

# ***DEDICATION***

*To ...*

*My dear father  
My dear mother*

*Who made my life simple  
and warm; they  
are great, and nothing  
great without them*

*sisters  
brothers  
dear friends  
teachers*

*To*

***All pregnant women***

# Acknowledgements

*All my thanks are in the name of Allah, the most Gracious and the most Merciful.*

*I would like to express my profound thanks to my supervisor, Dr. Mohamed Abdulrahim Abdallah for his fruitful guidance, unlimited assistance, encouragement and sustained interest throughout the course of this work.*

*I wish to extend my warmest thanks to the staff of the Clinical Chemistry Department, Sudan University of Science and Technology, for their continuous support and encouragement.*

*My thanks are also extended to Hassan Khames( my older brother), Magzob salah, , Mohamed Yassin for helping me during the study.*

*Also I am grateful to all people from whom samples were taken.*

## **Abstract**

An analytical study conducted during the period of January to July 2011, to compare serum levels of total protein, albumin, and urea of 80 pregnant women, 18 pregnant women (at first trimester), 23 pregnant women (at second trimester), and 39 pregnant women (at third trimester), 20 health non pregnant women (as control group).

Participants in this study were seen at Saudi Maternal Hospital Omdurman, Sudan.

Serum levels of total protein, albumin, and urea were measured using Bio System Spectrophotometer 310 and commercial kits from Bio System Company.

The result of the study shows that the mean of the serum levels of total protein in first trimester had no significant difference when compared to control group ( $P=0.055$ ), while serum albumin and urea in first trimester were significantly decreased when compared to control group ( $P=0.007, 0.008$ ).

The mean of the serum levels of total protein, albumin and urea in the second trimester was significantly

decreased when compared to control group (P= 0.001, P= 0.000, P=0.000)

The mean of the serum levels of total protein , albumin and urea in the third trimester was significantly decreased when compared to control group (P= 0.000, P= 0.000, P=0.000)

The result of the study shows that the mean of the serum levels of total protein, albumin in first trimester has no significant difference when compared to that of second trimester (P= 0.088, P=0.068), while the serum levels of urea was significantly decreased (P=0.046).

The mean of the serum levels of total protein, albumin, and urea in first trimester significantly decreased when compared to that of third trimester (P= 0.000, P=0.000, P=0.001).

The mean of the serum levels of total protein, urea in second trimester was no significant difference when compared to that of third trimester (P= 0.193, P=0.194), while the serum levels of albumin was significantly decreased (P=0.000).

الدراسة التحليلية

اجريت هذه الدراسة التحليلية خلال الفترة من يناير وحتى يوليو 2011، حيث تم  
( 80 ) من المرضى الذين تم علاجهم في مستشفى الملك سعود بالرياض  
18 23، و 39 من المرضى الذين تم علاجهم في مستشفى الملك سعود بالرياض  
20 (المرضى).

تم إجراء الدراسة التحليلية باستخدام برنامج SPSS 16.0.

تم إجراء الدراسة التحليلية باستخدام برنامج SPSS 16.0.

تم إجراء الدراسة التحليلية باستخدام برنامج SPSS 16.0. (P=0.008) (P=0.007) 0.05  
تم إجراء الدراسة التحليلية باستخدام برنامج SPSS 16.0. (P=0.055) 0.05

تم إجراء الدراسة التحليلية باستخدام برنامج SPSS 16.0. (P=0.001) (P=0.000) (P=0.000) 0.05

...  
...  
... $(P=0.000)$ ... $(P=0.000)$ ... $(P=0.000)$  0.05 ...

...  
...  
... $(P=0.088)$ ... $(P=0.068)$  0.05 ...  
0.05 ...  
... $(P=0.046)$

...  
...  
... $(P=0.000)$ ... $(P=0.000)$  0.05 ...  
... $(P=0.001)$

...  
...  
... $(P=0.194)$ ... $(P=0.193)$  0.05 ...  
... $(P=0.000)$

## CONTENTS

TOPIC .....	page
Dedication.....	I
Acknowledgements.....	II
English Abstract.....	III
Arabic Abstract.....	V
Contents.....	VII
List of tables.....	X

### CHAPTER ONE

1. Introduction ,Rational and Objectives	
1.1. Introduction.....	1
1.2. Rationale.....	2
1.3. Objectives.....	3

### CHAPTER TWO

2.Literature review	
2.1.The human ovary.....	4
2.2.The menstrual cycle .....	5
2.3.Pregnancy.....	5
2.3.1.Diagnosis.....	6

2.3.2. Terms and Definitions .....	6
2.3.3. Pregnancy trimesters.....	7
2.3.4. Postterm, Gravidity and parity.....	7
2.3.5. Pregnancy outcomes.....	7
2.3.6. Dating of Pregnancy.....	8
2.3.7. Physiological changes in pregnancy.....	8
2.3.7.1. Cardiovascular.....	8
2.3.7.2. Pulmonary.....	9
2.3.7.3. Gastrointestinal.....	9
2.3.7.4. Hematology.....	10
2.3.7.5. Endocrine.....	10
2.3.7.6. Musculoskeletal and Dermatologic .....	11
2.3.7.7. Nutrition.....	11
2.3.7.8. Urinary system change.....	12
2.3.7.8.1. Renal.....	12
2.3.7.8.2. Renal Function.....	12
2.3.7.8.3. Bladder.....	13
2.4. Proteins during pregnancy.....	13
2.4.1. The functions of proteins.....	14
2.4.2. Digestion and absorbance of proteins.....	15
2.4.3. Biochemistry of Plasma Proteins.....	16
2.4.4. Total serum protein.....	17
2.4.4.1. Causes of total protein increasing.....	17
2.4.4.2. Total protein decreasing.....	17
2.5. Albumin.....	18
2.5.1. Reference Values.....	19
2.5.2. Increasing of albumin.....	19
2.5.3. Decreasing of albumin.....	19
2.5.4. Prealbumin (PAB).....	20
2.5.4.1. Reference Values.....	21
2.6. Blood Urea.....	21
2.6.1. Reference Values .....	22
2.6.2. Increased urea levels (azotemia).....	22
2.6.3. Decreased urea levels.....	22
2.6.4. Interfering Factors.....	23
2.6.5. The urea cycle.....	23
2.6.5.1. Ammonia excretion.....	23



2.6.5.2.Urea cycle.....	24
2.6.5.3.Hyperammonemia.....	25
2.6.6.Urea production and salvage during pregnancy in normal women.....	26
2.6.7.Urea synthesis during pregnancy.....	27

### CHAPTER THREE

3.Materials and Methods.....	28
3.1.Study approach.....	28
3.2.Study design .....	28
3.3.Study area.....	28
3.4.Study period.....	28
3.5.Study population and sample size.....	28
3.6.Ethical consideration.....	28
3.7.Data collection and analysis.....	28
3.7.1.Interview and Questionnaire.....	28
3.7.2.Clinical examination and diagnosis.....	29
3.8.Collection of blood sample.....	29
3.9.Instrument used for biochemical measurements...	29
3.10.Material required.....	29
3.11.Methodology.....	29
3.11.1.Biochemical Measurement.....	29
3.11.2.Measurement of serum albumin.....	30
3.11.3.Measurement of serum total protein.....	30
3.11.4.Measurement of blood urea.....	31
3.12.Quality control.....	32
3.13.Statistical analysis.....	32

### CHAPTER FOUR

4.Results.....	33
----------------	----

### CHAPTER FIVE

5.Discussion, Conclusion and Recommendation	
5.1Discussion.....	43
5.2.Conclusion.....	45
5.3.Recommendation.....	46
References.....	47

Appendix

**List of tables:**

Table(4-1)	Number of pregnant women according to pregnant duration (trimesters)	35
Table (4-2)	Disease history of pregnant women	36
Table (4-3)	Concentration of biological markers in pregnant women during first trimester and control women	37
Table (4-4)	Concentration of biological parameters in control women and pregnant women of second trimester	38
Table (4-5)	Concentration of biological parameters in control women and pregnant women of third trimester	39
Table (4-6)	Concentration of biological parameters in pregnant women during first and second trimester	40
Table (4-7)	Concentration of biological parameters in pregnant women during first and third trimester	41

Table (4-8) Concentration of biological parameters in pregnant women during second and third trimester.....42