

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

وما توفيقى إلا بالله عليه توكلت وإليه أنيب

صدق الله العظيم

هود / آية ٨٨



Acknowledgment

First and foremost thanks are to Allah "the most beneficent, the merciful".

Second, I would like to express my deep thanks and gratitude to the eminent Prof. Dr. Ahmed Samy Khalifa, Prof. of Pediatrics, Faculty of Medicine, Ain Shams University, for giving me the privilege of working under his supervision. His constant encouragement, close supervision and constructive guidance were the paramount axes in the selection, initiation and progress of this work. My debt of gratitude for his constant support, valuable advice and remarks that have been of utmost help.

I wish also to express my hearty thanks to Prof. Dr. Gilane Abdel Hamid Osman, Prof. of Pediatrics, Faculty of Medicine, Ain Shams University, for her valuable comment, help, kindness and encouragement throughout the accomplishment of this thesis.

My deep thanks to Assist. Prof. Moustafa Abdel Aziz El Hodhod, Assist. Prof. of Pediatrics, Faculty of Medicine, Ain Shams University, for his remarkable effort, kind help and continuous guidance, which were the major factors behind the completion of this work. My deep gratitude goes to his faithful supervision, his active, skillful participation and great cooperation throughout the practical part and his meticulous revision of this work. He gave me a lot of his valuable time to improve the quality of this work.

I would like to express my sincere appreciation to
Dr. Arig Aly Mahmoud Seif, Lecturer of Clinical
Pathology, Faculty of Medicine, Ain Shams University,
for her understanding, patience and kind help all through
this work. I am most grateful to her.

Also, I would like to express my gratitude to Prof.
Dr. Mohssin Abdel Hamid Gad Allah, Prof. of Public
Health and Community Medicine, for helping me
sincerely in the statistical part of this work.

Lastly but not last, my thanks and appreciation to
all my Professors and Colleagues in Pediatric
Department, Ain Shams University and to all patients.

CONTENTS

	<u>Page</u>
List of abbreviations	
List of tables	
List of figures	
Introduction and aim of the work	1
Review of Literature	
Thalassemia syndromes.....	3
<i>Introduction.....</i>	3
<i>Pathophysiology</i>	7
<i>Clinical and hematologic features</i>	9
<i>Prevention and treatment</i>	24
Malabsorption.....	33
<i>Introduction.....</i>	33
<i>Definition</i>	34
<i>Carbohydrate malabsorption</i>	35
<i>Lipid malabsorption</i>	39
<i>Protein malabsorption</i>	43
<i>Intestinal mucosal changes in thalassemia</i> <i>major</i>	46
<i>Intestinal permeability</i>	48
Gut contamination	53
The normal microflora of the gut.....	53
Small bowel bacterial overgrowth	54
<i>Etiology.....</i>	55
<i>Pathogenesis.....</i>	56
<i>Clinical picture</i>	59

<i>Diagnosis</i>	60
<i>Treatment</i>	65
Subjects and Methods	67
Results	74
Discussion	106
Summary and conclusion	116
Recommendations	123
References	124
Appendices	164
Arabic Summary	---

LIST OF ABBREVIATIONS

α	Alpha
α_1 -AT	Alpha-1 antitrypsin
β	Beta
μg	Microgram
μm	Micrometer
δ	Delta
γ	Gamma
%	Percent
+	Positive
-	Negative
>	more than
$\geq$	Equal to or more than
ACTH	Adreno-coticotrophic hromone
AIDS	Acquired immune deficiency syndrome
B_{12}	Vitamin B_{12}
BHT	Breath hydrogen test
C	Controls
CBC	Complete blood count
CFU	Colony forming unit
Cm	Centimeter
CO_2	Carbon dioxide
^{13}C	Radioactive carbon 13
$^{13}\text{CO}_2$	Carbon dioxide with 13-radioactive carbon
$^{\circ}\text{C}$	Celsius
DF	Desferrioxamine
dL	Deciliter
DNA	Deoxy ribo nucleic acid
E.coli	Escherechia coli
EDTA	<u>Edetate calcium disodium</u>
F	Female

Fa Fasting
 FL Femto litter
 FSH Follicular stimulating hormone
 G₂ Gap 2
 GH Growth hormone
 GI Group I
 GIIa Group IIa
 GIIb Group IIb
 GIIIa Group IIIa
 GIIIb Group IIIb
 gm Gram
 GnRH Gonadotropin releasing hormone
 h Hour

H Hurried
 H.S Highly significant
 H₂ Hydrogen
 H₂O Water
 Hb Hemoglobin
 HbA Major adult hemoglobin
 HbA₂ Minor adult hemoglobin
 HbF Fetal hemoglobin
 HbH Tetramers of B-chain hemoglobin (B4)
 HDL High density lipoproteins
 HLA Human leukocytic antigen
 Ht Height
 IgA Immunoglobulin A
 IGF-1 Insulin like growth factor-1
 IgG Immunoglobulin G
 IgM Immunoglobulin M
 inf Infections
 Kg Kilogram

Klebs	Klebsila
L	Litter
L1	1,2-dimethyl-3-hydroxypyridine-4-one
LBHT	Lactulose breath hydrogen test.
LCAT	Lecithin cholesterol acyl transferase
LDL	Low density lipoproteins
LH	Leutenizing hormone
M	Male
MCH	Mean corpuscular hemoglobin
MCHC ...	Mean corpuscular hemoglobin concentration
MCV	Mean carpuscular volume
mg	Milligram
Min	Minute
ml	Milliliter
mm ³	Cubic mellimeter
m-RNA ..	Messenger ribonucleic acid
Mw	Molecular weight
N	Normal
N.S	Non-significant
Na+	Sodium ion
ng	Nanogram
nm	Nanometer
No.	Number
PCV	Packed cell volume
Pg	Picogram
Plat	Platelets
PNL	Polymorph nuclear leukocytes
ppm	Part per million
R.E.S	Reticuloendothelial system
RBCs	Red blood cells
Ret	Retics
S.	Serum

S. Serum
S. Significant
S.C..... Subcutaneous
SBBO Small bowel bacterial overgrowth
SD..... Standard deviation
SHAM ... Salicyl hydroxamic acid
SiO₂..... Silicon dioxide
T3 Tri-iodothyronine
T₄ Helper lymphocyte cell
T4 Tetraiodothyronine
T_s Cytotoxic lymphocyte cell
TLC Total leukocytic count
VLDL..... Very low density lipoproteins
wk..... Week
wt..... Weight
X Mean
y..... year

LIST OF TABLES

<u>Tab. No.</u>	<u>Page</u>
1	Clinical and hematologic features of α -thalassemia5
2	Clinical and hematologic features of B-thalassemia6
3	The generalized malabsorptive states in childhood34
4	Percentage of underweight cases and understature cases among the studied groups74
4a	P-value of intergroup comparisons regarding underweight.....74
4b	P-value of intergroup comparisons regarding understature75
5	Mean value of other clinical findings among the studied groups.....76
5a	P-value of intergroup comparisons regarding splenic size (cm).....76
5b	P-value of intergroup comparisons regarding liver span (cm).....77
5c	P-value of intergroup comparisons regarding freq. of bl. transf.77
5d	P-value of intergroup comparisons regarding duration of therapy77
5e	P-value of intergroup comparisons regarding amount of blood transfusion.....78
6	Mean values of hematological parameters among the studied groups.....80

7	Mean value of hemoglobin electrophoretic findings among the studied groups	83
8	Mean value of serum ferritin among the studied groups.....	84
8a	P-value of intergroup comparisons regarding serum ferritin	84
9	Percentage of gastrointestinal tract manifestations among the studied groups	86
9a	P-value of intergroup comparisons regarding gaseous abdominal distension	86
9b	P-value of intergroup comparisons regarding abdominal pain	87
9c	P-value of intergroup comparisons regarding anorexia	87
9d	P-value of intergroup comparisons regarding diarrhea	87
10	Percentage of lactose malabsorption among the studied groups.....	90
10a	P-value of intergroup comparisons regarding lactose malabsorption.....	90
11	Mean value of fecal α_1 -antitrypsin and fecal fat (steatocrit) among the studied groups.....	92
11a	P-value of intergroup comparisons regarding fecal α_1 -AT.....	92
11b	P-value of intergroup comparisons regarding fecal fat (steatocrit)	93
12	Percentage of positive lactulose BHT and stool culture among the studied groups.....	96

12a	Relation between results of LBHT and stool culture in all thalassemics.....	96
13	P-value of correlations of fecal alpha-1 antitrypsin and steatocrit with the hematological parameters	99

The first part of the paper discusses the importance of the study of the history of the English language. It is a branch of linguistics which deals with the changes in the language over time. The second part of the paper discusses the importance of the study of the history of the English language. It is a branch of linguistics which deals with the changes in the language over time. The third part of the paper discusses the importance of the study of the history of the English language. It is a branch of linguistics which deals with the changes in the language over time. The fourth part of the paper discusses the importance of the study of the history of the English language. It is a branch of linguistics which deals with the changes in the language over time. The fifth part of the paper discusses the importance of the study of the history of the English language. It is a branch of linguistics which deals with the changes in the language over time. The sixth part of the paper discusses the importance of the study of the history of the English language. It is a branch of linguistics which deals with the changes in the language over time. The seventh part of the paper discusses the importance of the study of the history of the English language. It is a branch of linguistics which deals with the changes in the language over time. The eighth part of the paper discusses the importance of the study of the history of the English language. It is a branch of linguistics which deals with the changes in the language over time. The ninth part of the paper discusses the importance of the study of the history of the English language. It is a branch of linguistics which deals with the changes in the language over time. The tenth part of the paper discusses the importance of the study of the history of the English language. It is a branch of linguistics which deals with the changes in the language over time.