Original Article

Evaluation of Thyroid Profile and Liver Function Tests in Pregnant Women of Mirpur AJK

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ABSTRACT

Objective: The objective of this study to evaluate thyroid profile and liver function tests in pregnant women of Mirpur AJK

Study Design: Cross-sectional study

Place and Duration of Study: This study was conducted at the Department of Obstetrics and Gynecology MBBS Medical College Mirpur AJK and Mohi-Ud-Din Islamic Medical College, Mirpur AJ&K from March 2021 to December 2022.

Materials and Methods: The study encompassed a total of 300 adult participants, consisting of 150 pregnant women and 150 non-pregnant females. The selection of 150 pregnant women was based on specific inclusion and exclusion criteria.Comprehensive patient profiles were established by conducting brief medical histories and clinical examinations. Pertinent information such as gestational period, height, weight, blood pressure, prior medication history, and relevant clinical details were documented. The participation of each patient was secured through informed verbal consent. Subsequently, blood specimens were collected from the participants. The analysis of these blood samples was performed at the Biochemistry Department of MBBS Medical College in Mirpur AJK

Results: The mean Fasting Blood Glucose value for the case group was found to be 92.02 (SD±115.04), whereas the control group displayed a mean value of 78.60 (SD±8.88). Importantly, a remarkably significant statistical outcome emerged from this analysis (p Value < 0.000), underscoring a substantial distinction between the two groups. .Furthermore, the investigation extended to the assessment of serum Bilirubin levels within both the case and control cohorts. In the case group, the mean serum Bilirubin value was observed to be 0.99 (SD±0.28), while the control group manifested a mean value of 0.78 (SD±0.19).

Conclusion: Any disruption in these functions can pose significant risks to both the mother and the fetus. Consequently, proper management of hepatic and thyroid function is essential to ensure the well-being of both the mother and the baby.

Key Words: thyroid profile**,** LFT, Pregnancy

Citation of article: Sarfaraz T, Yusuf A, Sajid S, Fatima A, Ahmed S, Qureshi AM. Evaluation of Thyroid Profile and Liver Function Tests in Pregnant Women of Mirpur AJK. Med Forum 2023;34(8):172-175. doi:10.60110/medforum.340840.

INTRODUCTION

Pregnancy induces significant physiological changes that lead to an increased demand for thyroid hormones to support both maternal and fetal requirements. Autoimmune Thyroid Disease (AITD) is the primary cause of hypothyroidism in pregnant women, while Grave's Disease (GD) is the predominant factor in hyperthyroidism, with reported prevalence rates ranging from 0.1% to 1%. Additionally, a transient gestational hyperthyroidism syndrome, affecting 1% to 3% of pregnant women, has also been documented.[1]Numerous retrospective studies consistently establish a direct correlation between unfavorable pregnancy outcomes and maternal thyrotoxicosis. The duration and effectiveness of maternal thyrotoxicosis control intricately influence the risks of complications for both the mother and the fetus/newborn. These studies reveal a significant incidence of severe prematurity, with an average delivery occurring at 30 weeks, and very low birth weight (less than 2 kg) among cases of uncontrolled maternal thyrotoxicosis. Neonatal hyperthyroidism is also observed in such cases, necessitating the administration of antithyroid drugs

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Received: March, 2023
Accepted: May, 2023
Printed: August, 2023

(ATDs) for treatment. In contrast, women diagnosed with Grave's Disease (GD) who undergo timely identification and prompt initiation of ATD treatment experience favorable pregnancy outcomes for both mother and fetus.[2-7]It is important to note that Thyroid-Stimulating Hormone (TSH) emerges as a sensitive indicator of thyroid dysfunction during pregnancy, offering valuable insights into thyroid-related changes. Specific immunoassays for Free Thyroxine (FT4) exhibit a strong correlation with equilibrium dialysis, a recognized gold standard for FT4 measurement during pregnancy, affirming the reliability and accuracy of these immunoassays in assessing FT4 levels in pregnant individuals.[8]Throughout pregnancy, maternal physiology undergoes substantial adjustments to support optimal fetal growth and development. [9.10] These intricate physiological changes underscore the dynamic interplay between maternal and fetal well-being during gestation. Estradiol and progesterone, categorized as estrogens and progesterone, respectively, gradually increase over the course of pregnancy, influencing the metabolic, synthetic, and excretory functions of the liver.[11,12]During the latter stages of pregnancy, a distinct alteration is observed in the biliary excretion of bromosulfophthalein, resulting in reduced levels.[13] This modulation potentially compromises the efficient clearance of specific substances typically excreted into the bile, emphasizing the complex relationship between hormonal shifts during pregnancy and hepatic functionality.[14]Normal pregnancy is associated with noticeable fluctuations in liver function test parameters. Liver involvement has been linked to hyperemesis gravidarum, characterized by excessive vomiting during pregnancy. [15.16] When nausea or vomiting occurs in the second or third trimester, it is prudent to consider these symptoms as potentially pathological.[17] Consequently, a comprehensive diagnostic approach, including the assessment of serum aminotransferase activity, is necessary to identify and address any underlying liver-related concerns in the context of pregnancy.[18,19]

MATERIALS AND METHODS

The research was carried out at two medical institutions: MBBS Medical College and Mohi-Ud-Din Islamic Medical College, Mirpur Aj&K. The study encompassed a total of 300 adult participants, consisting of 150 pregnant women and 150 non-pregnant females. The selection of 150 pregnant women was based on specific inclusion and exclusion criteria.Comprehensive patient profiles were established by conducting brief medical histories and clinical examinations. Pertinent information such as gestational period, height, weight, blood pressure, prior medication history, and relevant clinical details were documented. The participation of each patient was secured through informed verbal consent. Subsequently, blood specimens were collected from the participants. The analysis of these blood samples was performed at the Biochemistry Department of MBBS Medical College in Mirpur AJK. The collected samples were subjected to various assessments, including the determination of Fasting Blood Glucose levels, Free T3/T4, and Thyroid Stimulating Hormone (TSH) levels, as well as Liver Function Tests (LFT) which encompassed Serum Bilirubin, SGPT, SGOT, Alkaline Phosphatase, Total Protein, and Albumin levels. Notably, certain biochemical analyses, specifically serum LFT, serum GGT, Fasting Blood Glucose, and serum FT3, FT4, and TSH tests, were conducted at an external laboratory utilizing semi-automated techniques.

Table No.1: Participant characteristics

	Test adult (n=150) Pregnant women	**Control (n=150) Non-pregnant**
Age (years)	35.53 ± 11.49	35.56 ± 11.48
Education Basic Secondary University	B-46%, S-27% , U-27%	B-54 % , S-26% U-20%
Body weight (Kg)	70.3 + 12.6	72.1 + 12.4
BMI (kg/m2)	26.4 + 2.8	26.3 + 2.7

B: Basic , S: Secondary , U:University

Table No. 2: Biochemical profile with in pregnant women and non-pregnant women

Test (n=150) Pregnant women	**Control (n=150) Non-pregnant women**	**P-value**
Fasting Blood Glucose(mg/dl)		
92.02 (SD±115.04)	78.60 (SD±8.88).	< 0.000
serum Bilirubin (mg/dl)		
0.99 (SD±0.28)	0.78 (SD±0.19)	< 0.143
Thyroid Stimulating Hormone (TSH) mIU/L		
4.51 (SD±1.05),	2.98 (SD±0.78)	< 0.005)

RESULTS

In the context of this study, an examination of Fasting Blood Glucose levels was conducted in both the case and control groups. The mean Fasting Blood Glucose value for the case group was found to be 92.02 (SD±115.04), whereas the control group displayed a mean value of 78.60 (SD±8.88). Importantly, a remarkably significant statistical outcome emerged from this analysis (p Value < 0.000), underscoring a substantial distinction between the two groups.

.Furthermore, the investigation extended to the assessment of serum Bilirubin levels within both the case and control cohorts. In the case group, the mean serum Bilirubin value was observed to be 0.99 (SD±0.28), while the control group manifested a mean value of 0.78 (SD±0.19). However, meticulous statistical evaluation revealed an absence of statistical significance in the observed differentiation between the groups (p Value < 0.143).

Concomitantly, the study encompassed an exploration of Thyroid Stimulating Hormone (TSH) levels in both the case and control groups. The mean TSH value for the case group was documented as 4.51 (SD±1.05), compared to the control group's mean value of 2.98 (SD±0.78). Significantly, a statistically meaningful disparity between the two groups was identified (p Value < 0.005).In summary, the findings of this investigation illuminated several notable observations, including a marked contrast in Fasting Blood Glucose levels between the case and control groups, an absence of statistical significance in serum Bilirubin levels, and a significant distinction in TSH levels. These findings contribute to the body of knowledge in this domain and warrant further scholarly inquiry and exploration.

DISCUSSION

In this research endeavor, a cohort comprising 150 pregnant women as cases and an equivalent number of non-pregnant, healthy women as the control group was meticulously selected. The chosen participants fell within the age bracket of 22 to 37 years. The overarching aim of this study was to establish a discernible correlation between the thyroid profile and liver function test results during pregnancy. It is a well-established fact that thyroid disorders can exert a substantial impact on pregnancy, potentially giving rise to a spectrum of complications for the mother and the developing fetus, as well as the neonate postpartum. Given these ramifications, thyroid gland dysfunction assumes a pivotal role necessitating special attention during the course of pregnancy. Concurrently, hepatic dysfunction during gestation poses life-threatening implications, underscoring the criticality of incorporating liver function tests as a cornerstone of prenatal diagnostics .Notably, discernible alterations in the values of liver function tests manifest during uncomplicated pregnancies. Importantly, the occurrence of hyperemesis gravidarum may exhibit a concomitant involvement of the liver. To this end, instances of nausea or vomiting manifesting during the later stages of the second or third trimester warrant diligent evaluation, including the assessment of serum aminotransferase activity, to determine their potential pathologic underpinnings.[19] A pertinent precedent study conducted within the United States of America revealed the presence of vascular spiders in 14% of white women during the second month of pregnancy, a figure which surged to 66% by the ninth month of gestation.[20]Within the scope of our current study, a meticulous analysis of fasting blood glucose levels within both the case and control groups indicated normalcy. Specifically, the mean value for cases stood at 92.02 (SD±115.04), while the corresponding value for controls was recorded as 78.60 (SD±8.88). This observed discrepancy yielded a statistically significant outcome (p Value < 0.000). Turning attention to serum bilirubin levels, a comparative examination across the case and control cohorts yielded a mean value of 0.99 (SD± 0.28) for cases and 0.78 (SD± 0.19) for controls. However, it is imperative to note that the statistical analysis did not reveal a significant distinction (p Value < 0.143) between the two groups. Shifting focus to thyroid-stimulating hormone (TSH) levels, the investigative efforts unveiled a mean value of 4.51 (SD± 1.05) for cases, juxtaposed against 2.98 (SD± 0.78) for controls. Importantly, this discrepancy yielded a statistically significant outcome (p Value < 0.005). Of paramount significance, a meticulous exploration into the potential interplay between various thyroid hormones and liver enzymes, within both the case and control groups, did not substantiate any significant correlation. While several cases of thyrotoxicity exhibited marginal elevations in liver enzyme levels, a comprehensive statistical analysis failed to establish a significant link between thyroid hormones and liver enzymes in either the cases or controls.[21] In summation, this study underscores the importance of comprehending the intricate relationship between thyroid function, liver health, and pregnancy outcomes. While certain associations were established, others did not attain statistical significance, thereby necessitating further in-depth exploration and analysis in this multifaceted realm of medical research.

CONCLUSION

We conducted a case-control study aimed at investigating the potential correlation between liver function and thyroid function during pregnancy. Our study involved 150 pregnant women, all of whom exhibited normal liver function and thyroid profiles. These findings were compared with a control group comprising 150 non-pregnant, healthy females. The primary motivation for this research stems from the critical importance of maintaining optimal liver and thyroid function during pregnancy. Any disruption in these functions can pose significant risks to both the mother and the fetus. Consequently, proper management of hepatic and thyroid function is essential to ensure the well-being of both the mother and the baby.

Author's Contribution:

Concept & Design of Study:	Tahmeena Sarfaraz
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Conflict of Interest: The study has no conflict of interest to declare by any author.

REFERENCES

1. Bernal J. Thyroid hormone receptors in brain development and function. Nat Clin Pr Endocrinol Metab 2007;3(3):249–259.
2. LeBeau SO, Mandel SJ, Thyroid disorders during pregnancy. Endocrinol Metab Clin North Am 2006;35:117-136
3. Korevaar TI, Muetzel R, Medici M, Chaker L, Jaddoe VW, de Rijke YB, et al. Association of maternal thyroid function during early pregnancy with offspring IQ and brain morphology in childhood: a population-based prospective cohort study. Lancet Diabetes Endocrinol 2016;4(1): 35–43.
4. Mestman JH, Hyperthyroidism in pregnancy. Best Pract Res Clin Endocrinol Metab 2004;18:267-288.
5. Thyroid disease in pregnancy: ACOG practice bulletin, number 223. Obstet Gynecol 2020;135(6): e261–e274.
6. Männistö T, Mendola P, Grewal J, Xie Y, Chen Z, Laughon SK. Thyroid diseases and adverse pregnancy outcomes in a contemporary US cohort. J Clin Endocrinol Metab 2013;98(7):2725–2733.
7. Phoojaroenchanachai M, Sriussadaporn S, Peerapatdit T, et al, Effect of maternal hyperthyroidism during late pregnancy on the risk of neonatal low birth weight. Clin Endocrinol (Oxf) 2001;54: 365-370.
8. Smith C, Thomsett M, Choong C, Rodda C, McIntyre HD, Cotterill AM, Congenital thyrotoxicosis in premature infants. Clin Endocrinol (Oxf) 2001; 54: 371- 376.
9. Tortosa F, Subclinical thyroid dysfunction in pregnancy. Endocrinología y Nutrición 2011;58: 255-257.
10. Glinoer D, Spencer CA, Serum TSH determinations in pregnancy: how, when and why? Nat Rev Endocrinol 2010; 6: 526-529.
11. Anckaert E, Poppe K, Van Uytfanghe K, Schiettecatte J, Foulon W, Thienpont LM. FT4 immunoassays may display a pattern during pregnancy similar to the equilibrium dialysis ID–LC/tandem MS candidate reference measurement procedure in spite of susceptibility towards binding protein alterations. Clinica Chimica Acta 2010; 411: 1348-1353.
12. Kahric-Janicic N, Soldin SJ, Soldin OP, West T, Gu J, Jonklaas J. Tandem mass spectrometry improves the accuracy of free thyroxine measurements during pregnancy. Thyroid 2007; 17: 303-311
13. Singh S, Nair VG, Singh VV, Tiwari S, Arora D, Dey M, et al. Pregnancy-specific concerns and psychological impact of COVID19 on antenatal women. Gynecol Obstet Reprod Med 2022;28(2): 129–134.
14. World Medical Association, World Medical Association Declaration of Helsinki: ethical principles for medical research involving human subjects. JAMA 2013;310(20):2191–2194.
15. Alexander EK, Pearce EN, Brent GA, Brown RS, Chen H, Dosiou C, et al. Guidelines of the American Thyroid Association for the diagnosis and management of thyroid disease during pregnancy and the postpartum. Thyroid 2017; 27(3):315–389.
16. Türkiye Endokrinoloji ve Metabolizma Derneği (TEMD) Tiroid Hastalıkları Tanı ve Tedavi Kılavuzu 2020.
17. Bliddal S, Derakhshan A, Xiao Y, Chen LM, Männistö T, Ashoor G, et al. Association of thyroid peroxidase antibodies and thyroglobulin antibodies with thyroid function in pregnancy: an individual participant data meta-analysis. Thyroid 2022;32(7): 828–840.
18. Athar S, Beer SF, Martis Z, Alloub MI. The prevalence of thyroid autoimmunity in pregnancy and adverse neonatal outcomes at a secondary care hospital in the Middle East. Cureus 2022;14(5): e24814.
19. Alexander EK, Pearce EN, Brent GA, et al. Guidelines of the American Thyroid Association for the diagnosis and management of thyroid disease during pregnancy and the postpartum. Thyroid 2017;27:315–89.
20. León G, Murcia M, Rebagliato M, Álvarez-Pedrerol M, Castilla AM, Basterrechea M, et al. Maternal thyroid dysfunction during gestation, preterm delivery, and birthweight. the Infancia y Medio Ambiente Cohort, Spain. Paediatr Perinat Epidemiol 2015;29(2):113–122.
21. Khan TM, Malik S, Diju I. Correlation between plasma Thyroid Hormones and Liver enzymes levels in Thyrotoxic cases and controls in Hazara division" Department of Physiology, Medicine. J Ayub Med Coll Abbottabad 2010;2.