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Thyroid hormone in different trimester of normal pregnancy

Dr Avnish kumarTarwey, Senior Resident , Department of Biochemistry, Medinirai Medical College and Hospital,Palamu [1] .Dr Renu Yadav, senior Resident,Department of Gynecology,Laxmi Chandravanshi Medical college and Hospital Palamu[2.] Dr Rajat Kumar Singh, Senior Resident,Department of surgery,Medinirai Medical College and Hospital,Palamu[2.] Shahdil Khusroo,MBBS 3rd yr,ABVMMC, Rajnandgaon[3]

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Abstract: The normal physiological changes during pregnancy, the iodine adequacy, medication and presence of goitrogens in different geographical region altogether dictates the thyroid status in the body. (1-5) Topography, nutrition intake, socioeconomic status and cultural practices also contribute significantly. Indian thyroid society has taken recommendation of American thyroid association strongly recommends population defined , trimester-wise and region specific reference range for the diagnosis(6,7) **Aim and Objectives** To evaluate the thyroid hormone in different trimester of normal pregnancy. **Material And Method** Total of 150 normal pregnant women (50 in each trimester) enrolled for study. Their FT3,FT4 and TSH were estimated. **Observation And Result** Range of FT3 is 1.76-4.08 pg/ml in first trimester, 1.54-4.83 pg/ ml in second trimester and 1.24-4.91 pg/ml in third trimester. Range of FT4 is 0.74-4.03ng/dl in the first trimester, 0.70-3.86 ng/dl in second trimester and 0.60-4.67 ng/dl in third trimester. Range of TSH in the first, second and third trimesters were 0.46-5.72mIU/ml, 0.60-5.10 mIU/ml, 0.39-6.68mIU/ml, respectively. **Conclusion** Free T3 and FreeT4 level increases subsequently from first to third trimester and TSH level decreases from first to third trimester
Keywords: Pregnancy, Trimester, FT3, FT4,TSH.

1 Introduction

The extreme point of pregnancy is to have a healthy child and sound mother at the end of pregnancy.The typical physiological changes amid pregnancy, the iodine ampleness, pharmaceutical and nearness of goitrogens completely different geographical region inside and out manages the thyroid status within the body. (1-5) Geology, sustenance admissions, financial status and social hones moreover contribute altogether. Indian thyroid society has taken proposal of American thyroid affiliation unequivocally suggests populace characterized , trimester-wise and locale particular reference run for the diagnosis(6,7) due to the noteworthy ethnic contrasts. Physiological changes in pregnancy such as haemodilution, expanded serum thyroxine official globulin beneath impact of estrogen on the liver, expanded hCG particularly in 1st trimester , increment in sort 5 deiodinase due to extend in placental mass, increment in thyroglobulin generation and increment in iodine clearance due to extend in renal blood stream might influence working of thyroid organ and elucidation of thyroid function.These variety amid pregnancy requires to be examined altogether. Physiological adjustment amid pregnancy of the pituitary-thyroid pivot in pregnancy makes a difference us in administration of thyroid brokenness and Gestational age subordinate reference interims can be accommodating for maintaining a strategic distance from mis conclusion. It has been recommended that indeed in one nation, distinctive locale ought to have their possess reference extend interim and in this way there's a require of multicentric consider to characterize this run in India.

II. **Aims and Objectives** To evaluate in thyroid hormone in different trimester of normal pregnancy.

III. **Materials and Methods** The study was undertaken in the Department of Biochemistry, RIMS Ranchi Jharkhand as per the standard protocol followed in the institute and with prior approval from ethical committe and proper consent of patient was taken. It is a cross sectional study. Study population consists of 150 healthy pregnant women attending Ante Natal check up(ANC). Inclusion criteria includes women with euthyroid status with adequate diet and iodine intake. Exclusion criteria includes women with Diabetes Mellitus, thyroid disorder, polycystic ovary disease ,Pre-eclampsia & eclampsia, hepatitis and liver dysfunction and HIV, cancer or severe illness.

Parameters studied : Serum free T3, Serum free T4and Serum TSH was estimated by chemiluminescent microparticle immunoassay(CMIA) method on ABBOT ARCHITCT i1000SR IMMUNOASSAY machine(A Fully Automated Hormone Analyser).

Observations and Results:

Parameter	TSH(microIU/ml)	FT3(pg/ml)	FT4(ng/dl)
1st trimester	0.46-5.72	1.76-4.08	0.74-4.03
2nd trimester	0.60-5.10	1.54-4.83	0.70-3.86
3rd trimester	0.39-6.68	1.24-4.91	0.60-4.67

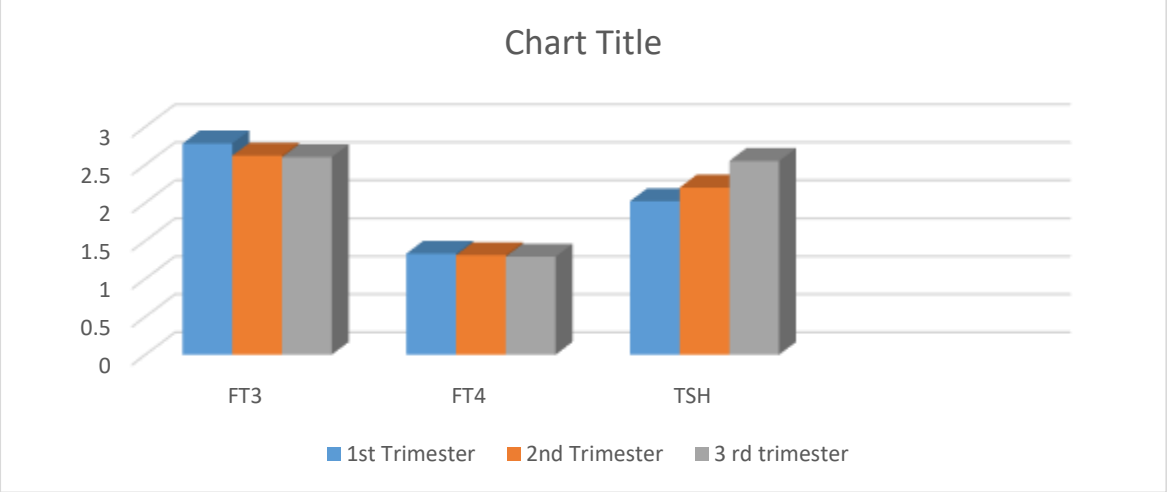
Table no.1 Range of FT3, FT4 ,TSH level

Table No.1 shows Range of FT3 is 1.76-4.08 pg/ml in first trimester, 1.54-4.83 pg/ ml in second trimester and 1.24-4.91 pg/ml in third trimester. Range of FT4 is 0.74-4.03ng/dl in the first trimester, 0.70-3.86 ng/dl in second trimester and 0.60-4.67 ng/dl in third trimester. Range of TSH in the first, second and third trimesters were 0.46-5.72mIU/ml, 0.60-5.10 mIU/ml, 0.39-6.68mIU/ml, respectively.

GROUP	FT3	FT4	TSH
1st trimester	2.78±0.45	1.33±0.83	2.02±1.11
2ndtrimester	2.62±0.58	1.31±0.83	2.20±0.97
3rd trimester	2.60±0.69	1.29±0.90	2.55±1.22

Table 2 :Thyroid Hormone In Different Trimester

Table No.2 shows mean value of TSH is highest in 3rd trimester and lowest in 1st trimester, mean value of FT3 is highest in 1st trimester and lowest in 3rd trimester and mean value of FT4 is lowest in 3rd trimester and highest in 1st trimester in all the age groups.



IV. **Discussion**

Our study documents that total TSH situations are lower during the first trimester and also provides trimester specific reference range of thyroid hormone for Jharkhand population. The neuro-endocrine development of fetus is dependent on the thyroid hormones[8]. Thyroid hormone is supplied by mama till 10- 12th weeks and also organification process of iodine thresholds and T4 and TSH gradationally increases.
Fetal pituitary thyroid axis is controlled by motherly TRH. Fetus gets the iodine from mama which is essential to make thyroid hormones. The WHO recommended iodine input of 200µg/ day during gestation to maintain acceptable thyroid hormone product, and 150µg/ day for non pregnant healthy women.[12,13]
Estrogen and hCG affect the thyroid function test[14] hCG is produced in large quantum at the end of the 1st trimester due to similarity in structure with TSH and it stimulates the motherly thyroid gland to increase its hormone product[15,16,17.] so the hCG and serum TSH rises together at about 10- 12 weeks.

Some of the cases of hCG- convinced increase in thyroid hormone generally comes down to normal by 2nd trimester without treatment. Due to stimulation effect by estrogen on liver, TBG(thyroid list globulin)conflation increases and its tube concurrence decreases.[18,19] The attention of TBG, come doubly by 16th-20th week of gravidity.

According to RK Marwaha, the range of TSH is(0.6 – 5.0, 0.44 – 5.78 and 0.74 – 5.7 microIU/ ml) in three successive trimesters[20]. Rajput R et al Haryana study showed range of TSH as 0.37- 3.69, 0.54- 4.47,0.704.64 microIU/ ml[21]. Jebasing et al Manipur study has 0.21 micro IU/ ml23. Sekhri et al study set up the range as 0.09- 6.65, 0.51- 6.61, 0.91- 4.86 microIU/ ml

in successive trimester[22]. In our study range of TSH in the first, alternate and third trimesters were 0.46- 5.72 microIU/ ml, 0.60- 5.10 microIU/ ml, 0.396.68 microIU/ ml, independently. Our study also showed this increase through the trimester. Rajput R et al the range of FT3 in the first trimester is 2.53- 4.54, 2.01- 4.73 in alternate trimester and 2.01-4.01 pg/ ml in third trimester[21], Sekhri et al range of serum FT3 as 3.1- 6.35, 2.39- 5.12, 2.57- 5.68 pg/ l indifferent trimester[22]. In our study, the range of serum FT3 in the first trimester is 1.76- 4.08, 1.54- 4.83 in alternate trimester and 1.24- 4.9 pg/ ml in third trimester.

According to Rajput R et al the range of FT4 in the first trimester is 0.88- 1.78, 0.91- 1.78 in alternate trimester and 0.83- 1.70 ng/ dl in third trimester[22], Sekhri et al range of serum FT4 as 9.81- 18.53, 8.52-19.43, 7.39- 18.28 pg/ l in different trimester[22].

In our study, the range of serum FT4 in the first trimester is 0.74- 4.03, 0.70- 3.86 in alternate trimester and 0.60- 4.67 ng/ dl in third trimester. Mankar et al showed 1.0- 2.2 ng/ dl in first, 0.45- 2.24 ng/ dl in alternate trimester and 0.47- 5.10 ng/ dl in third trimester[24] and Maji R et al 0.64- 2.00 ng/ dl, 0.53- 2.02 ng/ dl in alternate trimester and 0.64- 1.99 ng/ dl in third trimester[25].

V. **Conclusion**

Free T3 and FreeT4 level increases subsequently from first to third trimester and TSH level decreases from first to third trimester.

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