

Research Article

**A Case Study on the Relation between the Preeclampsia Pregnancy
and the Level of the Thyroid Hormone**

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ABSTRACT

OBJECTIVE: Relationship determination between the levels of thyroid hormone and preeclamptic pregnancies.

STUDY DESIGN: Case-Control research study.

PLACE AND DURATION: Research study was conducted at Nishtar Hospital Multan. Research was completed in the time span of one year extending from January 2017 – December 2017.

METHODOLOGY: Eighty controlled pregnant cases were selected for the research paper after the conception as twenty weeks passed. The cases were further divided groups with equal number of cases allocation. Forty cases were given to every group. General physical examination was carried out and detailed history was also noted and clinical investigations such as blood samples were taken to verify the level of serum thyroid hormone.

RESULTS: There was an evident association of free thyroxine (FT-4) (p-value = 0.009). Moreover, no significant statistical relation was observed in free triiodothyronine (FT-3) (p-value = 0.495) & thyroid stimulating hormone (p-value = 0.187) among the cases and controls. Systolic blood pressure also reflected an association (p-value < 0.001) & diastolic blood pressure association as (p-value < 0.001) among cases and controls. Urinary protein excretion percentage (Nil) was observed in controls as 95%. Additionally, UPE trace was observed as 5%. No UPE, UPE and UPE were observed respectively (1+), (2+) and (3+). Contrarily, UPE (1+) was observed in 32.50 percent cases, UPE (2+) was observed in 52.50 percent cases and the rate of UPE (3+) was observed as 15 percent cases.

CONCLUSION: Association of Preeclamptic pregnancies is made to lower thyroid hormone level limits when gestation's last weeks are in progress.

KEYWORDS: Preeclampsia, Thyroid Hormones, Proteinuria, Pregnancy and Hypertension

INTRODUCTION

Deficiency or excess of maternal thyroid hormone influences fetal and maternal results at almost every stage of the gestation. Thyroid hormone transport proteins levels (albumin, thyroxine binding prealbumin and thyroxine binding globulin) experience an extraordinary variation during normal pregnancies [1]. Enhanced hepatic synthesis & lowered catabolism by liver and in less proportion by renal tubular cells cause these changes. Increase in Thyroxine binding globulin

by 2.5 times produces an increase in the levels of plasma of thyroxine amounting in the range of 40 – 100 percent. T-4 & T-3 levels increase gradually from reach and conception a plateau within 20 weeks of pregnancy [2]. No change occurs till term. Though, hormones FT-3 & FT-4 maintains their reference limit or hardly there is a negligible change. During pregnancies the TSH levels are generally lowered with respect to specially 1st trimester [3].

Because a marked enhancement in levels of serum of human chorionic gonadotrophin. It is because of placental hormone with (α) chain same as TSH alpha chain [4]. A positive interference is provided in the estimation of TSH. Preeclampsia is referred as a unique multi-system disease during pregnancy in human. Hypertension is also associated to its features and derangement of organ system [5]. It causes complications in 2 – 10 percent cases of pregnancies over the world. Mortality during maternal state is at high rate in Pakistan as 1 out of 89 women expires during maternal state as preeclampsia is the reason behind this happening [6]. Etiology of mentioned disease persistently continues unidentified instead of several years deep and focused research. Hypertension in gestational period is another complication of preeclampsia and pregnancy. 6 – 30 percent of the pregnant cases are affected by this problem [7]. Mortality and morbidity at higher proportions is attributed to this risk wither prenatal or maternal. Nothing is unveiled about its etiology [8]. Proteinuria is considered a dysfunction significant in nature relating to preeclampsia. Proteinuria degree may have wide fluctuations y over the period of twenty-four hour because of urinary albumin excretion's circadian variation [9]. Several other factors including urine specific gravity, contamination, pH (potential hydro genii), posture and exercise also influence it. In the availability of locally gathered data threatening shortage is evident in the subject of preeclampsia [10]. Perplexing and lingering community impacts are persistent in between thyroid function and preeclampsia. Therefore, our research paper is focused at the determination of the levels of thyroid hormone levels in preeclamptic and normal pregnant women; additionally, it also aimed at the determination of relationship between levels of thyroid hormone & preeclamptic pregnancies [11].

METHODOLOGY

Referenced to Roofi's research an Open-Epi Calculator V-2.3 was used for the sample selection and the sample was restricted to eighty

cases. Interview and questionnaire was used as data collection tool that also targeted the demographic data of the patients such as gestational age and age, weight, BMI and height, and clinical examination of thyroid profile, it also documented related information of pertinent importance.

Cases were included, as eighty controlled pregnant cases were selected for the research paper after the conception as twenty weeks passed. The cases were further divided groups with equal number of cases allocation. Forty cases were given to every group. General physical examination was carried out and detailed history was also noted and clinical investigations such as blood samples were taken to verify the level of serum thyroid hormone. Patients with a history of thyroid related diseases including hyperthyroidism, thyroid surgery and hypothyroidism were not included in the research study, other exclusions were patients using medicines of thyroid, chronic illnesses, renal diseases, coronary heart diseases, complicated history of obstetric and hepatic diseases.

Preeclampsia was bifurcated in to mild & severe preeclampsia according to the set American Congress of Obstetricians and Gynecologists (ACOG) criteria. Mild preeclampsia defined in operational way as systolic blood pressure (> 140 mmHg) & diastolic blood pressure (> 90 mmHg) when proteinuria (1+) through 2 distinct measurements obtained at a difference of minimum six hours. Furthermore, severe preeclampsia was defined in an operational way as systolic blood pressure (> 160 mmHg) & diastolic blood pressure (> 110 mmHg) with proteinuria ($\geq 2+$) or in the presence of substantial indication of any dysfunctionality of end-organ.

Through ELISA method the blood samples were assayed for variables of hormones including serum FT-3, FT-4 & TSH, further analysis was made on C (plate-reader) and e 411 systems if Thyroid Cobas. Dipstick method was used for the urinary protein excretion sampling. BP was monitored with the help of mercury sphygmomanometer. Patients were asked to lie in

supine position for 5 minutes. After that their BP was documented.

SPSS-21 was used for the data entry and analysis. For continuous variables including age the value of Mean ± SD was also calculated. Percentage/Frequency was computed for the variables such as UPE and others considered categorical. Continuous variables were analyzed through T-test method. Categorical variables were analyzed through Chi square test with significant (p<0.05).

RESULTS

After the completion of 20 gestational weeks 80 subjects were enrolled in the research study. Characteristics of mean serum thyroid profile were compared as reflected in Table-I. In control and cases significant relation was observed in FT-4 with a p-value = 0.009. On the other hand, no

relation was observed in terms of Free Triiodothyronine FT-3 with a p-value = 0.495 & in terms of Thyroid Stimulating Hormone TSH with a p-value = 0.187 as reflected in Table-I. Additionally, significant link was present in UPE and FT-3 with a p-value = 0.002 as reflected in Table-II. Association was also observed significant among systolic BP with a p-value < 0.001 and diastolic BP with a p-value < 0.001 between cases and controls. Urinary protein excretion percentage (Nil) was observed in controls as 95%. Additionally, UPE trace was observed as 5%. No UPE, UPE and UPE were observed respectively (1+), (2+) and (3+). Contrarily, UPE (1+) was observed in 32.50 percent cases, UPE (2+) was observed in 52.50 percent cases and the rate of UPE (3+) was observed as 15 percent cases.

TABLE – I: COMPARISON OF MEAN SERUM THYROID PROFILE CHARACTERISTICS OF SUBJECTS (N=80)

	Controls (n=40)	Mean+SD	Cases (n=40)	Mean+SD	P-Value
FT3 (ng/mL)	1.48	+0.28	1.44	+0.29	0.495
FT4 (µg/dL)	10.09	+2.25	8.75	+1.97	0.009**
TSH (µIU/ml)	2.25	+1.19	2.65	+1.68	0.187

** = Highly statistically significant (p < 0.01)

TABLE – II: CORRELATION BETWEEN THYROID PROFILE AND UPE CHARACTERISTICS OF SUBJECTS (N=80)

	Correlation	r-value	P-value
FT3 (ng/mL)	Urinary Protein Excretion (UPE)	0.427	0.002**
FT4 (µg/dL)	Urinary Protein Excretion (UPE)	-0.187	0.248
TSH (µIU/ml)	Urinary Protein Excretion (UPE)	0.127	0.434

TABLE – III: COMPARISON OF MEAN SYSTOLIC AND DIASTOLIC BLOOD PRESSURES (N=80)

	Controls (n=40)	Mean+SD	Cases (n=40)	Mean+SD	P-Value
Systolic Blood Pressure (mmHg)	115.91	+12.63	163.64	+23.14	<0.001**
Diastolic Blood Pressure (mmHg)	77.50	+9.91	105.45	+11.50	<0.001**

** = Highly statistically significant (p < 0.01)

TABLE – IV: COMPARISON OF URINARY PROTEIN EXCRETION (UPE) CHARACTERISTICS OF SUBJECTS (N=80)

	Controls (n=40)	Cases (n=40)
	n (%)	n (%)
UPE (Nil)	38 (95%)	0 (0%)
UPE (Trace)	2 (5%)	0 (0%)
UPE (1 +)	0 (0%)	13 (32.50%)
UPE (2 +)	0 (0%)	21 (52.50%)
UPE (3 +)	0 (0%)	6 (15%)

n = number of subjects

DISCUSSION

It was observed in the research paper that levels of mean FT-3 are somewhat higher in controls in comparison to preeclamptic cases but without any statistical significant variation [12]. According to Dhananjaya levels of thyroid hormones were observed normal. No difference was observed in preeclamptic and normal cases [13]. Rathore disagrees to the outcomes of our research paper as preeclamptic cases; mean serum TT-4 & FT-4 was higher in a non-significant manner; whereas, TT-3 and FT-3 were low in a significant way with reference to normal pregnant cases [14]. This is often linked to levels of mean FT-3 may be due to lowered extra thyroidal conversion from T-4 to T-3. Moreover, FT-3 titers have significant relation to lowered concentration of plasma albumin in preeclampsia [15]. That is why research suggests that abridged thyroid hormones concentration in preeclampsia is possibly because of protein loss & urine protein-bound hormones [16].

It is observed in our research study that higher mean levels of FT-4 in controls in comparison to preeclamptic pregnant cases, found respectively 10.09 & 8.75 [17]. Difference was significant statistically in the mentioned groups. Roofi in his research observes FT-4 levels in preeclampsia pregnancies less in comparison to normal pregnancies [18]. On the other hand, Khadem observations are not in the favor of abovementioned outcomes. Possible reasons behind may include qualitative & non-quantitative measurement [18]. Results variate because of disparity and severity of prevalent of risk factors relating to preeclampsia [19].

Controls reflected somewhat higher mean levels of TSH in controls in comparison to preeclamptic cases. Though, no significant statistical difference was observed between mentioned groups [20]. As per the outcomes of the research similar outcomes were presented in the research study of Ayyub. Both in cases and controls the levels of TSH were elevated in the research outcomes of Dhananjaya with an additional significant statistical difference [21].

Our research correlates UPE and thyroid profile among 2 various research groups and serum FT-3 was found in positive association with UPE, serum FT-4 was negatively associated to UPE. Furthermore, serum TSH was positively associated to UPE. UPE and FT-3 showed high significant and statistical association [22]. This mentioned deficiency in research outcomes can be attributed to the difference between the areas in geographical representation including diet and race [23]. Moreover, the contributory connection in above-mentioned changes in the profile of thyroid can also be manifested by thermogenesis course. Cellular activity boosts thyroid hormones augmentation thermogenesis that assists the generation of adenosine triphosphate [24]. Identification of the accurate procedure is still a question unresolved. Our research outcomes reflect that mean diastolic and systolic BPs were in a very high state in preeclamptic cases when compared to controls [25]. Both the mentioned research groups reflected significant difference in systolic and diastolic BPs. Siddiqui and Pennington also noticed same outcomes in their research studies. Reason behind may have been low density lipoproteins (LDL) with elevated total levels lipid profile. Furthermore, scarce literature is available that handles the questions about UPE [26].

CONCLUSION

Association of Preeclamptic pregnancies is made to lower thyroid hormone level limits when gestation's last weeks are in progress.

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