

**THE CONTRIBUTION OF HYPOGONADISM TO  
THE DEVELOPMENT OF OSTEOPOROSIS IN  
THE ADOLESCENT  $\beta$ -THALASSEMIA MAJOR**

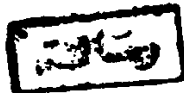
*Thesis*

Submitted for Partial Fulfillment of  
the Master Degree in Pediatrics

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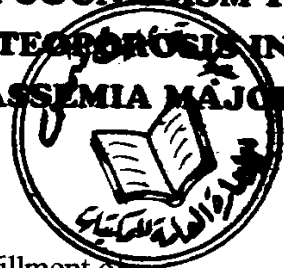
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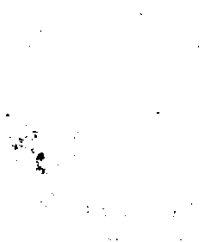
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وقل رب زدني علماً

صدق الله العظيم

(قرآن کریم سورة طه - آية ١١٤)



*Dedicated to*

***My Parents***

***MY Husband***

***and my Sons***

*With Love*



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## **LIST OF ABBREVIATIONS**

<b>ACTH</b>	Adrenocorticotropin hormone
<b>BGP</b>	Bone Gla protein = osteocalcin
<b>BMC</b>	Bone mineral content
<b>BMD</b>	Bone mineral density
<b>CAMP</b>	Cyclic adenosine monophosphate
<b>dl</b>	Deciliter
<b>DNA</b>	Deoxyribonucleic acid
<b>F</b>	Femur
<b>Ferr.</b>	Ferritin
<b>FL</b>	Femtoliter
<b>Freq.</b>	Frequency
<b>FSH</b>	Follicle stimulating hormone
<b>GH</b>	Growth hormone
<b>gm</b>	Gram
<b>Gn RH</b>	Gonadotropin releasing hormone
<b>Hb</b>	Hemoglobin
<b>HBs Ag</b>	Hepatitis B surface antigen
<b>HCG</b>	Human chorionic gonadotropine
<b>HLA</b>	Human leukocyte antigen
<b>HT %</b>	Height percentile
<b>HTSD</b>	Height standard deviation

<b>I.U.</b>	International unit
<b>IDDM</b>	Insulin dependent diabetes mellitus
<b>IGF-I</b>	Insulin-like growth factor-I
<b>IGFBP<sub>1</sub></b>	Insulin-like growth factor binding protein 1
<b>IGFBP<sub>3</sub></b>	Insulin-like growth factor binding protein 3
<b>IL-1, IL-6</b>	interleukin 1, interleukin 6
<b>Kg</b>	kilogram
<b>L</b>	Liter
<b>LH</b>	Luteinizing hormone
<b>LS</b>	Lumbar spine
<b>m RNA</b>	Messenger ribonucleic acid
<b>MCHC</b>	Mean corpuscular hemoglobin concentration
<b>MCV</b>	Mean corpuscular volume
<b>μg</b>	Microgram
<b>μm</b>	Micrometer
<b>ng</b>	Nanogram
<b>No</b>	Number
<b>P mol</b>	Picomole
<b>P.F.</b>	History of pathological fractures
<b>pg</b>	Picogram
<b>PG</b>	Prostaglandin
<b>PTH</b>	Parathyroid hormone
<b>S. P</b>	Serum phosphorus
<b>S. ALP</b>	Serum alkaline phosphatase

<b>S. Ca</b>	Serum calcium
<b>S. E<sub>2</sub></b>	Serum estradiol
<b>S. Testo.</b>	Serum testosterone
<b>T.S.</b>	Tanner score
<b>vit.</b>	Vitamin
<b>vit. D</b>	1, 25 dihydroxy cholecalciferol = calcitriol
<b>WT %</b>	Weight percentile

