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Research Article

**PROLACTIN WITH THE PREVALENCE OF GLUCOSE  
INTOLERANCE AMONG PREGNANT FEMALES**<sup>1</sup>Muhammad Mateen, <sup>2</sup>Talha Irfan, <sup>3</sup>Dr Muhammad Haseeb<sup>1</sup>Rawal Institute of Health Sciences, Islamabad<sup>2</sup>Islamic International Medical College, Rawalpindi<sup>3</sup>Army Medical College, Rawalpindi

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**Abstract:**

**Objective:** The purpose of this study is to determine the association of the prolactin with prevalence of glucose intolerance in period of pregnancy.

**Methodology:** This research work performed on 30 females with Gestational Diabetes Mellitus and 30 females with Impaired Glucose Tolerance and 30 healthy controls having fine glucose tolerance. All the participants were fasted overnight before test. We drew the sample of blood at 6.00 A.M. After that, 75.0 grams' oral glucose dissolved in 200.0cc water was provided to every patient, waiting for 2 hours, we drew another sample of blood from each member. Fasting as well as two hours after 75.0 grams' load of glucose, concentrations of plasma glucose (FBS & 2h-BS) were estimated by the method of glucose oxidase. We used immunoradiometric assay to measure the concentrations of insulin in fasting blood sample and sample after two hours with 75.0 grams' glucose load sample. We also used specific radioimmunoassay for the measurement of concentrations serum prolactin in after two hours' sample.

**Results:** There was no important disparity in the level of fasting serum insulin of all participants of 3 groups ( $P > 0.050$ ) whereas, the average level of two hours' serum insulin of group of females suffering from gestational diabetes mellitus group was much lower as compared to participants of impaired glucose tolerance and healthy controls groups ( $P < 0.0050$ ). Results showed that level of serum prolactin of healthy controls in 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> trimester increases with the increase in pregnancy period ( $P < 0.00010$ ). The findings of serum prolactin of control, gestational diabetes mellitus and impaired glucose tolerance groups in the last trimester stated that there was no significant difference in any two groups ( $P > 0.050$ ). According to the findings, there highest average of the level of prolactin was present in the group of healthy controls.

**Conclusion:** Level of prolactin increases with the increase of pregnancy period. This level reaches its peak value in the 3<sup>rd</sup> trimester when majority of the pregnant women may develop gestational diabetes mellitus because of condition of resistance to insulin. There are no proper evidences, if there is association of prolactin level with the insulin intolerance in females with pregnancy.

**Keywords:** Gestational Diabetes Mellitus, Trimester, Pregnancy, Prolactin, Intolerance, Impaired Glucose Tolerance, Radioimmunoassay.

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**INTRODUCTION:**

Prolactin or is a hormone of protein having molecular weight of approximately 23kDa [1] and it contains 199 amino acid residues as well as 3 disulfide bridges. It also has similarity in structure to the human growth hormone and HCS (Human Chorionic somatomammotropin). Half-life of prolactin is approximately 20 minutes [2]. Prolactin-secreting lactotrophs, which generally make up to 20.0% cells in pituitary in both males and nulliparous females, intensification to comprise up to 50.0% pituitary cells at last moments of pregnancy. Hyperplasia is considered to be the multiplication of lactotrophs which is associated to the direct impact of the increasing secretion of estragon as well as its action [3]. The mount of these particular cells as well as their sizes continue to increase in the period of pregnancy [1]. Prolactin is main cause of the secretion of milk from breasts after estrogen and progesterone priming. Prolactin also has the ability to restrict the impacts of the gonadotropins. It also performs an important role in the prevention of the ovulation in lactating females. Normal level of concentration of prolactin is about 8.0 ng/ml in females [2] but in period of pregnancy, it increases many times [4]. The data of previous research works is quite conflicting about the impacts of prolactin on the process of metabolism of glucose in humans [5].

Gestational diabetes mellitus is the carbohydrate intolerance of variation in its severity level with first detection in the period of pregnancy [6-8]. This did not include the already diagnosed females with diabetes before onset of pregnancy [9]. This elaboration applies whether insulin is utilized for therapy or this condition remained after the period of pregnancy. It does not discharge the probability that unidentified intolerance to glucose may have antedated process of pregnancy [10-12]. There is variation in the incidence rate of gestational diabetes mellitus in whole world from 1.0% to 14.0%.

**MATERIAL AND METHODS:**

Total 30 pregnant females suffering from gestational diabetes mellitus and 30 pregnant females with impaired glucose tolerance were admitted in Benazir Bhutto Hospital, Rawalpindi. All of these patients

were in their 3<sup>rd</sup> trimester of pregnancy. The criteria of diagnosis for the impaired glucose tolerance and gestational diabetes mellitus was in accordance with the guidelines of WHO. According to the recommendation of WHO, an oral load of 75.0 grams' glucose should be utilized for the testing of glucose tolerance. WHO elaborated the presence of diabetes in period of pregnancy as a level of fasting glucose > 7.80 mmol/l, or a value greater than 11.10 mmol/l one to two hours after the 75.0g glucose load. We selected thirty females having pregnancy with normal level of glucose tolerance as healthy controls. We followed the females of control group in all three trimesters of pregnancy. All the participants underwent overnight fast before the conduction of test. We drew the sample of blood at 6.00 A.M. After that, 75.0 grams' oral glucose dissolved in 200.0 cc H<sub>2</sub>O was provided to every participant, waiting for 2 hours, we drew one more sample of blood.

We used the glucose oxidase method for the estimation of the concentration of the plasma glucose in samples of fasting and 2 hours after 75.0 grams' glucose load. We utilized immunoradiometric assay for the measurement of the concentration of insulin in serum in both samples. We used the specific radioimmunoassay to measure the concentration of the prolactin in serum. We expressed the results in averages and standard deviations. ANOVA was in use for comparisons. Scheffe test having level of significance of 0.050 carried out to show significant disparity between average values. We used SPSS software for the statistical analysis of the collected information.

**RESULTS:**

The females suffering from gestational diabetes mellitus were present with higher average level of plasma glucose in comparison with the impaired glucose tolerance and healthy pregnant females as presented in Table-1 (P<0.00010). We found no disparity in the levels of fasting serum insulin of the members of all three groups (P>0.050) whereas, average level of two hours' serum insulin of the patients of gestational diabetes mellitus group was much low as compared to the participants of other two groups (P < 0.0050).

**Table-I: Results of the Studied Groups**

Groups	FBS (mmol/l)	2h-BS (mmol/l)	Fasting serum insulin (pIU/ml)	Serum insulin (120 min)	Serum prolactin (ng/dl)
Control	2.92 + 0.079	4.35 + 0.12	12.39 + 2.52	54.88 + 8.15	150.23 + 9.70
Impaired Glucose Tolerance	5.90 + 0.082**	7.98 + 0.13**	14.93 + 2.17	68.00 + 6.71*	144.3 + 14.99
Gestational Diabetes Mellitus	7.47 + 0.34***	12.35 + 0.57***	12.29 + 0.83	36.50 + 3.06**	123.60 + 9.61

\*Significant difference as compared with control group (p<0.05) \*\* (p<0.005), \*\*\* (p<0.0001).

Results about the serum prolactin of healthy controls in 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> trimester (Table-2) displayed that the level of prolactin increases with the increase in pregnancy period ( $P < 0.00010$ ).

**Table-II: Serum Prolactin Results of the Control Group**

Trimester	Serum Prolactin (ng/dl)
First	27.57 + 4.092
Second	74.14 + 9.754**
Third	0.23 + 9.703***

All data are expressed as mean + SEM.

\*\* ( $p < 0.005$ ) when compared with serum prolactin level in the first trimester.

\*\*\* ( $p < 0.0001$ ) when compared with serum prolactin level in the first trimester.

Findings serum prolactin of pregnant females of control, Gestational Diabetes Mellitus and Impaired Glucose Tolerance groups in 3<sup>rd</sup> trimester (Table-2) stated that none of two groups were much different at 0.050 level in accordance with the indication of Scheffe test ( $P > 0.050$ ), although there was highest level of prolactin in the healthy controls and lowest level of prolactin in the pregnant females of Gestational Diabetes Mellitus group.

### DISCUSSION:

Majority of the research works have stated the outcome of pregnancy in a state of insulin intolerance and females with onset of gestational diabetes mellitus appear to have a high level of insulin resistance [13]. The resistance of insulin appears to consequence from a combination of enhanced maternal adiposity and hormones secretion from placenta [14]. This resistance to insulin normally appears as hyperinsulinemia. To overwhelm this situation of insulin resistance, most of the females with pregnancy enhance their insulin secretion and this described the high levels of fasting and two hours' serum insulin of females of impaired glucose tolerance group as compared with the members of healthy controls [15]. But, when the capacity of secretion of insulin is not large to overcome the resistance, there is development of glucose intolerance and in consequence, there will be development of gestational diabetes mellitus in pregnant females [16].

The current research work stated that in the healthy controls the level of prolactin increases gradually with the enhancement in the pregnancy period and it reaches to its maximum value in the 3<sup>rd</sup> trimester [17]. This research work discovered that there was no important difference in levels of prolactin in the participants of all three groups. This finding is also consistent with the results mentioned by Grigorakis [18]. So, there is no clear evidence that the level of prolactin may be directly took any part in the pathogenesis of glucose intolerance in the period of pregnancy. This finding is also consistent with the results of Milasinovic who stated that there was no association between glucose metabolism and level of prolactin [19].

The level of prolactin starts to rise in at 5 to 7 gestation's week and there is parallel increase in the amount and size of the lactotrophs [20]. The subsequent high amounts of prolactin are the reason of maturation of mammary glands, preparing the females for process of lactation.

### CONCLUSION:

The level of prolactin increases with the advancement in the period of pregnancy and it reaches to its highest level in 3<sup>rd</sup> trimester of pregnancy. In last trimester, females can develop gestational diabetes mellitus. In gestational diabetes mellitus, there is decline in the secretion of insulin which may cause a decline in level of prolactin. The level of prolactin always remains low in the females present with gestational diabetes mellitus.

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