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To compare maternal and foetal outcomes among subclinical Hypothyroid and Euthyroid Pregnant Women

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ABSTRACT*: Background andpurpose;-The purpose of the study is to compare maternal and foetal outcomes among Subclinical Hypothyroid and Euthyroid Pregnant Women. Materials and Methods: Study design: Case control study, Tata steel Mines Hospital, Joda, District- Keonjhar, Odisha, Period of study: December 2020 to december2022. Study participants: Pregnant women of age group >18 years Inclusion criteria -Case: Newly diagnosed subclinical hypothyroid cases. Control: Euthyroid pregnant women matched for age, parity and previous LSCS. Sample size: A convenience sample of 120 case and equal number of controls were enrolled. Sampling method: About 900 pregnant women attending Joda hospital for consultation in the study duration. Results: PIH 15% (p=0.026), Preterm labour 25% (p=0.005) are more in subclinical hypothyroid women compared to euthyroid pregnant mothers. Subclinical Hypothyroid pregnant mothers got delivered by CS (25%) more compared to euthyroid pregnant mothers(6.6%) (p=0.010). Euthyroid pregnant mothers got delivered by vaginally (90%) morecompared to subclinical hypothyroid mothers(66.6%) (p=0.010). Fetal complications like Fetal hypoxia 18% (p=0.015) and LBW(16%) (p=0.029) are more in babies delivered from subclinical hypothyroid women. Conclusions:-Subclinical hypothyroidism in pregnancy poses an increased risk in maternal as well as foetal outcomes. Routine TSH level screening in high-risk cases is to done. Levothyroxine supplement is to be given in all subclinical hypothyroid pregnant women.*

KEYWORDS: *subclinical hypothyroid, preterm labour, euthyroid, foetal hypoxia, LBW, low birth weight, PIH, pregnancy induced hypertension, CS, caesarean section*

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I. INTRODUCTION

Pregnancy has a goitrogenic effect due to increased demand of thyroid hormone to maintain the increased maternal hormone level and meet the fetal requirement. Physiological and hormonal changes in pregnancy result in increased production of thyroxin (T4) and triiodothyronine (T3) by up to 50%, leading to an increase in a woman's daily iodide requirement, while thyroid-stimulating hormone (TSH) levels decrease, especially in the first trimester. TBG is increased under the influence of estrogen and reduced clearance. hCG shares structural similarities with TSH and causes thyrotropic effect and decreasing TSH level in first trimester. Iodine excretion during pregnancy increases due to increased glomerular filtration rate and increased plasma clearance. Women with borderline or deficient iodine reserve, thyroid hormone T3, T4 decreases and increases TSH level. This results in thyroid enlargement and goitre formation in pregnant mother as well as in fetus. Serum thyroglobulin is a good marker and correlates with thyroid stimulation due to iodine deficiency. Because of the physiological and hormonal change there may be overt hypothyroidism, sub clinical hypothyroidism or congenital hypothyroidism in pregnant mother.

Maternal complications include abortion, anemia, preeclampsia, gestational hypertension, placental abruption, preterm delivery, increased rate of caesarean section, and postpartum hemorrhage. The mode of delivery may have adverse impacts on fetal-pituitary-thyroid axis. Fetal outcomes resulting from thyroid dysfunction are preterm birth, neonatal respiratory distress syndrome, low birth weight (LBW), perinatal morbidity and mortality, increased NICU admission, and neuropsychological and cognitive impairment. Thyroid hormone is critical for brain development in the developing fetus. Children born with congenital hypothyroidism have severe cognitive, neurological and development abnormalities if the condition is not recognized and treated promptly. A study demonstrated that children born to pregnant women with hypothyroidism had lower intelligence quotient scores compared to children born to pregnant women without hypothyroidism.

II. MATERIAL AND METHOD

A retrospective case control study was conducted in Tata steel mines hospital Joda, Odisha, India from December 2020 to december2022. Study participants: Pregnant women of age group >18 years. Inclusion criteria for Case study group; were newly diagnosed subclinical hypothyroid case and for control group; Euthyroid pregnant women matched for age, parity and previous LSCS. Exclusion criteria were; Known case of overt hypothyroid/ hyperthyroid/ thyroid medication, known case of other pre-existing medical diseases, multiple pregnancy and women not giving consent for the study

About 900 pregnant women attending Joda hospital for consultation in the study duration were enrolled for the study.After screening for the thyroid profile, 120 subclinical hypothyroid case and 120 equal number of euthyroid (matched)controls were enrolled in the study adopting inclusion & exclusion criteria.History of infertility, family history of thyroid disease, menstrual pattern, recurrent abortion, hemoglobin level were noted.

Estimation for TSH ,T4,T3 was done using the Enhanced Chemi luminescence immune assay (CLIA)method.

Cut off values used for TSH were as per the American Thyroid Association (ATA) and the endocrine society and European thyroid association.

TSH = 0.1 -2.5 mIU/L in 1st trimester
TSH = 0.2-3.0 mIU/L in 2nd trimester
TSH = 0.3-3.0 mIU/L in 3rd trimester

III. OBSERVATION

Data analyzed using Epi Info version 7.Quantitative data were summarized as mean and standard deviation.Qualitative data were summarized as percentage.Independent t-test, Chi-square test and Fisher's exact test was used for inferential purpose. A P-Value of <0.05 was considered for declaring significant difference.

Criteria for considering subclinical hypothyroid; Table1.1

Thyroid function (Mean±SD)	Case	Control	P-Value
TSH	9.85±**1.88m**IU/L	3.38±**1.97m**IU/L	<0.01
FT3	174.2±**1.56ng/dl**	165.4±**0.98ng/dl**	<0.01
FT4	7.38±**1.97**µg/dl	5.89±**1.88**µg/dl	<0.01

Observedaverage T3, T4 and TSH value in case and control group; Table 1.2

trimester	TSH level	FT3 level	FT4 level
1st trimester	**>2.5m**IU/L	80-220 **ng**/dl	5-12 µg/**dl**
2nd trimester	**>3.0 m**IU/L	80-220 **ng**/dl	5-12 µg/**dl**
3rd trimester	**>3.0 m**IU/L	80-220 **ng**/dl	5-12 µg/**dl**

General characteristics; Table 1.3

Characteristics	Case	Control	P-value
Age			
<30Yrs.	70(58.3%)	72(60.0%)	

>30Yrs.	50(41.7%)	48(40.0%)	>0.05
Parity			
Primiparous	66(55.0%)	62(51.6%)	>0.05
Multiparous	54(45.0%)	58(48.4%)	
Married Since			
<2yr.	68(56.6%)	70(58.3%)	>0.05
>2Yr	52(43.4%)	50(41.7%)	

Comparison chart Case vs control; Table- 1.4

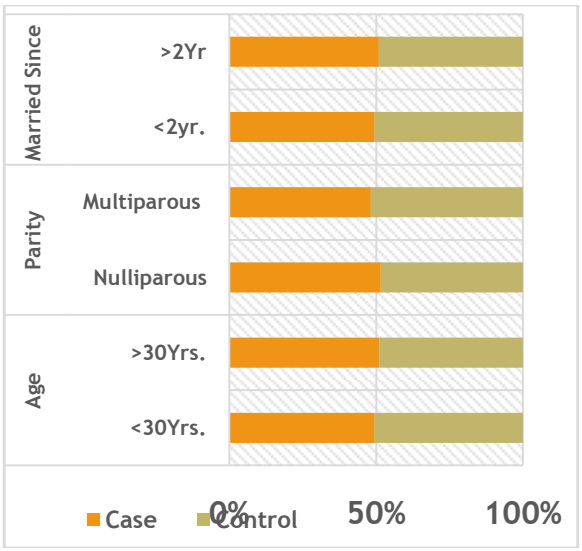

Table 1.4

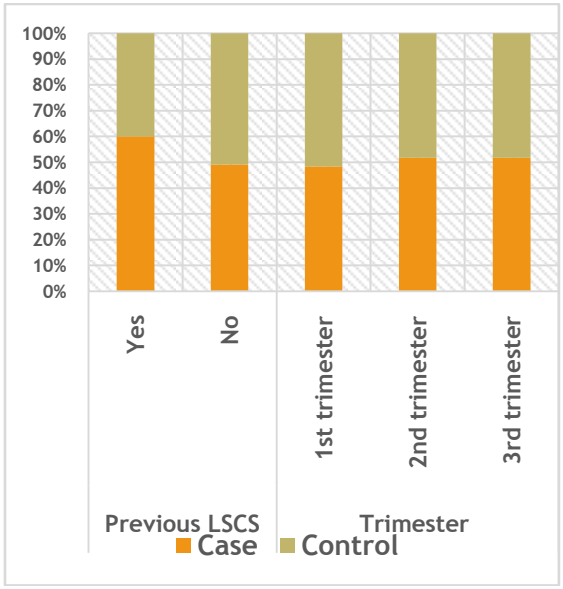

Table 1.5

Characteristics	Case	Control	P-value
Previous LSCS			
Yes	12(10.0%)	08(6.6%)	>0.05
No	108(90.0%)	112(83.4%)	
Trimester			
1st trimester	60(50.0%)	64(53.4%)	>0.05
2nd trimester	30(25.0%)	28(23.3%)	
3rd trimester	30(25.0%)	28(23.3%)	

Antepartum complication; Table 1.5

Characteristics	Case	Control	P-Value
Abortion	10(8.3%)	04(3.3%)	0.242
Hyperemesis Gravidarum	12(10.0%)	8(6.60%)	0.396
PIH	18(15.0%)	04(3.3%)	0.026
Preterm labor	30(25.0%)	08(6.6%)	0.005
Stillbirth	04(3.3%)	0(0.0%)	0.495

Intrapartum complication; Table 1.5

Characteristics	Case	Control	P-Value
Spontaneous Delivery	80(66.6%)	108(90.0%)	0.003
Cesarean Section	30(25.0%)	08(6.6%)	0.010
Forceps Delivery	06(5.0%)	02(1.6%)	0.618
PPH	10(8.3%)	04(3.4%)	0.439

Foetal complication; Table 1.5

Characteristics	Case	Control	P-Value
Fetal Hypoxia	22(18.3%)	04(3.3%)	0.015
Low birth weight	20(16.6%)	04(3.3%)	0.029
Hypothermia	08(6.6%)	02(1.6%)	0.364
Hyperbilirubinemia	10(8.3%)	04(3.3%)	0.439
Early Neonatal Death	02(1.6%)	0(0.0%)	1.000

IV. OBSERVATION

- PIH 15% (p=0.026), Preterm labour 25% (p=0.005) are more in subclinical hypothyroid women compared to euthyroid pregnant mothers
- Subclinical Hypothyroid pregnant mothers got delivered by CS (25%) more compared to euthyroid pregnant mothers(6.6%) (p=0.010)
- Euthyroid pregnant mothers got delivered by vaginally (90%) more compared to subclinical hypothyroid mothers(66.6%) (p=0.010)
- Fetal complications like Fetal hypoxia 18% (p=0.015) and LBW(16%) (p=0.029) are more in babies delivered from hypothyroid women

V. DISCUSSION

- Out of 900 pregnant mother screened, 120 (13%) were found to be TSH morethan trimester specific cut off and so estimated prevalence of sub clinical hypothyroid is 13% (Weiwei Wang et al. (10.2%) and Ajmani et al. (13.25%)
- Pre-eclampsia was observed in 15.0% of women ($p = 0.026$) with SCH mother. These results are comparable to those of other studies, in which preeclampsia was observed in 14.6% women with SCH and 14.7 in overt hypothyroidism (manju VK et al, Sreetha et al)
- Increased rate of cesarean delivery is observed in 25.0% ($p = 0.010$) of women with SCH. (Sreetha et al reported cesarean delivery of 22.9% in women with subclinical hypothyroidism)
- LBW was observed in 20(16.6%) of women with SCH, as compared to 20% observed in another study by Sharma D et al
- Fetal hypoxia with low Apgar scores occurred in 22(18.3%) of babies born to women with SCH, compared to 20% observed in study Manju VK, et al
- 02(1.6%)intrauterine death as a fetal complication of subclinical hypothyroidism, unlike the findings of 1% reported by Gupta HP Kunwar S, Goel S.

VI. CONCLUSION

- Subclinical hypothyroidism in pregnancy poses an increased risk in maternal as well as fetal outcomes .
- Routine TSH level screening in high-risk cases is recommended
- Universal routine TSH level screening is yet to be advised.
- Levothyroxine supplement to be given 1.0-2.0 mcg/day

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