

## Study of maternal and perinatal outcomes in pregnant women with thyroid dysfunction.

Lalzikpuii Tochohawn<sup>1</sup>, Usharani Devi<sup>2</sup>, Aheibam Bidya Devi<sup>3</sup>,  
Lalhlimpuii Murray<sup>4</sup>, Laisram Sarat Chandra Singh<sup>5</sup>, Lalrinzama Chhange<sup>6</sup>, RK  
Jinaluxmi<sup>7</sup>, L Ranjit Singh<sup>8</sup>

Corresponding Author: Aheibam Bidya Devi

Department of Obstetrics and Gynaecology, Regional Institute of Medical Sciences, Imphal, Manipur

### Abstract

*Objective:* To assess maternal and perinatal outcomes of pregnant women with thyroid dysfunction.

*Methods:* A cross sectional study was conducted in the Department of Obstetrics & Gynecology, RIMS, Imphal, Manipur. The study included 148 pregnant women in different trimesters with abnormal thyroid function. Study samples were collected for a period of 2 years from volunteer subjects who attended antenatal clinic and were followed up till delivery.

*Results:* Out of 148 study patients, 127 patients (85.8%) had subclinical hypothyroidism (SCH), 18 patients (12.2%) overt hypothyroidism and 3 patients (2.0%) hyperthyroidism. Ten (6.8%) patients had spontaneous abortion as a complication (6.8%). Among these patients, 9 belonged to SCH group and only 1 to hyperthyroidism group). Preterm delivery was seen in 12 patients (8 in SCH, 3 in overt hypothyroidism and 1 in hyperthyroidism). Intrauterine growth restriction (IUGR) was observed in 3 patients (2 in SCH and 1 in overt hypothyroidism). Low birth weight was seen in 8 cases (6 in SCH, 1 in overt hypothyroid, 1 in hyperthyroid). Out of 138 babies, 13 babies (10 in SCH, 2 in overt hypothyroidism and 1 in hyperthyroid) necessitated NICU admission. Majority of the cases (77.5%) delivered vaginally and only 31 patients (22.5%) delivered by Caesarean section.

*Conclusion:* The study concluded that thyroid disorders especially subclinical hypothyroidism is common during pregnancy and is associated with increase in preterm delivery and low birth weight which was statistically significant. However, randomised control trial in large number of patients is recommended to draw a definitive conclusion.

Date of Submission: 17-10-2020

Date of Acceptance: 02-11-2020

### I. Introduction

Thyroid dysfunctions constitute one of the most common endocrine disorders observed in pregnancy. Maternal thyroid function changes during pregnancy and inadequate adaptation to these changes result in thyroid dysfunction. These changes are due to various factors like an increase in thyroglobulin due to elevated estrogen, increased renal loss of iodine due to increase in renal glomerular filtration rate, modification in peripheral metabolism of maternal thyroid hormones and iodine transfer to placenta.<sup>1</sup>

Thyroid disorders in pregnancy can be broadly divided into hypothyroidism (subclinical & overt) and hyperthyroidism. Maternal and fetal effects of thyroid dysfunction during pregnancy include infertility, abortion, preterm labor, increased risk of preeclampsia, cardiac failure, thyroid storm, fetal growth restriction, stillbirth, fetal thyrotoxicosis, fetal hypothyroidism, fetal goiter, increased neonatal and perinatal mortality.<sup>2</sup> Women who were known to have hyperthyroidism should seek pre-pregnancy advice and specialist care for frequent checking of her thyroid status, thyroid antibody evaluation and close monitoring of her medication needs.<sup>3</sup>

Prevalence of thyroid disorder during pregnancy has a wide variation in different parts of the globe. Western literature shows a prevalence of hypothyroidism in pregnancy of 2.5% and hyperthyroidism of 0.1 to 0.4%. There is paucity of data on prevalence of thyroid disorders among pregnant women in India. The sporadic reports currently available show prevalence of 4.8% to 11% amongst Indian pregnant population.<sup>4</sup>

**AIM AND OBJECT:** To assess the maternal and perinatal outcomes of pregnant women with thyroid dysfunction.

## II. Materials And Methods:

**Study design:** Cross sectional study.

**Study setting:** The study was conducted in the Department of Obstetrics & Gynecology, RIMS hospital, Imphal, Manipur.

**Study Duration:** 2years, starting from July 2017 to October 2019.

**Study population:** Pregnant women attending antenatal clinic in the Department of Obstetrics and Gynecology, RIMS during the study period.

### Inclusion Criteria:

1. Primigravida/ multigravida with singleton pregnancy.
3. Age>18years and who give consent for the study.

### Exclusion Criteria:

1. Patients with gestational hypertension, gestational diabetes mellitus.
2. Known case of chronic disorders like diabetes, hypertension; cardiac, liver and kidney diseases, autoimmune disorders and endocrinopathy other than thyroid disorders.
3. Bad obstetric history with known cause.
4. Multifetal Pregnancy (twin/ tripletsetc)

The reference ranges of the test values used in the study are as per National guidelines for screening of thyroid dysfunction during pregnancy, Ministry of Health and Family Welfare, Govt. of India.

First trimester: 0.1 to 2.5 mIU/L

Second trimester: 0.2 to 3 mIU/L

Third trimester: 0.3 to 3 mIU/L

Normal free T4 level is 0.7 to 1.8ng/mL and free T3 level is 1.7 to 4.2 ng/mL range.<sup>5</sup>

**Data Collection:** Data of the patients were recorded in a pre-designed proforma. The particulars, history, examinations, investigations and treatment were recorded at the relevant time.

Patients attending the antenatal clinic during the study period were enrolled in the study according to the inclusion and exclusion criteria after obtaining a written informed consent. A complete history, examination and investigations were done for the patients. Thyroid hormonal status was assessed in the patients by sending the thyroid function tests and the values were recorded. Any previous results if available were also recorded.

On the basis of history and the results of thyroid function tests, the patients were categorised into cases with subclinical hypothyroidism, overt hypothyroidism and hyperthyroidism. Maternal outcomes and perinatal outcomes were determined, analysed and compared in all categories.

### Statistical Analysis:

Data was checked for consistency and completeness and statistics entered and analysed using SPSS version 21.0 IBM for WINDOWS. Descriptive statistics such as frequency, mean, percentage, SD were used. Chi-square test, t-tests were used for inferential statistics. And p-value <0.05 was taken as statistically significant.

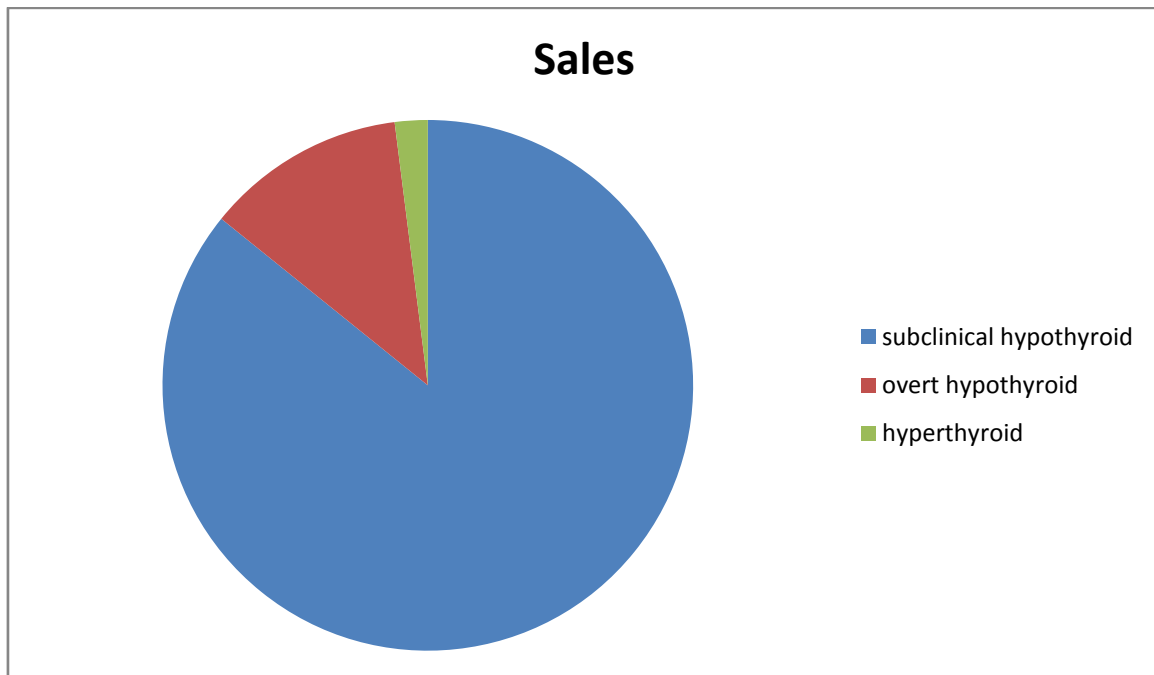
**Ethical issue:** The written informed consent was taken from all the patients before the recruitment for the study. Ethical clearance was taken from the Research Ethics Board of RIMS, Imphal.

## III. Results and observation

**Table1: Age distribution of patients**

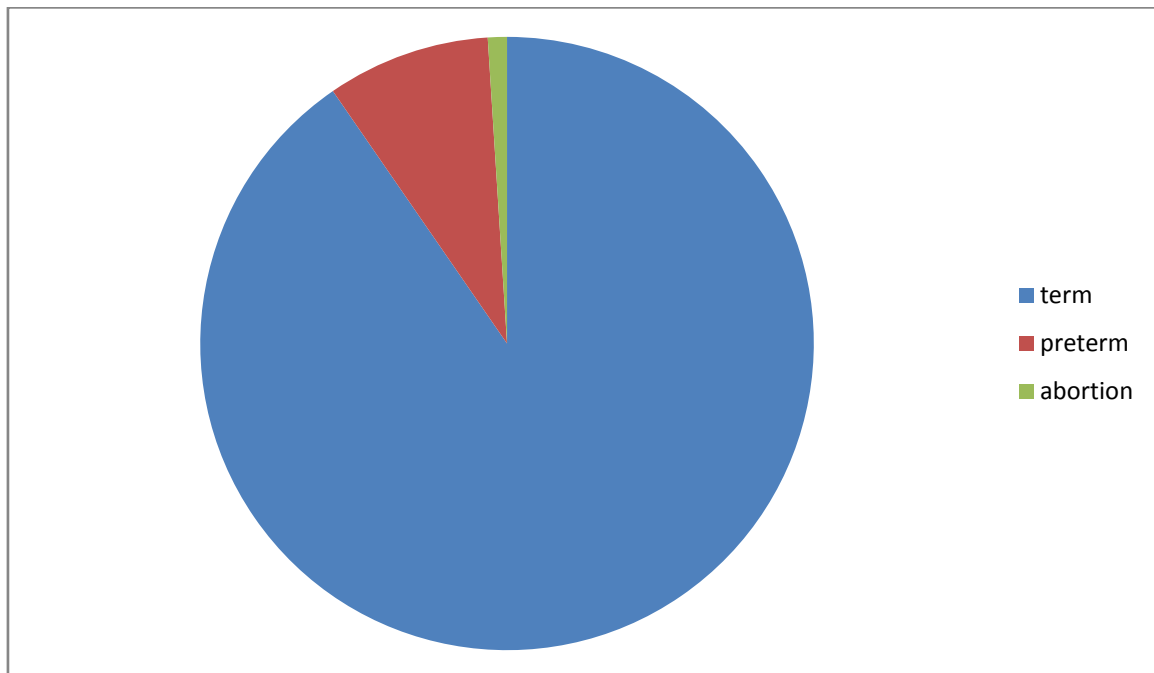
Age in years	Frequency	Percentage
19-25	36	24.3
26-30	48	32.4
31-35	47	31.8
36-40	17	11.5
<b>Total</b>	<b>148</b>	<b>100.0</b>
<b>Mean ±SD</b>	<b>29.45±5.12</b>	

Maximum no. of pregnant women with thyroid dysfunction were seen in the age group 26-30 years (32.4%) followed by 31-35years(31.8%) and its was least in the age 36-40 years(11.5%). Mean age the cases were 29.45±5.12 years.



**Figure1: Pie chart showing different categories of thyroid disorders**

Of all the thyroid disorders, subclinical hypothyroidism (85.8%) was most common in pregnancy followed by overt hypothyroidism ( 12.2%) and least common was hyperthyroidism (2%).



**Figure2. Pie chart showing distribution of patients by period of gestation at termination.**

In the study,85.13% of pregnant women with thyroid disorder had term pregnancy and 8.12% had preterm delivery where as 6.75% aborted in first trimester.

**Table 2: Relation between abortion and thyroid disorder category**

Abortion	Overt hypothyroid n (%)	Subclinical hypothyroid n (%)	Hyperthyroid n (%)	Total n (%)	Chi-square
Yes	0 (0.0)	9 (7.1)	1 (33.3)	10(6.8)	p-0.630
No	18 (100.0)	118 (92.9)	2 (66.7)	138(93.2)	
Total	18 (100.0)	127 (100.0)	3 (100.0)	148 (100)	

10 patients (6.8%) of pregnant women with thyroid disorders had abortion. Abortion was most common among hyperthyroid mothers (33.3%) followed by subclinical hypothyroid(7.1%) and no abortion observed among overt hypothyroid mothers.

**Table 3: Relation between preterm delivery and thyroid disorder category**

Preterm	Overt hypothyroid n (%)	Subclinical hypothyroid n (%)	Hyperthyroid n (%)	Total n (%)	Chi-square
Yes	3(16.7)	8(6.0)	1(50.0)	12 (8.0)	p-0.02
No	15(83.3)	110(94.0)	1(50.0)	126 (92.0)	
Total	18(100.0)	118(100.0)	2(100.0)	138 (100.0)	

Thyroid disorders were associated with increased frequency of preterm delivery where  $p < 0.05$  which was statistically significant. Preterm delivery was maximum among hyperthyroid mothers(16.7%) and least among subclinical hypothyroid mothers(6%).

**Table 4: Relation between IUGR and thyroid disorder category**

IUGR	Overt hypothyroidn(%)	Subclinical hypothyroid n (%)	Hyperthyroid n (%)	Total n (%)	Chi-square
Yes	1 (5.6)	2 (1.7)	0 (0.0)	3 (2.2)	p-0.08
No	17 (94.4)	116 (98.3)	2 (100.0)	134 (97.8)	
Total	18 (100.0)	118 (100.0)	2 (100.0)	138 (100.0)	

IUGR was found maximum amongof overt hypothyroid mothers (5.6%) while only 1.7% of subclinical hypothyroid mothers had IUGR and no IUGR among hyperthyroid mothers.

**Table 5: Relation between mode of delivery and thyroid disorder category (n=138)**

Mode of delivery	Overt hypothyroid n (%)	Subclinical hypothyroid n (%)	Hyperthyroid n (%)	Total n (%)	Chi-square
Vaginal delivery	14 (77.8)	91(77.1)	2 (100.0)	107 (77.5)	p-0.96
LSCS	4 (22.2)	27 (22.9)	0 (0.0)	31(22.5)	
Total	18 (100.0)	118 (100.0)	2 (100.0)	138 (100.0)	

Thyroid disorder in pregnancy does not increase the rate of cesarean section. Majority of the patients 77.8% of overt hypothyroid, 77.1% of subclinical hypothyroid and 100% of hyperthyroid mothers delivered vaginally where as 22.2% of overt hypothyroid, 22.9% of subclinical hypothyroid mothers delivered by cesarean section. No cesarean delivery among hyperthyroid mothers.

**Table 6: Relation between birth weight and thyroid disorder category**

Birth weight in KG	Overt hypothyroid n (%)	Subclinical hypothyroid n (%)	Hyperthyroid n (%)	Total n (%)	Chi-square
<2.5	1 (5.6)	6 (5.1)	1(50.0)	8 (5.8)	p-0.02
≥2.5	17 (94.4)	112 (94.9)	1(50.0)	120 (94.2)	
Total	18 (100.0)	118 (100.0)	2 (100.0)	138 (100)	

Pregnant women with thyroid disorders had increased rate of low birth weight where  $p < 0.02$  and it was statistically significant, Hyperthyroid mothers had maximum no.of low birth weight babies(50%) followed byovert hypothyroidism (5.6%) and least among subclinical hypothyroid mothers(5.1%).

**Table 7: Relation between NICU admission and thyroid disorder category**

NICU admission	Overt hypothyroid n (%)	Subclinical hypothyroid n (%)	Hyperthyroid n (%)	Total n (%)	Chi-square
Admitted	2(11.1)	10(8.5)	1(50.0)	13(9.4)	p=0.13
Not admitted	16(88.9)	108(91.5)	1(50.0)	125(90.6)	
<b>Total</b>	<b>18(100.0)</b>	<b>118(100.0)</b>	<b>2(100.0)</b>	<b>138(100.0)</b>	

**NICU admission was most common among babies born to hyperthyroid mothers(50%) followed by overt hypothyroid mothers(11.1%) and least among subclinical hypothyroid mothers(8.5%). The p>0.05 indicates that this observation was statistically not significant.**

#### IV. Discussion

The present study included 148 pregnant women with thyroid dysfunction. Thyroid dysfunction in the study comprises of subclinical hypothyroidism, overt hypothyroidism and hyperthyroidism. Subclinical hypothyroidism was the commonest form of all thyroid disorders in pregnancy.

In the study, most of the patients with hypothyroid disorders were in the age between 26-30years (32.4%) as shown in table 1. This finding was in concordance with observations in the study conducted by Basnet P et al<sup>6</sup> where majority of the patients were in the age group of 25-29 years. Majority of overt hypothyroidism and subclinical hypothyroidism were in the age between 26-30years whereas hyperthyroidism was more commonly observed in the age between 19-36years.

In this study, Out of 148 pregnant patients with thyroid disorders, subclinical hypothyroidism constituted 85%, overt hypothyroidism 12.2% and hyperthyroid 2%. This finding was consistent with the observation of Mulik J et al<sup>7</sup> where the incidence of subclinical hypothyroidism, overt hypothyroidism and hyperthyroidism were 83.8%, 13.3%, and 1.9% respectively. Joshi K et al<sup>8</sup> also observed that the most common form of thyroid disorder was subclinical hypothyroidism, followed by overt hypothyroidism and least was hyperthyroidism.

In the study, abortion rate was observed in 6.8%(10/148). Abortion was seen in 33.3% of hyperthyroid, 7.1% of subclinical hypothyroid mothers and no abortion in overt hypothyroidism group. However, the finding was statistically not significant as shown in table 2. This finding was consistent with the observations of Mulik J et al<sup>7</sup> where abortion rate was found to be 8.57%. Out of 8.57% abortions, 5.71% were in subclinical hypothyroid group, 2.8% in hyperthyroid and no abortion were observed in subclinical hypothyroid.

The present study showed that preterm delivery was observed in 8% of pregnant women with thyroid disorder. Half of hyperthyroid patients (50%) had preterm delivery whereas 16% of overt hypothyroidism and 6% of SCH had preterm delivery as shown in table 3. This finding is in contrast to the findings of the study conducted by Jani RS et al<sup>8</sup> where 100% of hyperthyroid, 12.5% of SCH had preterm delivery.

As shown in table 4, intrauterine growth restriction (IUGR) was found in 2.2% of pregnant women with thyroid disorders. The observation corresponds to the findings of the study conducted by Nath J et al<sup>10</sup> where the incidence of IUGR was 1.8%. But this finding is not in agreement with the findings of Mulik J et al<sup>7</sup> where the incidence of IUGR was high (35%). In the present study, 5.6% of overt hypothyroid patients and 1.7% of subclinical hypothyroidism had IUGR and IUGR was not recorded in hyperthyroid patients. But according to Mulik J et al<sup>7</sup> 1.9% of overt hypothyroidism and 33.3% of subclinical hypothyroidism had IUGR which was contradictory to the present finding.

In the present study, majority of the patients with thyroid disorders delivered by vaginal route (77.5%) while only 22.5% of them delivered by cesarean section as shown in table 5. Out of these, 77.8% of patients belonged to overt hypothyroidism, 77.1% to subclinical hypothyroidism and 100% of hyperthyroid patients delivered by vaginally. This finding was in accordance with the study conducted by Patwari M et al<sup>11</sup> where vaginal delivery rate was 76% and caesarean delivery was 24%. According to Patwari M et al, 50.75% of hypothyroid and 25% of hyperthyroid patients were delivered by caesarean section. And also that 75% of hyperthyroid patients and 49.25% of hypothyroid patients delivered by vaginal route. This is contradictory to the findings of the present study where no caesarean section among hyperthyroidism group even though 22.2% of overt hypothyroidism and 22.2% of subclinical hypothyroidism had caesarean section.

In the current analysis, 94.2% of pregnant women with thyroid disorders showed birthweight of  $\geq 2.5$ kgs. low birth weight babies were observed in 5.8% of all patients with abnormal thyroid function. Half of patients(50%) of hyperthyroid group had low birth weight while only 5.6% of overt hypothyroid and 5.1% of subclinical hypothyroid had low birth weight. This finding was statistically significant where  $p < 0.05$  as shown in table 6. In contrast to this finding, Patwari M et al<sup>11</sup> showed that only 53.3% of the babies born to thyroid abnormality in mother had normal birth weight  $\geq 2.5$ kgs. 47.76% of hypothyroidism and 37.5% of hyperthyroidism had low birth weight.

In the present study, NICU admission was required in 9.4% of thyroid disorder patients. Half of the baby born to hyperthyroid mothers had NICU admission while only 11.1% of overt hypothyroid and 8.5% of subclinical hypothyroid mothers gave birth to baby necessitating NICU admission as shown in table 7. Similarly, Mannisto T et al<sup>12</sup> also observed that NICU admission was seen in as much as 12% of women with thyroid disorders. Twenty percent of babies born to hyperthyroid and 13% of hypothyroid mothers had NICU admission. Joshi K et al<sup>13</sup> showed that NICU admission was seen in 11%, but in contrast to the present study NICU admission was most common in overt hypothyroidism (36%) followed by subclinical hypothyroidism (18%) and no NICU admission in hyperthyroidism.

#### V. Conclusion:

From the present study we observed that thyroid disorders especially subclinical hypothyroidism was more common in pregnancy and hyperthyroidism was associated with poor maternal and fetal outcomes as compared to hypothyroidism. Half of the hyperthyroid mothers had premature termination of pregnancy and gave birth to low birth weight babies which were statistically significant. Considering the risks and adverse outcomes, it is advisable to routinely screen all pregnant women by using serum TSH, and if TSH is found abnormal, further investigations like freeT3, free T4 and thyroid antibody should be carried out and appropriate treatment should be initiated as early as possible to avoid adverse maternal and fetal outcomes. However, to conclusively prove the study randomized control trial with larger number of study population is required.

#### References:

- [1]. Devi SR, Kumari NT, Shreen B, Rani UV. Prevalence of thyroid disorder in pregnancy and pregnancy outcome. *IAIM* 2016;3(3):1-11.
- [2]. Sharma JB. Textbook of Obstetrics. 1st ed. Avichal publishing company: Sirmour; 2014.
- [3]. Lazarus JH. Thyroid function in pregnancy. *Br Med Bull* 2011;97(1):137-48.
- [4]. Patel RD, Deliwala KJ, Shah PT, Singh RK. Fetomaternal outcome of thyroid disorder in pregnancy. *Int J Reprod Contracept Obstet Gynecol* 2016;5(12):4466-69
- [5]. Khadiolkar S. Thyroid stimulating hormones values in pregnancy. *J Obstet Gynecol Ind* 2019;69:389-94
- [6]. Basnet P, Aggrawal N, Suri V, Dutta P, Mukhopadhyay K. Comparison of maternal and perinatal outcome in pregnant women with hypothyroidism diagnosed before conception with hypothyroidism diagnosed during pregnancy. *J Univ Col Med Sci* 2014;2(6):21-27.
- [7]. Mulik J, Pratapan P, Agrawal N. Study of thyroid disorders in pregnancy & its effect on maternal & perinatal outcomes at tertiary care centre. *Ind J Res* 2017;6(1):3-5.
- [8]. Jani RS, Munshi DS, Jani SK, Munshi SP, Solanki SB, Pandya VM. Prevalence and fetomaternal outcome of thyroid disorder in pregnancy. *Int J Med Sci Public Health* 2014;3(8):944-48.
- [9]. Begum F. Thyroid dysfunction and pregnancy outcome, *J Dent Med Sci* 2016;15(9):07-10.
- [10]. Nath J, Dutta S. A clinical study on thyroid dysfunction in pregnancy and its effect on the fetomaternal outcome. *Int J Res* 2015;4(9):2069-70.
- [11]. Patwari M, Talukdar B, Waanbah BD. Study of thyroid profile in pregnancy with perinatal outcome. *New Indian J Obstet Gynecol* 2016;2(2):73-7.
- [12]. Mannisto T, Mendola P, Redely U, Loughon SK. Neonatal outcomes and birth weight in pregnancies complicated by maternal thyroid diseases. *Am J Epidemiol* 2013;178(5):731-34.
- [13]. Joshi K, Bhatt M, Saxena R. Incidence of thyroid dysfunction in antenatal women and its effect on fetomaternal outcome. *Int Arch Integrat Med* 2016;3(11):136-42.

#### Acknowledgement

First and foremost, I would like to thank to the almighty God for giving me the strength, knowledge, ability, time and opportunity to complete my Study.

It is a great privilege for me to express my deepest gratitude and heartfelt appreciation to my teachers Prof. L. Ranjit Singh, Prof & Head, Department of Obstetrics & Gynaecology, RIMS for his untiring guidance, supervision and encouragement in every step of my study during the entire research period. Without his kind supervision and valuable suggestions, the completion of the present study would not be possible. I am very grateful and deeply indebted to Dr. Usharani Devi, Department of Obstetrics & Gynaecology, RIMS for her enormous help, valuable advice, support, and guidance to complete the study.

I am thankful to all my friends and juniors for their priceless contribution to my work.

And I would like to acknowledge the fact that the love, patience, support and encouragement of my parents, my brothers and sister. My work would never have been possible without their inspiration and cooperation.

This study would be incomplete without me expressing my heartfelt gratitude to all the patients who were a part of this study for their cooperation and participation without which this work would have not been possible. I wish them good health in the days to come.

Aheibam Bidya Devi, et. al. "Study of maternal and perinatal outcomes in pregnant women with thyroid dysfunction." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 19(10), 2020, pp. 32-37.