CORRELATION BETWEEN ALPHA-FETOPROTEIN AND BLOOD GLUCOSE LEVEL IN DIABETIC PREGNANT WOMEN

A THESIS
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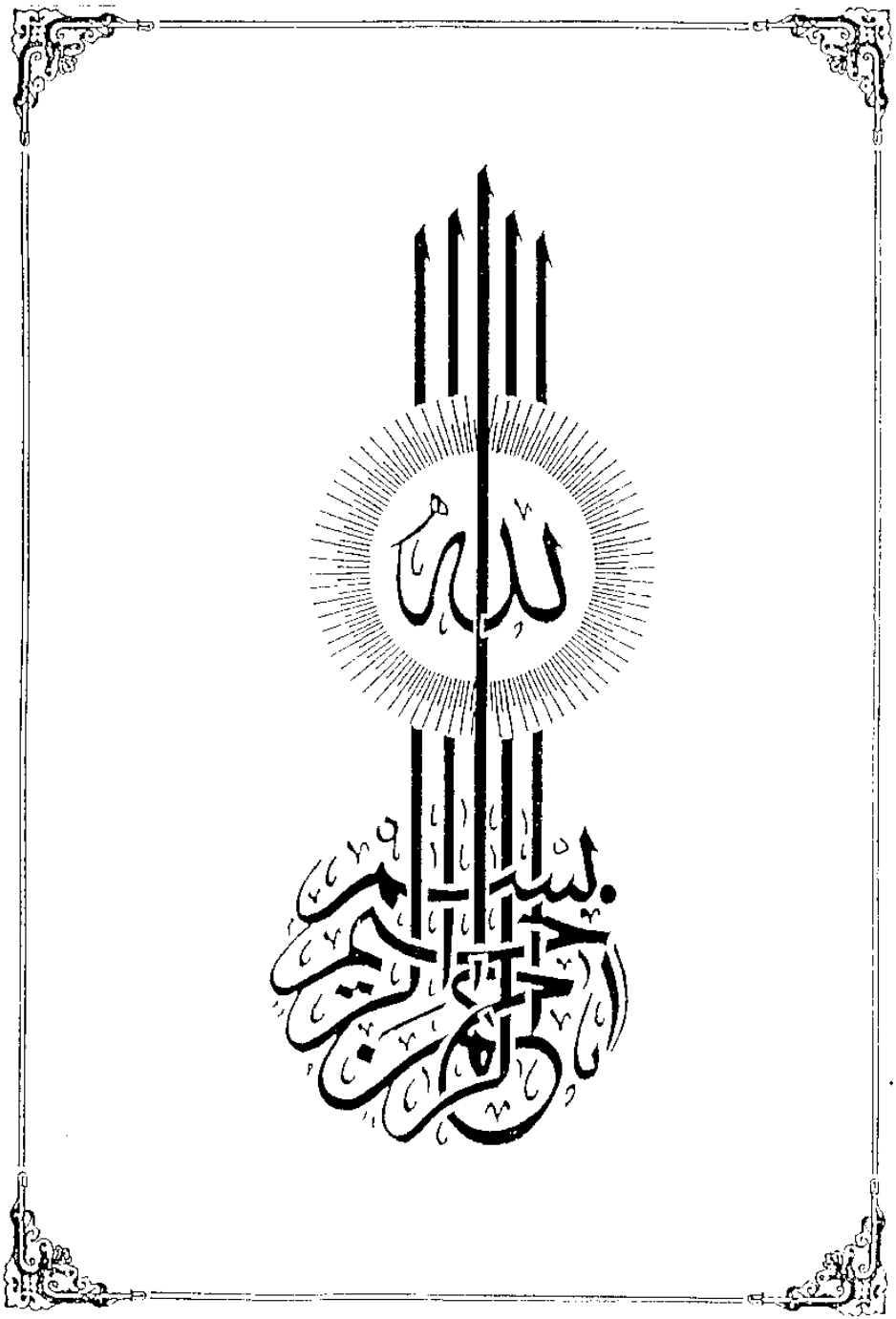

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INTRODUCTION

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Diabetes mellitus is a common condition worldwide which encompasses heterogenous group of chemical or biochemical syndromes characterized by the common metabolic feature of hyperglycaemia due to absolute or relative deficiency or resistance to the action of insulin (*Pearson D.W.M., 1991*).

Carbohydrate intolerance and diabetes during pregnancy cause significant increases in fetal and maternal morbidity *(Cousins L., 1987).*

Haemoglobin A (HbA) constitutes 90% of the haemoglobin found in the red cells of adults. Haemoglobin A1 results from glycosylation of HbA during the life time of the red cells *(Gabby K.H. et al., 1979),* it serves a useful tool in assessing long term glycaemic control of diabetes mellitus *(Yue D.K. et al., 1980 ; Hall P.M. et al., 1984; Langer O. and Mazze R.S., 1987 a).* It reflects the control of diabetes 2-3 months earlier and it is proportional to the mean blood glucose level in diabetics *(Reece E.A. et al., 1987).*

Congenital fetal malformations are more in infants of diabetic mothers than those of non diabetic mothers, occuring in 4-11% of the former infants *(Cousins L., 1983 ; Reece E.A. and Hobbins J.C., 1986).*

High glycosylated haemoglobin was associated with increased incidence of congenital foetal malformations *(Leslie R.D.G. et al., 1978).* While *Mills J.L. et al. (1988)* could find no relation between them.

Serum alphafoetoprotein may be decreased in diabetic pregnant women *(Wald N.J. et al., 1979; Milunsky A. et al., 1982; Baumgarten A. and Robinson J., 1988, Henriques C.U. et al, 1993); Zimmermann R. et al.,(1992)* failed to show such a relationship which was attributed to general reduction of fetal protein synthesis *(Baumgarten A. and Robinson J., 1988).*

The association between alphafoetoprotein & control of diabetes was also a subject for debate and controversial studies *(Baumgarten A. and Robinson J., 1988; Greene M.F. et al., 1988; Henriques C.U. et al., 1993).*

AIM OF THE WORK

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The aim of the work is to find out any correlation between maternal serum alphafoetoprotein and blood glucose and its control in diabetic pregnant women.

REVIEW OF LITERATURE

Diabetes Mellitus

DIABETES MELLITUS

INTRODUCTION AND DEFINITION

Diabetes mellitus is a common condition worldwide and the term encompasses a heterogenous group of chemical and biochemical syndromes characterized by the common metabolic feature of hyperglycaemia. An abnormally raised blood glucose level results from an absolute (or relative) deficiency of the hormone insulin, or resistance to the metabolic action of insulin and the clinical manifestations depend on the underlying derangements *(Pearson D.W.M., 1991).*

Historical perspective :

In 1824 Bennewitz, published the first case report of diabetes during pregnancy. This formed the basis of his MD thesis "Diabetes Mellitus: A symptom of Pregnancy".

..... the diabetes appeared in the patient along with the pregnancy and at the very same time when the pregnancy appeared, it appeared while pregnancy lasted, it lasted; as pregnancy developed, it developed and it terminated soon after the pregnancy *(H.G. Bennewitz, 1824, Cited in Hadden D.R., 1989).* In addition to the classic diabetic symptoms and signs of thirst, polyuria and associated glycosuria, he described the death of a macrosomic foetus due to impacted shoulders .

Many years later in *1882, J. Matthews Duncan (cited in Gillmer M.D. and Bickerton N.J.,1994)* read a paper before the London Obstetrical Society in which he reported a foetal loss of 47% and maternal mortality of 73%.

The most comprehensive review of diabetes in pregnancy in the preinsulin era was published in *1909 by J.Whitridge Williams (cited in Gillmer M.D. and Bickerton N.J.,1994)* with foetal loss of 49% and maternal mortality of 25%.

Insulin become generally available in 1923 and the first major appraisal of its effects in pregnancy complicated by diabetes was published by *Skipper in 1933 (cited in Gillmer M.D. and Bickerton N.J.,1994)* with foetal mortality of 40.5% (remained very high) and maternal mortality of 9.6% (fallen dramatically).

The outcome achieved nowadays in diabetic pregnancies is due to as much to modern technology as to the enhanced understanding of the pathology of diabetes *(Gillmer M.D. and Bickerton N.J., 1994).*

Diagnosis of DM :

In the presence of classical symptoms of diabetes mellitus (thirst, polyuria, weight loss), a random blood glucose level over 11.1 mmol/L (venous plasma glucose) confirms the diagnosis. If random venous plasma glucose is less than 5.5 mmol/L, diabetes

mellitus is not likely. Levels between these two cut off points should prompt a measurement of venous plasma glucose after an overnight fast. A fasting plasma glucose of over 7.8 mmol/L indicates diabetes mellitus, but if uncertainly is still present, a 120 minute venous plasma glucose, value after 75g oral glucose load less than 7.8 mmol/L is a normal result, values between 7.8 mmol/L and 11.0 mmol/L indicate impaired glucose tolerance and values of 11.1 mmol/L and over establish a diagnosis of diabetes mellitus *(National Diabetes Data Group, 1979) , table (1).*

Table (1)

The diagnostic criteria for diabetes mellitus

	Venous plasma glucose (mmol/L)		
	Normal	IGT *	Diabetes
Fasting.	6.0	<7.8	≥7.8
2 hours after 75 g oral glucose load.	<7.8	7.8-11	≥11.1
Random sample.			≥11.1

National Diabetes Data Group, 1979

* Impaired glucose tolerance.

Classification of DM

Many classifications have been suggested , these include :

1-White's classification and its modification (1980).

2-National diabetes data group classification (1979).

3-Classification according to severity (1971(modified)).

1-White's classification: (Adapted from Hare and White, 1980)

Gestational diabetes : Discovered during pregnancy, glycaemia may or may not be maintained by diet alone and insulin may be required.

Class A :

Discovered before pregnancy, controlled with diet alone and duration or age of onset.

Class B :

Onset age 20 year or older or duration less than 10 year.

Class C :

Onset age 10-19 years or duration 10-19 years.

Class D :

Onset age under 10 years, duration over 20 years.