# LIST OF ABBREVIATIONS

ACTH	: Adrenocorticotrophic hormone
ASD	: Atrial septal defect.
BMI	: Body mass index
CC	: Chest circumference
CHD	: Congenital Heart Disease
DORV	: Double outlet right ventricle.
ECG	: Electrocardiogram
ELISA	: Enzyme linked immunoabsorbent assay
GH	: Growth hormone
НС	: Head circumference
HT	: Height
IGFBPs	: Insulin like growth factors binding proteins
IGFs	: Insulin like growth factors.
IVC	: Inferior Vena Cava.
LH	:Leuteinizing hormone
LVF	: Left ventricular failure
MRI	: Magnetic Resonance Image
NCHS	: National centre of health statistics
PDA	: Patent ductus arteriosus
PS	: Pulmonary stenosis
RA	: Right atrium
REE	: Resting energy expenditure
SVC	: Superior vena Cava.
TEE	: Total energy expenditure
TGA	: Transposition of great arteries
TOF	: Tetralogy of fallot
TSH	: Thyrotropin
VSD	: Ventricular septal defect
WT	: Weight

## LIST OF TABLES

Title		
Table (1): Frequency of occurrence of cardiac malformation at birth.		
Table (2): Weight assessment		
Table (3): Height assessment		
Table (4): Head circumference (HC) assessment		
Table (5): Clinical and Laboratory data of group (I) control group.		
Table (6): Clinical and Laboratory data of group (II) acyanotic group.		
Table (7): Clinical and laboratory data of Group (III) cyanotic group		
<b>Table (8):</b> Means ( $\bar{x}$ ) ± Standard deviations (SD) & median of ages among the study groups.		
<b>Table (9):</b> Means ( $\overline{x}$ ) ± SD and median of HT.		
<b>Table (10):</b> Median and $\overline{x} \pm SD$ of WT.		
<b>Table (11):</b> Median and $\bar{x} \pm SD$ of Head circumference		
<b>Table (12):</b> Median and $\overline{x} \pm SD$ of BMI.		
<b>Table (13):</b> Median and $\overline{x} \pm SD$ of chest circumference		
<b>Table (14):</b> Median and $\bar{x} \pm SD$ of mid-arm circumference.		
<b>Table (15):</b> Median and $\overline{x} \pm SD$ of $IGF_1$		
<b>Table (16):</b> Median and $\overline{x} \pm SD$ of IGFBP <sub>3</sub>		
Table (17): Correlation coefficient "r" between IGF1 and different	100	
variables among control group.		
<b>Table (18):</b> Correlation coefficient "r" between IGF <sub>1</sub> and different	101	
variables among acyanotic group.		
Table (19): Correlation coefficient "r" between IGF <sub>1</sub> and different	105	
variables among cyanotic group.		
Table (20): Correlation coefficient "r" between IGFBP <sub>3</sub> and different	109	
variables among control group.		
Table (21): Correlation coefficient "r" between IGFBP <sub>3</sub> and different	110	
variables among acyanotic group.		
Table (22): Correlation coefficient "r" between IGFBP <sub>3</sub> and different	112	
variables among cyanotic group.		

# LIST OF FIGURES

Title	
Fig. (1): Structure of proinsulin, IGF-1 & IGF-II. Sequence of the 3	
peptides aligned for maximum homology with the common	61
residues outlined	
Fig. (2): Means of HT of the study groups	
Fig.(3): Means of Wt of the study groups	
Fig. (4): Means of BMI of the study groups	
Fig. (5): Means of IGF1 of the study groups	
Fig.(6): Means of IGFBP3 of the study groups	
Fig.(7): Correlation between IGF-1 and age among acyanotic group.	
Fig.(8): Correlation between IGF-1 and HT among acyanotic group	
Fig.(9): Correlation between IGF-1 and Wt among acyanotic group	
Fig.(10): Correlation between IGF-1 and age among cyanotic group	106
Fig.(11): Correlation between IGF1 and Ht among cyanotic group	107
Fig.(12): Correlation between IGF1 and Wt among cyanotic group	
Fig.(13):Correlation between IGFBP3 and age among acyanotic group.	111
Fig.(14):Correlation between IGFBP3 and age among cyanotic group	
Fig.(15):Correlation between IGFBP3 and Ht among cyanotic group.	
Fig.(16):Correlation between IGFBP3 and Wt among cyanotic group.	

# CONTENTS

Title	
LIST OF ABBREVIATIONS	
LIST OF TABLES	
LIST OF FIGURES	
INTRODUCTION	
AIM OF THE STUDY	
REVIEWOF LITERATURE	
Congenital heart disease	3
Physiological growth	48
<ul> <li>Insulin like growth factor -1</li> </ul>	60
<ul> <li>Insulin like growth factor binding Protein-3</li> </ul>	69
SUBJECT AND METHODS	
RESULTS	
ANALYSISOF THE RESULTS	
DISCUSSION	
SUMMAR AND CONCLUSION	
RECOMMENDATIONS	
REFERENCES	
ARABIC SUMMARY	

# ACKNOWLEDGEMENT

First Of all, I thank **GOD**, the most beneficent, the most merciful.

My deep appreciation goes to *Prof. Dr. Nihal Ahmed Wahby*, Professor of Pediatrics, Benha Faculty of Medicine for her keen interest, honest guidance, generous advice, kind support, motivation in this thesis.

My deep appreciation goes to *Prof. Dr. Eman Abd El-Azim Sharaf,* Professor of Pediatrics, Cairo Faculty of Medicine for her keen interest, honest guidance, generous advice, kind support, motivation in this thesis.

I would like to express my gratitude to *Dr. Farida Negm*, Assistant Professor of Pediatrics, Benha Faculty of Medicine for here advice and valuable help and huge assistance in this work.

I would like to express my gratitude to *Prof. Dr. Fatma El-Mogy* Professor of Clinical Pathology, Cairo Faculty of Medicine for her guidance, help and sincere supervision for the building up of this thesis. She offered me much of her unlimited experience in this research.

Last but no means least, I express my thanks to all the patients as without their co-operation such work would have been impossible.

#### دراسة معدل عامل النمو شبيه الأنسولين -1 والبروتين-3 المرتبط به في الأطفال الذين يعانون من عيوب خلقية بالقلب

رسالة توطئة للحصول على درجة الماجستير في طب الأطفال

مقدمة من الشرف عبد السلام صالح بكالوريوس الطب جامعة بنها

تحديم إهرافه ألام أحمد و هبي ألام أحمد و هبي أستاذ طب الأطفال - جامعة بنها

أ0د/ إيمان عبد العظيم شرف أستاذ طب الأطفال – جامعة القاهرة أ0م0د/ فريدة نجم أستاذ مساعد الأطفال – جامعة بنها

أ (0 د / فاطمة الموجي أستاذ البثولوجيا الإكلينكية جامعة القاهرة

كلية الطب جامعة بنها 2009

#### دراسة معدل عامل النمو شبيه الأنسولين -1 والبروتين-3 المرتبط به في الأطفال الذين يعانون من عيوب خلقية بالقلب

رسالة توطئة للحصول على درجة الماجستير في طب الأطفال

مقدمة من اشرف عبد السدلام صالح بكالوريوس الطب جامعة بنها

#### تحاله إشراف

أ0د/ نهال أحمد و هبي أستاذ طب الأطفال جامعة بنها

أ0م0د/ فريدة نجم أستاذ مساعد الأطفال جامعة بنها

أ0د/ فاطمـــة الموجـــي أستاذ البثولوجيا الإكلينكية جامعة القاهرة أ0د/ إيمان عبد العظيم شرف أستاذ طب الأطفال جامعة القاهرة

كلية الطب جامعة بنها 2009

## INSULIN - LIKE GROWTH FACTOR-1 AND INSULIN – LIKE GROWTH BINDING PROTEIN-3 IN CHILDREN WITH CONGENITAL HEART DISEASES

Thesis

Submitted in Partial Fulfillment for The Master Degree in Pediatrics

*By*Ashraf Abd El-Salam Saleh

Under supervision of

#### PROF. DR. NIHAL AHMED WAHBY

**Professor of Pediatrics Benha Faculty of Medicine** 

#### PROF. DR. EMAN ABD EL-AZIM SHARAF

**Professor of Pediatrics Cairo Faculty of Medicine** 

#### ASSIST, PROF. FARIDA NEGM

Assistant Professor of Pediatrics Benha Faculty of Medicine

#### PROF. DR. FATMA EL-MOGY

Professor of Clinical Pathology Cairo Faculty of Medicine

**Benha Faculty of Medicine** 

2009

## INSULIN - LIKE GROWTH FACTOR-1 AND INSULIN – LIKE GROWTH BINDING PROTEIN-3 IN CHILDREN WITH CONGENITAL HEART DISEASES

Thesis

Submitted in Partial Fulfillment for The Master Degree in Pediatrics

By

Ashraf Abd El-Salam Saleh

Under supervision of

ASSIST. PROF.
FARIDA NEGM

Assistant Professor of Pediatrics
Benha Faculty of Medicine

PROF. DR.

NIHAL AHMED WAHBY

Professor of Pediatrics Benha Faculty of Medicine

PROF. DR.

EMAN ABD EL-AZIM

Professor of Pediatrics
Cairo Faculty of Medicine

PROF. DR.

**FATMA EL-MOGY** 

Professor of Clinical Pathology Cairo Faculty of Medicine

Benha Faculty of Medicine

2009

# ARABIC SUMMARY