

## الآية

بسم الله الرحمن الرحيم

{وَاخْفِضْ لَهُمَا جَنَاحَ الذُّنُوبِ مِنَ  
الرَّحْمَةِ وَقُلْ رَبِّ ارْحَمْهُمَا كَمَا  
رَبَّيْتَنِي صَغِيرًا }

صدق الله العظيم

سورة الإسراء الآية (24)

## Dedication

To my Mum and Dad ...

To my sister and brother ...

To the soul of my incest's ...

To my big extended family...

## Acknowledgement

Thanks God for helping me and blessing me with the greatest Mum and Dad in the world...

Thanks for Dr. Khalda Mirghani Hamza for all the support and tolerance she showed with everyone ...

Thanks her for been great mentor and wonderful person my god bless her always...

Thanks for our haematology teachers Dr. Malik Alfadni and Dr. Tarig Almissbah for making me see how haematology can change the way we look to the world...

Thanks for Khartoum teaching hospital staff for all the help they offered....

Thanks for haematology department for support and help...

May God bless us all...

## Abstract

This is a cross-sectional descriptive and analytical study, conducted at Khartoum Teaching Hospital during the period from first of November 2009 to the first of April 2010. The aim of this study was to estimate the complete hemogram, prothrombin time and partial thromboplastin time tests in Sudanese pregnant women who attended Khartoum Teaching Hospital (Obstetric Ward).

50 Sudanese apparently healthy pregnant women were informed about the study and agreed for participation was obtained. The study population was divided into three groups according to the trimesters as follows:

Pregnant women at first trimesters were 30%, second trimesters were 32%, and third trimesters were 38%.

Venous blood of 5 ml was bleed (2.5ml in EDTA containers and 2.5ml in trisodium citrate containers) and investigated for the count of red blood cells, white blood cells, platelets, hemoglobin, prothrombin time and partial thromboplastin time tests.

Fully automated hematology analyzer (sysmex) was used for the CBC analysis, and manual analysis for PT and PTT tests.

All pregnant women had mean values of WBCs =  $7.580 \text{ cell/mm}^3$  RBCs =  $4.1 \times 10^{12}$  Hb = 11.7g/dl Platelets =  $256 \times 10^9$  PT = 13.4 seconds and PTT = 36.2 seconds.

The results indicated that RBCs, Hb, Platelets and PT showed slight decrease than normal mean value, while PTT results was slightly increase than normal mean value but this decrease and increase in this parameters was statistically insignificant.

WBCs mean value was slightly increased than normal mean value and this increase was statistically significant between the three trimesters with the peak in the second trimester.

## مستخلص البحث

هذه دراسة مقطعية وصفية تحليلية تم إجراؤها في الفترة ما بين الأول من نوفمبر 2009 حتى الأول من أبريل 2010 بمستشفى الخرطوم التعليمي لتقدير نسب كريات الدم الحمراء، كريات الدم البيضاء، الصفائح الدموية، الخضاب، معدل البروثرومين ومعدل الثرمبوبلاستين الجزئي في النساء السودانيات الحوامل اللائي (يترددن على مستشفى الخرطوم التعليمي) عبر الولادة.

أخذت 50 عينة من نساء حوامل بصحة جيدة بعد إخطارهم بهذه الدراسة وأهميتها وأخذ موافقتهم علي المشاركة. قسمت النساء الحوامل إلى ثلاث مجموعات حسب مراحل الحمل المختلفة، تم أخذ 5 مل من الدم من كل مشاركة في هذه الدراسة وقسمت إلى 2.5 مل في حاويات تحتوي على مانع تجلط EDTA و 2.5 مل في حاويات تحتوي على سترات الصوديوم الثلاثية.

تم استخدام جهاز (Sysmex) لتحليل إعداد الدم الكامل (CBC) الذي يعمل اتوماتيكيا وتم تحليل ال PT وال PTT بالطريقة اليدوية.

وجد أن معدلات الفحوصات في النساء الحوامل كالآتي:

كريات الدم البيضاء =  $7.580 \times 10^3$  خلية/ملم<sup>3</sup>

كريات الدم الحمراء =  $4.1 \times 10^{12}$  /لتر

معدل الخضاب = 11.7 جرام/ديسلتر

الصفائح الدموية =  $256 \times 10^9$  /لتر

زمن الثرومين = 13.4 ثانية

زمن الثرمبوبلاستين الجزئي = 36.2 ثانية

وجدت النتائج التي تخص RBCs، Hb، Platelets و ال PT أظهرت نقص بسيط عن المعدل الطبيعي، بالنسبة لنتيجة ال PTT فقد كان هناك زيادة بسيطة عن المعدل الطبيعي، لكن هذه الزيادة والنقص البسيط في هذه الفحوصات ليست ذات دلالة إحصائية.

WBCs أظهرت نتيجته زيادة بسيطة عن المعدل الطبيعي وهذه الزيادة ذات دلالة إحصائية بين مراحل الحمل الثلاثة خاصة في المرحلة الثانية من الحمل.

## List of contents

Subjects	Page No
Quranic Verse	I
Dedication	II
Acknowledgement	III
Abstract	IV
مستخلص البحث	V
List of contents	VI
List of tables	IX
List of figures	X
List of abbreviations	XI
<b>Chapter One: Introduction and Literature Review</b>	
1-1 Blood definition and composition	1
1-1-1 Haemopoiesis	1
1-1-2 Blood Physiology	3
1-1-2-1 Red Blood Cells	3
1-1-2-2 Heamoglobin	4
1-1-2-3 Leukocytes	4
1-1-2-4 Platelets	5
1-2 Hemostasis	9
1-2-1 Primary Hemostasis	9
1-2-2 Secondary Hemostasis	9
1-2-2-1 Intrinsic pathway	12
1-2-2-2 Extrensic pathway	13
1-2-2-3 Common pathway	14
1-2-2-4 Fibrinolysis	15
1-3 Pregnancy	16
1-3-1 Physiological changes in pregnancy	16
1-3-2 Effects of pregnancy on blood parameters	18
1-3-2-1 Hematological changes during pregnancy	18
1-3-2-2 Hemostatic changes during pregnancy	19
1-3-2-2-1 Platelet changes	19
1-3-2-2-2 Coagulation factor changes	19
1-3-2-2-3 Coagulation inhibitors changes	20
1-3-2-2-4 Changes in fibrinolysis	20
1-5 Rational	21
1-6 Objectives	22
<b>Chapter Two: Materials and Methods</b>	
2-1 Ethical consideration	23
2-2 Study design	23
2-3 Study area	23
2-4 Study population	23
2-4-1 Definition of the study population	23
2-4-1-1 Selection criteria	23
2-4-1-1-1 Inclusion criteria	23
2-4-1-1-2 Exclusion criteria	23
2-5 Sample size and type	23

2-6 Data collection	24
2-7 Data processing	24
2-8 Data presentation	24
2-9 Study duration	24
2-10 laboratory procedure	24
2-10-1 Materials	24
2-10-1-1 Equipments	24
2-10-1-2 Reagents	24
2-10-1-2-1 Reagents for complete haemogram	24
2-10-1-2-2 Reagents for PT and PTT	25
2-10-2 Methodology	25
2-10-2-1 Collection of blood samples	25
2-10-2-2 Complete hamenogram	26
2-10-2-2-1 Principle of automated analyzer system (sysmex)	26
2-10-2-2-2 Procedure	27
2-10-2-3 Prothrombine time test	27
2-10-2-3-1 Principle of PT test	27
2-10-2-3-2 Method of PT test	27
2-10-2-3-3 Expression of PT results	28
2-10-2-4 Partial thromboplastin time test	28
2-10-2-4-1 Principle of PTT	28
2-10-2-4-2 Method of PTT	28
<b>Chapter Three: Results</b>	
3-Results	29
<b>Chapter Four: Discussion, Conclusions &amp; Recommendations</b>	
4-1 Discussion	39
4-2 Conclusions	42
4-3 Recommendations	43
<b>Chapter Five: References</b>	
5- References	44
Appendixes	46

### List of Tables

<b>Table</b>	<b>Page No</b>
(Table I) distribution of study group according to age	31
(Table II) distribution of study group according to the trimesters	32
(Table III) distribution of study group according to the number of pregnancy	33
(Table IV) statistical significant in RBCs, Hb, Platelets, WBCs, PT and PTT between pregnant women in the three different trimester	34



## List of Figures

<b>Figure</b>	<b>Page No</b>
Fig. (1.1) The clotting cascade	15
Fig. (1.2) Tissue factor pathway coagulation cascade	16
Fig (3.1) distribution of study group according to age	31
Fig (3.2) distribution of study group according to the trimesters	32
Fig (3.3) distribution of study group according to the number of pregnancy	33
Fig (3.4) distribution of pregnant women according to supplement intake	34
Fig. (3.5) WBCs mean value of the study group at different trimester	37
Fig. (3.6) RBCs mean value of the study group at different trimester	37
Fig. (3.7) Hb mean value of the study group at different trimester	38
Fig. (3.8) Mean of platelets count of the study group in the three trimesters	38
Fig. (3.9) PT mean value at the three trimesters	39
Fig. (3.10) Mean of INR of the study group	39
Fig. (3.11) PTT mean value of the study group in the three trimesters	40