e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2022; 14(12); 265-278

Original Research Article

Prevalence of Subclinical Hypothyroidism in Pregnancy and its Maternal and Fetal Outcomes: A Prospective Analytical Study Done in a Tertiary Hospital of Southern Odisha

Anuradha Mishra[1], Jagdish Behera[2], Kuladeep Sethy[3], Aishwarya Sahu[4]

[1]Associate Professor, Department of Obstetrics and Gynecology, M.K.C.G. Medical College and Hospital, Berhampur, Odisha, India.
[2]Senior Resident, Department of Obstetrics and Gynecology, M.K.C.G. Medical College and Hospital, Berhampur, Odisha, India.
[3]Junior Resident, Department of Obstetrics and Gynaecology, M.K.C.G. Medical College and Hospital, Berhampur, Odisha, India.
[4]Junior Resident, Department of Obstetrics and Gynaecology, M.K.C.G. Medical College and Hospital, Berhampur, Odisha, India.

Received: 14-10-2022 / Revised: 13-11-2022 / Accepted: 05-12-2022
Corresponding author: Dr Aishwarya Sahu
Conflict of interest: Nil

Abstract

Background: Pregnancy can be viewed as a physiological state in which a combination of events concurs to modify the thyroidal economy. There is change in the level of thyroxine-binding globulin, total thyroid hormone level and level of thyroid stimulating hormone (TSH) during normal pregnancy. Subclinical hypothyroidism is defined when TSH level is elevated but free thyroxine (T4) and free tri-iodothyronine(T3) levels are normal. The prevalence of Subclinical hypothyroidism in child bearing age women in iodine sufficient areas is between 4 and 8%. Maternal hypothyroidism is associated with an increased risk of adverse obstetrical outcomes like preeclampsia, low birth weight, preterm labour, placental abruption, miscarriage and prenatal mortality. The aim of our study to find out the maternal complications and perinatal outcomes and how it has direct relation to the thyroid status of the mother.

Objectives: The prospective study aims to detect the prevalence of subclinical hypothyroidism in pregnancy and its maternal and fetal outcomes.

Materials and methods: The prospective study was conducted in the department of Obstetrics and gynaecology MKCG MCH Berhampur for a period of 2 years (July 2019 to July 2021) in consultation with department of Endocrinology MKCG MCH Berhampur. Blood samples of all patients were collected for assessment of thyroid profile which was done by machine ARCHITECT 1000 SR by electrochemiluminence (ECLIA) method. The fetal and maternal outcomes are great concern in our study.

Results: In our study we included 283 number of cases, out of which 15 cases were found to be SCH (sub clinical hypothyroidism) and 268 number cases found to be euthyroid. Prevalence of SCH in our study has observed to be 5.3% as against 94.7% euthyroid cases. Maximum cases of SCH (11 cases 73%) below 30 yrs. and maximum percentage is between 25-30 yrs., 60% from rural areas, 60% from upper middle SES. 46.6% received treatment, 53.3% patients were from third trimester. Out of 15 maximum were primigravida (73%). 20% patients developed placental abruption, 20% preterm delivery, 6.7% spontaneous abortion, 93.3% viable births, 6.7% prom occurred, 6.7% developed PIH, 6.7% developed IUGR. Maximum birth weight of baby was 77% and weight above 2.5 kg. 4 cases undergone LSCS

(27%) and 11 were NVD (73%).33.4% cases admitted in NICU for various reason. APGAR score >3 in 5 minute was 93.3% cases.

Conclusion: Overt maternal hypothyroidism manifests during pregnancy and if occurs in the first trimester, is associated with pregnancy complications like preeclampsia, preterm birth, abruptio placenta, low birth weight, fetal death and intellectual impairment during childhood. SCH which is a mild form of thyroid disorder has various pregnancy complications and poor perinatal outcomes.

Keywords: Subclinical hypothyroidism, fetal and maternal outcomes, NICU, Perinatal outcomes, abortions, IUGR, LSCS;

Introduction

Pregnancy can be viewed as a physiological state in which a combination of events concurs to modify the thyroidal economy. There is change in the level of thyroxine-binding globulin, total thyroid hormone level and level of thyroid stimulating hormone (TSH) during normal pregnancy [1]. Thyroid dysfunction (TD) is often overlooked because of the nonspecific symptoms and hypermetabolic state of normal pregnancy. It has varied impact on pregnancy outcome. The risk of miscarriage is increased in autoimmune thyroid disease [2]. Severe maternal hypothyroidism can result in irreversible neurological deficit in the offspring. Grave's disease (GD) can lead to pregnancy loss as well as fetal thyroid dysfunction [3].

Subclinical hypothyroidism (SCH) is defined when thyrotropin (TSH) levels are elevated but free thyroxine (T4) and free tri-iodothyronine (T3) levels are normal, the level of active hormones will be within the laboratory reference range [4,5].

The prevalence of subclinical hypothyroidism in child bearing age women in iodine sufficient areas is between 4 and 8% (6). As the condition is generally more common in the female, it is to be expected that it manifests during pregnancy. During the last decade there has been an increasing appreciation of the incidence of thyroid dysfunction during pregnancy as well as the resultant adverse maternal and fetal effects [6]. In the hope that many of these adverse effects could be prevented or ameliorated by early detection appropriate treatment, the proposal to implement screening for thyroid function during pregnancy deserves consideration. On the other hand the prevalence of overt hypothyroidism is around 5 per 1000 and that of overt hypothyroidism is about 3 per 1000 [6].

Maternal hypothyroidism is associated with an increased risk of adverse obstetrical outcomes like preeclampsia, low birth weight, preterm labour, placental abruption, miscarriage and perinatal mortality [7,8,9]. Demand for thyroid hormones is increased during pregnancy which may cause a previously unnoticed thyroid disorder to worsen. The deleterious effect of thyroid dysfunction also affects neurointellectual development in infancy and childhood [9].

While overt hypothyroidism (raised TSH with abnormally low thyroxine) complicate about 2 to 3 pregnancies per 1000, incidence of subclinical hypothyroidism (raised TSH with normal thyroxine) is quite high in women screened before mid-pregnancy [9].

Various studies have shown that maternal complications and perinatal outcomes have a direct relation to the thyroid status. In pregnant hypothyroid women the complication rate was 4.8% in those who were treated and became euthyroid by 20 weeks of gestation as compared to 19% in those who were euthyroid after 20 weeks. Those who never achieved euthyroid state during pregnancy had a complication rate of 31.5% [10].

As per American thyroid association, the recommended but yet debatable serum TSH level is 2.5m IU/ml as upper limit in early pregnancy i.e upto 12 weeks.

According to American college of obstetrics and gynaecologists (ACOG) guidelines in women with overt hypothyroidism (elevated TSH and low free T4 level), thyroxine supplementation during pregnancy has been associated with improved pregnancy outcomes. However, data indicating fetal benefit from thyroxine supplementation in pregnant women with SCH are not currently available. Interest in thyroid disease in pregnancy, especially subclinical hypothyroidism, has escalated consequent to reports suggesting that thyroid deficiency (including both overt and subclinical disease) during pregnancy results in impaired neurodevelopment the offspring [11,12]. Further, other reports have associated subclinical hypothyroidism with preterm delivery and other pregnancy complications [13]. These findings have led some national societies as well as public interest groups to recommend routine thyroid screening during pregnancy. The rationale for routine screening of pregnant women is supported by the prevalence of SCH and the benefits of treatment during pregnancy [13].

Based on current literature, thyroid testing in pregnancy should be performed on symptomatic woman and those with a personal history of thyroid disease or other medical conditions associated with thyroid disease (e.g. Diabetes mellitus). In these women it is most appropriate to assess TSH levels first and then evaluate other thyroid functions if the TSH level is abnormal [4]. Women with established overt thyroid disease (hyperthyroidism or hypothyroidism) should be appropriately treated to maintain a euthyroid state throughout pregnancy and during the postpartum period. Due to lack of evidence the identification and treatment of pregnant women with SCH improves maternal or infant outcomes, at present routine screening for SCH is not currently recommended [11,12,13].

Aims and Objectives of the Study

The prospective analytical study aims to detect the prevalence of subclinical hypothyroidism (elevated TSH, normal T3 and T4) in pregnancy its maternal and fetal outcomes.

The objective of the study is to justifying the estimation of thyroid profile in pregnancy as a routine screening method in an effort to decrease various pregnancy complications resulting due to subclinical hypothyroidism.

Materials and Methods

This prospective study was conducted in the department of O&G, MKCG MCH Berhampur for a period of 2years (July 2019 July 2021) in consultation with department of Endocrinology, MKCG MCH Berhampur. After taking written consent the cases were subjected to detailed history taking and a complete clinical examination with due emphasis on age, socio economic status (modified Kupuswami classification), geographic distribution(rural, urban), gravid status, gestational age, mode of delivery and pregnancy outcomes. Ethical clearance from ethical institutional committee was obtained for this study.

Blood samples of all patients were collected for assessment of thyroid profile (S.TSH, FT3, FT4) which was done by machine ARCHITECT 1000SR by

electrochemiluminence (ECLIA) method. Prevalence of admission to neonatal ICU (NICU) due to preterm/ hypoglycaemia/ birth asphyxia/ neonatal jaundice was recorded in babies born of subclinical hypothyroid mother.

Patients who fulfilled the following criteria were included in the study and rest were excluded.

Inclusion Criteria:

- All pregnant patients attending outpatient dept (OPD) of O&G department of MKCG MCH for routine checkup,
- Patients admitting to the antenatal ward of O&G department of MKCG MCH.
- Patients attending labour room of O&G department MKCG MCH in labour or with some complications.

Exclusion Criteria

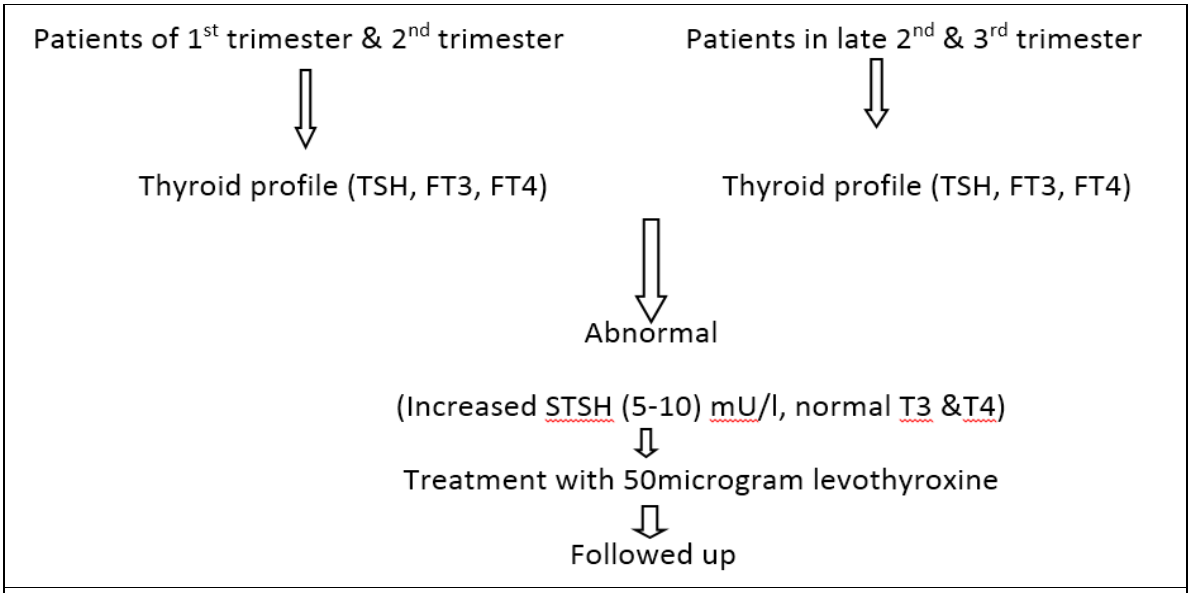
- Patients with gestational diabetes, other metabolic/endocrinological disorder.
- Patients with chronic diseases (hypertension, haemoglobinopathies, connective tissue diseases)
- Pregnancy with infections.

556 patients were initially recruited in this study. Out of which total of 283 cases were followed and rest did not report back with their thyroid profile report. Prevalence of SCH in 283 cases was analyzed. The pregnancy outcomes in term of spontaneous abortion, preterm labour, abruption placenta, PIH, PROM, IUGR, IUD, congenital malformation was studied in these patients. Mode of delivery (VD/LSCS) was also noted.

Study Design

Study groups were selected as per inclusion and exclusion criteria. Cases were subjected to detailed history taking and complete clinical examination. Thyroid profile (S.TSH, FT3, FT4) of all patients were estimated. Prevalence of admission to ICU (NICU) due to preterm/hypoglycaemia/birth asphyxia was noted in babies born of subclinical hypothyroid mother.

At the end of study the data was analysed, statistical significance was estimated. Conclusion was drawn regarding various maternal and fetal outcomes of subclinical hypothyroidism and benefits of treatment



Flow Chart of Study Design

Observation and Result

Out of 283 no. of cases 15 cases were found to be sub-clinically hypothyroid whereas rest 268 number of cases found to be euthyroid (i.e normal serum TSH, T3, and T4).

Table 1: Prevalence of subclinical hypothyroidism cases (n=283)

Thyroid status	No. Of cases	Percentage
SCH(Subclinical hypothyroid)	15	5.3%
EUT(Euthyroid)	268	94.7%
Total	283	100%

Hence prevalence of Sub-clinical hypothyroidism in this study has observed to be 5.3% as against 94.7% euthyroid cases.

Table 2: Distribution of age in both study groups

Age group	No. of SCH females	Percentage (%)	No. of EUT females	Percentage (%)	Total
<30yr	11	73%	237	88%	
>30yr	4	27%	31	12%	
Mean age in year	28.1		26.1		
Total	15		268		283

On comparing the age distribution amongst the cases diagnosed as SCH, 11 case (73%) were less than 30 yr. of age and 4 (27%) were more than 30 years of age. The pattern of age distribution in the control euthyroid group showed that 237 pregnant women (88%) were less than 30 yr. of age and 31 (12%) pregnant women were more than 30 yr of age. Hence the mean age for SCH is 28 year and mean age for euthyroid is 26 year.

Chi-square value was found to be 3.361 and P value calculated to be 0.067. So no significant difference in age was observed between both the study groups.

Table 3: Prevalence of SCH in response to age distribution (n=15)

Age distribution	15-20 years	20-25 years	25-30 years	>30 years	Total
No. Of cases of SCH	1	3	8	4	15
Percentage (%)	6%	20%	50%	24%	100%

Out of total 15 cases of subclinical hypothyroid patients in the study, 1 case(6%) belonged to the age group of 15-20 years, 3 cases (20%) were in the age group of 20-25 years, 8 cases(50%) were in the 25-30 year age group and 4 cases(24%) were above 30 years of age.

So from the table it is evident that the incidence of SCH is maximum (i.e50%) in 25-30 years age group. Also it is evident that the incidence is quite high in females who are >30yrs in the study.

Table 4: Geographical area distribution

Place of distribution	SCH No.	Percentage (%)	EUT No.	Percentage (%)	Total	Percentage (%)
Rural	9	60%	172	64%	181	64%
Urban	6	40%	96	36%	102	36%
Total	15	100%	268	100%	283	100%

From the table it is evident that out of 283 numbers of subjects 181 cases (i.e 63.8%) belonged to rural area and 102 cases (i.e36.2%) belonged to urban area.

Similarly out of 268 cases of euthyroid cases 172 cases (64%) belonged to rural area and 102 cases (36%) belonged to urban area.

Table 5: Socio-economic status of the patients (n=15)

Socio-economic status	No of cases	Percentage (%)
Upper	3	20%
Upper middle	9	60%
Lower middle	2	13%
Lower	1	7%
Total	15	100%

As per Modified Kuppuswamy classification for socio-economic status which takes education, occupation and family income into consideration. This table shows that out of total 15 SCH cases, 3 patients(20%) belonged to upper socioeconomic status group, 9 patients(60%) to the upper middle socio economic group, 2 patients(13%) to lower middle group and 1 patient(7%) belonged to lower socio economic status group. On combining upper and upper middle class, it is observed that 12 subjects (i.e80% in total) fall in upper socio economic group as compared to 3 subjects (i.e20% in total) who belonged to lower socio economic group.

Table 6: Treatment received by sub-clinical hypothyroid patients (n=15)

Treatment	No. Of SCH Cases	Percentage (%)
Received	7	46.6%
Not received	8	53.3%
Total	15	100%

Out of total 15 SCH patients, 7 patients (46.6%) received treatment with 50microgram levothyroxine, whereas 8 patients (53.3%) did not receive treatment in the study as they reported in late pregnancy with some form of complications like spontaneous abortion, preterm labour, abruption placentae, PIH, PROM or IUD and these sequelaes could no more be prevented with treatment as they have already been sent.

Table 7: Distribution of Gestational age among both study group (n=283)

Gestational age	SCH No.	Percentage (%)	EUT No.	Percentage (%)
1st trimester	2	13.4%	6	2.4%
2nd trimester	5	33.3%	12	4.5%
3rd trimester	8	53.3%	250	93.1%
Total	15	100%	268	100%

Among 15 number of SCH patient, 2 cases(13.3%) presented in 1st trimester, 5 cases(33.3%) in 2nd trimester & 8 cases (53.3%) presented in 3rd trimester in the study. Similarly out of 268 euthyroid cases, 6 cases (2.4%), 12 (4.5%), 250 (93.1%) cases presented in 1st, 2nd and 3rd trimester respectively during the study. So it is observed that during study more number of SCH cases could be detected during 1st and 2nd trimester by routine screening.

Table 8: Distribution of parity amongst subclinical hypothyroid patients (n=15)

Parity	No of patients	Percentage (%)
Primigravida	11	73%
Multigravida	4	27%
Total	15	100%

According to the table, 11 cases (73%) of subclinical hypothyroid patients were primigravida and rest 4 cases (30%) were multigravida in the study. So it is observed that the incidence of hypothyroidism is more in primigravida than in multigravida females.

Table 9: Occurrence of Abruptio placenta amongst the study subjects

SCH(n=15)				Euthyroid(n=268)			
Abruption		No Placental abruption		Abruption		No Placental abruption	
No	Percentage	No	Percentage	No	Percentage	No	Percentage
3	20%	12	80%	5	2%	263	98%

It is observed that abruptio placenta was associated in 20% cases (i.e., 3 cases among total15 cases) of the subclinical hypothyroid groups as compared to 2%(i.e., 5 cases among 268 cases) in the euthyroid group. Chi-square value found out to be 22.089, p value was calculated to be <0.0001, odds ratio (=ad/bc) was calculated to be 9.5

So it implies that occurrence of abruption is 9.5 times more common in subclinical hypothyroidism compared to euthyroid patients.

Table 10: Occurrence of Preterm birth among the study subjects

SCH(n=15)				Euthyroid(n=268)			
Preterm delivery		Term delivery		Preterm delivery		Term delivery	
No	Percentage	No	Percentage	No	Percentage	No	Percentage
3	20%	1	80%	10	3.7%	258	96.3%

It is observed that the preterm birth was associated in 20% cases(i.e., in 3 cases out of total 15) in subclinical hupothyroid group as compared to 3.7% cases(i.e 10 cases out of 268 cases) in euthyroid group. Chi-square was found to be17.15, p value calculated to be <0.001 and odds ratio(=ad/bc) was found out to be 6.4, so from the study preterm birth is observed to be 6.4 times more commonly associated with subclinical hypothyroidism than in euthyroidism.

Table 11: Occurrence of spontaneous abortion among the study subject

SCH(n=15)				Euthyroid(n=268)			
Spontaneous abortion		Viable birth		Spontaneous abortion		Viable birth	
No	Percentage	No	Percentage	No	Percentage	No	Percentage
1	6.7%	14	93.3%	7	2.6%	261	97.4%

From the above data spontaneous abortion occurred in 1 patient (6.7%) and was absent in 14 patients (93%) out of total 15 subclinical hypothyroid patients. Whereas in euthyroid patients it was seen in 7 cases (2.6%) and was absent in 261 cases (97.4%) out of total of 536.

Chi-square value was calculated to be 1.7, p value was found to be <0.19, so it implies that the statistical analysis that the association of subclinical hypothyroidism with spontaneous is not statistically significant

Table 12: Association of PROM between both Study Subjects

SCH(n=15)		Euthyroid(n=268)	
PROM occurred		PROM occurred	
No	Percentage	No	Percentage
1	6.7%	4	1.5%

From above it is observed that among 15 cases of subclinical hypothyroid cases 1 case (6.7%) were associated with PROM which was absent in rest 14 cases (93.3%). Similarly out of 268 euthyroid cases 4 cases (1.5%) were associated with PROM and it was absent in 264 cases (98.5%).

Chi-square value was calculated to be 10.7, p value was found out to be <0.001, odds ratio calculated to be equal to 7.3, so the analysis shows statistically significant association between PROM and SCH in the present study.

Table 13: Occurrence of PIH among both the study Subjects

SCH(n=15)				Euthyroid(n=268)			
PIH		Normotensive		PIH		Normotensive	
No	Percentage	No	Percentage	No	Percentage	No	Percentage
1	6.7%	14	93.3%	8	3%	260	97%

It is observed from the table that among 15 cases of subclinical hypothyroid cases 1 case(6.7%) were associated with pregnancy induced hypertension(PIH) which was absent in rest 14 cases(93.3%). Similarly out of 268 euthyroid cases 8 cases (3%) were associated with PIH and it was absent in 260 cases (97%). Chi-square value was found to be1.2, p value was found out to be <0.26, so it implies that the association between SCH and PIH is not statistically significant.

Table 14: Association of IUGR with both study Subjects

SCH(n=15)				Euthyroid(n=268)			
IUGR		Normal growth profile		IUGR		Normal growth profile	
No	Percentage	No	Percentage	No	Percentage	No	Percentage
1	6.7%	14	93.3%	7	2.6%	261	97.4%

Among 15 cases of subclinical hypothyroid cases in 1 case (6.7%) IUGR was present and rest 14 cases (93.3%) were associated with normal growth profile. Similarly out of 268 euthyroid cases 7 cases (2.6%) were associated with IUGR and rest 261 cases (97.4%) were having normal intrauterine growth profile. Chi-square value was found to be 1.7, p value was calculated to be <0.019, so no statistical significant association between SCH and IUGR was found in the study.

Table 15: Maternal thyroid status and birth weight of baby (n=283)

Birth weight	SCH((n=15)	Percentage (%)	EUT(n=268)	Percentage (%)
Abortion	1	7%	5	2%
<1.5kg	1	3%	3	1%
1.5-2.5kg	2	13%	5	2%
>2.5kg	11	77%	255	95%
Total	15	100%	268	100%

From the above data out of 15 cases of SCH there are 1 case (7%) of spontaneous abortion, in 1 case (3%) birth weight is less than 1.5 kg, in 2 cases (13%) birth weight is between 1.5-2 kg and rest 11cases (77%) have birth weight more than 2.5 kg. Similarly in control group out of total 268 no of cases, 5 cases (2%) have spontaneous abortion, 3 cases (1%) have birth weight less than 1.5 kg, 5 cases (2%) have birth weight between 1.5-2.5 kg and rest 255 (95%) have birth weight more than 2.5kg. As per table comparing both groups % of cases of abortion (7%) and LBW (16%) are higher in SCH group compared to Euthyroid group.

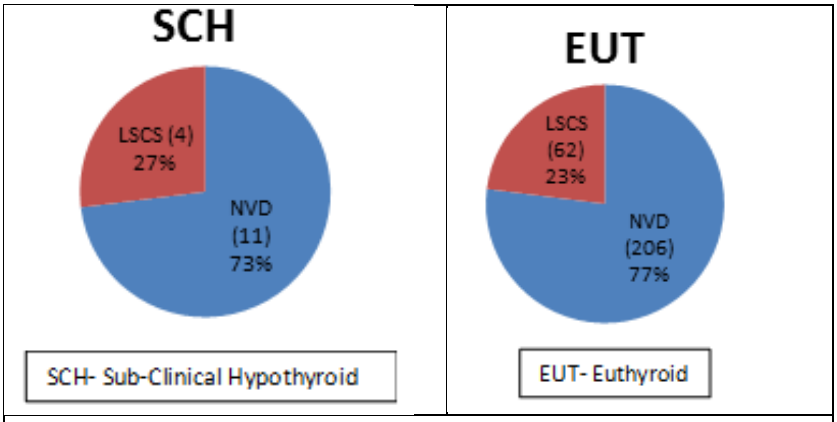


Figure 1: Comparison of mode of delivery both study groups

According to the pie chart out of total 15 SCH patients 4 cases (27%) delivered by LSCS and 11 cases (73%) delivered vaginally. Similarly in control euthyroid group out of total 268 cases 62 (23%) delivered by LSCS and 206 cases (77%) delivered by vaginal route. So it is observed that the caesarean section rate high in SCH (27%) compared to EUT group (23%).

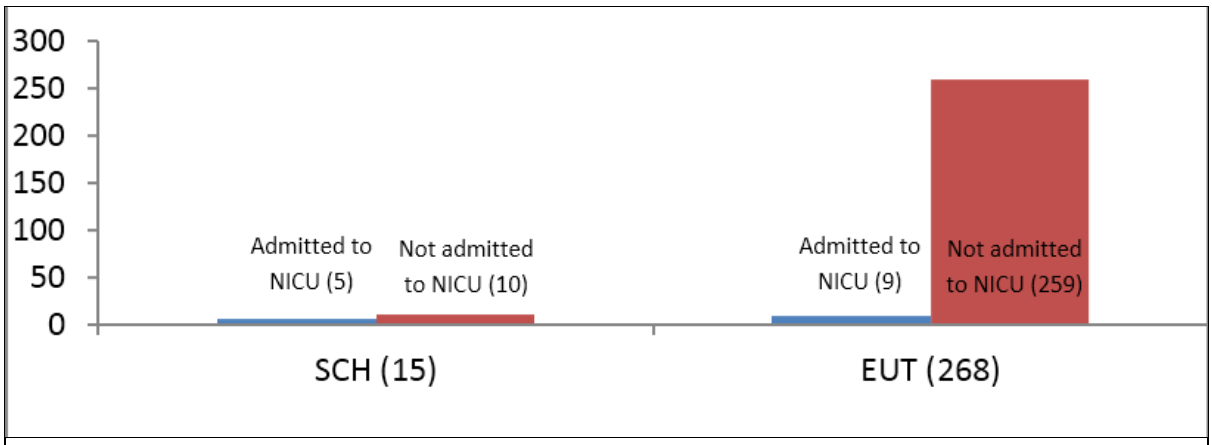


Figure 2: Comparison of rate of admission of new born babies to NICU in both study Group

From above data out of total 15 cases of SCH 5 babies(33.4%) born of subclinical hypothyroid mother got admitted to NICU due to various complications like birth asphyxia and prematurity, neonatal jaundice, hypoglycaemia etc. whereas in euthyroid control group out of total 268 cases, 9 babies (3.4%) got admitted to NICU . Hence admission to NICU is quite higher in SCH group compared to euthyroid control group. P value <0.001, hence the association is statistically significant.

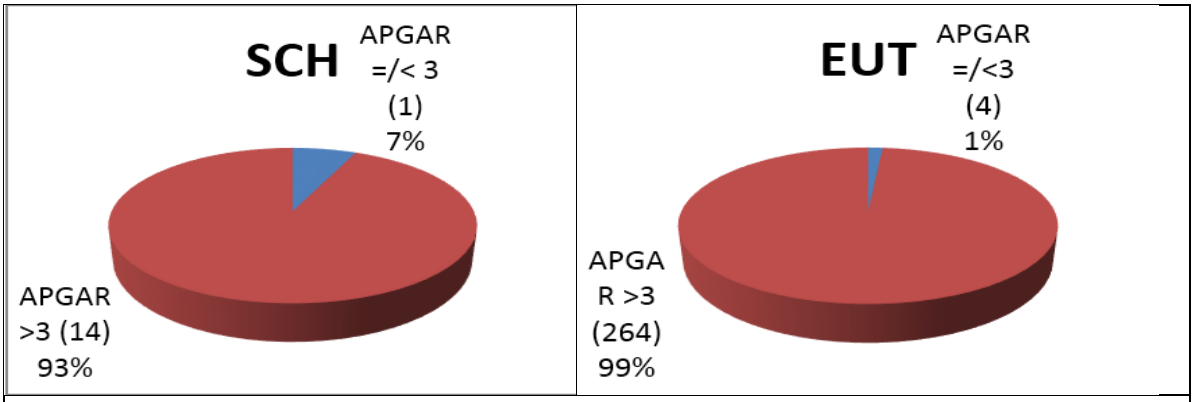


Figure 3: Comparison of APGAR score in both study groups

According to the chart out of total 15 cases of SCH, 1case has APGAR score less than 3 in 5 minute i.e6.7%. Rest 14 (94%) newborn babies of SCH have APGAR score >3 in 5 minute. Similarly in euthyroid control group out of total 268 cases, 4 cases (1.4%) have APGAR score<3 in 5minute and 264 cases (98.6%) have APGAR score more than 3 in 5 minute. Hence APGAR score at 5 minute is higher in SCH group (6.7%) compared to euthyroid group (1.4%), chi-square value was found to be 4.01 and p value calculated to be <0.05. It amplies the association is statistically significant.

Table 16: Pregnancy outcomes when subclinical hypothyroid patients received treatment

Gestational age	Treatment received	Good pregnancy outcomes	Percentage (%)	Adverse outcomes	Percentage (%)
1st trimester	2	2	100%	Nil	Nil
2nd trimester	5	3	60%	2	40%
total	7	5		2	

Out of 15 sub clinical hypothyroid patients 2 cases were in 1st trimester and all of them received treatment, and have good pregnancy outcome (100%) without any complication**.** Similarly out of 5 SCH patients in 2nd trimester 3 cases have good pregnancy outcomes and rest 2 cases ended with some pregnancy related complications i.e only 60% have good pregnancy outcomes and rest 40% have pregnancy related complications. Hence those who received treatment in 1st trimester 100% have good pregnancy outcomes compared to 60% for those received treatment in second trimester.

Table 17: A comparison between 1st & 2nd trimester subclinical hypothyroid patients

No. of cases	1st Trimester SCH Patients (% of total)	2nd trimester SCH Patients (% of total)
	2 (13%)	5 (33%)
Received treatment	2 (100%)	5 (33%)
Good pregnancy outcome	2 (100%)	3 (60%)
Mode of delivery (LSCS)	1 (25%)	4 (50%)
Birth Weight <2.5kg (Preterm +LBW)	1 (25%)	5 (62%)
APGAR Score <3 in 5 min	0 (0%)	1 (12%)
NICU admission of newborn	1 (25%)	3 (37%)

Out of total 15 SCH patients 2 cases (13%) belongs to 1st trimester and 5 cases(33%) cases belongs to 2nd trimester. Those who were in 1st trimester, 100% received treatment whereas, 33% of second trimester SCH could able to receive treatment as rest 40% reported with spontaneous abortion.

Good pregnancy outcome was observed in 100% of SCH patients who were in 1st trimester who received treatment early, whereas those who were in 2nd trimester good pregnancy outcomes had occurred only in 60% of cases as they received treatment late. 50% (4) of 2nd trimester patients had undergone LSCS whereas 25% (1) of SCH in 1st trimester had undergone LSCS. Similarly birth weight was less than 2.5kg in 25% of 1st trimester cases and 62% of 2nd trimester cases. Admission in NICU was higher for 2nd trimester SCH patients (37%) compared to 1st trimester cases (25%). APGAR score was less than 3 in 5 min in one case (12%) of 2nd trimester SCH patient and it was nil for 1st trimester patient.

Discussion

In this study out of total 283 no of cases 15 cases were detected to have SCH whereas 268 no of cases were euthyroid. Hence the prevalence of SCH is calculated as 5.3%.

Casey et al. (2005) in his study reported the prevalence of SCH in pregnancy as 2.4% (9). According to Sahu et al. (2010) prevalence of SCH in pregnancy is quite high (6.4%) [14].

Clearly-Goldman et al. (2008) had shown the prevalence of SCH in pregnancy as 4-8% [15]. Whereas Wang et al. (2011) reported the incidence of SCH in pregnancy as 5.48% which was almost similar to our study [16].

The variation in the incidence of SCH may be related to the iodine deficiency states in the respective areas.

Mean age for SCH is 28 year and mean age of euthyroid is 26 year in this study. Chi-square value found as 3.361 and p value was 0.067. Hence there is no significant difference in age was found in between both the study groups.

This study is almost in concordance with the prospective study conducted by B.M Casey et al (2005) were average age of patients presenting with SCH with pregnancy was 27year while for Euthyroid pregnant women mean age of distribution was 25 years. Most of the patients of SCH belong to 25-30 year of age group in the study. Prevalence of SCH is quite high also in more than 30yr age group which is in congruence with the findings of V. Photourechi et al. (2009). According to whom prevalence of SCH with pregnancy increases with increasing age [17].

60% patients of SCH belong to rural area and 40% belong to urban area. Maximum (90%) subjects belong to the upper middle class. On combining upper and upper middle class, 12 subjects (80% in total) fall in this category as compared to 3 subjects (20% in total) who belonged to lower and lower middle socioeconomic class. Out of 15 SCH patients 7 patients (46.6%) received treatment with 50microgram levothyroxine, whereas 8 patients (53.3%) did not receive treatment in the study as they reported in late pregnancy with some form of complications like spontaneous abortion, preterm labour, abruptio placentae, PIH, PROM or IUD. Among SCH patients 13.4% belonged to 1st trimester, 33.3% 2nd trimester and 53.3% 3rd trimester in the study. It is observed that during study more number of SCH cases could be detected during 1st and 2nd trimester by routine screening. Incidence of SCH is more in primigravida than in multigravida. Occurrence of abruption is 9.5 times more common in SCH compared to Euthyroid patients.

According to Casey et al (2005) placental abruption is 3 times (relative risk RR 3.0, 95% CI,1.1-8.2) more common in SCH compared to control group [9]. Higher

incidence of abruption placentae in SCH has also been reported by Glinoer et al [12], Idris et al [18], and Cleary-Goldman [15].

Preterm birth is 6.4 times more commonly associated with SCH than in Euthyroidism. Argentine et al showed an increased incidence of preterm deliveries which was about 7.2 times higher in SCH group in comparison to control group. Negro et al and Stagnaro et al reported a high incidence of preterm deliveries in SCH group [19, 20]. Spontaneous abortion is present in 6.7% of patients whereas in euthyroid patients it is 2.6%. Casey et al showed in his study, spontaneous abortion is not significantly associated with SCH with pregnancy. Glinoer et al, Arora and Sharma reported higher incidence of spontaneous abortion [21]. Wang et al also showed that incidence of spontaneous abortion was higher (15.4% Vs 8.8%) in SCH in comparison to control (p=0.017) [16].

Our study implies significant association between PROM & SCH, but study done by Cleary-Goldman et al shows no increased risk of PROM & PPROM (15). Our study implies SCH is not statistically associated with PIH, but Goel et al reported that SCH is associated with maternal complications like PIH in 33.3% of cases and Arora and Sharma et al also observed that SCH increases the risk of severe preeclampsia. Boogard et al reported presence of SCH in early pregnancy increases the risk of preeclampsia with odds ratio of 1.7. Admin et al reported the odds of a woman with untreated SCH were at higher risk of suffering from severe preeclampsia at an odds ratio of 1.6 to 1.

There is no significant association between SCH & IUGR as per our study which against the finding of Arora & Sharma who showed an increased risk of IUGR in SCH. Incidence of abortions (7%) and LBW (16%) are higher in SCH group as compared to euthyroid group, where it is 2% and 3% respectively, as per the finding of Goel et al who observed low birth weight in 13.3% cases of patients with SCH. Similar observation was made by Pop et al, Idris et al, Arora & Sharma et al.

According to Wang et al there is increased risk of preterm delivery (5.3%) & LBW (2.3%) in SCH compared to control group [16]. Our study shows caesarean section rate is high in SCH (27%) compared to EUT group (23%). The study is congruence with the study of Idris et al as per whom SCH in early pregnancy has got increased risk of caesarean section at term. 5 babies (33.4%) born of SCH got admitted to NICU whereas in euthyroid control, admission to NICU is only 3.4%, p value was found to be <0.001. Hence the association is statistically significant. This result is in congruence with result of study by Casey et al and Negro et al who stated admission to NICU is high in babies born of SCH mother [9,19].

Newborn with APGAR score <3 in 5 minute is higher in SCH group (6.7%) compared to euthyroid group (1.4%), it implies the association is statistically significant. Similar observation was made by Casey et al in a prospective study and found poor APGAR score <3 in 5 minute is higher in SCH group compared to euthyroid group.

Abalovich et al observed in their study that adequate thyroxine replacement for women with mild hypothyroidism in early pregnancy results in term delivery in 90% but failure to achieve normal TSH during pregnancy has been associated with term delivery in only 20%. Similar observation was made by Argentine researchers and a study published in 2002 on SCH patients who were on adequate treatment carried pregnancy till term in 90% of cases without any complication [22,23]. Negro et al also reported that treatment with levothyroxine in SCH was associated with a decrease risk of perinatal morbidity [19].

Conclusion

Overt maternal hypothyroidism manifests during pregnancy and if occurs in the first trimester, is associated with pregnancy complications like preeclampsia, placental abruption, preterm birth, LBW, fetal death and intellectual impairment during childhood. But since obvious clinical features are absent in SCH, its existence get unnoticed most often even though it can have a great impact on the feto-maternal outcome in pregnancy.

The effects of mild maternal thyroid deficiency with a normally functioning fetal thyroid gland is of importance because the spectrum of thyroid deficiency begins with SCH characterized by an elevated serum thyrotropin (TSH) concentration but a normal serum free thyroxine level. SCH which is a mild form of thyroid disorder characterized by elevated S.TSH & normal T3 & T4 level has various pregnancy complications and poor perinatal outcomes. This study reveals the adverse clinical manifestations of SCH and the benefits of treatment justifying the need for screening for thyroid function during early pregnancy.

Routine screening with thyroid profile in all pregnant women in 1st trimester can lead to early diagnosis of SCH & thus the early institution of treatment will prevent various adverse pregnancy complications and will improve the associated poor perinatal outcomes. More over routine estimation of cord blood serum TSH during delivery will help in diagnosis of congenital hypothyroidism as it is the commonest preventable cause of mental retardation in our country.

References

1. Glinoer D. The regulation of thyroid function in pregnancy: pathways of endocrine adaptation from physiology to pathology. Endocrine Review 2017; 18:871-887
2. Moravej A, Jeddi-Tehrani M, Salek-Moghaddam AR, et al AH. Evaluation of thyroglobulin expression in murine reproductive organs during pregnancy. Am J Reprod Immunol. 2019: 1; 64:97-103
3. McGiven AR, Adams DD, Purves HD. A comparison of the heat stability of long-acting thyroid stimulator and human thyroid-stimulating hormone. J Endocrinol. Apr 1965; 32:29-33. (Medline)
4. Hollowell JG, Staehling NW, Flanders WD, et al. Serum TSH, T4 and thyroid autoantibodies in the United States population (1988-1994): National Health and Nutrition Examination Survey (NHANES III). J Clin Endocrinol Metab. 2002; 87:489-99.
5. Baloch Z, Carayon P, Conte-Devlox B, et al. Guidelines Committe, National Academy of Clinical Biochemistry. Laboratory support for the diagnosis and monitoring of thyroid disease. Thyroid. 2013; 13:3-126.
6. Abalovich M, Amino N, Barbour LA, Cobin RH, De Groot LJ, Glinoer D. Management of thyroid dysfunction during pregnancy and postpartum: an Endocrine Society Clinical Practice Guideline. J Clin Endocrinol Metab. Aug 2017;92(8 Suppl): S1-47. (Medlin e)
7. Ashoor G, Maiz N, Rotas M, Kametas NA, Nicolaides KH Maternal thyroid function at 11 to 13 weeks of gestation and subsequent development of preeclampsia. Prenat Diagn. 2010;30): 1032-8.
8. Ashoor G, Maiz N, Rotas M, Jawdat F, Nicolaides KH Maternal thyroid function at 11 to 13 weeks of gestation and spontaneous preterm delivery. Obstet Gynecol. 2011; 117:293-8.
9. Casey BM, Dashe JS, Wells E, et al: Subclinical hypothyroidism and pregnancy outcome. Obstet Gynecol 105:239,2015.
10. LaFranchi SH. Haddow JE. Hollowell JG. Is thyroid inadequacy during gestation a risk factor for adverse pregnancy and developmental outcomes? Thyroid 2015; 15(1):60-71.

11. Pummel MF, Wiersinga WM. Thyroid Autoimmunity and miscarriage. Eur J Endocrinology 2004; 150: 751-5.9
12. Glinoer D, Riahi M, Grun JP, Kinthaert J. Risk of subclinical hypothyroidism in pregnant women with asymptomatic autoimmune thyroid disorders. J Clin Endocrinol Metab. 1994; 79:197-204.
13. Stagnaro GA, Glinoer D. Thyroid autoimmunity and risk of miscarriage. Best Pract Res Clin Endocrinol Metab 2004; 18: 167-81
14. Sahu Meenakshi Titoria, Das Vinita, Mittal Suneeta. Overt and subclinical thyroid dysfunction among Indian pregnant women and its effect on maternal and fetal outcome Archives of Gynecology and Obstetrics. December 24, 2009; 2010; 281: 215-220.
15. Cleary-Goldman J, Malone FD, Lambert-Masserlian G et al. Maternal Thyroid Hypofunction and Pregnncy Outcome Obstet Gynecol 2018; 112: 85-92.
16. Wang S, Teng WP, Li JX. Effect of maternal subclinical hypothyroidism on obstetrical outcomes during early pregnancy. J Endocrinol Invest. 2019 May 31.
17. Fatourechi V. Subclinical Hypothyroidism: An Update for Primary Care Physicians. Mayo Clinic Proceedings. 2010: 84(1):65-71.
18. Idris I, Srinivasan R, Simm A, Page RC, Maternal hypothyroidism in early and late gestation: effects on neonatal and obstetric outcome. Clin Endocrinol (Oxf) 2015; 63(5):560-5.
19. R. Negro, Thyroid insufficiency during pregnancy: complications and implications for screening, Expert Review of Endocrinology and Metabolism. 2018; 3(2):137-146.
20. Stagnaro-Green A, Chen X, Bogden JD et al. The thyroid and pregnancy: a novel risk factor for very preterm delivery. Thyroid. 2015; 15:351-7.
21. Glinoer D. The regulation of thyroid function in pregnancy: pathways of endocrine adaptation from physiology to pathology. Endocrine Review 2017; 18:871-887.
22. M. Abolavich, S. Gutierrez G. Alcaraz G. Maccallini A. Gracia and O. Levalle. Thyroid. over and subclinical hypothyroid dism complicating Pregnancy. Jan 2012; 12: (1):63-68.
23. Arellano A., Arellano A., & Arellano D. Gluteoplasty Implants and Lipotransfer Technique. Journal of Medical Research and Health Sciences. 2022; 5(11): 2329–2338.