



## SERUM CREATININE LEVEL IN FIRST TRIMESTER OF PREGNANCY AMONG ETHNIC ASSAMESE POPULATION OF UPPER ASSAM-A HOSPITAL BASED STUDY

<b>Dr. Uttara Borkotoki</b>	Associate professor Department of Microbiology, Jorhat Medical College, Jorhat-785001, Assam (India)
<b>Dr. Saurabh Borkotoki</b>	Professor & Head Department of Biochemistry, Jorhat Medical College, Jorhat-785001, Assam (India) (Corresponding author)
<b>Dr. Alakesh Choudhury</b>	Post Graduate Trainee, Department of Biochemistry, Jorhat Medical College, Jorhat-785001, Assam (India)
<b>Mr. Rituraj Baruah</b>	Assistant professor Department of Statistics, J. B. College, Jorhat 785001, Assam, India

**ABSTRACT** Endocrinological and haemodynamic changes during pregnancy leads to increased creatinine excretion resulting in its lower serum concentrations. A cross sectional observational study by estimating serum creatinine concentrations was undertaken involving 1018 apparently healthy pregnant women in their first trimester visiting antenatal OPD of Jorhat Medical College Hospital, located in the Jorhat district of upper Assam. The study aims to find a laboratory and region specific reference for serum creatinine level in first trimester of pregnancy of this unexplored population. Serum creatinine level was measured by using a vitros 250 dry chemistry autoanalyser (Johnson and Johnson) maintaining all laboratory quality control norms. The mean value obtained for serum creatinine in the study is 0.413752 mg/dl with standard deviation of  $\pm 0.078858$ . The range was found to be 0.3 mg/dl – 0.7 mg/dl. These results are found to be comparable with other studies around the globe except that the lower level is less by 0.1 mg than the other studies.

**KEYWORDS :** Pregnancy, First-trimester, Serum creatinine.

### Introduction:

Creatinine is a metabolic waste product derived from creatine of the muscles. It is excreted by the kidneys in urine. Creatinine produced each day is fairly constant in a healthy individual and is related to the muscle mass. In health, concentration of creatinine in the blood stream of a person is very nearly constant. It is freely filtered by the glomerulus with very little or insignificant tubular reabsorption. Rather, a small amount is secreted in the kidney tubules. Increased dietary meat intake can also lead to a moderate rise in serum creatinine level.

There is dramatic hormonal and haemodynamic changes during pregnancy resulting in increase of glomerular filtration rate leading to increased clearance of creatinine from the body. The serum creatinine level fall by an average of 0.4 mg/dl than the non pregnant level [1]. Thus a value which may be normal for non pregnant may reflect renal impairment during pregnancy.

Reference range of a particular parameter is defined as the concentration of that parameter in a group of clinically health persons [2]. In healthy individuals they vary considerably in different populations [3]. Several factors such as age, sex, dietary habits of people, genetic make up, ethnicity, geographical location and climate influence the normal laboratory values [4-9] Different laboratory set up mainly techniques and principles also change the values [10,11]

Jorhat Medical College Hospital (JMCH) provides health care services to the people mostly from Upper Assam districts of Jorhat, Golaghat and Sivsagar. Presently, there is no published data on normal reference values for serum creatinine level during pregnancy of the population of this region. The present study of evaluation of serum creatinine level has been undertaken among apparently healthy pregnant women in their first trimester of pregnancy visiting antenatal OPD of Jorhat Medical College Hospital. The study is an attempt to systematically evaluate and present the data of this yet to be explored area with the objective to suggest reference values of this important and routinely sought after biochemical parameter in antenatal checkup visits. In fact, the approach in developing reference values has been regarded as an important step towards clinical interpretation of laboratory data [12]

### Materials & Methods :

A total 1018 number of apparently healthy women between 18 years to

40 years of age in their first trimester of pregnancy visiting antenatal OPD of Jorhat Medical College Hospital were estimated for serum creatinine.

### Inclusion Criteria :

1. Ethnic Assamese people of Jorhat, Golaghat and Sivsagar districts of upper Assam or living in this region for more than six months.
2. Apparently healthy & normotensive.

### Exclusion Criteria :

1. Diabetes Mellitus
2. Hypertension or any other cardiovascular disease.
3. Liver/Kidney dysfunction.
4. Strenuous exercise
5. Alcohol consumption
6. Chronic disease like TB
7. Acute inflammatory conditions.

**Period of Study :** December, 2016 to April, 2017

**Specimen Collection :** Collected 2cc of venous blood in red top vacutainers (with clot activators) by venipuncture maintaining all routine precautions. Samples were made to stand for 20 minutes at room temperature and then centrifuged for 5-10 minutes at 3200 rpm. Serum separated into separate sample cups and then analyzed for serum creatinine. All grossly haemolysed, Lipaemic and turbid samples were discarded.

### Estimation:

Serum creatinine was analysed in the Biochemistry wing of central clinical laboratory, Jorhat Medical College Hospital using Vitros 250 (Johnson and Johnson), a fully automated dry chemistry analyser. Calibration done with Vitros chemistry products calibrator kit 1.

### Quality control :

Adequate laboratory control parameters were followed.

### Statistical Analysis :

Done in Microsoft Excel

### Results and observation :

Total number of cases	Mean $\pm$ SD (mg/dl)	Range (mg/dl)
1018	0.413752 $\pm$ 0.078858	0.3-0.7

Table showing total number of cases , mean $\pm$ SD , upper and lower limit values of serum creatinine in apparently healthy pregnant ladies in their 1st trimester.

A total number of 1018 cases were estimated for serum creatinine . The mean of all values was found to be 0.413752 mg/dl. Standard deviation of the values was  $\pm$  0.078858.Lowest value recorded was 0.3 mg/dl and the highest value was 0.7 mg/dl.

### Discussion

The range of serum creatinine level in the present study of 0.3 mg/dl – 0.7 mg/dl is quite similar to the values found by various other authors.[1,13,14].However , the upper and lower limits are marginally higher and lower respectively in our study ( both by 0.1 mg/dl ). This slight change may be due to the reduced muscle mass generally found in the people of North Eastern India.

Only one published previous study record could be found on serum creatinine level among healthy non pregnant females in this group of people [15]. The values were found to be in the range of 0.5 mg/dl – 1.1 mg/dl, which are higher than our findings on pregnant women in 1st trimester.

### Conclusion :

The present work is an endeavour to study the serum creatinine level in first trimester of pregnancy in a group of people from North Eastern India.Further ,it concludes with a reference range of serum creatinine level during first trimester of pregnancy for the study population which is fairly similar to other studies.Very little published biochemical datas are available for the people of this region . More studies on various biochemical parameters in this group of population will be helpful in diagnosis and treatment of diseases with availability of specific region and laboratory based reference values.

### References :

1. Furrugh S, Anitha D and Venkatesh T. Estimation of reference values in liver function test in health plan individuals of an urban south Indian population. *Indian Journal of Clinical Biochemistry*. 2004; 19(2):72-79.
2. Kratz A, Lewandowski K B, Siegel A J et al. Effect of marathon running on hematologic and biochemical laboratory parameters, including cardiac markers. *American Journal of Clinical Pathology*. 2002; 118(6):856-863.
3. El Hazmi M A F, Al Faleh F Z, and Al Mofleh I A. Establishment of normal "reference" ranges for biochemical parameters for healthy Saudi Arabs. *Tropical and Geographical Medicine*. 1982; 34(4):323-332.
4. Bridgen M L and Heathcote J C. Problems in interpreting laboratory tests: what do unexpected results mean? *Postgraduate Medicine*. 2000; 107(7): 145-162.
5. Alimonti A, Bocca B, Mannella E et al. Assessment of reference values for selected elements in a healthy urban population. *Annali dell' Istituto Superiore di Sanita*. 2005; 41(2):181-187.
6. Friedewald W T, Levy R I and Fredrickson D S. Estimation of the concentration of low-density lipoprotein cholesterol in plasma, without use of the preparative ultracentrifuge. *Clinical Chemistry*. 1972; 18(6):499-502
7. Knight E M, Spurlock B G, Edwards C H et al. Biochemical profile of African American women during three trimesters of pregnancy and at delivery. *Journal of Nutrition*. 1994; 124(6): 943S-953S.
8. Zeh C, Amornkul P N, Inzaule S, Ondoa P, Oyaro B, Mwaengo D M et al. Population-based biochemistry, immunologic and hematological reference values for adolescents and young adults in a rural population in Western Kenya. *PLoS One*. 2011; 6: e21040.
9. Otokwula A A E, Isichei U P and Das S C. Establishment of a local biochemical reference range: Jos university teaching hospital experience. *Highland Medical Research Journal*. 2002; 1(1):17-20.
10. Hale W E, Stewart R B and Marks R G. Haematological and biochemical laboratory values in an ambulatory elderly population: an analysis of the effects of age, sex and drugs. *Age and Ageing*. 1983; 12(4):275-284.
11. Sunderman Jr Fw. Current concept of "normal values", "reference values", and "discrimination values" in clinical chemistry. *Clinical chemistry*. 1975; 21(13):1873-1877.
12. Abbassi –Ghanavati M, Greer LG, Cunningham FG. *Pregnancy and laboratory Studies: a reference table for clinicians*. *Obstet Gynecol*. 2009 Dec; 114(6): 1326-31.
13. *Protocols for High Risk Pregnancies : An Evidence Based Approach* , Fifth Edition. Edited by- John T Queenan, John C Hobbins and Catherine Y Spong @ 2010. Blackwell science Ltd. ISBN: 978-1-405-19650-5.
14. Dutta RK, Borkotoki S, Kashyap CK. Study on serum creatinine level among the ethnic Assamese population of Jorhat, Golaghat and Sivsagar districts of upper assam-A hospital based study. *Int J Health Sci Res*. 2016; 6(a): 201-205.