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Evaluation screening of serum TSH in antenatal OP for the diagnosis of hypothyroidism to prevent congenital hypothyroidism in the foetus

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Abstract
Introduction: Screening of pregnant women for hypothyroidism during the pregnancy to detect hypothyroidism and prevent congenital hypothyroidism during pregnancy.
Screening is defined as the application of a test to detect a potential disease or condition in a person who has no known signs or symptoms of that condition at the time the test is done. The presence of the condition, however, should have proven adverse effects which can be prevented by early detection and treatment.
Materials and Methods: This is a observational study for a period of one year from October 2017 to October 2018 wherein a number of pregnant women were screened for hypothyroidism during Pregnancy by using TSH levels as a criteria.
Results:
1. Most of the women (61.5%), had made their first visit to the tertiary hospital after their 24 weeks of gestation and 19.8% of them had their TSH level between 5 and 9.99 mIU/dL.
2. Majority of women (87%) had term deliveries irrespective of their hypothyroid level.
3. About 54% of deliveries were LSCS and one was spontaneous expulsion.

Conclusion: The study clearly showed that maternal outcome operative surgery (LSCS) was statistically significant. All the three TSH sub groups LSCS was done as upto4.99 group as 32.3%, 5 to 9.99 group as 18.7% and 10 and above group as 3.1%
Like GDM screening, Gestational Thyroid Dysfunction (GTD) screening among Antenatal Women in the First trimester registration should be made compulsory in all Hospitals by Government. This will lead to early and effective treatment of thyroid disorders that ensures safe pregnancy with minimal maternal and fetal complications and also lesser operative surgery, which leads to lot of complications to women.

Keywords: gestational thyroid dysfunction, congenital hypothyroidism in foetus

Introduction
Screening of pregnant women for hypothyroidism during the pregnancy to detect hypothyroidism and prevent congenital hypothyroidism during pregnancy.
Screening is defined as the application of a test to detect a potential disease or condition in a person who has no known signs or symptoms of that condition at the time the test is done. The presence of the condition, however, should have proven adverse effects which can be prevented by early detection and treatment.

Need for study
Thyroid diseases are the commonest endocrine disorders affecting women of reproductive age group. The goal of screening for thyroid disease is to identify and treat patients at risk for the health consequences of thyroid dysfunction before they become clinically apparent.
Screening for thyroid dysfunction can be performed using the medical history, physical examination or any of several serum thyroid function tests.
The TSH is usually recommended because it can detect abnormalities before other tests become abnormal. When used to confirm suspected disease in patients referred to an endocrine specialty clinic, the TSH test has a sensitivity above 98 percent and a specificity greater than 92 percent for the clinical and functional diagnosis.
TSH is often considered the “gold standard” for assessing thyroid function.
Pregnancy with hypothyroidism is associated with higher incidence of maternal complications

like Eclampsia and GDM, Anemia, PPH, low birth weight in pregnancy due to PIH requiring preterm delivery, there is high incidence of fetal distress in pregnancy with hypothyroidism.
Hypothyroidism complicating pregnancy is not common, as it is commonly associated with anovulation and infertility. Uncontrolled hypothyroidism is associated with increased incidence of abortions, stillbirths and infertility and there should be a high index of suspicion for hypothyroidism in patients with recurrent abortions and unexplained stillbirth. Careful monitoring and control of hypothyroidism during pregnancy and intrapartum period is necessary.
Clinical hypothyroidism is diagnosed when T4 is low and thyroid stimulating hormone (TSH) levels are high.

Objective(S)
Screening of pregnant women for hypothyroidism during pregnancy to detect hypothyroidism and prevent congenital hypothyroidism the aim of our study was to determine the incidence of hypothyroidism complicating pregnancy. With the evidence provided by these results we wanted to determine whether hypothyroidism fitted into a condition warranting routine screening in pregnancy.

Methods
This is a observational study for a period of one year from October 2017 to October 2018 wherein a number of pregnant women were screened for hypothyroidism during Pregnancy by using TSH levels as a criteria.

Standard TSH levels
Euthyroid: 0.17- 4.05 mlu/ ml
Hypothyroid: >5.0 mlu/ml

Method of collection of data
Sample size: 327

Inclusion criteria
All pregnant women irrespective of age group and parity walking into the obstetric OPD are included in the study.

Exclusion criteria
Pregnant women who are already diagnosed as hypothyroid on treatment are excluded from the study.

Outcome of the study
Screening of pregnant women for TSH levels to detect hypothyroidism and thus prevent congenital hypothyroidism and complications.

Review of literature
The recent research report published in the journal of medical sciences issue 9 dated September 2008 vol 62 on Prevalence of hypothyroidism in recurrent pregnancy loss in first trimester researched by V Ramachandra Rao *et al* of Osmania University, Hyderabad, concludes thus “The study demonstrates that hypothyroidism has a statistically significant relationship with recurrent pregnancy loss in the first trimester and suggests that diagnosis of hypothyroidism could help couples with recurrent pregnancy loss to have a successful outcome in subsequent pregnancies”.
The American association of clinical endocrinologists in a report published in ENDOCRINE PRACTICE Vol. 5 No. 6 November/December 1999 367 on a report published by hossein gharib *et al* of mayo clinic Minnesota, USA, on sub clinical hypothyroidism during pregnancy reports thus The importance of thyroid hormones for normal fetal development is well established. Maternal thyroxine (T4) is important for fetal neural development throughout pregnancy but particularly during the first trimester.
Maternal thyroid dysfunction during pregnancy can result in impaired psychoneurologic development of the fetus. Maternal hypothyroidism has been associated with mental retardation in the living euthyroid offspring as well as with increased fetal and neonatal losses.
When the mother has hypothyroidism, fetal brain development could be impaired by lack of sufficient T4 before fetal thyroid function begins or even after the onset of fetal thyroid function.
In a more recent study by the Dutch group (9), they reported that low maternal free T4 concentrations in apparently healthy women during early gestation are associated with a significantly increased riskof impaired neurodevelopment in the infant. These observations suggest that mild (sub clinical) hypothyroidism early during pregnancy may adversely affect fetal psych neurologic development.
In a recent research report published in Indian journal of obstetrics and gynecology in its issue dated July August 2007 on hypothyroidism in pregnancy by sharma partha *et al* of Dept of Gynecology and Obstetrics, IPGME & R, Kolkata, Institute of Post Graduate Medical Education and Research, Kolkata reported that the Incidence of hypothyroidism in pregnancy was 1.15%.
Common associated complications were preeclampsia, preterm labor, threatened abortion low birth weight, neonatal hyperbilirubinemia, neonatal hypothyroidism and early neonatal death.
Perinatal mortality rate was 81 per 1000 live births in hypothyroid women during the study period.
A researched report published in the journal of clinical endocrinology and metabolism a report on detection of thyroid function in early pregnancy: universal screening or targeted high-risk case finding? Done by Bijay Vaidya states a prevalence rate of 2.6% of the pregnancies have raised TSH levels (>4.2 mIU/liter and concludes that “Targeted thyroid function testing of only the high-riskgroup would miss about one third of pregnant women with overt/subclinicalhypothyroidism”
A research report published in the journal of obstetrics and gynecology in its issue dated November December 2006.

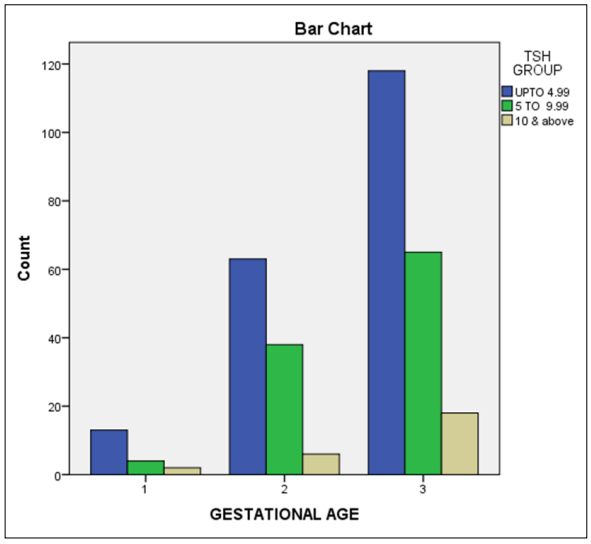
Hypothyroidism in pregnancy: Is universal screening needed? Done by aziz nuzhat *et al* of Fernandez hospital bogulkunta Hyderabad analaysed 161 cases of hypothyroidism complicating pregnancy, over a period of 2 ½ years Concluded that Hypothyroidism in pregnancy is associated with incidence of maternal complications similar to that in diabetes complicating pregnancy but has a much higher perinatal mortality rate. Hence screening for hypothyroidism in pregnancy is recommended.
In the most recent publication of the journal of obstetrics and gynecology of India dated January February 2008 in its editorial the misery of TSH states that Hypothyroidism and pregnancy The prevalence of clinical and sub-clinical hypothyroidism during pregnancy is estimated to be 0.3 to 0.5% and 2.3% respectively.
Back in May of 2004, the American Thyroid Association issued new guidelines regarding pregnancy and hypothyroidism, calling for testing before pregnancy and in early pregnancy of women who are at high risk for thyroid disease, as well as for more frequent testing.

In a recent publication in Thyro Think titled Hypothyroidism and Pregnancy by Dr. Ms. Mala Dharmalingam MD DM Asst. Professor, Dept of Endocrinology & Metabolism Thyroid Division, MS Ramaiah Medical College and Hospital, Bangalore the publication reports that in Hypothyroid women who become pregnant also carry an increased risk for obstetrical complications such as IUD, pregnancy – induced hypertension, abruptio placenta and increase in perinatal mortality. Higher perinatal mortality. There is also recent evidence for long – lasting psychoneurological impairment in the progeny.

Results

Table 1: Gestational age at first visit * TSH group

		TSH GROUP			
		Up to 4.99	**5 to 9.99**	**10 & above**	**Total**
Gestational age	Upto 12 weeks	13	4	2	19
		4.0%	1.2%	0.6%	5.8%
	13-24 weeks	63	38	6	107
		19.3%	11.6%	1.8%	32.7%
	Above 24 weeks	118	65	18	201
		36.3%	19.8%	5.4%	61.5%
Total		194	107	26	327
		59.3%	32.7%	8.0%	100.0%



Chi square=2.489 P=0.647 Not significant.

Most of the women (61.5%), had made their first visit to the tertiary hospital after their 24 weeks of gestation and 19.8% of them had their TSH level between 5 and 9.99 mIU/dL.

Table 2: Outcome of Preg. Preterm/Term * TSH group

		TSH Group			Total
		Till 4.99	**5 to 9.99**	**10 and above**	
Outcome of Preg. Preterm/term	1 Preterm	24	17	2	43
		7.3%	5.2%	0.6%	13.1%
	2 Term	170	90	24	284
		52.0%	27.5%	7.3%	86.9%
Total		194	107	26	327
		59.3%	32.7%	8.0%	100.0%

Chi square= 1.483 P= 0.476 statistically not significant.

Majority of women (87%) had term deliveries irrespective of their hypothyroid level.

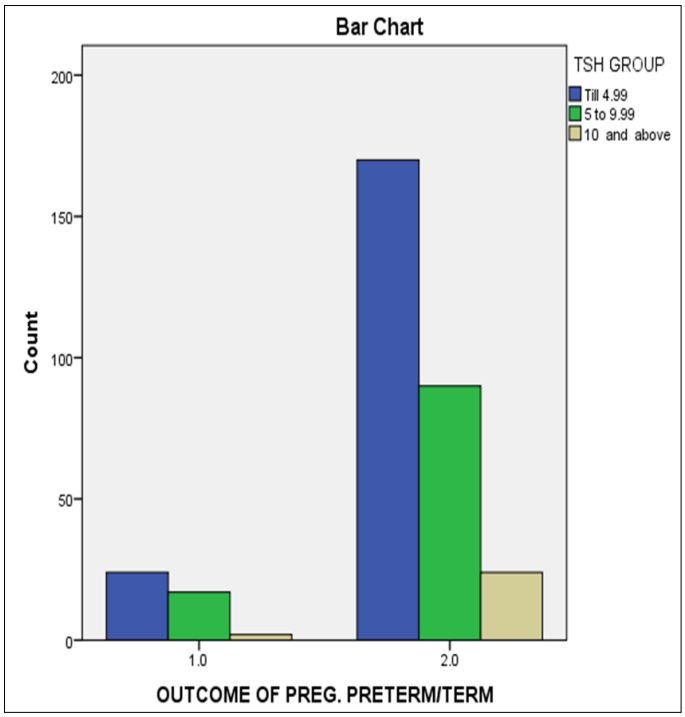


Table 3: Mode of delivery* TSH group

	TSH group			
	Till 4.99	**5 to 9.99**	**10 and above**	**Total**
Normal LSCS	88	46	15	149
	26.9%	14.1%	4.6%	45.6%
	106	61	10	177
	32.3%	18.7%	3.1%	54.1%
Spont. Expulsion	0	0	1	1
	0.0%	0.0%	0.3%	0.3%
Total	194	107	26	327
	54.3%	32.7%	8.0%	100.0%

Chi square= 13.926 P=0.008 statistically significant.

About 54% of deliveries were LSCS and one spontaneous expulsion occurred.

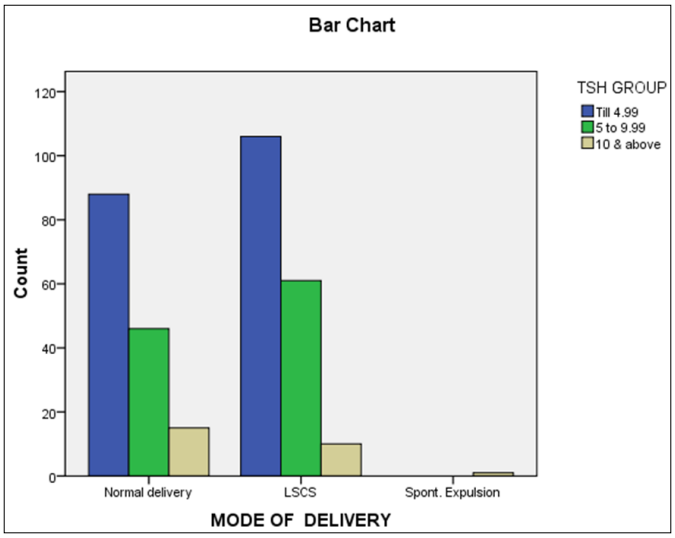
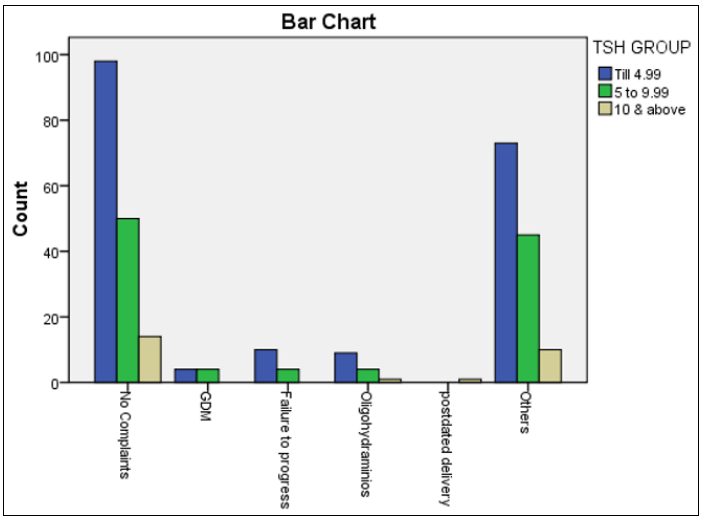


Table 4: Maternal complications during delivery * TSH group

		TSH GROUP			Total
		Till 4.99	5 to 9.99	10 and above	
Maternal complications during delivery any	No Complications	98	50	14	162
		30.0%	15.3%	4.3%	49.5%
	GDM	4	4	0	8
		1.2%	1.2%	0.0%	2.4%
	Failure to progress	10	4	0	14
		3.1%	1.2%	0.0%	4.3%
	Oligohydrominios	9	4	1	14
		2.8%	1.2%	0.3%	4.3%
	Postdated pregnancy	0	0	1	1
		0.0%	0.0%	0.3%	0.3%
	Others	73	45	10	128
		22.3%	13.8%	3.1%	39.1%
	Total	194	107	26	327
		59.3%	32.7%	8.0%	100.0%

Chi-Square =15.398 P=0.118. Not significant.

There were "No complications" for 49.5% of women during their deliveries. Among the remaining women with complications, a few notable complaints were GDM (2.4%), Anaemia (2.8%), Oligohydramnios (4.3%), Failure to progress (4.3%) and Post dated delivery (0.3%). For the women of about 39.1% with other complaints like Unengaged head, Mobile head, Cord around neck, BOH, etc., their Hypothyroid levels were below 5mIU/dL (22.3%) and between 5 - 9.99 mIU/dL (13.8%).



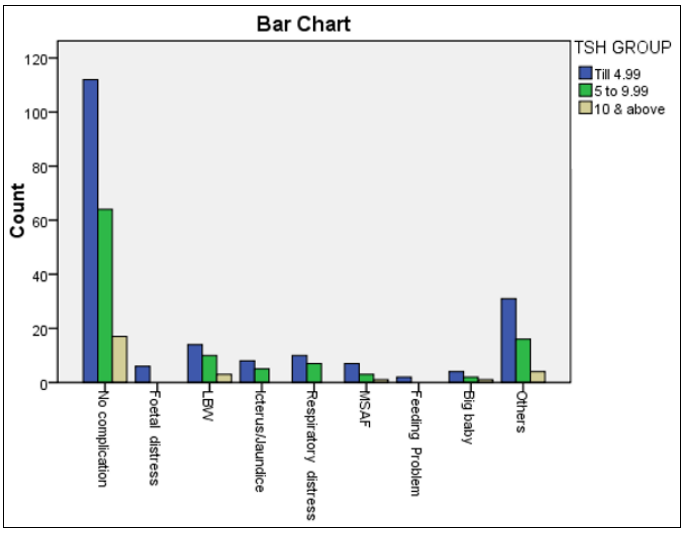
Maternal Complications during delive

Table 5: NICU complications *TSH Group

		TSH GROUP			
		Till 4.99	5 to 9.99	10 & above	Total
NICU	No complication	112	64	17	193
		34.3%	19.6%	5.2%	59.0%
	Foetal distress	6	0	0	6
		1.8%	0.0%	0.0%	1.8%
	LBW	14	10	3	27
		4.3%	3.1%	.9%	8.3%
	Icterus/Jaundice	8	5	0	13
		2.4%	1.5%	0.0%	4.0%
	Respiratory distress	10	7	0	17
		3.1%	2.1%	0.0%	5.2%
	MSAF	7	3	1	11
		2.1%	0.9%	0.3%	3.4%
	Feeding Problem	2	0	0	2
		0.6%	0.0%	0.0%	0.6%
	Big baby	4	2	1	7
		1.2%	0.6%	0.3%	2.1%
	Others	31	16	4	51
		9.5%	4.9%	1.2%	15.6%
	Total	194	107	26	327
		59.3%	32.7%	8.0%	100.0%

Chi-Square =9.970 P=0.868. Not significant.

59% of babies were born without any complication during delivery. The notable complications of other babies were LBW (8.3%), Respiratory distress (5.2%), MSAF (3.4%), Icterus/ Jaundice (4.0%), Big Baby (2.1%) and Feeding problem (0.6%).



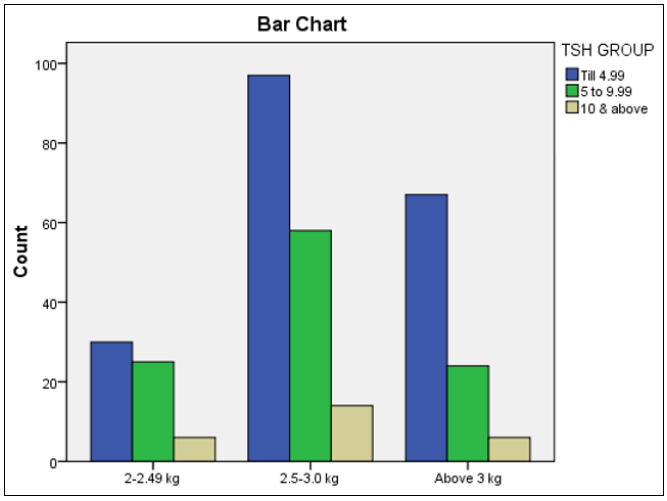
NICU

Table 6: Birth weight (kg) * TSH group

		TSH GROUP			
		Till 4.99	**5 to 9.99**	**10 & above**	**Total**
Birth weight (Kg)	2-2.49 kg	30	25	6	61
		9.2%	7.6%	1.8%	18.7%
	2.5-3.0 kg	97	58	14	169
		29.7%	17.7%	4.3%	51.7%
	Above 3 kg	67	24	6	97
		20.5%	7.3%	1.8%	29.7%
	Total	194	107	26	327
		59.3%	32.7%	8.0%	100.0%

Chi square=6.686 P=0.153 statistically not significant.

18.7% of babies were underweight and among them only 7.6% of their mothers' hypothyroid levels were between and 5 and 9.99 mIU/dL



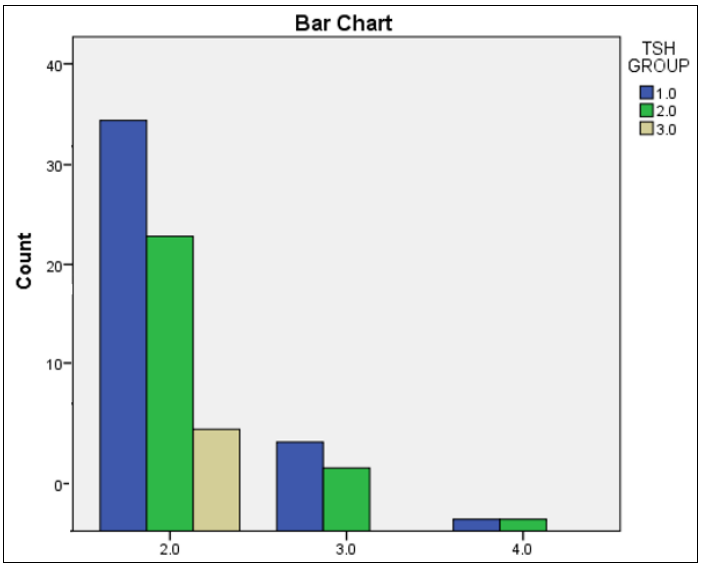
Birth Weight (kg)

Table 7: Baby TSH values (miU/ml) * TSH group

			TSH GROUP			**Total**
			Till 4.99	**5 to 9.99**	**10 & above**	
Baby TSH Values (mIU/ml)	2.0	Normal	32	23	8	63
			41.6%	29.9%	10.4%	81.8%
	3.0	Below Normal	7	5	0	12
			9.1%	6.5%	0.0%	15.6%
	4.0	Above Normal	1	1	0	2
			1.3%	1.3%	0.0%	2.6%
Total			40	29	8	77
			51.9%	37.7%	10.4%	100.0%

Chi square= 2.044 P= 0.728 statistically not significant.

Among the newborns, who were provided with their TSH results, about 82% of them had their Normal values of TSH.



Baby TSH Values (mlU/ml)

Summary

1. Most of the women (61.5%), had made their first visit to the tertiary hospital after their 24 weeks of gestation and 19.8% of them had their TSH level between 5 and 9.99 mIU/dL.
2. Majority of women (87%) had term deliveries irrespective of their hypothyroid level.
3. About 54% of deliveries were LSCS and one was spontaneous expulsion.
4. There were "No complications" for 49.5% of women during their deliveries. Among the remaining women with complications, a few notable complaints were GDM (2.4%), Anaemia (2.8%), Oligohydramnios (4.3%), Failure to progress (4.3%) and Postdated delivery (0.3%). For the women of about 39.1% with other complaints like Unengaged head, Mobile head, Cord around neck, BOH, etc., their Hypothyroid levels were below 5 mIU/dL (22.3%) and between 5 - 9.99 mIU/dL (13.8%).
5. 59% of babies were born without any complication during delivery. The notable complications of other babies were LBW (8.3%), Respiratory distress (5.2%), MSAF (3.4%), Icterus/Jaundice (4.0%), Big Baby (2.1%) and Feeding problem (0.6%).
6. 18.7% of babies were underweight and among them only 7.6% of their mothers' hypothyroid levels were between and 5 and 9.99 mIU/dL
7. Among the newborns, who were provided with their TSH results, about 82% of them had their Normal values of TSH.

Conclusion

- The study clearly showed that maternal outcome operative surgery (LSCS) was statistically significant. All the three TSH sub groups LSCS was done as upto4.99 group as 32.3%, 5 to 9.99 group as 18.7% and 10 and above group as 3.1%
- Like GDM screening, Gestational Thyroid Dysfunction (GTD) screening among Antenatal Women in the First trimester registration should be made compulsory in all Hospitals by Government. This will lead to early and effective treatment of thyroid disorders that ensures safe pregnancy with minimal maternal and fetal complications and also lesser operative surgery, which leads to lot of complications to women.
- This study emphasizes the need for increased awareness,

regular antenatal checkups, early detection and treatment of thyroid dysfunction among the Antenatal population.

It also emphasizes the need to strengthen our outreach services and family welfare services.

Limitation of the study: We have not seen the awareness of Thyroid dysfunction among study population.

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