

Original Article

# Association Between Thyroid Dysfunction Among Pregnant Women with Bad Obstetric History A Comprehensive Study

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## ABSTRACT

**Background:** Thyroid dysfunction is increasingly prevalent globally, particularly in developing countries where dietary and hygiene practices during pregnancy contribute to its incidence. This condition significantly affects maternal and fetal health, necessitating closer examination, especially in populations with adverse obstetric histories.

**Objective:** To evaluate the prevalence of thyroid dysfunction among pregnant women with a history of adverse obstetric outcomes and to underscore the necessity for targeted screening and management strategies.

**Methods:** A cross-sectional study involved 260 pregnant women aged 18 to 40 with a history of poor obstetric outcomes. Participants were selected through non-probability consecutive sampling. After obtaining informed consent, demographic data were collected, and thyroid function was assessed by measuring TSH, T3, and T4 levels in a hospital laboratory. Data analysis was performed using SPSS version 16.0, utilizing means and standard deviations for quantitative data and frequencies and percentages for qualitative data.

**Results:** The average age of participants was  $30.31 \pm 3.11$  years. Mean thyroid hormone levels were recorded at T4:  $1.84 \pm 1.12$  and TSH:  $4.32 \pm 0.91$ . Thyroid dysfunction was identified in 45.4% of the women, with 65.2% having subclinical hypothyroidism and 34.7% exhibiting subclinical hyperthyroidism among those diagnosed.

**Conclusion:** The study highlights a significant prevalence of thyroid dysfunction in pregnant women with poor obstetric histories, indicating a critical need for comprehensive screening and tailored management to improve maternal and fetal health outcomes.

**Keywords:** Adverse obstetric history, Pregnancy, Subclinical hyperthyroidism, Subclinical hypothyroidism, Thyroid dysfunction

## INTRODUCTION

The concept of bad obstetric history (BOH) encompasses a variety of definitions and is often evaluated through multiple lenses, including its management, causation, and epidemiological aspects. Typically, BOH is characterized by a history of three or more consecutive miscarriages, neonatal deaths, or unexplained stillbirths (1, 2). Despite extensive research, approximately 40.51% of these cases remain idiopathic. Women with BOH are more likely to encounter various complications such as malpresentations, hypertension, antiphospholipid antibody syndrome (APLA), cervical incompetence, premature deliveries, and higher rates of cesarean sections (3, 4).

Thyroid dysfunction is a prevalent endocrine disorder during pregnancy, ranking second only to diabetes mellitus. It significantly influences maternal and fetal outcomes, with both overt and subclinical thyroid dysfunctions being detrimental (5, 6). Statistics reveal that thyroid dysfunction affects 24.7% of pregnant women, with hypothyroidism present in 16.8% of cases (4.5% overt and 83.3% subclinical) and hyperthyroidism in 7.9% (0% overt and 83.9% preclinical). The occurrence rates during pregnancy are noted

as 2-3% for subclinical hypothyroidism, 0.3-0.5% for overt hypothyroidism, and 0.1-0.4% for hyperthyroidism (8, 9). These variations in the frequency of thyroid dysfunction underscore the necessity for further inquiry.

Given the significant health implications of thyroid disorders for both mother and child, and the high prevalence of unexplained cases in BOH populations, it is crucial to examine the prevalence and implications of thyroid dysfunction in pregnant women with a history of BOH. The conflicting evidence in existing literature calls for a more definitive study to establish accurate prevalence rates and develop efficient screening and treatment protocols for this demographic (12, 13). Therefore, this study aims to delineate the prevalence of thyroid dysfunction among pregnant women with a bad obstetric history and to enhance the understanding required to improve prognostic outcomes for this vulnerable population.

## MATERIAL AND METHODS

This cross-sectional study was conducted at the Lady Wallington Hospital, located in the Department of Obstetrics and Gynecology in Lahore, with a focus on pregnant women who had a history of poor obstetric outcomes (BOH). The study enrolled 260 participants, calculated to provide a robust statistical power with a 3% margin of error at a 95% confidence level, anticipating a subclinical hypothyroidism rate of 6.47% among the targeted population (14, 15). The inclusion criteria specified were pregnant women aged between 18 and 40 years with a documented history of BOH, as per the operational definition used in the study. Exclusion criteria were meticulously set to omit any participants with prior thyroid surgeries, those on medications such as beta-blockers, thyroxine, neomercazole, antipsychotic medications, or those carrying twins to avoid confounding the study results.

The method of recruitment involved non-probability consecutive sampling, ensuring that all participants who met the inclusion criteria during the study period were considered for enrollment. Once consent was obtained, demographic data including age and gestational age were meticulously recorded. Blood samples were collected for the assessment of thyroid hormone levels—triiodothyronine (T3), thyroxine (T4), and thyroid-stimulating hormone (TSH). The samples were analyzed in the hospital's laboratory, where a pathologist interpreted the results to identify any thyroid dysfunction, adhering strictly to the operational definitions.

Data management and analysis were conducted using SPSS version 20. Quantitative data, such as age and hormone levels, were presented in means and standard deviations. Qualitative data, including the presence or absence of thyroid dysfunction and the specific type of dysfunction (hypothyroidism or subclinical hyperthyroidism), were depicted using frequencies and percentages. A specially designed proforma facilitated the accurate recording of the data, ensuring the integrity and reliability of the findings throughout the study process.

## RESULTS

The study investigated thyroid dysfunction among 260 pregnant women with a history of bad obstetric outcomes. The average age of the participants was recorded at 30.31 years, with a standard deviation of 3.11, indicating a middle-aged cohort predominantly in their third decade of life. Hormonal analysis revealed that the mean triiodothyronine (T3) level was 2.62 with a standard deviation of 1.14, the thyroid-stimulating hormone (TSH) level averaged at 4.32 with a standard deviation of 0.91, and the thyroxine (T4) level was 1.84 with a standard deviation of 1.12.

Out of the total sample, 118 women, representing 45.4% of the study population, were diagnosed with thyroid dysfunction, whereas 142 women, accounting for 54.6%, displayed no signs of thyroid issues. Further breakdown of the data showed that within the group with thyroid dysfunction, 77 individuals, or 65.3%, were suffering from subclinical hypothyroidism, while 41, or 34.7%, had subclinical hyperthyroidism.

These findings underscore the significant prevalence of thyroid dysfunction, particularly subclinical disorders, among pregnant women with a prior history of adverse obstetric events. The results indicate a critical need for targeted screening and management strategies to mitigate the potential impacts on maternal and fetal health.

Table 1: Distribution of Age and Thyroid Hormone Levels Among Pregnant Women in the Study

Parameter	Mean	Standard Deviation	Total Cases
Age	30.31	3.11	260
T3 Level	2.62	1.34	
TSH Level	4.32	0.91	
T4 Level	1.84	1.12	

Table 2: Prevalence and Types of Thyroid Dysfunction Among Pregnant Women in the Study

Description	Frequency	Percent
<b>Thyroid Dysfunction</b>		
Yes	118	45.4
No	142	54.6
<b>Total</b>	<b>260</b>	<b>100.0</b>
<b>Type of Thyroid Dysfunction</b>		
Subclinical Hypothyroidism	77	65.3
Subclinical Hyperthyroidism	41	34.7
<b>Total</b>	<b>118</b>	<b>100.0</b>

## DISCUSSION

The medical community has long recognized the impact of thyroid dysfunction during pregnancy as a critical area of study. Thyroid disease is a prominent endocrine disorder among fertile women, second only to diabetes mellitus (16). Untreated thyroid disorders are linked to several adverse outcomes such as growth restriction, hypertension, miscarriage, and placental abruption (17). Notably, an analysis of 586 pregnant women in Iran revealed that the observed TSH levels exceeded those recommended by the American Thyroid Association (ATA), with similar findings reported in studies from India (3, 17). These discrepancies highlight the influence of factors such as testing methods, maternal iodine status, and environmental, genetic, and ethnic differences on thyroid function tests (18).

The variations in TSH ranges observed globally underscore the complexities of establishing standardized diagnostic thresholds. While the ATA has strived to standardize guidelines to enhance the precision of diagnosis and treatment, our findings reflect the variability still present in the assessment of thyroid function during pregnancy. In our cohort, the prevalence of hypothyroidism was identified at 13.7%, comprising 2.4% clinical and 11.3% subclinical cases, and isolated hypothyroxinemia affected 1.4% of the population (19). These figures align with earlier reports, which have documented clinical and subclinical hypothyroidism ranges in pregnant women from 1% to 3.5% and 4% to 31%, respectively (7). The prevalence of hyperthyroidism in our study was noted at 1.5%, consistent with other findings ranging from 0.2% to 2% (7).

Thyroid hormones play a pivotal role in fetal brain and body development, influencing growth hormone production and the development of neuronal structures (1, 24). The fetus relies entirely on maternal thyroid hormone supply, especially in the early stages of pregnancy (5). Although much is known about the immediate impact of maternal thyroid dysfunction, less is understood about its postpartum implications and the effects of thyroid autoantibody presence in euthyroid women on offspring outcomes.

In our study, the high prevalence of subclinical hyperthyroidism, recorded at 34.7%, presents a unique finding compared to other research. This observation may reflect the specific demographic and environmental conditions of our study population, which can influence the biochemical parameters during pregnancy (22, 23). The association of thyroid dysfunction with increased rates of hypertension and varying rates of preterm birth further emphasizes the complex interplay between thyroid health and pregnancy outcomes. Specifically, 6.3% of our pregnant subjects with thyroid dysfunction experienced hypertension, compared to lower rates in those with euthyroidism (16). Additionally, the rates of preterm birth differed significantly across thyroid function statuses, suggesting an underlying relationship that warrants further exploration.

The strength of this study lies in its comprehensive evaluation of thyroid function in a demographically diverse cohort, using well-established guidelines and rigorous diagnostic criteria. However, the study is not without limitations. The cross-sectional design limits the ability to establish causality between thyroid dysfunction and adverse pregnancy outcomes. Future research should consider longitudinal approaches to better understand the dynamics of thyroid function throughout pregnancy and its long-term effects on maternal and child health.

Overall, this study contributes to the ongoing discourse on thyroid health in pregnancy, underscoring the need for standardized protocols and highlighting areas for further investigation to optimize maternal and fetal health outcomes.

## CONCLUSION

The findings from our study reveal a notably high prevalence of thyroid dysfunction among pregnant women, likely influenced by factors such as inadequate nutrition and limited educational resources. These conditions underscore the necessity of vigilant monitoring of thyroid function during pregnancy to mitigate adverse outcomes for both mothers and their children. To address this critical health issue, it is imperative to implement comprehensive screening programs and educational interventions that emphasize

the importance of proper nutritional support and informed healthcare practices. Such measures will not only improve maternal and fetal health outcomes but also enhance the overall quality of antenatal care, potentially reducing the incidence of thyroid-related complications in pregnancy.

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