بسم الله الرحمن الرحيم

وَلَقَدْ خَلَقْنَا الْإِنسَانَ مِن سُلَالَةٍ مِّن طِينٍ {12} ثُمَّ جَعَلْنَاهُ نُطْفَةً فِي قَرَارٍ مَّكِينٍ {13} ثُمَّ خَلَقْنَا النُّطْفَةَ عَلَقَةً فَخَلَقْنَا الْعَلَقَةَ مُضْغَةً فَخَلَقْنَا الْمُضْغَةَ عِظَامًا فَكَسَوْنَا الْعِظَامَ لَحْمًا ثُمَّ أَنشَأْنَاهُ خَلْقًا آخَرَ فَتَبَارَكَ اللَّهُ أَحْسَنُ الْخَالِقِينَ {14

(سورة المؤمنون من الآية 12-14)

Dedication

To My parents

My brothers

My sisters

My colleagues

& everyone who helped me to complete this research

Acknowledgement

I thank Allah first for helping me to achieve this research and I thank everyone who supported and stand up during different steps in this research.

I deeply indebted to my supervisor **Dr. Munsoor Mohammed Munsoor** for his valuable help and guidance during this study, I'm also grateful to his keen interest, patience assistance and invaluable advice.

My appreciation is extended to all the medical staff in Khartoum teaching hospital and also thanks to haematology department staff and our class mates.

My especial thanks are extended to the staff of Umbadda hospital and Alsaudi maternal hospital. Finally special thanks to all my subjects the pregnant women who contributed to complete this research.

Abstract

This is a cross sectional descriptive and analytical study, conducted at Umbadda and Alsaudi hospitals during the period from January to June 2011. The aim of this study is to estimate haemostatic parameters (PT, INR, APTT, fibrinogen concentration and platelet count) and haemoglobin concentration in Sudanese pregnant women who were referring to Umbadda and Alsaudi hospitals.

The study included 150 Sudanese females, 100 were pregnant women and 50 were non pregnant women (as controls). The 100 pregnant women, who were apparently in good health, are informed about the study and their consent for participation was obtained. The study population was divided into three groups according to the trimesters (first trimester, second trimester and third trimester).

Venous blood sample of 5 ml was taken from each subject (2.5ml in EDTA container and 2.5ml in trisodium citrate container).

Fully automated coagulation analyzer (sysmex CA-500) was used for haemostatic test and automated haematology analyzer (sysmex KX-21N) was used for platelet count and hemoglobin concentration.

The results were analyzed by Statistical Package for Social Science (SPSS version 10.0) and the mean of each parameter was calculated. They were as followed:

In pregnant women the result showed that the mean of PT, INR, APTT, fibrinogen, platelet and haemoglobin were (11.96 sec, 0.998, 32.49sec, 311.9 mg/dl, 237.14×103 /µl, 10.962 g/dl respectively),when compared to control group (non pregnant women), the above values show significant difference (P value in all parameters below 0.05).

The PT, INR and APTT show insignificant difference between the trimesters during pregnancy (P value more than 0.05), while that fibrinogen, platelet and haemoglobin show significant difference during the trimesters with P value less than 0.05.

Significant increase in the haemoglobin concentration among pregnant women who taken fefol supplement indicated the importance of supplement during pregnancy.

The results of this study indicate that platelet is the only parameter affected by the haemoglobin concentration below 11.0g/dl with P value = 0.017.

This study concluded that pregnant women are at risk of venous thrombosis and anaemia.

هذه الدراسة مقطعيه وصفية تحليلية، تم أجراؤها في الفترة من يناير إلى يونيو 2011 بمستشفي المَدينة والسعودي. وكان الهدف من هذه الدراسة تقدير زمن البروثرومبين، نسبة التطبيع الدولية، زمن الثرومبوبلاستين الجزئي ، تركيز الفيبرينوجين، عدد الصفائح الدموية وتركيز خضاب الدم لدى النساءالسودانيات الحوامل اللائي يترددن علي مستشفي أمبده و المستشفي السعودي.

وشملت الدراسة عدد 150 من النساء السودانيات الحوامل وغير الحوامل، مئة 100 عينة دم من النساء الحوامل وخمسون 50 عينة دم من النساء الغير حوامل (للمقارنة). أخذت مئة 100 عينة دم من النساء الحوامل بعد إخطارهن بهذه الدراسه وأهميتها وأخذت موافقتهن علي المشاركة ثم قسمت النساء الحوامل الي ثلاث مجموعات حسب مراحل الحمل الثلاث.

أخذت 5 مل من الدم من كل مشاركة في هذه الدراسة و قسمت الي 2.5 مل في حاويات تحتوي علي مانع تجلط EDTA الثلاثية و 2.5 مل في حاويات تحتوي علي سترات الصوديوم.

تم إستخدام محلل التخثر الآلي (Sysmex CA-500) لاختبارات تخثر الدم والمحلل الآلي (Sysmex KX-21N) لعدد الصفائح الدموية وتركيز خضاب الدم.

وكانت النتائج كالتالي SPSS و قد تم تحليل النتائج احصائيا بواسطه برنامج الحاسوب الاصدار 10.0:-

في النِساءِ الحوامل، نتيجة متوسط زمن البروثرومبين ، نسبة التطبيع الدولية وزمن الثرومبوبلاستين الجزئي ، الفيبرينوجين ،صفيحة دمّ وخضاب الدم كانا (11.96 ثانية، 0.998 ، 32.49ثانية، 311.9 ملغ / ديسيلتر، 237.14 × 103 / ملمتر مكعب ، 10.962 غ / دل على التوالي) ، عند مقارنتها مع مجموعة التحكم(نساءغير الحوامل)، القيم أعلاه تظهر فروق ذات دلالة إحصائية (قيمة ف في جميع الإختبارات أقل من 0.05).

وأوضحت الدراسة أنه لايوجد إختلاف ذو دلالة إحصائية في زمن البروثرومبين، نسبة التطبيع الدولية وزمن الثرومبوبلاستين الجزئي أثناء مراحل الحمل الثلاثة(قيمة ف< 0.05)، بينما يوجد أختلاف ذو دلالة إحصائية في قيمة الفيبرينوجين ،صفيحة دمّ وخضاب الدم خلال مراحل الحمل الثلاثة (قيمة ف< 0.05) .

هنالك زيادة ملحوظه في تركيز خضاب الدم في النِساءِ الحوامل اللواتي يَأْخذنَ مكملات الفيفول، الذي يُشيرُ إلى أهميةِ المكملات أثناء فترة الحملِ.

إنّ نَتائِجَ هذه الدراسةِ تُشيرُ بأنّ صفيحةِ الدمّ البارامترُ الوحيدُ المتأثر بتركيزِ خضاب الدم تحت 11.0 جم/دل ((قيمة ف= 0.017)).

إستنتجتْ من هذه الدراسةِ بأنّ النِساءِ الحوامل في خطرِ التخثّرِ الوريدي وفقرِ الدم.

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List of abbreviations

AcG	Accelerator globulin
ADP	adenosine 5′-diphosphate
AHF	Antihaemophilic factor
APTT	Activated partial thromboplastin time
AT	Antithrombin
ATIII	AntithrombinIII
ATP	adenosine 5′-triphosphate
BT	Bleeding time
$CaCl_2$	Calcium chloride
cAMP	Cyclic adenosine monophosphate
CBC	Complete Blood Count
DIC	Disseminated intravascular coagulopathy
2,3-DPG	2,3-diphosphoglycerate
DVT	deep venous thrombosis
EDTA	Ethylene diamine tetra acetic acid
EPCR	endothelial Protein C receptor
Fe^{+2}	Ferrous
FSH	follicle-stimulating hormone
GDP	guanosine 5′-diphosphate
GnRH	gonadotrophin-releasing hormone
GPI	Glycophosphoinositol
GTP	guanosine 5′-triphosphate
Hb	Haemoglobin
hCG	human chorionic gonadotrophin
Hct	Haematocrit
HELLP	haemolysis, elevated liver enzymes, low platelets
HIV	Human immunodeficiency virus
HMWK	high molecular weight kininogen
INR	International normalization ratio
LCD	liquid crystal display
LDH	Lactate dehydrogenase
LH	luteinizing hormone
LNMP	last normal menstrual period
MCV	Mean Cell Volume
NO	Nitric Oxide
OCHF	Optical Cytometer Hydrofocus Free
PA	plasminogen activator
PAI-1	plasminogen activator inhibitor-1
PAI-2,	plasminogen activator inhibitor-2
PC	Protein C
PAP	plasmin–antiplasmin complex
PDGF	platelet-derived growth factor
PE	pulmonary embolism
PF4	Platelet factor 4
PLA2	Phospholipase enzymes

PPP	Platelet poor plasma
PT	Prothrombin Ratio
PTC	Plasma thromboplastin component
RES	reticuloendothelial system
RMM	Relative molecular mass
RNA	Ribonucleic acid
SD	Stander deviation
TAFI	thrombin-activated fibrinolysis inhibitor
TAT	thrombin–antithrombin complex
TF	Tissue Factor
TFPI	Tissue Factor Pathway inhibitor
t-PA	tissue plasminogen activator
TXA2	thromboxane A2
TXB2	Thromboxane B2
u-PA	Urokinase
vWF	Von Willebrand fa*ctor*