بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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شبكة المعلومات الجامعية

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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

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MONA MAGHRABY

Evaluation of Bone Mineral Density and Body Composition in 13-14 Years Old Egyptian Males

Thesis

Submitted For Partial Fulfilment of
Master Degree **in Pediatrics**

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بسم الله الرحمن الرحيم

قالوا

سبحانك لا علم لنا
إلا ما علمتنا إنك أنت
العليم الحكيم

صدق الله العظيم

سورة البقرة الآية: ٣٢

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Aya Ibrahim Tamazin Said

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List of Abbreviations

Abb.	Full term
µCT	*Micro-computed tomography*
2D	*Two-dimensional*
aBMDs	*Areal bone mineral densities*
ALP	*Alkaline phosphatase*
APC	*Adenomatous polyposis coli*
BA	*Bone area*
BGP	*Bone gla-protein*
BMAD	*Bone mineral apparent density*
BMC	*Bone mineral content*
BMD	*Bone mineral density*
BMP	*Bone morphogenetic proteins*
BTT	*Bone transmission time*
CK1	*Casein kinase 1*
CSR	*Calcium sensing receptor*
CT	*Calcitonin*
CT	*Computed tomography*
CV	*Coefficient of variation*
Dkk-1	*Dickkopf WNT signaling pathway inhibitor 1*
DMP	*Dentin matrix protein*
DPyr	*Deoxypyridinoline*
DXA	*Dual-energy x-ray absorptiometry*
ECF	*Extracellular fluid*
ECM	*Extracellular matrix*
EGF	*Epidermal growth factor*
FFQ	*Food frequency questionnaire*
FGF	*Fibroblast growth factor*
FN	*Femoral neck*
FNB	*Food and Nutrition board*
Fzd	*Frizzled*

List of Abbreviations (Cont...)

Abb.	Full term
GGHL	*Glycosyl-galactosyl-hydroxylysine*
GHL	*Galactosyl-hydroxylysine*
GIT	*Gastrointestinal tract*
Gla	*g- Carboxylated proteins / Gamma-carboxyglutamate*
GLA	*Glutamic acid*
GM – CSF	*Granulocyte / macrophage - colony stimulating factor*
GSK3	*Glycogen synthase kinase 3*
HL	*Hydroxylysyl pyridinoline*
HR-pQCT	*High resolution peripheral quantitative CT*
IGF	*Insulin-like growth factor*
IGFBP	*IGF-binding proteins*
IJO	*Idiopathic juvenile osteoporosis*
IL	*Interleukin*
ISCD	*International Society of Clinical Densitometry*
LEF	*Lymphoid enhancer factor*
LP	*Lysyl pyridinoline*
LRP	*Lipoprotein receptor-related proteins*
LS	*Lumbar spine*
LSC	*Least significant change*
M - CSF	*Macrophage - colony stimulating factor*
M-CSF	*Macrophage colony stimulating factor*
MDCT	*Multi-detector CT*
miRNA	*MicroRNA*
MMP	*Matrix metalloproteinase*
MRI	*Magnetic resonance imaging*
MSC	*Mesenchymal stem cells*
NAS	*National academy of sciences*

List of Abbreviations (Cont...)

Abb.	Full term
NFkb	*Nuclear factor kappa B*
NIH	*National institutes of health*
OCIF	*Osteoclast inhibiting factor*
ODF	*Osteoclast differentiation factor*
OHP	*Hydroxyproline*
OPG	*Osteoprotegerin*
OPGL	*Osteoprotegerin ligand*
PA	*Posterior-anterior*
PCP	*Planar cell polarity*
PDGF	*Platelet-derived growth factor*
PG	*Prostaglandin*
PGE2	*Prostaglandin E2*
PICP	*Procollagen type I carboxy-terminal propeptide*
PINP	*Procollagen type I aminoterminal propeptide*
pSoS	*Pure speed of sound*
PTH	*Parathyroid hormone*
PTHrP	*Parathyroid hormone-related protein*
Pyr	*Pyridinoline*
QCT	*Quantitative computed tomography*
QUS	*Quantitative ultrasonography*
RANK	*Receptor activator of nuclear factor kappa B*
RANKL	*Receptor activator of nuclear factor kappa-B ligand*
RDA	*Recommended dietary allowance*
RDI	*Recommended dietary intake*
Runx2	*Runt-related transcription factor 2*
SD	*Standard deviations*
TBLH	*Total body less head*
TCF	*T cell factor*

List of Abbreviations (Cont...)

Abb.	Full term
TGF- b	*Transforming growth factor- b*
TNF	*Tumor necrosis factor*
TPN	*Total parenteral nutrition*
TRANCE	*TNF related activation-induced cytokine*
TRAP	*Tartrate-resistant acid phosphatase*
VEGF	*Vascular endothelial growth factor*

INTRODUCTION

Bone mass accrual throughout childhood and early adolescence is a key determinant of skeletal health later in life. Genetic disorders, chronic diseases, immobility and inadequate nutrition can compromise optimal peak bone mass achievement causing osteopenia in children and adolescents and osteoporosis later in life with subsequent bone loss ***(Kilbanski et al., 2001).*** Also the increased incidence of childhood fractures over the past years has questioned whether the current lifestyles are compromising early bone health ***(Bachrach and Gordon, 2016).*** Therefore it's mandatory to study the factors influencing bone mineral density (BMD) and the risk factors for early osteopenia, in order to modify our children's life style in a way to gain optimal peak bone mass.

According to the International Society of Clinical Densitometry (ISCD), Dual energy X-ray absorptiometry (DXA) is the preferred method for assessing BMD and bone mineral content (BMC) in children as it is non-invasive, readily available, safe due to its low radiation dose, high resolution images and good precision ***(Rauch et al., 2008).***

The need to set normative reference data and to study more the impact of multiple factors on BMD is the controversies found between previously published studies regarding the influence of physical activity, calcium intake, sun

exposure and other lifestyle variables on BMD. Also ethnic and gender differences have been reported. we preferred DXA over other methods of bone assessment as there are more published pediatric reference data using DXA than any other method, this allows for comparison between different ethnicities.