# IMPORTANCE OF SCREENING FOR GLYCOSURIA AND PROTEINURIA IN ANTENATAL CARE

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## ABSTRACT

**Background:** The identification and treatment of women with gestational diabetes mellitus continues to be controversial due to the costs involved in the screening and treatment, even in developed countries. Proteinuria is pathognomonic of a number of renal diseases, a high-risk condition for complications associated with pregnancy. Glycosuria and Proteinuria can be screened with cost effective methods in almost every set up of health facility of our country. This study was designed to know the prevalence of glycosuria and proteinuria in pregnant women as study group and non-pregnant women as control.

**Material and Methods**: This study was designed and conducted in Basic Medical Sciences Institute, JPMC, Karachi, form September 2001 - March 2002. Group A consisted of 290 pregnant women apparently normal and group B 70 non-pregnant women of fertile age group. Midstream urine of at least 4 hours stay in bladder was processed for screening glycosuria and proteinuria. The two groups were statistically compared by $\chi^2$ test.

**Results:** Out of 290 pregnant women, there were 8 cases (2.75%) found with glycosuria and 16 (5.5%) with proteinuria and 2 cases (0.68%) with glycosuria as well as proteinuria. In group B 5 (7.14%) with glycosuria, 6 (8.57%) with proteinuria and one case (1.42%) with glycosuria as well as proteinuria. The $\chi^2$ test for the results reported P value > 0.05 showing pregnancy as independent variable and it is prepregnant situation which continued in pregnant condition.

**Conclusion**: Screening for glycosuria and proteinuria and its treatment should be ensured at prepregnant status. All women with glycosuria and proteinuria during pregnancy should be labeled risk cases for further investigations. All paramedics working in primary level health centers should be trained in testing proteinuria and glycosuria and the facility made available for public.

**Key words:** Pregnancy, Midstream urine, Glycosuria, Proteinuria.

## INTRODUCTION

Gestational diabetes mellitus (GDM) is co-related to an elevated maternal and neonatal morbidity[1]. Higher prevalence was found of pre-term delivery in GDM 12.5% (6% in nongestational diabetes mellitus (NGD)), caesarean section 31.6% GDM (20.3% NGD), occurrence of macrosomia GDM 27.6% (NGD 16.2%). In addition a higher prevalence of hyperbilirubinemia, hypoglycemia and hypertrophic cardiomyopathy was observed in newborn from GDM women.[1] Females with GDM were significantly older in age, increase in weight with higher gravidity, greater percentage of operative deliveries, still birth and heavier fetal birth weight as compared with the non gestational diabetes mellitus group[2]. GDM is associated with a higher risk of caeserian section, hydromnios and macrosomias. Hence screening for GDM should be performed in all pregnant women 24 to 28 weeks of pregnancy using a glucose challenge test (GCT).[3] GCT is 50 g glucose load test as a screening test for gestational diabetes mellitus considered positive at >7.2 mmol/L followed by 100 g oral glucose tolerance test (OGTT). With complication,[2,3,4] GDM was prevalent 6.25%, 12.5%, 5.5% and 3.3% in the respective studies.[1,2,3,4] Indications for GCT were advanced maternal age, familial diabetes history and glycosuria.[5] GCT effectiveness for GDM varies in sensitivity and specificity 75%,44%[1] and 100%,64.66%.[5]

Proteinuria can be due to a number of diseases like urinary tract infections, glumerulonephrits, nephritic syndrome, eclampsia, urinary schistosomiasis, hypertension and severe febrile illness.[6] Proteinuria and hypertention are more related to preeclampsia during pregnancy.[7] The combined adverse maternal outcomes included maternal death due to hepatic failure, haematuria, rupture of uterus, coma, stroke, seizures, cortical blindness and myocardial infarction.[8]

The identification and treatment of women with gestational diabetes continues to be controversial due to the costs involved in the screening[9]. The GCT and OGTT are not possible in most of our network of

health facilities in rural areas where more than 70 % of population is residing. Macrosomia and hypoglycemia has been found associated with GCT > 10.3 mmol/L. The GCT at this level will definitely exhibit the Glycosuria and can be detected with out going to OGTT[13]. This study was conducted to adopt the easiest method applicable nearly in every set up and to see prevalence of Glycosuria and Proteinuria as dependant variable in women with pregnancy as independent variable.

## MATERIAL AND METHODS

This study was designed and conducted in Basic Medical Sciences Institute, Jinnah Postgraduate Medical Center (JPMC), Karachi, during September 2001 to March 2002. Females with confirmed pregnancy coming for registration and antenatal check up to Gynecology and obstetrics unit of JPMC were registered for the study. Those cases with known disease or presentation were not included in this study. The non-pregnant women were either those with the pregnant fellows or health workers and their relatives. Group A consisted of 290 pregnant women and group B of fertile age group of 70 non-pregnant women. As it was impossible to take early morning specimen and to properly preserve, this difficulty was overcome to ensure the >04 hours stay of urine in bladder. Midstream urine was processed for screening glycosuria and proteinuria immediately. In case of delay, the specimen was refrigerated but not more than two hours. The pH of all specimens was found acidic. The urine was tested for glycosuria by Benedicts solution, taking 5ml of it, after heating in test tube, no change in colour, five drops of urine were added. Persistence of blue color was taken as normal urine. Appearance of green color was taken as >50 mg/dl=+. The appearance of yellow color (>150mg/dl=++), orange color (>500mg/dl=+++), red color (>1000mg/dl=++++) was confirmed by other standards. The protein was tested by adding 5 drops of sulphosalisylic acid (200gms/L) to 5ml of urine taken in test tube. No change in appearance was taken as urine normal for protein. Appearance of turbidity was taken as proteinuria, counter confirmed and graded for by dipsticks Produkt-Nr.: 93108 Combiscreen ANALYTICON™, Germany, as + = 30 mg/dl, ++ = > 30 — < 100 mg/dl, +++ = 100-499 mg/dl and ++++ = > 500 mg/dl[10]. The results are shown in table. The two groups were statistically compared by $X^2$ test. [11]

**Table–1: Mean Age Wise Comparison of Group A and Group B**

| Groups | Mean of Ages | P value |
|---|---|---|
| A (n= 290) | 25.33±5.81 | > 0.05 |
| B (n = 70) | 27.82±6.18 | |

Figures in parenthesis are number of cases in groups.

## RESULTS

The population coming for registration was mostly belonging to indigent group and mean of ages of group A 25.33±5.81 years and that of group B 27.82±6.18 years as shown in table-1. Age difference of two groups was statistically matching (P value > 0.05). One important point of interest among the visitors was that although most of them were not educated but very much anxious about the possible complications of pregnancy and making the best use of free medical service of public sector. Out of

**Table–2: Positive Findings in Pregnant Women (Group A) and Control (Group B)**

| Groups | Glycosuria | | | | %Age | Proteinuria | | | | %Age |
|---|---|---|---|---|---|---|---|---|---|---|
| | + | + | ++ | +++ | | + | ++ | +++ | ++++ | |
| Group A | 6 | 1 | 1 | – | 2.75 (8/290) | 8 | 5 | 1 | 2 | 5.51 (16/290) |
| Group B | 0 | 2 | – | 3 | 7.14 (5/70) | 3 | 2 | – | 1 | 8.57 (6/70) |

**Key for the Kit used:**

**Proteinuria:**

+ = 30 mg/dl
++ = > 30 — < 100 mg/dl
+++ = 100-499 mg/dl
++++ = > 500 mg/dl

**Glycosuria:**

+ = 50 mg/dl
++ = 150 mg/dl
+++ = 500 mg/dl
++++ = > 1000 mg/dl

290 pregnant women, there were 08 cases (2.75%) found with Glycosuria and 16(5.5%) with Proteinuria and 2 cases (0.68%) with Glycosuria as well as Proteinuria. In-group B there was found 5/70 (7.14%) with Glycosuria, 6/70 (8.57%) with Proteinuria and one case (1.42%) with Glycosuria as well as Proteinuria. Results are shown in the table. The cases found with Glycosuria and Proteinuria, with degree of severity, are given in detail in table-2. The $X^2$test for the results reported P value > 0.05 showing pregnancy as independent variable and it is pre-pregnant situation which continues to pregnant condition.

## DISCUSSION

In this study the mean of ages of study group was 25.33 ± 5.81 years and the mean of ages of control group was 27.82 ± 6.18 years statistically compared with P value > 0.05

The Glycosuria was found to be 2.75% (group A) and 7.1% (group B). The higher %age of group B may be due to the less number of subjects screened for. But it can generally be estimated that the prevalence of Glycosuria in the study group is that of control group (P value >0.05) The Proteinuria was found in 5.5% (16/290) in the study group and 8.57% (6/70) in control group (P value >0.05). It can also be considered that the proteinuria present in control group continues to pregnancy status. The degree of severity of Glycosuria and Proteinuria although variable, is risk for complications related to pregnancy. It was impossible to follow, however referred for further managements. The glycosuria occurs when blood glucose level exceeds renal threshold value. Landy et al[13] showed that a glucose screen above 10.3 mmol/L was associated with a probable diagnosis of GDM and predictive of neonatal macrosomia and hypoglycemia in their patient population and suggested the use of this approach in the diagnosis of GDM without OGTT. As cost and labor involved in for GCT is not possible in our set up but Glycosuria can be detected easily. Albuminuria will occur at minimal glomerular diseases and can be screened at low cost method[10]. Both the test are possible to arrange in even primary set up level. The prevalence of Glycosuria and Proteinuria in non pregnant females continues to pregnancy status due to illiteracy and lack of facility for diagnosis. The concept of planned pregnancy cannot be in indigent population, each pregnant woman should be screened for Glycosuria and Proteinuria. The positive cases should be marked risk cases and followed. The treatment at primary level reduces all complications related to Glycosuria and proteinuria[1,2,3,7,8].

## CONCLUSION

Pregnancy, which exerts extra workload on body, should be preplanned. The screening of asymptomatic diseases and their treatment will ensure safe pregnancy outcome. The existence of diseases before pregnancy leads to complications during pregnancy. The screening of Glycosuria and Proteinuria and the treatment should be ensured at pre-pregnant status. All women should be screened for Glycosuria and Proteinuria during pregnancy and positive cases should be labeled risk cases for further investigations. All the paramedics working in primary and secondary level health centers should be trained in urine testing for Glycosuria and Proteinuria and the facility made available for public.

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