

Assessment of Vitamin D Status in Egyptian Boys Aged 2-10 Years

Thesis

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا

سبحانك لا علم لنا
إلا ما علمتنا إنك أنت
العليم العليم

صدق الله العظيم

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List of Abbreviations

Abb.	Full term
AITDs	Autoimmune thyroid diseases
AMPs	Antimicrobial peptides
aPL.....	Against cell membrane phospholipids
APS	Anti-phospholipid syndrome
BCG	Bromocresol green
Ca.....	Calcium
COPD.....	Chronic obstructive pulmonary disease
CT	Calcitonin
CVD	Cardiovascular disease
DEXA.....	Dual energy X-ray absorptiometry
DNA	Deoxribonuclic-acid
DRIP	Vitamin D receptor interacting protein complex
ECLAM.....	European Consensus Lupus Activity Measurement
EDTA.....	Ethylenediaminetetraacetic acid
ELISA	Enzyme-Linked Immunosorbent Assay
FEV1.....	forced expiratory volume in 1
HT	Hashimoto's thyroiditis
IBD.....	Inflammatory bowel disease
IL-6	Interleukin-6
INF- γ	Interferon
IU	International unit
MCTD	Mixed connective tissue disease
MS.....	Multiple sclerosis
MT.....	Mycobacterium tuberculosis
NAFLD	Non-alcoholic fatty liver disease
OCPC	Ortho-cresolphthalein complexone
PTH.....	Parathyroid hormone
RA	Ruhmatiod arthritis
RCTs	Randomized controlled trials
RDA	Recommended dietary allowances
RNP	Anti- ribonucleo protein

List of Abbreviations Cont...

Abb.	Full term
SLE	Systemic lupus erythrmatosis
SPSS	Statistical package for Social Science
SS.....	Sjogren's syndrome
SSc	Systemic sclerosis
TGF- β 1.....	Transforming growth factor- β 1
T1DD.....	Type1diabtis mellitus
TNF- α	Tumor necrosis factor alpha
TNF- α	Tumor necrosis factor- α
UCTD.....	Undifferentiated connective tissue disease
ULs	Upper Intake Levels
UVB	Ultraviolet B
VDBP	Vitamin D-binding protein
VDREs	Vitamin D response elements

INTRODUCTION

Vitamin D is a potent steroid hormone that have important physiological actions. Apart from its role in mineral homeostasis it has many extra-skeletal actions, as most of tissues and cells in the body have vitamin D receptors. Several of these cells possess the enzymatic machinery to convert the primary circulating form of vitamin D, 25 – hydroxy vitamin D, to the active form: 1,25 – dihydroxy vitamin D (*Holick, 2007*).

As regards skeletal health, vitamin D is essential in regulation of calcium homeostasis and bone metabolism. On the other hand, vitamin D plays an important role to decrease risk of many chronic illnesses. These include cancers e.g colorectal cancer (*Joan et al., 2007*), autoimmune diseases e.g., Rheumatoid arthritis (*Munger et al., 2006*) infections diseases, cardiovascular diseases (*Wang et al., 2008*), schizophrenia and Alzheimer diseases.

Humans get vitamin D mainly from exposure of the skin to solar ultra violet B radiation (uVB; 290-315 nm) and from dietary intake. The solar ultraviolet radiation penetrates the skin and converts 7 – dehydroxy cholesterol to pre-vitamin D₃ (*Holick, 2007*).

Vitamin D deficiency is common because of lack of appreciation that sun exposure is the major source of vitamin D for most humans. In countries of the Middle East the common

use of concealing clothing where the skin is shielded from the sun reduces the skin's ability to synthesize vitamin D in response to sunlight exposure.

Vitamin D deficiency causes Rickets in children and Osteomalacia in Adults. It also precipitates and exacerbates osteopenia, osteoporosis and fractures in adult (*Holick, 2008*).

A circulating level of 25-hydroxyvitamin D of >30 ng/ml is required to maximize vitamin D beneficial effects for health. In the absence of adequate sun exposure, at least 800-1000 IU vitamin D₃ / day needed to achieve this in children and adults (*Holick, 2007*).

Some people are more at risk of vitamin D deficiency and so are recommended to take vitamin supplements routinely, these include all pregnant and breast feeding women, all infants and young children aged 6 month to 5 years, people aged 65 years and over and people who are not exposed to much sun (*Holick, 2006*). A doctor may also recommend routine supplements for certain people with darker skin and for people with certain gut, liver, or kidney diseases (*Ravithadhani et al., 2012*).

Vitamin D deficiency is a worldwide health problem, spanning many countries and including all ages (*Hosseini-Nezhad and Holick, 2013*).

High prevalence of vitamin D insufficiency in healthy children and adolescent has been reported worldwide in the past few years. Studies in India found that hypovitaminosis D was seen in 95% of apparently healthy adolescents. Other studies reported prevalence of vitamin D deficiency as 59.4% in Turkey, 78% in France, 42.5% in Beijing, 47% in Greece (*Rajakumar et al., 2005*).

In recent studies about the prevalence of vitamin D deficiency in Egypt reveal that: the rate of hypovitaminosis in adult between (20-60) years is 77% (*Marawan, 2013*), infertile females between (20-50)years is 80% in Cairo (*Matar, 2011*) and 70% in port-Foud (*ElDawoody, 2011*), and in old age between (60-70)years the rate is more than 50% (*Salem, 2011*) and 90% in those over 75 years (*Salem, 2011*).

AIM OF THE WORK

We aim to determine the status of vitamin D deficiency/sufficiency in a sample of Egyption male children in the age period 2-10 years living in greater Cairo region.