

# BLOOD SUGAR LEVELS IN INDIAN PREGNANT WOMEN

by

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## SUMMARY

**A study was undertaken of 100 pregnant women in various trimesters of pregnancy for their blood sugar levels. Blood urea nitrogen, serum cholestrol, serum creatinine were also estimated. The average norms were established for the Indian population.**

Pregnancy is considered diabetogenic. As the duration of pregnancy increases blood sugar and serum insulin levels also rise. It has been stated that the post-prandial blood sugars are elevated in normal pregnancy. Therefore, different criteria are used for normal values in pregnancy.

Although ample data is available for western patients regarding blood sugar values, no such data exists for normal generally poorly nourished Indian population.

It is also generally believed that blood sugar values tend to rise as pregnancy advances. The purpose of this study was to evaluate pregnant women for blood sugar in the first, second and third trimesters of pregnancy. Also it was decided to have them evaluated for serum creatinine and cholesterol values to determine the normal values in pregnancy.

It would have been ideal to do a stand-

ard glucose tolerance test with 75 Gms. glucose with blood sugar values at fasting, 1, 2 and 3 hours with simultaneous insulin levels and urinary glucose estimation. However, there was fear that patients would not co-operate to allow multiple sample collections. Hence, fasting and 2 hour post glucose samples only were taken.

### *Material and Method*

The patients attending the antenatal clinic of this hospital were selected for this study. Only those who did not give history of diabetes were included. Patients generally were on their regular diet-containing at least 200 Gms. carbohydrate daily. 50 Gms. of glucose dissolved in 300 ml. of water was given orally after obtaining fasting blood sample. Two hours later another sample was obtained. The fasting sample was collected for blood urea nitrogen, serum creatinine and serum cholesterol. In addition to sugar, 2 ml. of serum was separated, centrifuged in a vial and kept in cryofreeze for subsequent insulin assay. Blood sugar was

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analysed on serum by technician auto Analyser by Ferriyanide method. Serum creatinine was estimated by Alkaline picrate method. Blood urea nitrogen and cholesterol were analysed by Diacetyl menoxime and P. Zurkovasky method respectively.

Insulin assay was done on an average on 50 samples at a time by charcoal absorption method at B.A.R.C. radio-isotope unit.

### Results

The results are shown in Table I.

It should be noted that the blood sugar

was higher in the first trimester as compared to second and third trimesters. Insulin levels showed great fluctuations and at several times the correlation of fasting and post-prandial levels did not follow any specific pattern. No inference could be drawn on these values. Blood urea nitrogen was lower as is well known in pregnancy. Creatinine and cholesterol were also normal as expected.

Table II shows the 't' values calculated for the variables of Blood sugar fasting and post glucose. BUN serum creatinine and serum cholesterol. The 't' values

TABLE I

	Blood sugar		B U N %	Creatinine %	Cholesterol
	Fasting mg. %	P.G. %			
1st Trimester	100	113.75	8.00	0.96	238.38
2nd Trimester	89.19	110.62	11.73	0.93	250.92
3rd Trimester	84.66	112.98	11.27	0.82	223.71

TABLE II  
Calculated 't' Values for Different Comparisons

Variables	Trimesters	Calculated	Significance
Blood sugar fasting	I & II	1.26	Not significant
	II & III	1.41	"
	I & III	1.04	"
Blood sugar P.G.	I & II	0.15	Not significant
	II & III	0.35	"
B.U.N..	I & II	0.04	"
	I & III	4.40	P. <0.001
	II & III	0.59	Not significant
Serum creatinine	I & III	6.66	P. 0.001
	I & II	0.36	Not significant
S. Cholesterol	II & III	1.47	"
	I & III	1.98	P. 0.05
	I & II	0.25	Not significant
	II & III	1.77	"
	I & III	0.30	"

were calculated and no significant change was noted.

#### Discussion

Significantly lower fasting plasma and blood glucose concentrations have been reported in late normal human gestation as compared to the non-pregnant state (Bleicher *et al* 1964). Serial measurements throughout pregnancy have shown that this change first occurs as early as the tenth week, with either further reductions that reach a lower plateau in the

appearance of contra-insulin events in late gestation. The net effect in the final weeks of the gravid state appears to augment glucogen storage and prolong excursions of plasma glucose in the fed state while accentuating glucogen mobilization and gluconeogenesis during fasting.

#### Conclusion

Considering the mean values we would suggest the following values as depicted in Table III for the pregnant Indian women in various trimesters.

TABLE III

	Fasting Blood Sugar	2 Hrs. Post- prandial	NUN	Creatinine	Cholesterol
1st Trimester	100%	130%	10%	1% 238	38 ± 129.67
2nd Trimester	90%	110%	12%	1% 250	92 ± 65.00
3rd Trimester	84%	112%	12%	1% 223	71 ± 61.06

third trimester or else a relatively fixed lower level from the tenth week to term. These minor differences are probably related to overnight fasting or to techniques measuring the substrate (Lind *et al* 1973).

In this study of the Indian population, the fasting glucose levels were higher in the first trimester of pregnancy as compared to the second and third trimesters. This is contrary to the accepted view of lowered fasting levels in the first trimester as explained due to increased B cell hypersecretion of insulin augmented tissue glucogen storage.

The blood sugar levels in the second and third trimesters are lowered. The facilitating insulin action on carbohydrate metabolism, which dominates early human pregnancy, is compromised by the

#### Acknowledgement

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the suture and its timely removal could be a definite benefit to the mother as well as to the foetus.

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TABLE I  
 Comparison of Obstetric Outcomes in  
 the Present Study and Previous Studies

Parameter	Present Study	Previous Studies
Maternal Mortality (%)	0.5	1.2
Fetal Mortality (%)	1.8	2.5
Stillbirth (%)	0.8	1.5
Neonatal Mortality (%)	2.5	3.2
Preterm Birth (%)	12.5	15.0
Low Birth Weight (%)	8.0	10.0
Postnatal Mortality (%)	1.5	2.0

TABLE II  
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