

Association of Thyroid Dysfunction and Pregnancy Outcomes

NAGINA BIBI¹, IRAM INAM², GHIASUL HASSAN³

¹Assistant Professor, Department of Gynae/Obs, Continental Medical College Lahore, Pakistan

²Associate Professor, Department of Gynae/Obs, Continental Medical College Lahore, Pakistan

³Assistant Professor, Department of Gastroenterology, PGMI/LGH Lahore, Pakistan

Correspondence to: Nagina Bibi, Email: dr_nagina@hotmail.com, Cell: 0331-4161316

ABSTRACT

Background: Hypothyroidism in pregnancy results in serious consequences for both mother and fetus. Pregnant women are prone to thyroid dysfunction due to physiological changes taking place in body. This study is undertaken to see the effect of thyroid dysfunction on pregnancy outcomes.

Methodology: A prospective observational study was done. Study was conducted in a private gynecological and obstetric unit. A sample size of 200 women in selected institute with singleton pregnancy was recruited. Pregnant women with chronic disabilities and previously known thyroid disorders were excluded. Data was analyzed using SPSS version 23.0 and binary logistic regression analysis was done. Ethical rules were followed throughout the study and consent taken from all participants.

Results: Out of 200, 23 participants were positive for thyroid disorder. Thyroid dysfunctions are responsible for causing multiple complications in pregnancy for mother and fetus. Findings suggest a significant association of thyroid dysfunction and fetomaternal consequences (p-value <0.005).

Conclusion: Subclinical hypothyroidism is a common finding during pregnancy. It is compulsory to detect and treat thyroid dysfunction early in pregnancy so that adverse outcomes could be avoided. There is a need for timely screening of thyroid profile in suspected pregnancies.

keywords: TSH, FT3, FT4, Pregnancy, Outcomes.

INTRODUCTION

During pregnancy, thyroid dysfunction is the most prevalent disorder distressing the life of both mother and fetus¹. Stressful effects of pregnancy are predominantly seen on thyroid gland in the form of either hypothyroidism or hyperthyroidism². Compared with normal population, thyroid functions are changed in pregnancy due to physiological mechanisms. Mostly, hypothyroidism accompanied in pregnancy. Hypothyroidism may present in subclinical type that is predominating or overt hypothyroidism or hypothyroxinemia. Usually, hyperthyroidism is uncommon during pregnancy³.

During pregnancy, metabolic demands are increased due to requirements from developing fetus. Thyroid hormones play a key role in maintaining thermoregulation in body and balancing the energy expenditure⁴. Also, thyroid hormones are involved in metabolism of carbohydrates and lipids. Thyroid levels are changed during pregnancy due to increase metabolic activities⁵.

Hypothyroidism in pregnancy result in serious consequences for both mother and fetus. Pregnancy result in increased iodine requirements due to increased synthesis of T3 and T4 in response to physiological and endocrine changes⁶. Thyroid disorder remains the most interesting topic of endocrine research recently. Because of hostile outcomes for mother and fetus, hypothyroidism became a prominent factor of debilities during pregnancy⁷. Children born to mothers with hypothyroidism suffer mental disabilities and their performance is poor due to low IQ level. Comparatively, hypothyroidism is most prevalent in Asian population⁸.

Hypothyroidism in pregnancy leads to multiple causalities like miscarriages, IUGR, IUD, pre-eclampsia, preterm delivery, LBW babies, placental abruption, fetal distress, and low intellect in offspring. Issue of hypothyroidism in pregnancy remains undiagnosed in developing countries like Pakistan⁹. Although if diagnosed early, it is easy to treat and limit the disabilities resulting from this incapacitating illness¹⁰.

Deleterious outcomes resulting from hypothyroidism are also seen after pregnancy¹¹. In children with hypothyroidism, severe neurological dysfunction result in cognitive impairment instigating mental disabilities¹². Based on these devastating effects, it is imperative to identify and treat hypothyroidism early in pregnancy to avoid unforeseen circumstances¹³. Prompt screening helps to commence treatment on time. Controversies exist in the range of values in different trimester of pregnancy across the world¹⁴.

Pre-conceptional counselling helps to detect subclinical hypothyroidism early and proves fruitful in controlling the illness through prompt treatment¹⁵. The recommended reference values

vary in all the three trimester of pregnancy. According to American thyroid association, TSH value for first trimester ranges 0.01 to 2.5 mIU/L, 0.2 to 3.0 mIU/L in second and 0.3 to 3.0 mIU/L in 3rd trimester¹⁶.

In pregnancy chances of getting thyroid disorder are 2-5%. Pregnant women are prone to thyroid dysfunction due to physiological changes taking place in body¹⁷. Steps taken timely are key to avoid adverse circumstances. This study is undertaken to see the effect of thyroid dysfunction on pregnancy outcomes.

METHODOLOGY

A prospective observational study was done to see the effect of thyroid disorder on fetomaternal outcomes. Study was conducted in a private gynecological and obstetric unit. A sample size of 200 women (in 2nd & 3rd trimester) admitted in selected institute with singleton pregnancy was recruited. Pregnant women with chronic disabilities and previously known thyroid disorders were excluded. After admission, routine blood test along with thyroid profiles were executed from selected participants. Participants with deranged thyroid profile were followed to see the impact of disorder on mother and fetus. Data was analyzed using SPSS version 23.0 and binary logistic regression analysis was done to observe the relationship of thyroid dysfunction and pregnancy outcomes. Study was conducted at C.I of 95 with significance level of 0.05 i.e p-value. Ethical rules were followed throughout the study and consent taken from all participants.

Outcome variables of study were measured for both mother and fetus. Maternal consequence including problem of miscarriage, anemia, pre-eclampsia, and C-Section delivery rate were observed. Fetus outcomes measured in present study were LBW APGAR score less than 5 in one minute and admissions in NICU.

RESULTS

200 pregnant females participated in the current study. Out of 200, 23 participants were positive for thyroid disorder.

Table#1 clearly depicts that 23 out of 200 pregnant females had deranged thyroid functions. In diagnosed 23 cases, 12 suffered with subclinical hypothyroidism. As, results show that prevalence was high i.e 5.6%. Subclinical hypothyroidism is the most common disorder in pregnancy. Values of TSH, T3 & T4 reveal the true clinical picture of hypothyroidism. Similarly, overt hypothyroidism was evident in 3.5% cases. Out of identified cases, 8 were positive for overt hypothyroidism. Thyroid profile of 3 participants also had subclinical hyperthyroidism.

Table#1: Thyroid dysfunction in 2nd & 3rd trimester of pregnancy.

Thyroid Profile	Prevalence	Mean TSH Miu/L	Mean FT3 Miu/L	Mean FT4 Miu/L
Subclinical hypothyroidism n=12	5.6%	8.02±1.25	1.09±0.30	3.07±0.56
Overt Hypothyroidism n= 8	3.5%	11.92 ± 5.34	0.36 ± 0.24	0.81 ± 0.66
Subclinical hyperthyroidism n=3	1.5%	0.07 ± 0.03	1.2 ± 0.10	4.1 ± 0.40

In participants with deranged thyroid profile, serum TSH levels gave different values as 8.02 ± 1.25mIU/ml for subclinical hypothyroidism, 11.92 ±5.34mIU/ml in overt hypothyroidism and 0.07 ± 0.03mIU/ml in subclinical hyperthyroidism. Also in subclinical hypothyroidism mean of serum FT3 was 2.92 ± 0.454 pg/ml, in overt hypothyroidism 1.58 ± 1.43 pg/ml, and 4.16 ± 0.40 pg/ml in subclinical hyperthyroidism. Mean values of serum FT4 were 1.09 ± 0.30 ng/dl, 0.36 ± 0.24 ng/dl and 1.2 ± 0.10 ng/dl for thyroid functions shown in above table.

Table#2: Association between thyroid dysfunction and feto-maternal outcomes

Outcomes n (%age)	95% C.I	Odds Ratio	p-value
Anemia 5 (26.3%)	1.50–15.8	4.88	0.008
Preeclampsia 3 (15.8%)	1.06–19.22	4.52	0.041
Caesarean section 5 (26.3%)	1.39–14.38	4.47	0.012
Low birth weight (LBW) 6 (31.6%)	2.03–19.54	6.30	0.001
Low Apgar Score 4 (21.1%)	1.04–12.70	3.64	0.042
NICU admission 8 (42.1%)	0.048–0.391	0.14	0.000

Table#2: shows a clear depiction of thyroid dysfunction and feto-maternal outcomes. It is obvious that thyroid dysfunctions are responsible for causing multiple complications in pregnancy for mother and fetus. Anemia is correlated with thyroid dysfunction as 5 out of 23 participant had a history of anemia. p-value of <0.05 reveal the fact that a significant association exist between anemia and thyroid disorder. Association between thyroid abnormality and pre-eclampsia was also significant as p-value <0.05. Thyroid disorder also affect the mode of delivery and in this study 5 participants underwent C-Section delivery (p-value <0.05). Multiple fetus outcomes i.e LBW, low APGAR score and NICU admission also show significant results as p-value was less than 0.05. So, an association was revealed in thyroid dysfunction and fetus outcomes evident in above mentioned table.

DISCUSSION

Present study was undertaken to reveal the effect of thyroid dysfunction on mother and fetus. Results from this study showed that subclinical hypothyroidism was the most predominating disorder of pregnancy. In this study, 12 participants had subclinical type out of diagnosed 23 cases. Subclinical hypothyroidism is a common disorder of pregnancy. These findings are also consistent with other studies depicting similar results^{18,19}.

In this study, thyroid dysfunction was considered as a mainstay of maternal complications like anemia and findings revealed a significant association. During pregnancy, Thyroid disorder accentuate the problem and 5(26.3) participants were found to have anemia. Another study also depicted the notion of association between thyroid disorder and anemia²⁰.

Findings of this study showed that Thyroid disorder contributes towards pre-eclampsia during pregnancy. As, results showed that significant number of pregnant females 3(15.8%)

suffered with pre-eclampsia (p-value<0.05). These findings are consistent with other studies that revealed a close association between these two variables^{21, 22, 23}.

Furthermore, other maternal outcomes evident in present study was rate of C-Section. Results provide ample evidences that a significant association exists and thyroid dysfunction was a root cause for C-Section delivery. Other studies also identify role of thyroid disorder in causing emergencies for women in pregnancy^{24, 25}.

Present studies represented the role of thyroid dysfunction in causing adverse fetus outcomes. Results of the study were significant as p-value <0.05 emphasize the fact that thyroid problems in pregnancy contribute to LBW, low APGAR score and NICU admissions. Finding revealed a clear depiction as significant association reflected between thyroid abnormality and adverse fetus outcomes (p-value <0/05). The outcomes are persistent with other studies revealing hostile response of thyroid dysfunction during pregnancy^{26, 27}.

CONCLUSION

It is concluded from present study that subclinical hypothyroidism is a common finding during pregnancy. Adverse outcomes related to thyroid dysfunction place the life of both mother and fetus in danger. It is compulsory to detect and treat thyroid dysfunction early in pregnancy so that adverse outcomes could be avoided. There is a need for timely screening of thyroid profile in suspected pregnancies.

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