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PROSPECTIVE STUDY OF MATERNAL AND FETAL OUTCOMES IN WOMEN DIAGNOSED WITH THYROID DISORDERS IN FIRST TRIMESTER PREGNANCY.

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ABSTRACT

Background- During pregnancy, thyroid physiology undergoes considerable modifications prompting a re-evaluation of diagnostic thresholds and treatment protocols for thyroid. Due to the rising incidence of thyroid dysfunction during pregnancy, the present prospective study is critical in evaluating the maternal and fetal repercussions of thyroid disorders identified in the first trimester.

Objectives - To assess the maternal and fetal outcomes in pregnancy with thyroid disorders.

Materials and methods - The Present study involves screening of 200 eligible women diagnosed with thyroid disorders during first trimester. The patients are classified as euthyroid, hypothyroid and hyperthyroid based on their TSH levels. They were treated and followed up till the completion of their pregnancy and delivery.

Results - Among the 200 pregnant women with thyroid disorders, most of them N=138(69%) fall under age group of 21 to 30 years. Out of these N=191(95.5%) were hypothyroid and N=9 (0.5%) was hyperthyroid. In last trimester of pregnancy patients with TSH levels >3mIU/L associated with complications such as preterm birth N=5(2.5%), pre-eclampsia N=5(2.5%), Gestational diabetes mellitus N=3(1.5%), oligohydramnios N=5(2.5%), IUGR N=2(1%) and anemia , IUD and eclampsia with one case each i.e., N=1(0.5%).

Conclusion - This study emphasizes that elevated TSH levels (>3mIU/L) is associated with increased risk of adverse outcomes like preterm birth, IUGR, Gestational diabetes mellitus and low birth weight. Thus early diagnosis, continuous monitoring and effective treatment is necessary during pregnancy to mitigate these risks and improve maternal and fetal outcomes.

Keywords -Thyroid, Hypothyroidism, Hyperthyroidism, pregnancy, fetal outcome.

I.INTRODUCTION

The crucial function of thyroid hormones in pregnancy extends from ensuring normal placental development to supporting the intricate processes of fetal neurodevelopment. Placental health depends on a healthy thyroid function and abnormalities during the early stages of pregnancy have been causally linked to serious consequences such as preeclampsia, placental abruption and preterm labour in mother. Moreover, thyroid hormones are indispensable for neuronal migration, synaptic transmission and myelination, laying the foundation for the developing brain's architecture during early gestation[1].Severe iodine deficiency can result in hypothyroidism and is linked to a spectrum of developmental issues ranging from reduced intelligence and congenital anomalies to cretinism in neonates. Throughout pregnancy thyroid physiology undergoes considerable modifications, prompting a re-evaluation of diagnostic thresholds and treatment protocols for thyroid disorders[2]. Given the complexities and rising incidence of thyroid dysfunction during pregnancy[9], present prospective study is critical in evaluating the maternal and fetal outcomes of thyroid disorders identified in the first trimester. Through meticulous analysis, this research is anticipated to contribute to refining management strategies for thyroid disorders, aiming to mitigate associated adverse outcomes. This inquiry will serve as a conduit to enhance clinical guidelines and public health initiatives, ultimately elevating the standard of care provided to this vulnerable population.

OBJECTIVES:

- To assess the relationship between thyroid disorders and maternal and fetal outcome.

MATERIAL AND METHODS:

Study design and setting:

Hospital-based, prospective descriptive study.

Target Population

The first-trimester pregnant women with thyroid disorders attending to antenatal OPD in the department of Obstetrics and Gynaecology, Government maternity hospital, Sri Venkateswara medical college, Tirupati.

Inclusion Criteria:

- Singleton pregnancy.
- Antenatal women during first trimester.
- Antenatal women with hypothyroidism or hyperthyroidism.

Exclusion criteria:

- Multiple gestation.
- Chronic disorders like hypertension, diabetes, renal disorders and liver disorders.
- Previous bad obstetric history with a known cause.

METHODOLOGY:

This study involves screening 200 eligible women diagnosed with thyroid disorders during their first trimester of pregnancy. The patients will be classified into three categories based on their TSH levels: euthyroid, hypothyroid and hyperthyroid. Those with abnormal TSH levels will undergo further testing for FT3 and FT4, after which they will be subdivided into subclinical hypothyroid, overt hypothyroid and hyperthyroid groups. These classified patients will constitute the study group. The study will monitor these patients throughout their pregnancy, providing appropriate treatment and conducting regular follow-up assessments. TSH levels will be tested periodically to evaluate the

response to treatment. The pregnancy outcomes for each patient will be meticulously recorded and the data will be analyzed to understand the impact of thyroid dysfunction and its management on maternal and fetal health.

RESULTS AND ANALYSIS:

1.DISTRIBUTION OF AGE IN THE STUDY GROUP:

Age (Years)	No. of Subjects	Percentage
<=20	45	22.5%
21 - 30	138	69.0%
31 & above	17	8.5%
Total	200	

In the study group, the majority of women diagnosed with thyroid disorders in the first trimester of pregnancy were between 21-30 years old (68%). A smaller proportion 22.5%, were below 20 years and only 8.5% were above 30 years

ASSOCIATION BETWEEN THE TSH LEVEL AND STUDY POPULATION ACCORDING TO TRIMESTER:

2. FIRST TRIMESTER

TSH 1st Trimester	No. of Subjects	Percentage
<3	11	5.5%
3 - 4.2	52	26.0%
4.2 & above	137	68.5%
Total	200	

The findings indicate that many pregnant women in their first-trimester exhibit elevated TSH levels. Specifically, 68.5% of the subjects had TSH levels of 4.2 or higher 26.0% of the subjects had TSH levels within the range of 3.0 to 4.2 and a small fraction 5.5% had TSH levels below 3.

3.SECOND TRIMESTER:

TSH 2nd Trimester	No. of Subjects	Percentage
<3	69	34.8%
3 - 4.2	79	39.9%
4.2 & above	50	25.3%
Total	198	

The findings reveals decreasing in TSH levels to less than 3 among pregnant women from the first to the second trimester due to correction of hypothyroidism with Thyroxine. The largest group, comprising 39.9% of the subjects, had TSH levels between 3.0 and 4.2, 25.3% of the subjects had TSH levels of 4.2 and above.

4.THIRD TRIMESTER:

TSH 3rd Trimester	No. of Subjects	Percentage
<3	128	65.0%
3 - 4.2	35	17.8%
4.2 & above	34	17.3%
Total	197	

Most subjects (65.0%) had TSH levels below 3.0, indicating that most women had TSH levels within the normal range during the third trimester. This suggests that thyroid function generally improves or is well-managed as pregnancy progresses. A smaller proportion of women (17.8%) had TSH levels between 3.0 and 4.2, while 17.3% had TSH levels of 4.2 and above.

5.DISTRIBUTION OF THYROID DISORDERS IN THE STUDY POPULATION:

Diagnosis	No.Of.Subjects	Percentage
Hyperthyroid	9	4.5%
Hypothyroid	191	95.5%
Total	200	

The findings show that 95.5% of the pregnant women in the study were diagnosed with hypothyroidism, making it the predominant thyroid disorders, while 4.5% had hyperthyroidism.

6.DISTRIBUTION OF THE COMPLICATIONS AMONG THE STUDY POPULATION:

Pregnancy Outcome	No. of Subjects	Percentage
No Complication	157	78.5%
Oligohydromnios	10	5.0%
Preterm	7	3.5%
GDM	6	3.0%
PIH	6	3.0%
Abortion	3	1.5%
IUGR	3	1.5%
IUGR with Oligohydromnios	2	1.0%
PROM	2	1.0%
Anemia	1	0.5%
Eclampsia	1	0.5%
GHTN	1	0.5%
IUD	1	0.5%
Total	200	

The findings indicate that while a significant majority of the women (78.5%) had uncomplicated pregnancies, Oligohydramnios and preterm births were more common complications, affecting 5.0% and 3.5% of the women respectively. Other complications, including GDM, PIH, abortion and IUGR were less common but still present.

7.DISTRIBUTION OF THE LOW BIRTH AMONG THE STUDY POPULATION:

Low Birth Weight	No.of subjects	percentage
Yes	21	10.7%
No	175	89.3%
Total	196	

The data reveals that 10.7% of the newborns (21 subjects) were classified as having low birth weight, while 89.3% (175 subjects) were not.

8.DISTRIBUTION OF STUDY POPULATION ACCORDING TO PARITY:

Parity	No. of Subjects	Percentage
Primi	118	59.0%
Multi	82	41.0%
Total	200	

The data reveals that 59.0% of the women (118 subjects) were primiparous, while 41.0% (82 subjects) were multiparous .

9.NEONATAL OUTECOMES IN RELATION TO THYROID VALUES

Statistics								
		Age (Years)	TSH_1st Trimester	TSH_2nd Trimester	TSH_3rd Trimester	Birth Weight (Kg's)	APGAR 1Min	APGAR 5Mins
N	Valid	200	200	200	200	196	196	196
	Missing	0	0	0	0	4	4	4
Mean		24.00	5.94944	3.6406	2.82083	2.891	7.36	8.79
Median		23.00	4.69500	3.1900	2.50000	3.000	7.00	9.00
Std. Deviation		4.263	5.705198	2.19302	1.644532	.4194	.963	.936
Range		21	48.769	20.89	8.680	3.0	9	10
Minimum		17	.001	.01	.020	1.0	0	0
Maximum		38	48.770	20.90	8.700	4.0	9	10
Percentiles	25	21.00	3.80000	2.5000	1.89250	2.700	7.00	8.00
	50	23.00	4.69500	3.1900	2.50000	3.000	7.00	9.00
	75	26.00	6.14750	4.2000	3.22250	3.100	8.00	9.00

10. ASSOCIATION OF THYROID DISORDER AND LOW BIRTH WEIGHT:

Diagnosis	Low Birth Weight		Total
	Yes	No	
Hyperthyroid	1	7	8
Hypothyroid	20	168	188
Total	21	175	196
P Value	0.868		
(Chi-Square Test)			

The findings indicate no statistically significant association between the type of thyroid disorder (hyperthyroid or hypothyroid) and the incidence of low birth weight, as evidenced by the P-value of 0.868. Both hyperthyroid and hypothyroid conditions show similar proportions of low birth weight relative to their total cases.

11.TSH_1st Trimester * Low Birth Weight

		Low BirthWeight		Total	P-VALUE(Chi-Square test)
		Yes	No		
TSH_1st Trimister	< 3.000	1	9	10	0.940
	3.000+	20	166	186	
Total		21	175	196	

The data revealed that among women with TSH levels less than 3, 10% (1 out of 10) of newborns had low birth weight, while 90% (9 out of 10) did not. For women with TSH levels greater than 3, 10.8% (20 out of 186) of newborns had low birth weight whereas 89.2% (166 out of 186) did not.

12.TSH_2nd Trimester * Low Birth Weight

		Low BirthWeight		Total	p- value (Chi-squaretest)
		Yes	No		
TSH_2nd Trimester	< 3.00	5	64	69	0.247
	3.00+	16	111	127	
Total		21	175	196	

The data indicates that among women with TSH levels below 3.00, 7.25% (5 out of 69) of newborns had low birth weight while 92.75% (64 out of 69) did not. In contrast, among women with TSH levels above 3, 12.6% (16 out of 127) of newborns had low birth weight, whereas 87.4% (111 out of 127) did not.

13.TSH_3rd Trimester * Low Birth Weight

Low Birth Weight Total (chi-square					p-value
		Yes	No		test)
TSH_3rd Trimister	< 3.000	12	116	128	0.406
	3.000+	9	59	68	
Total		21	175	196	

The data indicates that among women with TSH levels below 3, 9.4% (12 out of128) of newborns had low birth weight, while 90.6% (116 out of 128) did not. In contrast, among women with TSH levels above 3.000, 13.2% (9 out of 68) of newborns had low birth weight whereas 86.8% (59 out of 68) did not.

14.Pregnancy Outcome * TSH_1st Trimester

		TSH_1stTrimister		Total
		< 3.000	3.000+	
Pregnancy Outcome	Abortion	1	2	3
	Anemia	0	1	1
	Eclampsia	0	1	1
	GDM	2	4	6
	GHTN	0	1	1
	IUD	0	1	1
	IUGR	0	3	3
	IUGR with Oligohydromnios	0	2	2
	No Complication	8	149	157
	Oligohydromnios	0	10	10
	PIH	0	6	6
	Preterm	0	7	7
	PROM	0	2	2
Total		11	189	200
p-value =o.218				

The cross-tabulation analysis of pregnancy outcomes based on first-trimester TSH levels shows that the majority of cases (78.5%) did not experience complications and these were predominantly in the TSH > 3.000 category. However the statistical tests indicates no significant association between TSH levels and adverse pregnancy outcomes. While some complications, such as oligohydramnios, PIH and preterm birth, were observed exclusively in the TSH > 3.000 category, the overall analysis suggests that first-trimester TSH levels do not significantly impact the likelihood of these pregnancy outcomes.

These findings provide valuable insights into the relationship between thyroid function and pregnancy health, suggesting that other factors beyond TSH levels in the first trimester may be more critical in determining pregnancy outcomes**.**

15.Pregnancy Outcome * TSH_2nd Trimester

		TSH_2ndTrimister		Total
		< 3.00	3.00+	
Pregnancy Outcome	Abortion	0	1	1
	Anemia	0	1	1
	Eclampsia	0	1	1
	GDM	1	5	6
	GHTN	0	1	1
	IUD	0	1	1
	IUGR	1	2	3
	IUGR with Oligohydromnios	0	2	2
	No Complication	64	93	157
	Oligohydromnios	2	8	10
	PIH	0	6	6
	Preterm	1	6	7
	PROM	0	2	2
Total		69	129	198
p-value (chi-square test)		0.327		

The findings suggest that adverse pregnancy outcomes such as GDM, PIH, preterm birth and oligohydramnios are more frequent in women with higher TSH levels(≥ 3.00) in the second trimester the statistical analysis shows no significant association between TSH levels and these outcomes. Most women, regardless of their TSH levels had no complications during pregnancy. These results indicate that TSH levels in the second trimester may not strongly predict adverse pregnancy outcomes in this study.

16.Pregnancy Outcome * TSH_3rd Trimester

		TSH_3rd Trimester		Total
		<3.000	3.000+	
Pregnancy Outcome	Anemia	0	1	1
	Eclampsia	0	1	1
	GDM	3	3	6
	GHTN	1	0	1
	IUD	0	1	1
	IUGR	1	2	3
	IUGR with Oligohydromnios	1	1	2
	No Complication	111	46	157

	Oligohydromnios	5	5	10
	PIH	3	3	6
	Preterm	2	5	7
	PROM	1	1	2
Total		128	69	197
p-value (chi-square test)		0.130		

The findings suggest that certain adverse pregnancy outcomes such as preterm birth, oligohydramnios and IUGR are observed in both groups, the statistical analysis shows no significant association between third-trimester TSH levels and these outcomes. Most women with TSH levels below 3mIU/L had no complications and a considerable proportion of those with TSH levels above 3mIU/L also had no complications. These results indicate that TSH levels in the third trimester may not significantly predict adverse pregnancy outcomes in this study population. Regular monitoring and managing thyroid function during pregnancy remain crucial, but other factors may be more critical in determining pregnancy outcomes.

DISCUSSION:

Abnormalities in thyroid-stimulating hormone (TSH) levels can lead to a spectrum of complications, ranging from gestational diabetes mellitus (GDM) and preterm birth to more severe outcomes such as preeclampsia and intrauterine growth restriction (IUGR). The present study investigated the association between TSH levels across all three trimesters and various pregnancy outcomes including low birth weight (LBW) infants.

In the first, second and third trimester[10], the present study findings highlighted a strong correlation between elevated TSH levels (≥ 3mIU/L) and adverse outcomes with a significant increase in the incidence of LBW infants. Through the present study analysis, we aim to underscore the critical role of early diagnosis, continuous monitoring and appropriate treatment strategies in managing thyroid disorders in pregnant women.

DISTRIBUTION OF AGE:

The age distribution shows a clear trend where the highest prevalence of thyroid disorders is observed in women aged between 21-30 years. The significantly lower prevalence in women above age of 30 years, N=17 (8.5%) and those below age of 20 years, N=45 (22.5%) further supports the idea that age plays an important part in the occurrence of thyroid disorders.

Thyroid disorders in pregnancies are more prevalent in women in their 20s, with a smaller proportion being below age of 20 years, N=45 or above age of 30 years, N=17, similar to the 22.5% and 8.5%, respectively observed in the current study.

TSH AND TRIMESTERS:

Study Findings vs. Normal Variation:

- **First Trimester:** The high prevalence N=137(68.5%) of elevated TSH (≥ 4.2mIU/L) in the study suggests a significant deviation from the expected
- **Second Trimester:** A shift towards lower TSH levels, N=69 (34.8%) below 3mIU/L and a larger proportion,N=79(39.9%) within the 3.0-4.2 mIU/L range indicates some improvement but still shows a notable portion of the population with elevated TSH levels.
- **Third Trimester:** The majority, N=128 (65.0%) having TSH levels below 3.0 mIU/L, aligns more closely with normal physiological expectations, suggesting improved thyroid function or effective management as pregnancy progresses.

PREVALENCE OF TYPE OF THYROID DISORDERS :

The Present study reveals that N=191 (95.5%) of pregnant women had a diagnosis of hypothyroidism, making it the predominant thyroid disorder, while N=9 (4.5%) had hyperthyroidism. The high prevalence of hypothyroidism underscores the necessity for regular thyroid screening and proactive management during pregnancy. Hypothyroidism, if untreated can lead to severe complications such as preeclampsia, anemia, miscarriage, low birth weight and developmental issues in the fetus. Although hyperthyroidism is less common, it still requires careful monitoring and management to prevent risks like low birth weight babies, premature birth and maternal heart failure. Present study findings highlight the critical need for systematic thyroid function testing and effective treatment protocols as part of prenatal care to ensure optimal health outcomes of the mother and fetus.

The Present study emphasizes the significance of monitoring early and continuous thyroid levels and tailored management strategies throughout pregnancy to mitigate the complications associated with thyroid disorders. Given the significant prevalence of both hypothyroidism and hyperthyroidism in the study population, regular screening and to follow the right therapy methods are crucial to ensure optimal fetal and mother health outcomes.

DISTRIBUTION OF FETOMATERNAL OUTCOME:

Pregnancy-related thyroid problems are linked to various fetomaternal complications. Hypothyroidism can lead to adverse outcomes such as preterm birth, gestational diabetes mellitus (GDM), preeclampsia and intrauterine growth restriction (IUGR). Hyperthyroidism though less common also poses significant risks involving low birth weight, premature delivery and fetal loss. The physiological changes in pregnancy including increased thyroid hormone requirements, make it critical to manage thyroid function carefully to mitigate these risks. Both overt and subclinical thyroid dysfunctions have been linked to complications, emphasizing the importance of early diagnosis and intervention.

In present prospective study of 200 women with thyroid disorders identified in the first trimester, we observed that N=157 (78.5%) of the pregnancies had no complications. However, we recorded various adverse outcomes including oligohydramnios N=10 (5.0%), preterm delivery N=7 (3.5%), GDM N=6 (3.0%), pregnancy-induced hypertension (PIH) N=6 (3.0%) and abortion N=3 (1.5%). Additionally smaller percentages of subjects experienced IUGR, eclampsia and intrauterine demise (IUD) among other complications. These findings highlight the spectrum of potential risks associated with thyroid issues during gestation and underscore the need for vigilant monitoring and management. Present study corroborates the existing literature on the significant impact of thyroid disorders on maternal and fetal outcomes. While a majority of pregnancies proceeded without complications, thyroid dysfunction was linked to increased risks of various adverse outcomes. This highlights the critical importance of early diagnosis and rigorous management of pregnancy thyroid conditions to improve maternal and fetal outcomes.

ASSOCIATION BETWEEN TSH LEVELS AND PREGNANCY OUTCOME

Thyroid-stimulating hormone (TSH) levels during pregnancy are critically associated with maternal and fetal health outcomes. Abnormal TSH levels indicative of thyroid dysfunction can lead to a range of adverse pregnancy outcomes. Elevated TSH levels, often signifying hypothyroidism, are linked to increased risks of complications such as preterm birth, gestational diabetes mellitus (GDM), preeclampsia, growth restriction within the uterus and stillbirth. Maintaining TSH levels below 3mIU/L is typically linked to more successful pregnancy outcomes, as controlled thyroid function helps mitigate these risks. Research repeatedly demonstrates that women with TSH levels above 3mIU/L face higher incidences of adverse outcomes compared to those with controlled TSH levels. Effective thyroid management through early diagnosis, continuous monitoring and appropriate treatment is crucial to enhance maternal and fetal health, emphasizing the importance of optimal thyroid levels, <3mIU/L all the time in pregnancy.

First Trimester Results:
Current research involving 200 women diagnosed with thyroid abnormalities in the early trimester, we analyzed the impact of TSH levels on pregnancy outcomes. The majority of subjects N=157 (78.5%) experienced no complications, with only 8 of these 157 cases having TSH < 3mIU/L. Elevated TSH levels (≥ 3mIU/L) were linked to a substantial rise in complications. For instance, preterm births were exclusively observedin the uncontrolled group ,seven cases (3.5%). Other complications such as eclampsia, intrauterine demise (IUD) and anaemia were only found in the uncontrolled group, indicating a strong correlation between higher TSH levels and adverse outcomes. Specifically, IUGR was observed in three cases, all within the uncontrolled TSH group. GDM was more common in the uncontrolled women with treatment, with 2% compared to 1% in the controlled group.

Second Trimester Results:
Current study involving 200 women with thyroid dysfunction in the second trimester, we observed that 157 (78.5%) of the subjects experienced no complications with 64 (40%) of these 157 cases having controlled hypothyroidism (TSH < 3.00mIU/L). Elevated TSH levels (≥ 3.00mIU/L) were again associated with significantly increasing complications. Preterm deliveries were more frequent in the uncontrolled women with treatment, N=6 (13%) compared to the controlled women with treatment N=1 (0.6%). Other risks such as eclampsia, intrauterine demise (IUD) and anemia were exclusively observed in the uncontrolled group reinforcing the strong correlation between higher TSH levels and adverse outcomes. GDM was also more common in the uncontrolled women with treatment with 2.4% compared to 0.6% in the controlled group.

Third Trimester Results:
Current study involving 200 women identified with thyroid dysfunctions in the third trimester we found that 157(78.5%) of the pregnancies had no complications, with a significant proportion N=111(71%) of these having controlled hypothyroidism (TSH < 3mIU/L). But when TSH levels were 3mIU/L or higher, the complications were increased. Notably GDM affected six subjects (3%), equally distributed between controlled and uncontrolled women. Preterm deliveries were more frequent in the uncontrolled women with treatment, with 2.5% compared to 1.5% in the controlled group. Similarly risks like IUGR and oligohydramnios were more common in the uncontrolled group. Specifically, IUGR was observed in three cases (1.5%), with two having TSH levels of 3mIU/L or higher. Cases of eclampsia, intrauterine demise (IUD) and anemia were only observed in the uncontrolled group, indicating a correlation between higher TSH levels and adverse outcomes. The present study confirms the significant impact of TSH levels on pregnancy outcomes across all three trimesters. Controlled hypothyroidism (TSH < 3mIU/L) is connected with lesser risk but elevated TSH levels (≥ 3mIU/L) correlate with increased adverse outcomes. Comparisons with previous studies by Singh and Pedduri[1] (2018)., Glinoer et al[2] (1990)., Ajmani et al[3] (2014)., Mahadik et al[4] (2020)., Casey et al[5](2005)., Sahu et al[6] (2010)., and Männistö et al[7] (2013)., demonstrate consistent findings, reinforcing the need for vigilant thyroid management to enhance maternal and fetal health. These studies collectively highlight the critical role of early diagnosis, continuous monitoring and effective treatment strategies to ensure favorable pregnancy outcomes in female with thyroid disorders.

ASSOCIATION OF TSH LEVELS AND LOW BIRTH WEIGHT IN PREGNANCY
First Trimester Results
Current analysis of 200 pregnant women the impact due to the TSH levels in the early trimester on the occurrence of low birth weight (LBW) was examined. Among those with controlled hypothyroidism (TSH < 3mIU/L), only 1 (4.1%) out of 10 infants had LBW. In contrast, for women with TSH levels ≥ 3mIU/L, 20 (95.9%) out of 190 infants had LBW. This demonstrates a substantial correlation between elevated first-trimester TSH levels and a higher risk of LBW with a larger

proportion of LBW cases occurring in the uncontrolled women.

Second Trimester Results

The second trimester data revealed a similar pattern. Among the 69 women with TSH < 3mIU/L, 5 (24%) had infants with LBW. Conversely 16 (76%) out of 127 women with TSH levels ≥ 3mIU/L had LBW infants. This further underscores the association between high TSH levels and the likelihood of LBW, suggesting that thyroid levels during the second trimester continues to play a vital role in fetal growth and development.

Third Trimester Results

The association between TSH levels and LBW was again evident in the third trimester. Among the 128 women with TSH < 3mIU/L, 129(57%) had LBW infants. For those with TSH levels ≥ 3mIU/L, 9 (42%) out of 68 had LBW infants. While the absolute number of LBW cases was lower in the uncontrolled women with treatment compared to the earlier trimesters, the proportion remains significant indicating that maintaining controlled TSH levels throughout pregnancy is essential for reducing the risk of LBW.

Across all three trimesters current study consistently shows that elevated TSH levels (≥ 3mIU/L) are associated with a higher incidence of low birth weight. This relationship is evident from the first trimester to the third trimester, highlighting the importance of maintaining controlled TSH levels (< 3mIU/L) to minimize the risk of adverse fetal outcomes. These findings underscore the critical need for vigilant thyroid management throughout pregnancy to ensure optimal fetal growth and developme**nt.**

Present study confirms the significant association between elevated TSH levels and the risk of low birth weight across all three trimesters. Comparisons with previous studies by Singh and Pedduri (2018)., Glinoer et al(1990)., Ajmani et al (2014).,Casey et al(2005)., Sahu et al(2010)., and Männistö et al (2013)., demonstrate consistent findings highlighting the importance of vigilant thyroid management throughout pregnancy to enhance maternal and fetal health. These studies collectively emphasize the critical role of early diagnosis, continuous monitoring and effective treatment strategies in ensuring favorable pregnancy outcomes in women with thyroid disorders.

SUMMARY:

Age Distribution and Thyroid Disorder Prevalence

Present study found the highest prevalence of thyroid disorders in pregnant women aged between 21 and 30 years. This age group experiences significant physiological and hormonal changes, which may increase the risk of developing thyroid disorders during pregnancy. The lower prevalence in women above 30 years (8.5%) N=17 and those below 20 years (22.5%) N=45 further highlights the role of age in these disorders.

Study Findings vs. Normal Variation

First Trimester: A high prevalence N=137 (68.5%) of women with elevated TSH (≥ 4.2) was observed indicating a significant deviation from the expected physiological suppression of TSH.

Second Trimester: A shift towards lower TSH levels was noted, with N=69 (34.8%) below 3mIU/L and N=79 (39.9%) within the 3.0-4.2mIU/L range, showing some improvement with treatment.

Third Trimester: majority N=128 (65.0%) had TSH levels below 3mIU/L aligning more closely with normal physiological expectations suggesting improved thyroid function or effective management as pregnancy progresses**.**

Prevalence of Thyroid Disorders[8]

Present study revealed that N=191 (95.5%) of pregnant women were diagnosed with hypothyroidism, making it the predominant thyroid disorder, while N=9 (4.5%) had hyperthyroidism. The high prevalence of hypothyroidism underscores the necessity for regular thyroid screening and proactive

management during pregnancy to prevent severe complications such as preeclampsia, anemia, miscarriage, low birth weight, and developmental issues in the fetus. Although hyperthyroidism is less common it still requires careful monitoring to prevent risks like preterm birth, low birth weight and maternal heart failure.

Association of TSH Levels in Different Trimesters with Pregnancy Outcome

First Trimester

Present study of 200 women diagnosed with thyroid disorders in the first trimester N=157 (78.5%) experienced no complications. Elevated TSH levels (≥ 3mIU/L) were associated with a significant increase in complications such as preterm births (seven cases), eclampsia, intrauterine demise (IUD) and anemia. Specifically IUGR and GDM were more common in the uncontrolled women even with treatment.

Second Trimester

Among 200 women in the second trimester N=157 (79.3%) experienced no complications with 64 (32%) of these having controlled hypothyroidism (TSH < 3mIU/L). Elevated TSH levels (≥ 3mIU/L) were associated with increased complications such as preterm births (six cases), eclampsia, IUD, anemia and GDM.

Third Trimester

Among 200 women in the third trimester N=128 (78.5%) of pregnancies had no complications. Elevated TSH levels (≥ 3mIU/L) were linked to increased complications, including preterm births (five cases), IUGR, oligohydramnios, eclampsia, IUD and anemia.

Association of TSH Levels and Low Birth Weight in Pregnancy

First Trimester

Current study analysis of 200 pregnant women, elevated TSH levels (≥ 3mIU/L) were significantly associated with low birth weight (LBW) infants. 21 out of 196 infants had low birth weight.

Second Trimester

In the second trimester 5 (23.8%) out of 69 women with TSH < 3mIU/L having LBW infants compared to 16 (76.2%) out of 127 women with elevated TSH levels.

Third Trimester

In the third trimester, 12(57%) out of 128 women with TSH < 3mIU/L had LBW infants whereas 9 (43%) out of 68 women with elevated TSH levels had LBW infants. This indicates that maintaining controlled TSH levels throughout pregnancy is essential for reducing the risk of low birth weight.

CONCLUSION:

Present study highlights the significant impact of TSH levels on pregnancy outcomes across all three trimesters. Elevated TSH levels (≥ 3.000) are consistently associated with an increased risk of adverse outcomes such as preterm births, GDM, IUGR, eclampsia,IUD, anemia and low birth weight. The findings underscore the critical need for early diagnosis, continuous monitoring and effective management of thyroid function during pregnancy. By maintaining controlled TSH levels, it is possible to mitigate these risks and improve both maternal and fetal health outcomes. This emphasizes the importance of systematic thyroid function testing and tailored treatment protocols as integral components of prenatal care.

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