



**Sudan University of Science and Technology**

**Collage of Graduate Studies**



**Evaluation of Serum Human Chorionic Gonadotropin Level in Women with Preeclampsia in Khartoum State**

تقويم مستوى هرمون الحمل في مصل الدم لدى النساء اللاتي يعانين من ارتداد الرحم (تسمم الحمل) في ولاية الخرطوم

A dissertational submitted for partial fulfillment for the requirement of M.Sc

Medical laboratory science –Clinical chemistry

BY:

Hanaa Abdeen Mohamed Elabied

B.Sc in Medical laboratory Sciences –clinical Chemistry

Khartoum University

2012

Supervisor:

Naser Aldin Mohamed Ahmed

2016

## الآيه

بسم الله الرحمن الرحيم

قال تعالى :

( قُلْ لَوْ كَانَ الْبَحْرُ مِدَادًا لِكَلِمَاتِ رَبِّي لَنَفِدَ الْبَحْرُ قَبْلَ أَنْ تَنفَدَ كَلِمَاتُ رَبِّي وَلَوْ جِئْنَا بِمِثْلِهِ مَدَدًا )

قال تعالى :

وَاللَّهُ خَلَقَ كُلَّ دَابَّةٍ مِنْ مَاءٍ ۖ فَمِنْهُمْ مَنْ يَمْشِي عَلَىٰ بَطْنِهِ وَمِنْهُمْ مَنْ يَمْشِي عَلَىٰ رِجْلَيْنِ وَمِنْهُمْ مَنْ يَمْشِي عَلَىٰ أَرْبَعٍ ۗ يَخْلُقُ اللَّهُ مَا يَشَاءُ ۗ إِنَّ اللَّهَ عَلِيمٌ ۖ كُلِّ شَيْءٍ قَدِيرٌ ﴿٤٥﴾

صدق الله العظيم

سورة الكهف الآية (109)

سورة النور الآية (45)

## **Dedication**

To my father and mother

To my sisters and brothers

To my dear family and friends

Hanaa

## **Acknowledgements**

First I thank Allah, who helps me to do this work successfully.

I hope to express my gratitude to my supervisor Dr. Nasereldin Mohamed Ahmed for his efforts and valuable supervision through out this work

Also deep thanks to my colleague in Omdurman military hospital and Bahry teaching Hospital.

Special thanks to doctor Nuha Algilai Abubkr, the head department of clinical chemistry and moawia Ali

And great thanks to doctors Yassir Alsamani and all staffs in Algilai Khalid Musa laboratory .

Finally my thanks for my family and all those encourage me and follow me to achieve this work.

## Abstract

**Background:** Pregnancy associated hypertensive disorder and intrauterine growth restriction are common complication responsible for neonatal and maternal morbidity. Most current hypothesis regarding the pathophysiologic mechanisms of pregnancy induced hypertension point to early placenta abnormalities. The production of hCG by the placenta in early pregnancy is critical for implantation and maintenance of the blastocyst. Since it is postulated that preeclampsia is likely a trophoblastic disorder. It may be essential for understanding of this disease, to investigate the pathologic and secretory reaction of the placenta.

**Materials and Methods:** A case control study was conducted at Omdurman military hospital and Khartoum Bahry Teaching Hospital during the period from June to December 2016. Eighty one pregnant women with gestational age 16-36 weeks were selected, they were classified into 3 groups: group 1 consist of 47 women with normal pregnancy as control an effort made to match the participant regarding age and gestational age, group 2 consists of 14 patients with mild preeclampsia and group 3 consists of 20 patients with severe preeclampsia. Maternal serum hCG, blood pressure and proteinuria were measured.

**Results:** The mean concentration of hCG was significantly increased among preeclamptic pregnant women ( $17472.59 \pm 4470.244$  ml IU/ml) in comparison with ( $12403.67 \pm 2647.164$  ml IU/ml) in normal pregnant women with (P value 0.012). The mean concentration of hCG in mild preeclamptic pregnant women was significantly decrease ( $14596.50 \pm 5037.689$  ml IU/ml) in comparison ( $46870.00 \pm 21864.876$  ml IU/ml) in severe preeclamptic pregnant women (with P value 0.006).

The mean concentration of hCG was significantly decreased in second trimester of pregnancy among preeclamptic pregnant women ( $7540.00 \pm 6314.45$  ml IU/ml)

in comparison with (24870.65±8006.34ml IU /ml )in third trimester of pregnancy among preeclamptic pregnant women with( P value 0.001) .Maternal serum BhCG is not correlated with systolic blood pressure ( r =0.140 , P- value 0.296 ) . Also no correlation with diastolic blood pressure (r =0.186, P-value 0.161).

Results showed that there is significant increased in BhCG and proteiuria with ( P-value 0.021) in preeclamptic pregnant women.

**Conclusion:** The study concluded that BhCG is higher in preeclamptic pregnant women than normal pregnant women.

## المستخلص

**خلفيه الدراسه:** اضطرابات الضغط اثناء الحمل وقصور النمو داخل الرحم هي من اكثر المضاعفات المسئوله عن موت الامهات والاجنه ومعظم البحوث الحديثه تعتبر آليه حدوث المرض التي تؤدي الى ارتفاع الضغط اثناء الحمل هي مشاكل المشيمه المبكره . خلال الحمل تصنع المشيمه عددهرمونات منها هرمون الحمل و له عدده فوائد منها غرس وحفظ البويضه في الرحم .ولفهم طبيعه هذا المرض يجب دراسه تغيير افرازات المشيمه وتفاعلاتها .

**الطرق والمواد:** اجريت دراسه استعاديه خلال الفتره من يونيو الى ديسمبر 2016م في مستشفى العسكري بام درمان (السلاح الطبي)ومستشفى الخرطوم بحري .وتمت هذه الدراسه 81 امراه حامل وصنفت الى ثلاثه مجموعات نساء لايعانين من ارتفاع الضغط كمجموعه تحكم ونساء زوات ارتداد رحم متوسط ونساء زوات ارتداد رحم عالي .تم اختيار النساء الصحيحات والمريضات على حسب عمر المرأة الحامل وعمر الجنين وتتراوح اعمارهن من 17-47 سنه. قد تم قياس مستوى هرمون الحمل وبروتين البول وضغط الدم لدى جميع المشاركات في البحث .

**النتائج:** اوضحت الدراسه ان هنالك زياده ذات دلالة احصائيه في متوسط تركيز هرمون الحمل عند النساء ذوات ارتداد الرحم ( $17472.59 \pm 14470.244$  ml IU/ml) مقارنة بالنساء ذوات الحمل الطبيعي (  $12403.67 \pm 2647.164$  ml IU/ml) القيمة الاحتمالية (0.012) ، وان هنالك نقصان في متوسط تركيز هرمون الحمل عند النساء ذوات ارتداد الرحم المتوسط ( $14596.50 \pm 5037.689$  ml IU/ml) مقارنة بالنساء ذوات ارتداد الرحم العالي ( $21864.876 \pm 46870$  ml IU/ml) القيمة الاحتمالية (0.006) ، وهنالك نقصان في متوسط تركيز هرمون الحمل في الثلث الثاني من الحمل ( $6314.45 \pm 7540$  ml IU/ml) مقارنة بمتوسط هرمون الحمل في الثلث الثالث من الحمل ( $8006.34 \pm 24870.65$  ml IU/ml) لدى النساء ذوات ارتداد الرحم العالي ، القيمة الاحتمالية (0.001).كما بينت الدراسه انه لا يوجد ارتباط بين مستوى هرمون الحمل و ضغط الدم الانقباضي ( $R=0.142$ , p value 0.296) وضغط الدم الانبساطي ( $r= 0.186$  p value 0.161). كما اوضحت أن هنالك ارتباط طردي بين متوسط هرمون الحمل وبروتين البول والقيمة الاحتمالية (0.021) لدى النساء ذوات ارتداد الرحم.

**الخلاصة :** خلصت الدراسه الى ان هنالك زياده في متوسط تركيز هرمون الحمل لدى النساء ذوات ارتداد الرحم مقارنة بالنساء ذوات الحمل الطبيعي

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**Abbreviation:**

PE	Preeclampsia
BhCG	Human chorionic gonadotropin
HTN	Hypertension
DM	Diabetes mellitus

# **Chapter One**

## **Introduction**

### **Literature review**

## **1. Introduction**

### **1.1 Human chorionic gonadotropin and preeclampsia**

Human hCG is glycoprotein with lipid structure that is expressed in trophoblast and various malignant tumor. Human placenta synthesis steroid, protein, glycoprotein throughout gestation (Petralgia, 1990). The production of hCG by placenta is crucial for implantation and maintenance of blastocyst since it postulate that PE is trophoblastic disorder, it has become to investigate the pathologic and secretory reaction of placenta (Redman, 1990). Twins pregnancies and molar pregnancy produce higher levels of hCG and they are associated with higher incidence of PE than uncomplicated singleton pregnancies (Curry et al, 1975). An association between PE and elevated third trimester hCG levels considerable evidence suggests an association between serum hCG and PE (Onderoglu et al, 1997, Anneli et al, 1998). Physiological concentration of hCG is significantly increased invitro capillary formation and migration of endothelial cells in dose dependent manner and has novel function in uterine adaptation to early pregnancy (Zygment et al, 2002).

### **1.2 Human placenta hormones**

Human placenta synthesis steroid, protein, glycoprotein hormone throughout gestation (Petralgia, 1990)

#### **1.2.1 Steroid hormone**

Steroids hormones produced by placenta as estrogen, progesterone, and relaxin

#### **1.2.2 Protein hormone**

Protein hormone produced by placenta as human chorionic somatomammotropin (hCS) or human placental lactogen (hPL)

### **1.2.3 Glycoprotein hormone**

Glycoprotein produced by placenta as human chorionic gonadotropin (hCG) or choriogonadotropin (Carl et al, 2008)

### **1.3 Human chorionic gonadotropin**

Human chorionic gonadotropin is hormone produced during pregnancy that is made by the developing embryo after conception and later by the syncytiotrophoblast (part of placenta). hCG is glycoprotein with lipid structure that is expressed in trophoblast and various malignant tumor (Carl et al, 2008). hCG can be detected by blood test around eight to eleven days past ovulation. The production of hCG by placenta in early pregnancy is crucial for implantation and maintenance of blastocyst since it is postulate that preeclampsia is trophoblastic disorder (Redman, 1990) , twin pregnancies (Long and Oat 1987) and molar pregnancies (Curry , 1994) produce higher levels of hCG and they are associated with a higher incidence of preeclampsia than uncomplicated singleton pregnancies. An association was reported between preeclampsia and elevated third trimester hCG levels (Hsu, 1994), whereas early experience with second trimester levels suggests a link between increased hCG and other adverse pregnancy outcomes (Wenstrom, 1994, Onderoglu , 1997).

#### **1.3.1 Function of Human chorionic gonadotropin**

hCG maintains the corpus luteum, which is responsible for progesterone production in early pregnancy that is help to keep the lumen of uterus thick for healthy pregnancy, to maintain endometrium for the first trimester, to stimulate fetal gonad development and androgen synthesis by the fetal testes and to stimulate secretion of estrogen and development of placenta (Carl et al, 2008)

### **1.3.2 Human chorionic gonadotropin during second and third trimester of pregnancy**

In most cases hCG levels will double every 13-72 hours in early pregnancy the level will reach its peak at around 8-11 weeks of pregnancy and then will decline and level off for the remainder of the pregnancy

### **1.4 Type of hypertention during pregnancy**

Type of hypertention during pregnancy are gestational hypertention, preeclampsia and eclampsia

#### **1.4.1 Gestational Hypertention**

Gestational hypertention is the development of new hypertention in pregnant women after 20 weeks gestation with out the presence of protein in urine or the signs of preeclampsia .Gestational hypertention is dfined as having blood pressure higher than 140/90 mmHg measured on two occasion,more than 6 hours apart, with out the presence of protein in the urine and diagnosed after 20 weeks of gestation (Mission and Cougher,2013)

#### **1.4.2Preeclampsia(PE)**

Preeclampsia is gestational hypertention plus protein in a24 hour urine sample .sever preeclampsia involves blood pressure greater than 160/110 mmHg with additional medical signs and symptoms, mild preeclampsia when blood pressure greater than 140/90 and less than 160/110.

Preeclampsia is a multi systemic disorder involving the placenta ,liver ,kidneys, blood and neurological and cardiovascular system (wagnar,2004).It is arelatively common syndrome ,dangerous for mother and infant ,unpredictable in its onset and



progression ,unpredictable except through termination of pregnancy (Redman,1991).

The symptoms of this multisystemic disorder which appear during the second and third trimester of pregnancy are caused by increase vasoconstriction, which result in maternal hypertention, decreased , uteroplacental blood flow ,edema, proteinuria, abnormal clotting liver and renal dysfunction (James 2006,Cromble 2008) Generalized dysfunction of maternal cells may underlie most of the clinical symptoms such as hypertention , fluid retention and clotting abnormalities .hormonal changes contribute to the physiological maternal adaptation during human gestation ,these hormonal changes are different in pathological pregnancy and may be monitored for diagnosis or risk prediction of gestational disease taking into account both hormonal levels and preexisting maternal risk factor (Reis etal,2002) . Excessive or deficient release of some placental hormone in association with gestational diseases may be of an adaptive response of the placental and fetal membranes to adverse environmental condition such as hypertention, hypoxia and infection or to malformation of the fetus and placenta (Larry ,2006)

The high concentrations of these placental hormones in maternal peripheral blood, in fetal (cord) blood, and in the amniotic fluid are clinically accessible signs of increased placental hormone synthesis(Reis,2002).The secretion of several placental hormones is augmented in preeclamptic patients such as hCG, estrogen and inhibin A

### **1.4.3Eclampsia**

Eclampsia is occur when tonic –clonic seizure appear in pregnant women with high blood pressure and proteinuria

## **1.5Risk factor**

### **1.5.1-Maternal causes**

Maternal causes such as obesity ,age 43 or more ,past history of DM, HTN ,renal disease ,adolescent pregnancy ,new paternity ,thrompophilia and having donated a kidney.

### **1.5.2pregnancy**

Pregnant women with multiple gestation, placental abnormalities as hyperplacentalosis and placental ischemia.

## **1.2 literature review**

Study was done in Egypt from June 2009 to June 2010 on 90 pregnant women classified into 3 group: group 1 consist of 30 normotensive non proteinuric pregnant women ; group 2 consist of 30 women with mild preeclampsia ;and group 3 consist of 30 women with sever preeclampsia .it found the maternal serum B-hCG was significantly higher in group 3 than in group 2 and group 1

The maternal age; maternal serum levels B-hCG showed a significant positive correlation with SBP/DBP and albuminuria in group 2 . The maternal serum B-hCG and age showed asignificant positive correlation with SBP/DBP and albuminuria in group 3(Elhadi, 2011).

Study was done in Dhaka medical college hospital ,Dhaka between January and July 2013 on 74 pregnant women with preeclampsia and 76 normotensive pregnant women .It found significant difference between the B-hCG level in the preeclamptic women compared to the normotensive pregnant women and severity of preeclampsia increase with further rise of B-hCG level(Begumz etal,2014) .

Study was done in china on 142 normotensive and 43 preeclamptic women .The study conclude that that B-hCG level might reflect the degree of disorder activity of placenta induced hypertention and could be utilized as marker for in determing PIH (Feng etal ,2000)

Study was done in Iraq on 120 pregnant women divided into 30 healthy pregnant women and90 pregnant women with preeclampsia whose divided into 37 pregnant women with mild preeclampsia and 53 pregnant women with severe preeclampsia .this study conclude that preeclamptic women with severe cases but not mild cases had significant increased levels of serum hCG as compared with healthy pregnant (Suaad et al ,2012 )

Study was done in turkey on thirteen women with sever preeclampsia and twenty one normotensive, healthy pregnant women with singleton pregnancies in the third trimester were matched .It conclude there is relationship between sever preeclampsia and elevated serum B-hCG levels (Remzi et al ,2000).

Study was done in Iran on 66 preeclampsia pregnant women matched by age and gestational age to 66 normotensive pregnant women, the study concluded that the mean of maternal serum B-hCG level in patient with preeclampsia was significant higher than control (yousif and moslemizadeh,2013).

Study was done in Nigeria on 70 pregnant women with preeclampsia and 80 health normotensive pregnant women, the study concluded that there is low serum beta human chorionic gonadotropin in preeclamptic pregnant women (Adeosun,2016)

### **1.3 objectives:**

#### **1.3.1 general objective:**

To study the beta human chorionic gonadotropin on preeclamptic pregnant women .

#### **1.3.2 specific objective:**

1. To measure and compare between BhCG in preeclamptic pregnant women and normal pregnancy.
2. To measure and compare between BhCG level in mild and sever preeclampsia.
3. To measure and compare between second and third trimester BhCG in preeclamptic pregnant women.
4. To correlate between BhCG and systolic and diastolic blood pressure in preeclamptic pregnant women.
5. To find association between B hCG and proteinuria in preclamptic pregnant women

## **1.4 Rationale**

Preeclampsia is common syndrome dangerous for mother and infant unpredictable in its onset and progression and untreatable except through termination of pregnancy (Redman, 1990). It affects up to 7% of pregnant women and is considered a leading cause of fetal growth restriction and perinatal morbidity and mortality. Number of theories have been put forward Where different biochemical markers have been implicated in the causal association of preeclampsia. Several studies have reported an association between unexplained increases in maternal serum hCG levels in the second trimester of pregnancy and subsequent development of preeclampsia (Hsu, 1991).

To our knowledge up to now no research has been divert to solve or to illustrate the correlation between hormone BhCG and preeclampsia .

**Chapter two**

**Material**

**&**

**Methods**

## **2-Material and Methods**

### **2.1 Study design**

This is a case control study.

### **2.2 Study area**

This study was conducted on Omdurman Military Hospital and Bahry Teaching Hospital.

### **2.3 Study populations**

Eighty pregnant women were selected for this study of thirty three pregnant women with preeclampsia (as case) depending on clinical sign and forty seven normal pregnant women (as control)

#### **2.3.1 Inclusion criteria**

Specimens were collected from Pregnant women with preeclampsia and apparently healthy pregnant women with gestational age 20-36 weeks

#### **2.3.2 Exclusion criteria**

Pregnant women with chronic hypertention, multiple pregnancy ,diabetes mellitus and women suspected to have premature delivery were excluded from study

### **2.4 Ethical approval**

The research was granted ethical approval by Sudan University research committee and informed consent was given by each participants (appendix).

### **2.5Data collection**

The data were collected by using a direct interviewing questionnaire (appendix)



## **2.6 Sample size**

About 34 patients visited the hospital during the period June to december. 2016 and matched group by 47 healthy pregnant as control group from the Hospital.

## **2.7 Sample collection**

Sample collected using vacotainer system, tourniquet was used to make veins more prominent, 3 ml blood sample was collected in plane container and was collected under septic condition .All blood sample in plane container were allowed to clot at 25 c, then they were centrifuged at 4000 Rpm to obtain serum and stored at -20 until analysis .Also urine samples were collected and examined directly for protein which was measured by dipstick test.

## **2.8Sample analysis**

### **2.8.1 Methods**

TOSOH AIA System Analyzer was used for measurement of BhCG.

### **2.8.2 Principle of the assay**

Brief according to manufacture, the STAIA-PACK BHCG is tow –site immunoenzymometric assay for the intact hCG molecule and beta subunit which is performed entirely in the STAIA –pack BhCG test sups. Intact hCG molecule and beta subunits present in the test sample are bound with monoclonal antibody immobilized on magnetic solid phase, and then a distinctly different antigenic site on the beta subunits is bound with enzyme –labeled monoclonal antibody in the test cups. The magnetic beads are washed to remove unbound enzyme labeled monoclonal antibody and are then incubated with a fluorogenic substrate 4-methylumbelliferyl phosphate (4MUP). The amount of enzyme –labeled monoclonal antibody that binds to the beads is directly proportional to the beads is directly proportional to the BhCG concentration in the test sample. Standard

curve is constructed, and unknown sample concentration are calculated using this curve.

## **2.9 Quality control**

For internal quality control, normal control sera and pathological control sera were included in every batch of chemical analysis.

## **2.10 Statistical analysis**

The data was analyzed using statistical package of social science (SPSS computer program ), independent t test ; one way ANOVA ; and correlation were used to correlate and compare between study parameter and test variables .

# **Chapter three**

## **Results**

### 3 Results

This study included 34 preeclamptic pregnant women and 47 normal pregnant women. The mean concentration of BhCG was significantly increased among preeclamptic pregnant women ( $17472.59 \pm 4470.244$ ) in comparison with ( $12403.67 \pm 2647.164$ ) in normal pregnant women with P value 0.012 which is presented in figure 3:1

The mean concentration of BhCG in mild preeclamptic pregnant women was significantly decrease ( $14596.50 \pm 5037.689$ ) in comparison ( $46870.00 \pm 21864.876$ ) in sever preeclamptic pregnant women with P 0.006 which is presented in figure 3:2

The mean concentration of BhCG was significantly decreased in second trimester of pregnancy among preeclamptic pregnant women ( $7540.00 \pm 6314.45$ ) in comparison with ( $24870.65 \pm 8006.34$ ) in third trimester of pregnancy among preeclamptic pregnant women with P value 0.001 which is presented in figure 3:3

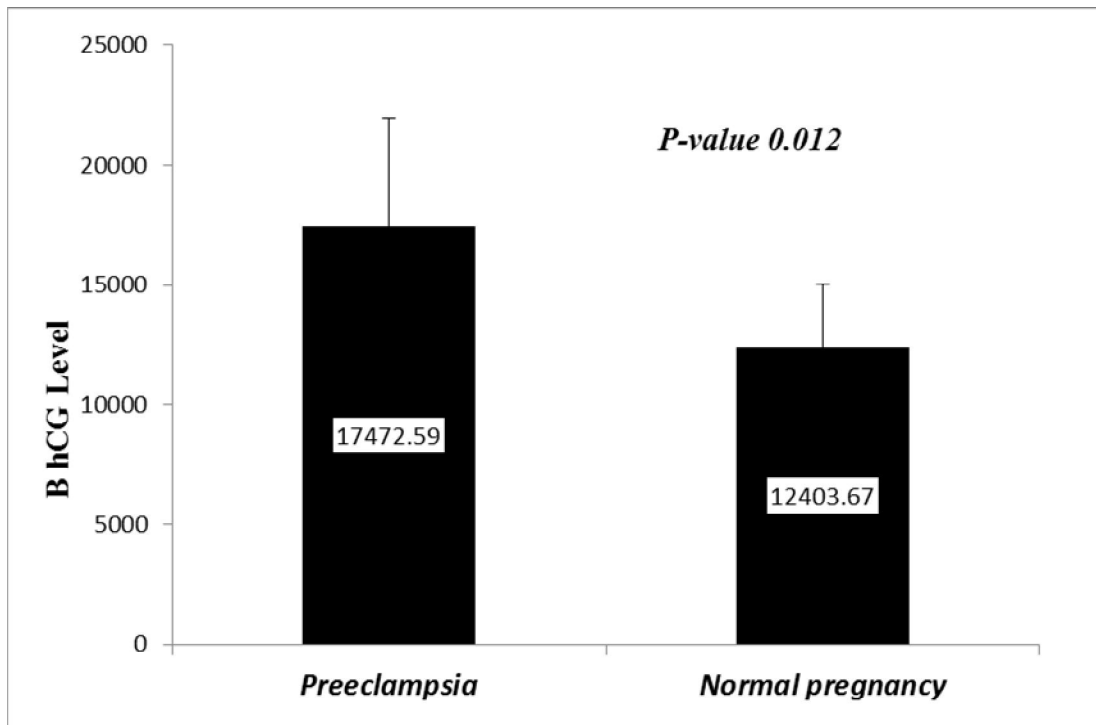
Pearson,s correlation showed maternal serum BhCG is not correlated with systolic blood pressure (  $r = 0.140$  , P- value 0.296 ) which is presented in table 3.1 . Also no correlation with diastolic blood pressure ( $r = 0.186$ , P-value 0.161) which is presented in table 3:1

One way ANOVA used to compare between B hCG and proteinuria which showed that there is significant increased in BhCG and proteiuria ( with P-value 0.012) in preeclamptic pregnant women which is presented in Figure 3:4

Table 3.1 correlation between BhCG and systolic and diastolic blood pressure

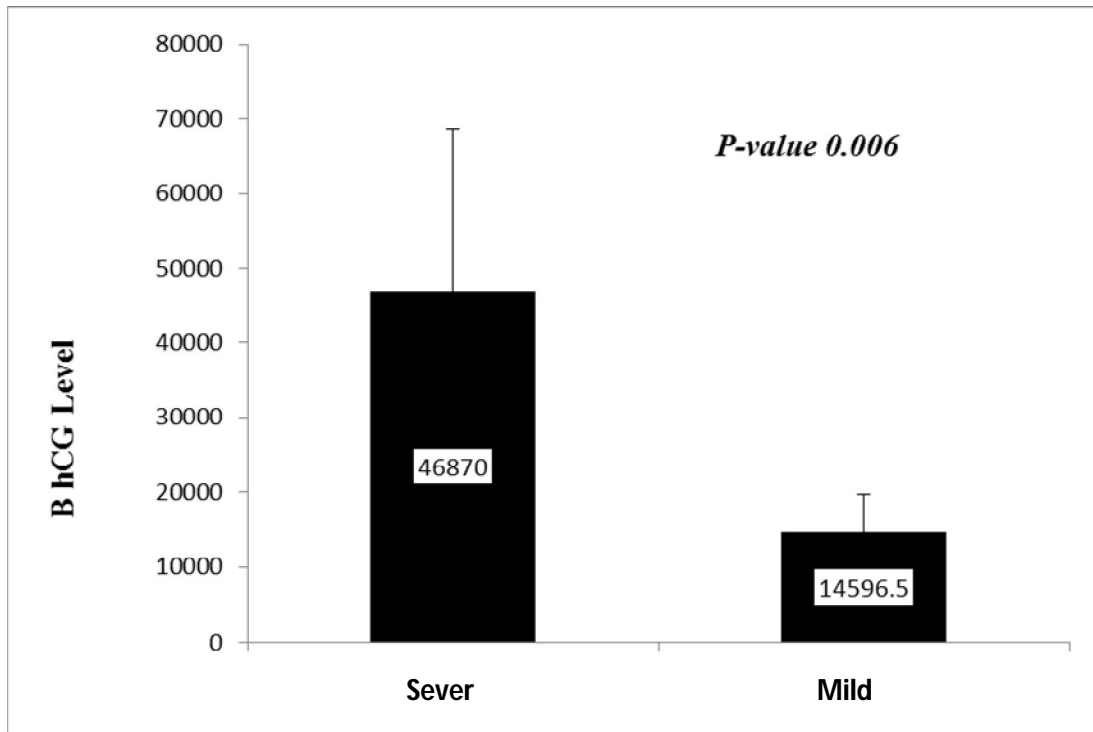
<b>Variable</b>	<b>R-value</b>	<b>P-value</b>
Systolic blood pressure	0.140	0.296
Diastolic blood pressure	0.186	0.161

Figure 3:1 B- hCG level in preeclampsia pregnant women and normal pregnancy women



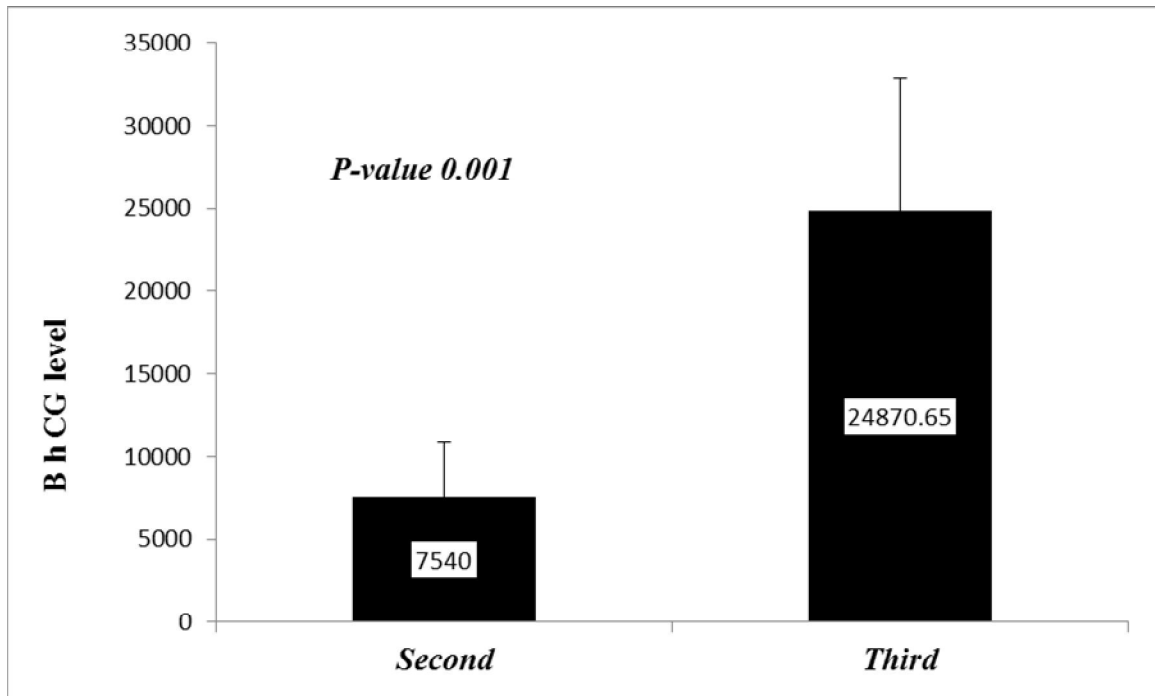
Results express as mea  $\pm$ SD, significant considered as P-value  $<0.05$

Figure 3:2 B- hCG level in mild and sever preeclampsia pregnant women



Results expressed as mean  $\pm$ SD ,significant the P-value  $<0.05$

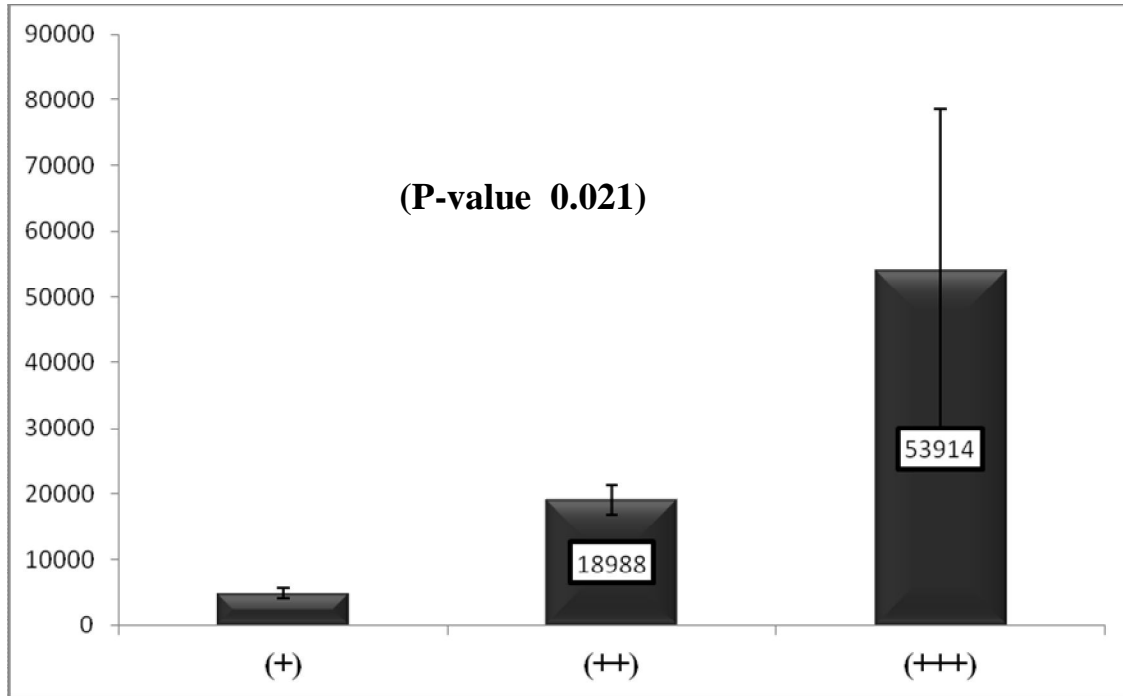
Figure 3:3 BhCG level in second and third trimester of pregnancy in preeclamptic pregnant women



Results express as mean  $\pm$ SD; significant the P-value  $<0.05$



Figure 3:4 relationship between the BhCG and proteinuria



Results expressed as mean  $\pm$  SD, significant the P-value  $< 0.05$

# **Chapter four**

**Discussion**

**&**

**Conclusion**

**&**

**Recommendation**

## 4.1 Discussions

The normal placenta differentiates during pregnancy with dominance of cytotrophoblast in early gestation and syncytiotrophoblast in late gestation. It is well known that cytotrophoblasts are undifferentiated stem cells and that syncytiotrophoblasts are differentiated from the cytotrophoblast (Kliman et al, 1987). Although the mechanism of regulation of gestational hCG remains largely unknown, it is generally accepted that hCG is secreted only by the syncytiotrophoblast (Fox, 1970). Remzi et al showed that early placental vascular damage leading to decreased oxygen supply might result in increased hCG production by hyperplastic cytotrophoblastic cells (Remzi, et al., 2000). Also, hCG production has been shown to increase when normal placental villi in organ culture were maintained under hypoxic condition. Typically the placenta is the affected tissue in PE (Correa et al, 2007). In PE, placental pathologic examination reveals focal cellular necrosis in the syncytiotrophoblast and increased mitotic activity with cellular proliferation in the cytotrophoblast. In addition, the proliferating cytotrophoblast in severe PE is rapidly transformed into syncytiotrophoblast within 72 hour (Hoshina et al, 1982).

In recent years, many studies have been conducted to determine the relation between maternal serum hCG levels and subsequence development of PE.

This study showed that, the mean concentration of BhCG was significantly higher in preeclamptic pregnant women than that in their control counterpart with P-value 0.012, this finding was in agreement with previous report who stated that there is association between BhCG level and PE (Elhadi et al, 2011; Begumz et al, 2014; Feng et al, 2000; Suaad et al, 2012; Remzi et al 2000; Yousif and moslemizaden, 2013). In contrast with other study reported contradict our finding

that, serum BhCG decrease in pregnant women with preeclampsia (Adeosun et al ,2016)

The independent t test showed that there is significant decrease in BhCG in mild preeclampsia in compare to sever preeclampsia with P-value 0.006 , this finding was agreement with previous report who stated that there is increase in BhCG in sever preeclampsia than mild preeclampsia ( Begumz et al ,2014 ; Suaad et al ,2012 ; Remzi et al ,2000 ;)

The independent t test showed that there is significant decrease in BhCG in second trimester in compare to third trimester with (P-value 0.001) this finding was agreement with other study who reported that serum BhCG is higher in third trimester in women with preeclampsia ( Remzi et al,2000 )

Pearson correlation showed that there is no correlation between BhCG and systolic and diastolic blood pressure with P-value(0.296, 0.161 ) respectively ,this finding was not agreement with previous report who stated that there is correlation between BhCG and systolic and diastolic blood pressure ( Elhadi et al 2011 , Begzum , 2014).

One way ANOVA showed that there is significant increased in BhCG and proteinuria with P-value (0.021),this finding agreement with other study report who stated that there is significant different when compare between BhCG and proteinuria (Elhadi et al ,2011).

#### **4.2 Conclusion:**

The Study concluded that BhCG is higher in preeclamptic pregnant women than normal pregnant women.

#### **4.3 Recommendation:**

1. Measure BhCG concentration at early of pregnancy
2. Do cohort study to know consequence of elevation of BhCG in preeclamptic women.
3. Do other study to know the mechanism of elevation of BhCG in preeclampsia

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# **Appendix**

## Questionnaire

### For Preeclampsia:

Name .....NO (.....)

Age .....years

Gestational age .....

Chronic Hypertension Yes (....) No (.....)

Multiple Pregnancy Yes (.....) No (.....)

Diabetes Mellitus Yes (.....) No (.....)

Premature Delivery Yes (.....) No (.....)

Biochemical finding :

Blood Pressure :

Diastolic .....Systolic Pressure .....

Beta HCG.....mlu/ml

Proteinuria .....

**For control:**

Name .....No (.....)

Age .....Years

Gestational age .....

Biochemical finding:

Blood pressure:

Systolic pressure .....Diastolic pressure .....

Beta HCG.....mlu/ml

Proteinuria .....

## Consent Form

الاسم.....العمر.....رقم التلفون .....

عزيزي المريض :

مشاركتك في هذا البحث ستساعدنا كثيرا في تحديد نسبه المرضى الذين يعانون من ارتفاع نسبه هرمون الحمل اثناء ارتفاع ضغط المراه الحامل وذلك لمنع مضاعفاته على الام والجنين والفائده قد لا تكون مباشره عليك ولكن قد يستفيد منها مرضى اخرون مما يعود بالنفع والثواب عليك بعد موافقتك وموافقته الطبيب المعالج لك سيتم اخذ الاتي :

عينه من دم الوريد قدرها 5مل

عينه من البول

قد نحتاج لأخذ عينه ثانيه اذا احتاج الامر

ارجوا التوقيع في الاسفل في حال الموافقه واذا كان لديك اي سوال لا تتردد في ان تسال .

التوقيع : .....