

# Study of Perinatal Outcome and Neonatal Hypothyroidism in Pregnant Women with Hypothyroidism Delivering in a Tertiary Care Centre in Western Nepal

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## ABSTRACT

**Introduction.** Hypothyroidism is a common endocrine problem in pregnant women with a reported prevalence of 1.5 to 4.4%. Both overt and subclinical hypothyroidism have adverse effects on perinatal outcome. Aim and Objective. To find the prevalence of hypothyroidism in pregnancy and its impact on perinatal outcome and neonatal hypothyroidism in a tertiary centre in western Nepal.

**Methods.** This is a retrospective descriptive study conducted from April 2018 to April 2022 involving 75 hypothyroid pregnant women during their antenatal check-ups. It also included known cases of hypothyroidism. The hospital records of all the hypothyroid women who delivered in this centre were reviewed. The prevalence of subclinical and overt hypothyroidism were calculated. The relationship between the status of hypothyroidism and perinatal outcome in terms of mode of delivery, APGAR scores, birth weight and admission to neonatal intensive care unit were evaluated.

**Results.** The prevalence of maternal hypothyroidism was 0.92% with subclinical hypothyroidism being 0.29% and overt hypothyroidism being 0.63%. The perinatal outcomes in terms of mode of delivery, APGAR scores, birth weight and admission to neonatal intensive care unit were not statistically significant between subclinical and overt hypothyroidism.

**Conclusion.** The prevalence of maternal hypothyroidism, especially subclinical hypothyroidism was low. There were no significant adverse effects on perinatal outcome.

**Keywords.** APGAR score, Hypothyroidism, Newborn, Prevalence.

## INTRODUCTION

Thyroid disorder is the second most common endocrine disorder affecting women of reproductive age and can have adverse effects on pregnancy outcome.<sup>1</sup> The prevalence of thyroid dysfunction is 1.5 – 4.4% of women in pregnancy.<sup>2,3</sup> The most common thyroid disorder in pregnancy is hypothyroidism. The incidence of overt hypothyroidism is 0.2% cases in pregnancy whereas subclinical manifestation of hypothyroidism is 2.3% cases.<sup>4</sup>

It is now well established that not only overt, but also subclinical thyroid dysfunction has significant adverse effects on pregnancy and fetal development.<sup>5</sup> Uncontrolled thyroid dysfunctions can be associated with adverse pregnancy outcomes like miscarriage, placental abruption, pre-eclampsia, preterm delivery etc.<sup>6</sup> These obstetric complications contribute to overall increase in the frequency of adverse neonatal outcomes, which include

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preterm birth, low birth weight, increase admission to neonatal intensive care and increase perinatal morbidity and mortality.<sup>7</sup>

In view of potential adverse outcomes associated with maternal thyroid disorders and obvious benefits of treatment, some expert panels have suggested routine thyroid function screening in all pregnant women, which will help in timely detection and treatment of the disorder ultimately reducing the burden of maternal and perinatal adverse outcome.<sup>1</sup> However, published literature on hypothyroidism and its perinatal outcome in Nepalese context is scarce, more so in the rural area. This study, therefore, aimed to determine the prevalence of hypothyroidism in pregnant women as well as assess the perinatal outcome in a tertiary centre in western Nepal. It also evaluated the thyroid function in all the neonates born to hypothyroid women.

## METHODS

It was a hospital based retrospective descriptive study conducted in the Department of Obstetrics and Gynaecology of Lumbini Medical College and Teaching Hospital after obtaining ethical clearance from the Institutional Review Committee (IRC-LMC-06/J-022). The hospital records of all the women with hypothyroidism in this centre over a period of four years from April 2018 to April, 2022 were reviewed from the Medical Records Department.

The sample size was calculated using the following formula:  
 $n = Z^2pq/e^2$

Where, n= minimum sample size

Z= 1.96 for 95% confidence interval (CI)

p= prevalence, taken as 25.7% from the study of Shrestha B et al.<sup>8</sup>

q= 1-p

e= 10% estimated margin of error

The sample size calculated was 72.03 –73.

We included all the pregnant women with diagnosed hypothyroidism who delivered at our centre while multiple pregnancy and those with any other complications like hypertensive disorder of pregnancy, gestational diabetes mellitus, obstetric cholestasis, polyhydramnios were excluded.

Their antenatal, past medical history and delivery records were obtained. Their demographic, past medical history, thyroid function test (TFT) reports, antenatal records, mode of delivery, outcome of fetus, APGAR scores at 1 and 5 minutes, birth weight of baby, any congenital malformation and neonatal intensive care unit (NICU) admission records were reviewed. Besides this, neonatal TFT report done after 72 hours of life was also noted.

Lastly, these data were collected in structured proforma and entered to and analyzed with Statistical Package for Social Sciences (SPSS) software version 22. All the quantitative data were expressed in mean  $\pm$  standard deviation, median and qualitative data were presented in frequencies with percentages. Parametric data were tested using Student's t test and non-parametric data were tested with Chi Square test. A p value of <0.05 was considered statistically significant.

## RESULTS

There were a total of 8149 deliveries during the study period. Out of them, women with diagnosed hypothyroidism were 75. Thus, the prevalence of hypothyroidism in pregnant women in this study was 0.92%. The prevalence of overt hypothyroidism was 0.63% and subclinical hypothyroidism was 0.29%.

In the present study, out of 75 hypothyroid pregnant women 51 (68%) were of overt hypothyroidism and 24 (32%) were of subclinical hypothyroidism. Table 1 presents the demographic and clinical characteristics of the study population.

**Table 1. Demographic characteristics of pregnant hypothyroid women (n= 75)**

Variables	Values
Mean maternal age $\pm$ SD (years)	28.4 $\pm$ 4.52
Gestational age at delivery $\pm$ SD (weeks)	38.11 $\pm$ 2.61
Birth weight $\pm$ SD (grams)	2841 $\pm$ 628
Median APGAR score (Out of 10)	At 1 minute
	At 5 minutes
	8
	9

Majority of the patients belonged to the age group of 18 to 35 years with a mean age of 28.4  $\pm$  4.52 years while none of the pregnant women less than 18 years had hypothyroidism.

Twenty six (34.7%) and 49 (65.3%) cases were primigravida and multigravida respectively. Most of the hypothyroid women (n=50, 66.7%) were term at delivery (Fig. 1).

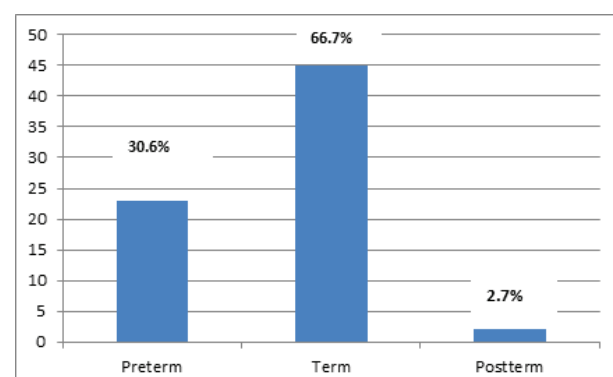


Fig. 1. Distribution of gestational age at delivery

Table 2: Relationship between maternal hypothyroidism and mode of delivery (n=75)			
Maternal hypothyroidism	Mode of delivery		p value
	Vaginal	Caesarean	
Subclinical hypothyroidism	9 (37.5%)	15 (62.5%)	0.350*
Overt hypothyroidism	25 (49%)	26 (51%)	

\*Chi square test

The relationship between maternal hypothyroidism and mode of delivery was tested with  $\chi^2$  test and was found to be not statistically significant (p=0.350) (Table 2).

Table 3: Relationship between maternal hypothyroidism and APGAR scores at 1minute and 5 minute (n= 75).						
Maternal thyroid status	APGAR score at 1 minute		p value	APGAR score at 5 minute		p value
	≤6	≥7		≤6	≥7	
Subclinical hypothyroidism	3 (12.5%)	21 (87.5%)	0.716 *	3 (12.5%)	21 (87.5%)	0.324 *
Overt hypothyroidism	8 (15.7%)	43 (84.3%)		3 (5.9%)	48 (94.1%)	

\* Chi square test

There were 71 (94.7%) newborn babies with APGAR score of ≥7/10. Two fetuses (2.7%) had APGAR scores of ≤6/10 and 0/10 each. Our study showed no statistically significant relationship between maternal hypothyroidism and APGAR scores at 1 and 5 minute of delivery as depicted in Table 3.

We observed the mean birth weight was  $2841 \pm 628$  grams in the study population with the maximum birth weight of 4140 grams and the minimum birth weight of 950 grams. The mean difference in birth weight between subclinical and overt hypothyroidism groups was 0.0352. This difference was tested by Student's t-test and was not statistically significant (p =0.822).

Table 4. Relationship between maternal hypothyroidism and NICU admission (n = 75).			
Maternal thyroid status	NICU admission		p value
	Yes	No	
Subclinical hypothyroidism	4 (12.5%)	20 (87.5%)	0.394*
Overt hypothyroidism	5 (5.9%)	46 (94.1%)	

\* Chi square test

No statistically significant relationship was seen between maternal hypothyroidism and NICU admission (Table 4).

## DISCUSSION

The prevalence of hypothyroidism was found to be very low (0.92%) in the present study. On the other hand,

the prevalence of hypothyroidism was found to be high (25.7%) in a study by Shrestha B et al.<sup>8</sup> Likewise the studies conducted by Ajmani SN et al.<sup>9</sup> and Singh A et al.<sup>10</sup> reported higher prevalence of 12% and 7.5% respectively as compared to this study. This lower prevalence may be because most of the women had missed the diagnosis as they usually presented in third trimester or at the time of delivery as referred cases when TFT was not done according to the hospital protocol. This institution serves as a referral centre for the nearby six districts and the pregnant women from those areas who had their ANC check ups at their respective health centres constitute a significant percentage of this institution's deliveries. Because most of those peripheral centres still do not have the facilities for performing TFT, we get a lot of pregnant women without initial TFT reports. A number of women with hypothyroidism might therefore have been missed resulting in a low prevalence of hypothyroidism in this study. Furthermore, most of the centres did not have the policy of universal screening for thyroid status in antenatal women till recently hence women with known thyroid disorder or positive family history or with other indications were selectively screened. All of these reasons might have led to under-diagnosis of hypothyroidism in our study population and hence the lower prevalence.

This study found a lower prevalence of subclinical hypothyroidism (0.29%) than overt hypothyroidism (0.63%). Singh A et al. reported the prevalence of subclinical hypothyroidism to be 6.0% and that of overt hypothyroidism to be 1.5%.<sup>10</sup> In a study authored by Sahu MT et al., the prevalence of subclinical and overt

hypothyroidism were 6.5% and 4.6% respectively.<sup>11</sup> Furthermore, a higher prevalence was also found in a study done in western part of Nepal which showed 13 % prevalence of overt hypothyroidism and 31 % of subclinical hypothyroidism.<sup>12</sup> Another study from eastern part of Nepal reported the prevalence of subclinical and overt hypothyroidism as 19.5% and 1.1% respectively.<sup>13</sup> Patwari M et al. had also concluded that the most common thyroid disorder during pregnancy was subclinical hypothyroidism (68%) which is in contrary to our findings.<sup>1</sup>

The universal screening of thyroid disorder in pregnancy in our centre was incorporated as a routine antenatal investigation since two years back only. Prior to that, screening was done only in indicated cases or in women who were diagnosed as a case of hypothyroidism pre-conceptionally. This implies that almost all the cases diagnosed as hypothyroidism were overt hypothyroidism and subclinical hypothyroidism was missed. This might be the reason for the contradictory finding of higher prevalence of overt hypothyroidism in our study compared to other studies. .

This study showed no statistically significant difference between subclinical and overt hypothyroidism in terms of mode of delivery, APGAR scores, birth weight and NICU admission. Only nine (12%) newborns had NICU admission. Thus it was seen that overt hypothyroidism did not have any worse perinatal outcome than subclinical hypothyroidism or vice versa. All the women with hypothyroidism were diagnosed either pre-conceptional or in first trimester. This might be because pregnant women diagnosed with hypothyroidism were treated early and adequately with Levo-thyroxine ultimately decreasing the risk of adverse perinatal outcome. Therefore there was no significant difference in perinatal outcomes in both types of hypothyroidism. Adequate pharmacological management of hypothyroidism therefore presumably improves the perinatal outcome of newborns irrespective of subclinical or overt status of hypothyroidism.

Out of 75 women with hypothyroidism, there were two intrauterine fetal deaths and one newborn had polydactyly. However, the number was too small to suggest any association with maternal hypothyroidism.

Out of 73 newborns, TFT was performed after 72 hours of life in 53 newborns while in the remaining 20 newborns it was not obtained because of early discharge from hospital in cases of uncomplicated vaginal deliveries or refusal by the parents and difficulty in following up the babies in the community. All the newborns that underwent thyroid function tests were found to be euthyroid. Furthermore, replacement with Levothyroxine to the pregnant women as soon as the diagnosis was established must have rendered the 53 newborns euthyroid.

## CONCLUSION

The prevalence of hypothyroidism in pregnant women in this study was found to be lower than most other studies. Subclinical hypothyroidism was less prevalent than overt hypothyroidism.

There was no association between maternal hypothyroidism and perinatal outcome in terms of mode of delivery, outcome of fetus, APGAR scores and NICU admission. Neonatal thyroid profile of all newborns who underwent thyroid screening were normal.

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