

## Prothrombin Time and Activated Partial Thromboplastin Time (PT & APTT) among Gestational Diabetes Mellitus, 2017

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### Abstract:

**Background:** *Diabetes mellitus is carbohydrate disorders characterized by hyperglycemia resulting from defect in insulin secretion, action, or both. It is classified into type I, type II, and Gestational diabetes. Gestational Diabetes Mellitus This diagnosis is given when women, who has never had diabetes before, gets diabetes or high blood sugar when she is pregnant. GDM affect 2-10% of women during their pregnancy, it is important to recognize and monitor GDM closely due to the risk of adverse effects to the mother and fetus such as development of preeclampsia, necessity for cesarean section and it is associated risk of birth injuries.*

**Objectives:** *The purpose of this study was to measure and compare the range of Prothrombin time and activated partial Thromboplastin time in gestational diabetes mellitus and normal pregnant women according to the age, trimester and diabetes onset.*

**Material and method:** *This was a case control study conducted in Khartoum state (Al-Saudi hospital) in 2017. It included 100 samples, 50 were gestational diabetes mellitus and 50 were normal pregnant women as control group. Random blood glucose was estimated by biosystem, Prothrombin time and activated partial Thromboplastin are estimated by coagulometer.*

**Result:** *PT and APTT were significantly lower in GDM patients compared to normal control group ( $P > 0.05$ ). PT and APTT were significantly lower in trimester 3 GDM patient.*

**Conclusion:** *This study finding indicates that shorten time of PT and APTT in GDM developing thrombi embolism more than normal pregnant women.*

**Key words:** gestational diabetes mellitus, normal pregnant women

## INTRODUCTION

Diabetes mellitus is carbohydrate disorders characterized by hyperglycemia resulting from defect in insulin secretion, action, or both.<sup>3</sup> It is classified into type I, type II, and Gestational diabetes. 1. Gestational Diabetes Mellitus This diagnosis is given when women, who has never had diabetes before, gets diabetes or high blood sugar when she is pregnant and it associated with increase complication to mothers and fetus. 1. Pregnancy is associated with homeostasis changes include as increase in the majority of clotting factors, decrease of quantity of natural anticoagulant, and reducing in fibrinolytic activity. These changes result in a state of hyper coagulability, due to hormonal change and increase the risk of thrombi embolism. The increase in clotting activity is greatest at the time of delivery with placental explosion, releasing thromboplastic substances. Which stimulate clot formation to stop maternal blood loss.<sup>5</sup> since the placenta is what causing the insulin resistance, when it is gone, gestational diabetes usually resolves as well. GDM have 40% higher chance of developing type II diabetes later in the life than normal pregnant women. 6. GDM increase risk of intrauterine fetal death during the last 4<sup>th</sup> – 8<sup>th</sup> weeks of gestation. 2. Women at high risk of GDM should have glucose testing at the first antenatal visit if not to

have GDM at the initial screening retest at between 24<sup>th</sup> and 28 weeks gestation.<sup>7</sup>

## **MATERIAL AND METHOD:**

This were case control study conducted in Khartoum state (alsaudi hospital) in 2017 .it include 100 samples ,50 were gestational diabetes mellitus and 50 were normal pregnant women as control group .random blood glucose was estimated by biosystem, Prothrombin calibrated kits used in laboratory practice for specific coagulation tests . 2 ml of blood sample was collected into standard tubes containing 0.25ml of 0.109M trisodium citrate. platelets poor plasma was obtained by centrifugation at 3500g at 10°C for 20 min the plasma sample was analysis immediately after preparing ,normal range of PT(11 -15 Sec) and for APTT(25-45 Sec).

**Inclusion criteria:** gestational diabetes mellitus and normal pregnant women.

**Exclusion criteria:** any gestational diabetes has pathological condition affect PT and APTT.

**Statistical analysis:** data was analyzed manually by using computer software (spss version21) and the result was presented in the tables. Statistical value for  $p < 0.05$  were considered significant, and  $p > 0.05$  were considered in significant.

## **RESULTS:**

A total of 100 sample were collected in this study

**Table 1: Comparison of PT and APTT between GDM and normal pregnant**

	Group	N	Mean	Std. Deviation	p.value
PT	Case	50	9.3980	.84527	.000
	Control	50	13.1100	1.01464	
APTT	Case	50	28.7540	2.09628	.000
	Control	50	31.7260	3.35588	

**Table 2-2: Comparison between trimester 1 and 2 in GDM group**

	Group	N	Mean	Std. Deviation	p. value
PT	trimester 1	13	9.4538	.88092	.632
	trimester 2	19	9.5947	.71839	
APTT	trimester 1	13	30.5000	1.81246	.037
	trimester 2	19	29.0895	1.77823	

**Table 2-2: Comparison between trimester 1 and 3 in GDM group**

	Group	N	Mean	Std. Deviation	p.value
PT	trimester 1	13	9.4538	.88092	.365
	trimester 3	18	9.1500	.92434	
APTT	trimester 1	13	30.5000	1.81246	.000
	trimester 3	18	27.1389	1.33423	

**Table 2-3: Comparison between trimester 2 and 3 in GDM group**

	Group	N	Mean	Std. Deviation	p.value
PT	trimester 2	19	9.5947	.71839	.110
	trimester 3	18	9.1500	.92434	
APTT	trimester 2	19	29.0895	1.77823	.001
	trimester 3	18	27.1389	1.33423	

**Table 3 -1 : Group comparison between age group(15-25)&(26-35)**

	AGE	N	Mean	Std. Deviation	p. value
PT	15-25	9	9.6444	1.00637	0.355
	26-35	23	9.3000	.90303	
APTT	15-25	9	29.0556	2.24060	0.818
	26-35	23	28.8522	2.22442	

**Table 3 -2 : Group comparison between age group(15-25)&(36 -45)**

	AGE	N	Mean	Std. Deviation	p.value
PT	15-25	9	9.6444	1.00637	.465
	36-45	18	9.4000	.69452	
APTT	15-25	9	29.0556	2.24060	.494
	36-45	18	28.4778	1.93863	

**Table 3 -3 : Group comparison between age group(26 -35)&(36 -45)**

	AGE	N	Mean	Std. Deviation	p.value
PT	26-35	23	9.3000	.90303	.70
	36-45	18	9.4000	.69452	
APTT	26-35	23	28.8522	2.22442	.575
	36-45	18	28.4778	1.93863	

## DISSCUSSION:

The present study was done on 50 gestational diabetes mellitus and 50 normal pregnant women as control. Prothrombin time and activated partial Thromboplastine were measured and compared between GDM and control (table one). PT value were highly significantly low  $p < 0.05$  between GDM and control group indicating that PT is short in GDM. APTT value also were highly significantly low  $p < 0.05$  indicating that APTT is short time in GDM. Shorten time in PT and APTT IN GDM have been considered to contribute to the high risk of thrombi embolism. According to GDM trimester PT and APTT were insignificant different in trimester 1 compared to trimester 2  $p > 0.05$  table (2-1). in trimester 1 compared to trimester 3 PT value were insignificant different  $P > 0.05$ , but APTT were highly significant low  $P < 0.05$  table(2-2). In trimester 2 compared to 3 PT and APTT were highly significant low  $P < 0.05$  table (2-3). according to GDM age ther is no significant different between age groups table (3-1( (3-2) (3-3) PT & APTT  $p > 0.05$ .

## **CONCLUSION:**

Gestational diabetes mellitus is complicated pregnancy by exposing prothrombosis and may be dangerous for both mother and her baby. And level of coagulation factors IN (PT&APTT) may vary in different stage of pregnancy. Similar to previously reported studies this study suggested that GDM play role in pathogenesis leading to thrombotic tendency. Further clinical studies at large scale are needed to further delineate the relationship between GDM and thrombosis.

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