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Short Communication

Protein levels in Urine of Pregnant women in Rivers State, Nigeria

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ABSTRACT: The levels of protein in urine of pregnant Women in Rivers State, Nigeria, were investigated. A total of one hundred and twenty (120) Sample were analyzed, out of which ninety (90) were obtained from pregnant Women and thirty (30) from non-pregnant Women used as control. The protein concentration (mg/100ml) in pregnant Women (56.3 + 8. 8. 7) was significantly (P≤ 0.o5) higher than values in non-pregnant woman (35.3± 8.3). At different gestation periods values decreased from 53. 6± 5.51 mg /100ml in the first trimester to 28.3± 4.20 mg/ 100ml in the third trimester. Protein levels decreased after 25 years of age and then increased after 35 years of age of pregnant women. The concentration of protein in relation to the number of pregnancies showed a range of 40.9± 11.4 mg/ 100ml gravida 2 pra to 75.8± 17.7 mg/100ml at primer. The value at the primer did not differ significantly (p≤ 0.05) from that at fourth pregnancy which was 73.7± 13.7 mg/100ml. It can be concluded that proteinuria occurred during pregnancy especially at the first trimester, and the age and number of pregnancies influenced the level of protein in urine. These findings may offer scientific basis for the monitoring and treatment of pregnant Women for healthy living and safe delivery of their babies. @JASEM

High level of protein in urine may be due to renal disease or more rarely, due to large amounts of low molecular weight proteins circulating and therefore being filtered (Eden and Cooney, 1935). Normal subjects excrete up to 0.08 g of protein a day in the urine, an amount undetectable by usual screening tests (Harold, 1980) Proteinuria may occur in spite of normal renal function if abnormally large amounts of low molecular weight proteins are being produced. It can be due to Bence-Jones proteins or severe haemolysis with haemoglobinuria, or due to severe muscular damage with myoglobinuria (Pollack, 1976). During pregnancy, many changes occur. In pregnancy, the rate of excretion of urine is slightly higher than that in non-pregnancy. Frequent urination is less common during the second trimester and reoccurs after the baby descends into the pelvis close to the time of delivery (Harold, 1980)

Pre-eclampsia is a problem that occurs in some women during pregnancy, mostly during the second trimester. It is characterized by oedema, elevated blood pressure and proteinuria. (Dennis and Hester, 1977). Pre-eclampsia patients need close monitoring by their Doctors until delivery time in order to save the baby and mother. In the absence of treatment, a very high percentage of eclampsia patients die. A part from proteinuria associated with disease, there is also gestation proteinuria which is the presence of protein in urine during or under the influence of pregnancy in the absence of hypertension, oedema, renal infection or known intrinsic Renovascular disease (Pollack, 1976). The present investigation is therefore aimed at estimating the total protein level in urine of pregnant woman in Rivers state, Nigeria. This will help to establish if the presence of proteinuria is peculiar to the condition of pregnant women and what factors could be responsible for the presence of protein in their urine.

MATERIALS AND METHODS

*Urine sample collection***:** The specimen used was early –morning urine from pregnant and non-pregnant women. The pregnant women attended ante-natal clinics in five different local government areas of Rivers State. The five out of the twenty three (23) local government areas in Rivers State used for the study were determined by use of simple random sampling technique. Sample bottles were given to ninety (90) pregnant women to bring back their early-morning urine the next time they attended the clinic. The thirty (30) non-pregnant women were also given sample bottles to bring back with early-morning urine the next day. They were ascertained non-pregnant by human chronic gonadotrophin (HCG) urine test. Altogether, a total of one hundred and twenty (120) urine samples (10 ml each) were collected from pregnant women and non- pregnant women selected by simple random sampling technique out of a population of four hundred (400) women interviewed The urine samples were spun at 2500 rpm for twenty minutes in order to get clear urine free from substances that could cause turbidity. The volunteers were divided into four groups (4) of thirty (30) women each. Group A served as control and consisted of non- pregnant women. Groups B, C and D, based on their hospital reports, also consisted of thirty (30) pregnant women who attended ante-natal clinic) at first, second, third trimester of pregnancy

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respectively. The volunteers were further regrouped based on their ages. Group A_2 fell within the age group 17-25 years Group B_2, 26-35 years and C_2, 36-50 years.

Protein determination: The urine protein concentration of the pregnant and non-pregnant women in Rivers State, Nigeria was estimated by the method of Lowry et al (1951) with bovine serum albumin (BSA 1 mg/ml) as standard.0.25g BSA was dissolved in distilled water in a 250 ml volumetric flask and made up to the ml mark. To a series of test tubes were added 0.2, 0.4, 0.6, 0.8 and 1.0 ml of the BSA solution. Each of these was made up to a final volume of 1 ml with distilled water. From each tube was taken 0.5 ml solution and 0.5 ml reagent (50 ml of 2% Na_2 CO_2 in 0.1 M NoaH) with 1 ml of 0.5% $CuSO_4$ in 1% Na-K tart rate added and mixed well. The tubes were allowed to stand for 10 minutes at room temperature; 0.5 ml of Follin-Ciocalteau reagent (1 part phenol + 2 parts distilled water) was rapidly added and mixed immediately. The test tubes were then allowed to stand at room temperature for 10 minutes after which absorbance was read at 625 nm with spectronic 20 spectrophotometer. Absorbance was then plotted against BSA concentration to give a calibration curve for protein determination. 0.5 ml urine was pipetted into test tubes and protein concentration of each urine sample was determined as already described. The concentration of protein in each urine sample was extrapolated from the calibration curve using the absorbance value. Determinations were done in triplicates.

RESULTS AND DISCUSSION

Mean protein concentration (ml/100ml) was higher in pregnant women (56.3± 8.7) than in non-pregnant women (35.4±8.3) (Table1). The difference was significant (P≤ 0.05). Protein level at different gestation periods (Table 2) showed that protein concentration decreased as the pregnancy advanced. Table 3 shows the effect of age of pregnant woman on urine protein level. There was a decrease in protein level after the age of 25 years followed by an increase above the age of 35 years. The difference was also significant (P ≤ 0.05).

Table 1: Protein levels in pregnant and non-pregnant woman.

Parameter	Pregnant	Non- pregnant
Protein level (Mg/ 100ml)	56.30±8.77(n)	35.28±8.30(n)

Values are ± SD of triplicate determinations n = number of samples analyzed (30).

Table 2: Protein level at different gestation periods

Age (months)	Protein (mg/ 100w)
First trimester n=30	53.6+ 10.0[a]
Second trimester n=30	39.3 + 6.46[b]
Third trimester n=30	28.3 + 5.51[c]

Values are means ± SD of triplicate determinations, N= number of samples analyzed.Values in the same column bearing different superscript letters areSignificantly different at the 5% level.

Based on parity (Table 4) it was observed that the least urine protein level (40.9 ± 11.4 mg/100 ml) occurred at second pregnancy, the highest levels were observed at first (75.8 ± 17.7 mg/100 ml) and fourth (73.7± 13.7) pregnancies and values were not significant at the 5% level (P≤ 0.05). From the results obtained in this study, it is evident that mean urine protein concentration was significantly (P≤ 0.05) higher in pregnant woman than in non-pregnant mothers. This finding agrees with earlier reports (Guthrie and Pic Glano 1945 kinicaid – Smith and Buller, 1965, Toback et al, 1990, McEwan, 1973). This increase in urinary protein concentration during pregnancy may be due to physiological changes that occur during pregnancy. These changes include increase in glomerular size and glomerular filtration rate (GFR) (Seehan and Lynch, 1973), Bailey and Rolleston 1971). Urinary collecting system, 1 cm increase in renal length (kaupilla et al 1972) and dilation of the ureters, pelvic and calcyces (Fainstar, 1973, Leuriheimer, 1977) Pathological changes may be as a result of impairment of the glomeruli and Kidney which occur in glomerular nephritis and other conditions such as hypertension in pregnancy, pre-eclampsia and eclampsia.

Table 3: Effect of age of pregnant woman on urine protein levels

Age (Years)	Protein (mg/ 100ml)
17- 35 n=30	47.0 + 14.7[b]
26-35 n=30	33.4 + 7.62[c]
36-50 n=30	49.4 + 7.62[a]

Values are means ± SD of triplicate determinations n= number of samples analyzed.Values in the same column bearing different superscript letters are significantly different at P = 0.05.

Table 4: Effect of number of pregnancies (parity) on urine protein levels

Number of pregnancies	Protein
Primary n = 10	75.8 + 17.7[a]
Gravid a 3 Pra n = 10	40.9 + 11.4[d]
Gravid a 3 Pra	55.5 + 20.0[c]
Multifarious (4th) n = 10	73.7 + 13.7[a]
Multifarious (5th) n = 10	61.1 + 10.8[b]

Values are means ± SD of triplicate determination. Values in the same column having the same superscript letters are not significantly different at the 5% level (P ≤ 0.05).n = number of urine samples analyzed.

High protein diet could be a contributory factor to the proteinuria observed in pregnancy. This is possible since during pregnancy more protein is consumed. High protein diet will lead to high protein concentration in serum and aided by the increased kidney size and increased glomerular filtration rate these proteins are excreted in the urine. Mean protein concentration was observed to decrease with age of pregnancy. The least protein concentration (28. 3 ± 5.5 mg/100m) was observed at the third trimester. There was also a decrease in urine protein concentration after the age of 25 years followed by an increase above the age of 35 years. This tends to suggest that bearing children at tender ages (teenagers) and after the age of thirty- five years (35) is not very safe and should be discouraged. This is so because their pregnancies are considered to be more complex.

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