prevalence of anemia among school	72
	adolescents by sex.	
X	Mean haemoglobin concentration among	75
	school adolescents by sex.	
XI	Distribution of school adolescent by	84
	educational grade, anemia and father's	
	education	
XII	Distribution of school adolescent by	85
	educational grade, anemia and mother's	
	education.	

# LIST OF TABLES (CONT.)

Table No.	Content	Page
XIII	Distribution of school adolescent by	87
	educational grade, anemia and father's	
	occupation.	
XIV	Distribution of school adolescent by	88
	educational grade, anemia and mother's work	
	status.	
XV	Distribution of school adolescents by	89
	educational grade, anemia and crowding	
	index.	
XVI	Distribution of school adolescent by	91
	educational grade, anemia and perceived	
	family income.	
XVII	Distribution of school adolescents by	92
	educational grade, anemia and socioeconomic	
	level.	
XVIII	Distribution of school adolescents by sex and	94
	intestinal parasitic infection.	
XIX	Distribution of school adolescents according	95
	to anemia and intestinal parasitic infection.	
XX	Distribution of students drinking tea in	97
	relation to meals and anemia.	
XXI	Distribution of students drinking tea in	97
	relation to meals by locality.	

### LIST OF TABLES (CONT.)

Table No.	Content	Page
XXII	Exercise practicing among school adolescents	99
	and presence of anemia	
XXIII	Distribution of adolescent girls by anemia	101
	and age at menarche.	
XXIV	Distribution of adolescent boys by anemia and	102
	age at spermarche.	
XXV	Mean weight (kg) of school adolescents by age and sex.	104
XXVI	Z score of weight/age of school adolescents by	105
	anemia and sex.	
XXVII	Mean weight/age percentiles of school	106
	adolescents by anemia and sex.	
XXVIII	Mean height (meters) of school adolescents	107
	by age and sex.	
XXIX	Z score of height/age of school adolescents by	108
	anemia and sex.	
XXX	Mean height/age percentiles of school	109
	adolescents by anemia and sex.	
XXXI	Body mass index - for - age of school	111
	adolescents by sex and anemia.	
XXXII	Frequency of symptoms and signs among	113
	anemic school adolescents.	
XXXIII	Distribution of school adolescents by history	115
	of chronic condition.	

# LIST OF TABLES (CONT.)

Table No.	Content	Page
XXXIV	School adolescents' total and macronutrient	117
	sources of energy intake by age and sex	
XXXV	Percentage of animal and plant origin from	119
	total protein and fat intake for school	
	adolescents by sex.	
XXXVI	Mean percentage of caloric, protein and	120
	mineral intake from RDA, and percentage	
	students with less than 2/3 RDA by age and	
	sex.	
XXXVII	Mean percentage of vitamin intake of RDA	121
	and percentage of students with less than 2/3	
	of RDA by age and sex.	
XXXVIII	Nutrient intake as mean percentage of RDA	129
	of school adolescents by social class.	
XXXIX	Nutrient intake of school adolescents by sex	133
	and anemia	
XL	Simple logistic regression analysis of anemia	135
	among school adolescents.	
XLI	Multiple logistic regression analysis of anemia	137
	among school adolescents.	