بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

MONA MAGHRABY

Correlation Between Vitamin D Deficiency In Pregnancy and Low Birth Weight Neonates

Thesis

Submitted for Partial Fulfillment for master degree in Obstetrics and Gynecology

Presented by

Mohamed Ragab Fahmy Abo – Shedida

M.B.B.C.H 2014

Resident of Obstetrics and Gynecology

Damanhur Medical National Institute

Under supervision of

Pro. Dr. Mounir Mohamed Fawzy El -Hao

Professor of Obstetrics and Gynecology

Faculty of Medicine - Ain Shams University

Dr. Haitham Fathy Mohamed Gad

Lecturer of Obstetrics and Gynecology

Faculty of Medicine - Ain Shams University

Dr. Heba Hassan Aly

Lecturer of Clinical Pathology

Faculty of Medicine - Ain Shams University

Faculty of Medicine

Ain Shams University

2020

سورة البقرة الآية: ٣٢

Acknowledgment

First and foremost, I feel always indebted to
***ALLAH**, the Most Kind and Most Merciful.*

I'd like to express my respectful thanks and profound gratitude to ***Pro. Dr. Mounir Mohamed Fawzy El - Hao,*** *Professor of Obstetrics and Gynecology, Faculty of Medicine - Ain Shams University for his keen guidance, kind supervision, valuable advice and continuous encouragement, which made possible the completion of this work.*

I am also delighted to express my deepest gratitude and thanks to ***Dr. Haitham Fathy Mohamed Gad****, Lecturer of Obstetrics and Gynecology. Faculty of Medicine - Ain Shams University, for his kind care, continuous supervision, valuable instructions, constant help and great assistance throughout this work.*

I am deeply thankful to ***Dr. Heba Hassan Aly,*** *Lecturer of Clinical Pathology, Faculty of Medicine - Ain Shams University, for her great help, active participation and guidance.*

Mohamed Ragab Fahmy

List of Contents

List of Abbreviations

Abb.	Full term
ACOG	American College of Obstetricians and Gynecologists
AEDs	Anti-epileptic drugs
cAMP/PKA	Cyclic Adenosin Monophosphat and Protein Kinase
CNS	Central nervous system
FAS	Fetal alcohol syndrome
FHR	Familial hypophosphatemia rickets
HAART	Highly active antiretroviral therapy
HIV	Human immunodeficiency virus
IUGR	Intra-uterine growth restriction
LBW	Low birth weight
PTH	Parathyroid hormone
RDA	Recommended Dietary Allowance
RXR	Retinoid X receptor
SGA	Smallfor- gestational-age
SNP	Single nucleotide polymorphism
UVB	Ultraviolet B
VDI	Vitamin D intoxication
VDR	Vitamin D receptor
VDRE	Vitamin D response element
vit D	Vitamin D
WHO	World Health Organization

List of Tables

List of Figures

PROTOCOL OF A THESIS FOR PARTIAL FULFILMENT OF MASTER DEGREE IN OBSTETRICS AND GYNECOLOGY

Title of the Protocol: Correlation Between Vitamin D Deficiency In Pregnancy and Low Birth Weight Neonates

Postgraduate Student: **Mohamed Ragab Fahmy Abo – Shedida**
M.B.B.CH 2014
Degree: Resident Of *Obstetrics and Gynecology*
Damanhur Medical National Institute

DIRECTOR: *PROF.DR. Mounir Mohamed Fawzy El -Hao*
Academic Position: *Professor in Obstetrics and Gynecology*
Department: *Obstetrics and Gynecology* Ain Shams University

Co-DIRECTOR: *DR.* Haitham Fathy Mohamed Gad
Academic Position: *Lecturer in Obstetrics and Gynecology*
Department: *Obstetrics and Gynecology* Ain Shams University

Co-DIRECTOR: *DR.* Heba Hassan Aly
Academic Position: *Lecturer in clinical pathology* Ain Shams University

Faculty of Medicine
Ain Shams University
2019

What is already known on this subject? AND

What does this study add?

The association between vitamin D deficiency and various adverse pregnancy outcomes has been extensively investigated in recent years. The pregnant woman is the only source of vitamin D for the foetus. The main sources of vitamin D for pregnant women are sunlight, fortified dairy products, oily fish and dietary supplements. Vitamin D deficiency during pregnancy has been associated with some adverse neonatal outcomes as well as an increased risk of late pregnancy complications ***(Dawodu, 2013).***

There is existing Correlation regarding the prevalence of vitamin D deficiency during pregnancy and possible pregnancy complications such as Low Birth Weight Neonates ***(Zehnder, 2001).***

1. INTRODUCTION/ REVIEW

Vitamin D is a steroidal prohormone, the active type which plays a significant role in absorption of calcium and phosphate. It reaches the body through skin synthesis via ultraviolet rays when the sun exposure is adequate and can be ingested through food. Through influencing the absorption of calcium in the intestinal tissues and other effects on bone and other tissues of the body, the metabolites of this vitamin have key roles in regulating the metabolism of minerals ***(Płudowski, 2013).***

During pregnancy, fundamental changes occur in calcium and vitamin D metabolism. Requirement for calcium increases in the third trimester of pregnancy so that in the final stages of pregnancy, about 30g of the calcium for the fetal skeleton is created from the maternal skeleton and through hormonal intervention. So, it is vital to receive adequate vitamin D and calcium during the pregnancy for the fetal homeostasis, bone growth and mineral development ***(Jan Mohamed, 2014).***

Vitamin D deficiency brings about obvious damages to the growth and development of fetal bones. It can lead to osteomalacia in pregnancy, skeletal abnormalities and fetal mineral bone

acquisition in childhood, and influences the neonatal skeletal development, bone size and impaired bone mass accrual.

Extraskeletal consequences of vitamin D deficiency in pregnancy include potentially increased risks of gestational diabetes mellitus, preeclampsia and maternal bacterial vaginosis but not delivery by caesarean section. It increases the risk of intrauterine growth retardation, low birth weight and early-onset sepsis in infants. In addition, sufficient vitamin D concentration in pregnancy is supposed to have a positive influence on mother's and child's immune system ***(Rostami, 2018).***

Vitamin D deficiency in pregnancy is prevalent, especially in women with limited access to sunlight due to minimal outdoor activity or heavy use of sunscreen, cultural practices or traditional clothing, and among women with dark skin pigmentation ***(Hollis, 2013).***

Despite the controversies related to adverse outcomes, and lack of evidence of clear benefits of routine supplementation, most Western countries recommend vitamin D supplementation during pregnancy ***(Płudowski, 2013).***

Low birth weight (LBW) refers to term or preterm neonates with birth weight < 2500 gr. These neonates may be small for gestational age or have intrauterine growth restriction. Mortality rate in such neonates is 40 times more than those with normal weight**.** Some investigations highlighted the effect of micronutrients on birth weight. Vitamin D (vit D) has a key role in fetal growth by its interaction with parathyroid hormone and Ca2+ homeostasis. Studies confirmed that insufficient prenatal and postnatal levels of vit D have great effects on poor bone mineralization which have significant association with small for gestational age (SGA) births. SGA births are reported more frequent in pregnancies occurring in the winter with vit D deficiency ***(Collins-Fulea, 2012).***

2.AIM/ OBJECTIVES

The aim of this work to study and investigate the relation between maternal vitamin D level in pregnancy and development of Low Birth Weight Neonates in Ain Shams Hospital.

3.METHODOLOGY:

Patients and Methods/ Subjects and Methods/ Material and Methods

- **Type of Study:** Cross-sectional study.
- **Study Setting:** Faculty Of Medicine, Department of Obstetrics and Gynecology, Ain Shams Hospital.
- **Study Period:** Starting from November 2019.
- **Study Population:** 60 pregnant female come in labour in Ain Shams Maternity Hospital. their neonates after their birth will be categorized into two groups, neonates with birth weight< 2500 gr (n=30) and neonates with birth weight>2500 gr (n = 30). Data regarding medical history, physical examination and anthropometric measurements of neonates will be noted in a questionnaire. Birth time blood samples of their mothers will be analyzed for serum 25-(OH)-vitamin D by ELISA method. Maternal vitamin D status will be compared in two groups. Using medcalc program,version 15, setting alpha erzol at 5%,power at 80% result from previous study ***(Dawodu, 2013)*** showed that the needed sample size is 60 cases.

Inclusion *Criteria*:

1- Living fetus

2- Gestational age at full term as confirmed by last menstrual period and early first trimester ultrasound

Exclusion Criteria:

1. Twin pregnancy.

2. Uncertain gestational age.

3. mothers with preeclampsia, eclampsia, postpartum hemorrhage, insulin dependent diabetes mellitus

4. systemic and chronic disease, hematologic disorders, medication,, drug abuse.

5. Accidental hemorrhage associated with moderate or severe bleeding

6. neonates with congenital malformation and infection (TORCH).

- **Materials and Methods**: A Cross-sectional study will be carried out in Ain Shams Maternity Hospital during 6 months starting from November 2019. 60 neonates after their birth will be categorized into two groups, neonates with birth weight< 2500 gr (n=30) and neonates with birth weight>2500 gr (n = 30). Data regarding medical history, physical examination and anthropometric measurements of neonates will be noted in a questionnaire. Birth time blood samples of their mothers will be analyzed for serum 25-(OH)-vitamin D by ELISA method. Maternal vitamin D status will be compared in two groups then a designed questionnaire and recorded neonatal gender, birth weight and height, gestational age, mode of delivery, mother's age, parity, race and ethnicity, mother's education and clinical vit D deficiency symptoms. Depending on mothers' 25- (OH)-vit D level, all mothers will be categorized in deficient (< 25 nmol/L), insufficient (25-50 nmol/L), normal (> 50nmol/L) and toxic level (> 250nmol/L).
- **Statistical Analysis:** Data will be collected, tabulated, then analyzed using Chi-square test and T test to focuse on examining the correlation between vit D in pregnancy and low birth weight neonates using the cut-off value as mentioned.
- **Outcome:**.Study correlation between maternal vitamin D level in pregnancy and development of Low Birth Weight Neonates in Ain Shams Hospital.

4.REFERENCES

1. **Andersen LB, Abrahamsen B, Dalgard C, Kyhl HB, Beck-Nielsen SS, Frost-Nielsen M, et al.** Parity and tanned white skin as novel predictors of vitamin D status in early pregnancy: a population-based cohort study. Clin Endocrinol (Oxf). 2013;79(3):333–41.