

**PHYSICAL GROWTH AND MENTAL
DEVELOPMENT OF PRIMARY SCHOOL
CHILDREN IN SOME ENDEMIC PARASITIC
INFECTIONS IN EGYPT**

Thesis

Submitted For Ph.D. Childhood Studies

Medical Department

By

Ashraf Hamed M. Shaalan

M.B., B.Ch. - M.Sc. Ped.
National Research Center

Supervisors

Prof. Dr. Saadia Bhader

Prof. of Dev. Psychology
Inst. of Childhood Studies
Ain Shams University

Prof. Dr. Aly A. El-Notely

Prof. of Phys. Anthropology
National Research Center
Dokki - Cairo

Prof. Dr. Hamed Khalil

Prof. of Parasitology
Faculty of Medicine
Ain Shams University

Dr. Gamal Samy Ali

Lecturer of Medical Childhood Studies
Inst. of Childhood Studies
Ain Shams University

1993

47216
الرسالة

613-9296
A.H



H.M. Khalil

Gamal

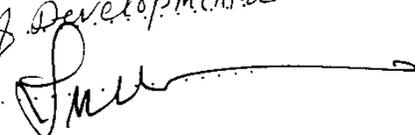
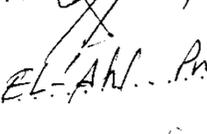


بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

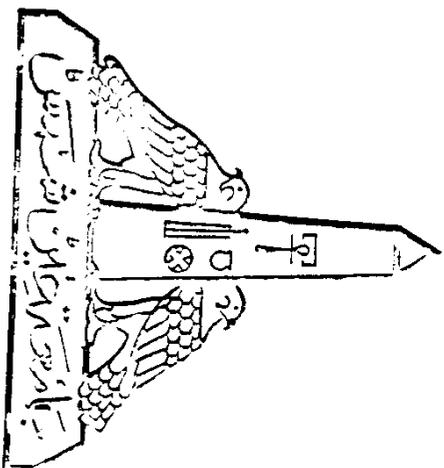
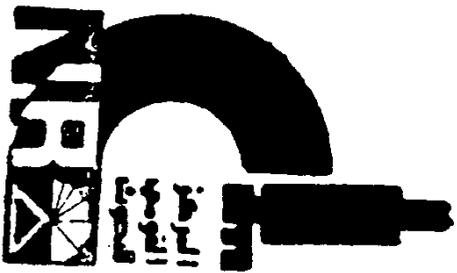


DISCUSSION AND JUDGMENT COMMITTEE

The vice-president for higher studies and research of Ain-Shams University has approved to form the following committee for the discussion of Mr. Ashraf. Hamed. Mousse Shayan

1. Prof. Dr. Saadia M. A. Bahader.. Prof. of Developmental Psychology.. Inst. of Child. Studies.. Chairman. 
2. Prof. Dr. Zeinab.. Beshry Alid EL-Hameed.. Prof. of Neuro-psychiatry.. Faculty of Medicine.. Member. 
3. Prof. Dr. Mohamed Hamza.. Saied.. EL-AHL.. Prof. of Ped. Military Medical Academy. Member. 
4. Member. 

THANKS TO THE CO-OPERATION BETWEEN
THE NATIONAL AND AIN-SHAMS
RESEARCH CENTER UNIVERSITY



THIS THESIS WAS PRODUCED

CONTENTS

Subject	Page
Introduction	1
Aim of the study	3
Review of Literatures	
Growth and development	5
Parasitic infections	41
Host-parasite relationship	47
Parasites and nutrition	49
Parasites and anaemia	51
Parasites and growth	55
Subjects and Methods	60
Results	73
Discussion	131
Conclusions	157
Summary	159
Recommendations	161
References	165
Appendix	200
Arabic summary	

ACKNOWLEDGEMENT

It has been a pleasure and a benefit for me to work and learn under the supervision of Prof. Dr. Saadia Bhaider Prof. of Developmental Psychology, Institute of Childhood studies, Ain-Shams University, and to be guided by her kind advices. I also like to express my cordial thanks to Prof. Dr. Aly El-Nofely, Prof. of Physical Anthropology, National Research Centre, for his remarkable effort which was the major factor behind the completion of this work. I wish also to express my deep gratitude and appreciation to Prof. Dr. Hamed Khalil, Prof. of Parasitology, Ain-Shams University, for his advices and suggestions on this work. I am also deeply indebted to Dr. Gamal Samy, Lecturer of Medical Childhood studies, Institute of Childhood Studies, Ain-Shams University, for his supervision and continuous guidance and advices that helped me greatly in completion of this study. Particular thanks to all members of El-Katta village schools for their co-operation.

Finally, it is a pleasure to acknowledge my wife, sun and daughter, who suffer a lot to finish this work, and all the members of my family specially my father and mother.

LIST OF TABLES

TABLE NO. (1):

DISTRIBUTION OF THE STUDY SAMPLE BY AGE AND SEX.

TABLE NO. (2):

DISTRIBUTION OF THE INFECTED CHILDREN BY AGE AND SEX.

TABLE NO. (3):

DISTRIBUTION OF THE STUDY SAMPLE ACCORDING TO THE PRESENCE OR ABSENCE OF PARASITIC INFECTION IN RELATION TO SEX.

TABLE NO. (4):

DISTRIBUTION OF THE STUDY SAMPLE ACCORDING TO THE TYPE OF PARASITIC INFECTION IN RELATION TO SEX.

TABLE NO. (5):

ANALYSIS OF MEANS OF THE DIFFERENT VARIABLES ACCORDING TO THE TYPE OF PARASITIC INFECTION IN MALE CHILDREN BETWEEN 6 AND 8 YEARS OF AGE BY ANALYSIS OF VARIANCE.

TABLE NO. (6):

ANALYSIS OF MEANS OF THE DIFFERENT VARIABLES ACCORDING TO THE TYPE OF PARASITIC INFECTION IN FEMALE CHILDREN BETWEEN 6 AND 8 YEARS OF AGE BY ANALYSIS OF VARIANCE.

TABLE NO. (7):

ANALYSIS OF MEANS OF THE DIFFERENT VARIABLES ACCORDING TO THE TYPE OF PARASITIC INFECTION IN MALE CHILDREN BETWEEN 8 AND 10 YEARS OF AGE BY ANALYSIS OF VARIANCE.

TABLE NO. (8):

ANALYSIS OF MEANS OF THE DIFFERENT VARIABLES ACCORDING TO THE TYPE OF PARASITIC INFECTION IN FEMALE CHILDREN BETWEEN 8 AND 10 YEARS OF AGE BY ANALYSIS OF VARIANCE.

TABLE NO. (9):

ANALYSIS OF MEANS OF THE DIFFERENT VARIABLES ACCORDING TO THE TYPE OF PARASITIC INFECTION IN MALE CHILDREN BETWEEN 10 AND 12 YEARS OF AGE BY ANALYSIS OF VARIANCE.

TABLE NO. (10):

ANALYSIS OF MEANS OF THE DIFFERENT VARIABLES ACCORDING TO THE TYPE OF PARASITIC INFECTION IN FEMALE CHILDREN BETWEEN 10 AND 12 YEARS OF AGE BY ANALYSIS OF VARIANCE.

TABLE NO. (11):

COMPARISON BETWEEN MEANS OF THE VARIABLES PROVED TO HAVE SIGNIFICANT DIFFERENCE IN THE NON-INFECTED MALE CHILDREN VERSUS THOSE WITH ENTEROBIUS VERMICULARIS.

TABLE NO. (12):

COMPARISON BETWEEN MEANS OF THE VARIABLES PROVED TO HAVE SIGNIFICANT DIFFERENCE IN THE NON-INFECTED FEMALE CHILDREN VERSUS THOSE WITH ENTEROBIUS VERMICULARIS.

TABLE NO. (13):

COMPARISON BETWEEN MEANS OF THE VARIABLES PROVED TO HAVE SIGNIFICANT DIFFERENCE IN THE NON-INFECTED MALE CHILDREN VERSUS THOSE WITH ASCARIS LUMBRICOIDES.

TABLE NO. (14):

COMPARISON BETWEEN MEANS OF THE VARIABLES PROVED TO HAVE SIGNIFICANT DIFFERENCE IN THE NON-INFECTED FEMALE CHILDREN VERSUS THOSE WITH ASCARIS LUMBRICOIDES.

TABLE NO. (15):

COMPARISON BETWEEN MEANS OF THE VARIABLES PROVED TO HAVE SIGNIFICANT DIFFERENCE IN THE NON-INFECTED MALE CHILDREN VERSUS THOSE WITH HYMENOLEPIS NANA.

TABLE NO. (16):

COMPARISON BETWEEN MEANS OF THE VARIABLES PROVED TO HAVE SIGNIFICANT DIFFERENCE IN THE NON-INFECTED FEMALE CHILDREN VERSUS THOSE WITH HYMENOLEPIS NANA.

TABLE NO. (17):

COMPARISON BETWEEN MEANS OF I.Q. AND HEMOGLOBIN LEVELS OF THE WHOLE SAMPLE IN THE DIFFERENT TYPES OF PARASITIC INFECTIONS BY ANALYSIS OF VARIANCE.

TABLE NO. (18):

COMPARISON BETWEEN MEANS OF I.Q. AND HEMOGLOBIN LEVELS OF THE WHOLE SAMPLE IN THE DIFFERENT TYPES OF PARASITIC INFECTIONS.

TABLE NO. (19):

COMPARISON BETWEEN MEANS OF I.Q. AND HEMOGLOBIN LEVELS OF MALE CHILDREN VERSUS THOSE OF FEMALE CHILDREN.

TABLE NO. (20):

COMPARISON BETWEEN MEANS OF I.Q. AND HEMOGLOBIN LEVELS OF THE INFECTED AND NON-INFECTED CHILDREN ACCORDING TO THEIR AGE GROUP BY ANALYSIS OF VARIANCE.

TABLE NO. (21):

COMPARISON BETWEEN MEANS OF I.Q. AND HEMOGLOBIN LEVELS OF THE INFECTED AND NON-INFECTED CHILDREN IN RELATION TO THEIR AGE GROUP.

TABLE NO. (22):

CORRELATION BETWEEN I.Q. AND HEMOGLOBIN CONCENTRATION IN THE DIFFERENT TYPES OF PARASITIC INFECTIONS.

LIST OF FIGURES

- FIGURE NO. (1) :**
MAIN TYPES OF POSTNATAL GROWTH OF VARIOUS PARTS AND ORGANS OF THE BODY.
- FIGURE NO. (2) :**
CURVES OF TRICEPS AND SUBSCAPULAR SKIN-FOLD.
- FIGURE NO. (3) :**
LOCATION OF THE STUDY FIELD.
- FIGURE NO. (4) :**
FORMOL-ETHER CONCENTRATION TECHNIQUE AFTER CENTRIFUGATION.
- FIGURE NO. (5) :**
DISTRIBUTION OF THE SAMPLE ACCORDING TO AGE AND SEX (HISTOGRAM).
- FIGURE NO. (6) :**
DISTRIBUTION OF THE SAMPLE ACCORDING TO AGE AND SEX (PIE CHART).
- FIGURE NO. (7) :**
DISTRIBUTION OF THE INFECTED SAMPLE BY AGE AND SEX (HISTOGRAM).
- FIGURE NO. (8) :**
DISTRIBUTION OF THE INFECTED SAMPLE BY AGE AND SEX (PIE CHART).
- FIGURE NO. (9) :**
DISTRIBUTION OF THE SAMPLE ACCORDING TO THE TYPE OF INFECTION.
- FIGURE NO. (10) :**
DISTRIBUTION OF THE SAMPLE BY AGE AND TYPE OF INFECTION.
-

-
- FIGURE NO. (11) :
DISTRIBUTION OF ENTEROBIUS VERMICULARIS CASES ACCORDING TO
AGE GROUP.
- FIGURE NO. (12) :
DISTRIBUTION OF ASCARIS LUMBRICOIDES CASES ACCORDING TO
AGE GROUP.
- FIGURE NO. (13) :
DISTRIBUTION OF HYMENOLEPIS NANA CASES ACCORDING TO
AGE GROUP.
- FIGURE NO. (14) :
MEAN WEIGHT OF MALES IN DIFFERENT TYPES OF INFECTION.
- FIGURE NO. (15) :
MEAN WEIGHT OF FEMALES IN DIFFERENT TYPES OF INFECTION.
- FIGURE NO. (16) :
MEAN HEIGHT OF MALES IN DIFFERENT TYPES OF INFECTION.
- FIGURE NO. (17) :
MEAN HEIGHT OF FEMALES IN DIFFERENT TYPES OF INFECTION.
- FIGURE NO. (18) :
MEAN ARM CIRCUMFERENCE OF MALES IN DIFFERENT TYPES OF
INFECTION.
- FIGURE NO. (19) :
MEAN ARM CIRCUMFERENCE OF FEMALES IN DIFFERENT TYPES OF
INFECTION.
- FIGURE NO. (20) :
MEAN SKIN-FOLD THICKNESS OF MALES IN DIFFERENT TYPES OF
INFECTION.
- FIGURE NO. (21) :
MEAN SKIN-FOLD THICKNESS OF FEMALES IN DIFFERENT TYPES OF
INFECTION.
-

-
- FIGURE NO. (22) :**
MEAN I.Q. OF MALES IN DIFFERENT TYPES OF INFECTION.
- FIGURE NO. (23) :**
MEAN I.Q. OF FEMALES IN DIFFERENT TYPES OF INFECTION.
- FIGURE NO. (24) :**
MEAN HEMOGLOBIN LEVEL OF MALES IN DIFFERENT TYPES OF INFECTION.
- FIGURE NO. (25) :**
MEAN HEMOGLOBIN LEVEL OF FEMALES IN DIFFERENT TYPES OF INFECTION.
- FIGURE NO. (26) :**
I.Q. OF NON-INFECTED VERSUS INFECTED CHILDREN.
- FIGURE NO. (27) :**
HEMOGLOBIN LEVEL OF NON-INFECTED VERSUS INFECTED CHILDREN.
- FIGURE NO. (28) :**
I.Q. OF NON-INFECTED VERSUS INFECTED CHILDREN ACCORDING TO SEX.
- FIGURE NO. (29) :**
HEMOGLOBIN LEVEL OF NON-INFECTED VERSUS INFECTED CHILDREN ACCORDING TO SEX.
- FIGURE NO. (30) :**
I.Q. OF NON-INFECTED AND INFECTED CHILDREN IN DIFFERENT AGE GROUPS.
- FIGURE NO. (31) :**
HEMOGLOBIN LEVEL OF NON-INFECTED AND INFECTED CHILDREN IN DIFFERENT AGE GROUPS.
-

INTRODUCTION

INTRODUCTION

Children constitute nearly half of the total population of third-world countries. Most of them suffer from widely prevalent malnutrition, bacterial infections and parasitic infections leading to high morbidity and mortality (Rathi, 1984). Intestinal parasitic infections in man are extremely common worldwide, and the school-age group is one of the most susceptible groups to the infection (Ekeh and Adeniyi, 1986). Parasitic infections in that age may lead to poor nutritional status which is associated significantly with decrease in the mental and physical growth rates (Sabbour and Farid, 1978).

Many investigators were interested to study the relation of parasitic infections and growth. Most of these studies proved retarding influences of different types of parasitic infections on physical and mental growth and development (Stephenson et al., 1980, 1989, 1993, and Thein-Hlaing et al., 1991), while some other studies could not prove this relation (Freij et al., 1978, Kloetzal et al., 1982 and Taren et al., 1987).

In Egypt, one of the most important studies done, was that conducted in 1987 by Gad et al., in Alexandria who