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Correlation of Thyroid Profile with Blood Pressure and Blood Glucose in Hypothyroid Pregnant Women and its Relation with Neonatal Outcome

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Abstract: ***The present study was undertaken to assess the correlation of thyroid profile with blood Pressure and blood glucose in hypothyroid pregnant women and its relation with neonatal Outcome. Thyroid dysfunction is most common during pregnancy. Hypothyroidism is one of the significant thyroid disorders in pregnancy. There has been evidence which states that women affected with hypothyroidism are more prone to have pregnancy complication such as gestational diabetics, hypertension and complicated deliveries. Total of 30 recordical data of pregnant females with hypothyroidism during third trimester were collected .The study shows that there is a less correlation between the variables in hypothyroid pregnant woman and their neonatal outcomes.***

Keywords: hypothyroidism, thyroid profile, preeclampsia, pregnancy, correlation TSH-thyroid stimulating hormone, SBP-Systolic blood pressure, SBP-Diastolic blood pressure, GTT-Glucose tolerance test, RBS-Random blood sugar.

1. Introduction

Giving birth and being born brings us in the essence of creation. Pregnancy is a natural life event. It is a time of maternal adaptation for the increasing demands of the growing foetus where by the mother experiences great anatomical, physiological, emotional, biochemical changes. Hormonal fluctuation are common during pregnancy.[1]The thyroid gland well known as master gland of the body is associated with body metabolism, growth and development and maintenance of homeostasis. The principal hormones produced by the gland are thyroxin and triiodothyronine.

Thyroid dysfunction is most common during pregnancy.[2] Hypothyroidism is one of the significant thyroid disorders in pregnancy[3].There has been evidence which states that women affected with hypothyroidism are more prone to have pregnancy complication such as gestational diabetics, hypertension and complicated deliveries.[4] Moreover thyroid dysfunction also club with fetal loss, placental abruption, and reduced intellectual function in the offspring[5,6]. Maternal thyroid hormone from the placental transfer plays vital role in normal growth and development of fetus until 12 weeks of gestation[7]. There is a momentary extinction of TSH and stimulation of triiodothyronine during normal pregnancy. Hypothyroidism during early pregnancy has detritus effect on foetal brain development and increases the rate of abortion and stillbirth. It also causes impaired neuropsychological development of the fetus and congenital malformation and increased perinatal mortality[8].

Hypertension in pregnancy is induced by hypothyroidism. Preeclampsia is a condition in pregnancy characterized by abrupt hypertension (BP-140/90mmHg) with proteinuria and edema of hands, feet and face after 20 weeks of gestation[9]. When compared with non-pregnant women preeclampsia women have elevated T3 and T4 levels. Whereas, when compared with normotensive pregnant woman preeclampsia women shows decreased T3 and T4 level. TSH levels in both preeclampsia and normotensive pregnant women are very high[10]. In preeclampsia there is a reduction in TBG, TT3 and TT4 along with retarded growth of foetus which is due to deficient estrogen production because of placental insufficiency[11]. Several research studies have encountered about the correlation between thyroid hormonal status and foetal birth weight. Among those, some of them showed the relevant relation between the foetal outcome and thyroid function in preeclampsia.[12] while other studies showed no correlation [13].

During pregnancy insulin resistance is tremendously increased at the gestational age.[14]Estrogen, thyroid-binding globulin, human chorionic gonadotropin, placental lactogen, cortisol, and placental insulin enzymes are the hormones which implies the changes in blood sugar and thyroid function during pregnancy[15].Pre-eclampsia, increased caesarean rates, prenatal mortality and macrosomia, shoulder dystocia, birth defects, metabolic complications in neonate and morbidity due to subsequent childhood obesity are the complications of gestational diabeteic mellitus DURING pregnancy[16]. Earlier Studies depicts that during the later stages of pregnancy there occurs an increase in insulin resistance which is strongly related to impairment in glucose tolerance and it is more in hypothyroidsm. [17]Variations in these critical parameters may be associated with maternal and neonatal complications. Hence the present study is undertaken to observe any correlation between thyroid profile, blood sugar, blood pressure and its relation with neonatal outcome.

2. Materials and Methods

The present study was conducted in department of Obstetrics and Gynaecology Department of Physiology, Little Flower Hospital and Research Centre, Angamaly**,** Kerala in between April 2018 – October 2018 .The present study was approved

by institutional ethical committee of Little Flower Hospital and Research Centre, Angamaly. No EC/21/2017 Permission also obtained from LIMSAR to conduct the study

Participants

Total of 30 recordical data of pregnant females with hypothyroidism at third trimester were collected. .data collections were by convenient sampling.

Inclusion Criteria

1) Pregnant women with in age group of 23-30 years
2) Hypothyroid pregnant women: TSH=0.39-3.55µIU/ml. 9
3) Willing participants
4) Not suffering with any major complications

Exclusion Criteria

Pregnant women with Family history of thyroid, blood pressure and blood glucose

Methods

1) Thyroid profile: TSH by chemiluminescent microparticle immunoassay ABBOT (CMIA) method.
2) Measurement of BP will be performed by mercury manometer.
3) Measurement of blood glucose will be performed by standard methods

Statistical Analysis

Data was analyzed by SPSS 20.0. Statistical test applied are Pearson's correlation coefficient and followed by paired t test will be used to observe the correlation between the variables. P value <0.05 was considered as significant.

3. Results

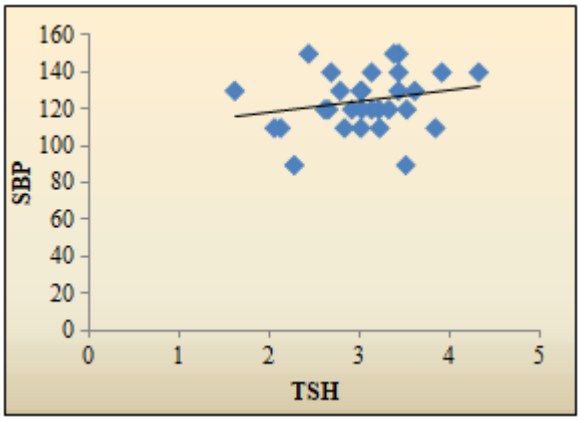
Hypothyroid Pregnantwomen

Table 1: Assessment of Correlation between TSH & SBP

Variables	Range	N	Pearson Correlation(r)	Significance *(p-value)*
TSH	1.61-4.32	30	0.229	*p = 0.224*
SBP	90-150			

P<0.05 consider as statistical significance

The correlation coefficient 0.229, is positive correlation and is not significant, since the *p-value* is greater than 0.05. There is no significant correlation between TSH and SBP.



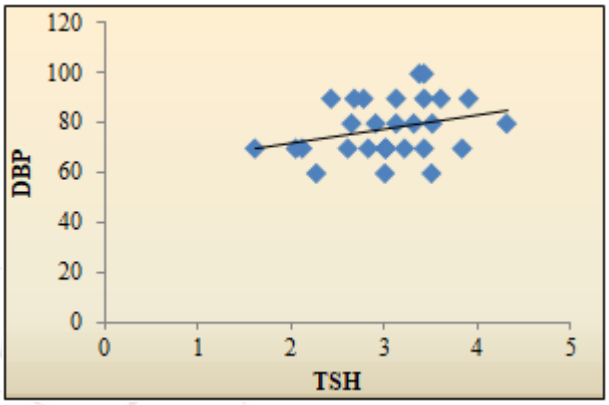
Graph 1: Scatter diagram of correlation between TSH & SBP

Table 2: Assessment of Correlation between TSH & DBP

Variables	Range	n	Pearson Correlation(r)	Significance (p-value)
TSH	1.61-4.32	30	0.278	p = 0.137
DBP	60-100			

P<0.05 consider as statistical significance

The correlation coefficient 0.137, is positive correlation and is not significant, since the *p-value* is greater than 0.05. There is no significant correlation between TSH and DBP.



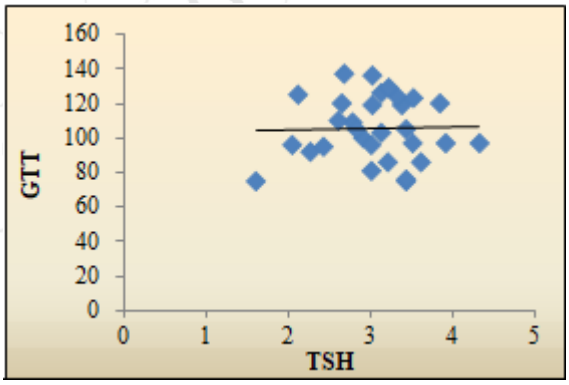
Graph 2: scatter diagram of correlation between TSH and DBP

Table 3: Assessment of Correlation between TSH & GTT

Variables	Range	n	Pearson Correlation(r)	Significance *(p-value)*
TSH	1.61-4.32	30	0.027	*p = 0.887*
GTT	75-137			

P<0.05 consider as statistical significance

The correlation coefficient 0.027, is positive correlation and is not significant, since the *p-value* is greater than 0.05. There is no significant correlation between TSH and GTT.



Graph 3: scatter diagram of correlation between TSH and GTT.

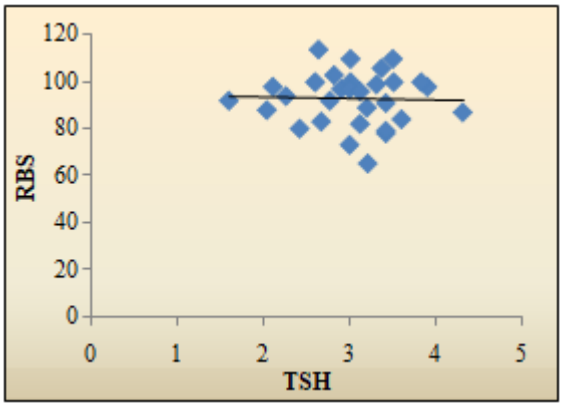
Table 4: Assessment of Correlation between TSH & RBS

Variables	Range	n	Pearson Correlation(r)	Significance *(p-value)*
TSH	1.61-4.32	30	-0.025	*p = 0.894*
RBS	73-114			

P<0.05 consider as statistical significance

The correlation coefficient -0.025, which shows less negative correlation and is not significant (p= 0.84), since

the *p-value* is greater than 0.05. There is no significant correlation between TSH and RBS.



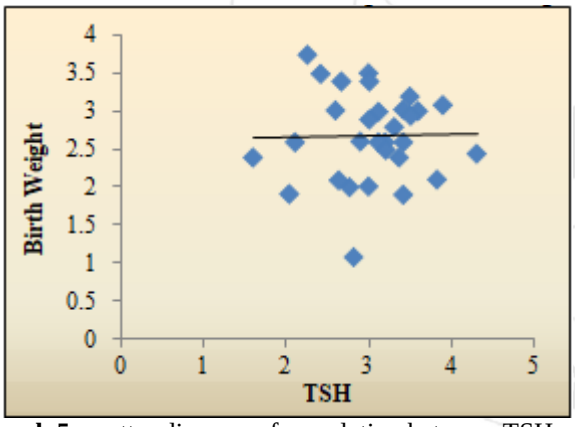
Graph 4: Scatter diagram of correlation between TSH and RBS

Table 5: Assessment of Correlation between TSH & Birth Weight

Variables	Range	n	Pearson Correlation(r)	Significance *(p-value)*
TSH	1.61-4.32	30	0.01	*p = 0.957*
Birth weight	1.09-3.75			

P<0.05 considered as statistical significance

The correlation coefficient 0.01, is positive correlation and is not significant, since the *p-value* is greater than 0.05. There is no significant correlation between TSH and birth weight.



Graph 5: scatter diagram of correlation between TSH and BW

4. Discussion

In the study "thyroid hormone changes in women with pre eclampsia and its relationship with presence of pre eclampsia" by Zhou J etal. (2014) showed a significant positive correlation between TSH and preeclampsia[18]. This is in accordance with our present study which also shows positive correlation between TSH and BP although it is not significant.

In a study conducted by Das B.P. (2015) on 'Relationship of Gestational Diabetes Mellitus with Hypothyroidism in Pregnancy', it was proved that pregnant women with hypothyroidism have greater chance of developing Gestational Diabetes.[16] This supports the findings of the present study in which a positive correlation between TSH and GTT(r=0.027, p=0.887) is obtained although it is not significant.

In the present study a positive correlation was observed between BW and TSH although it is not significant. Contrasting results were obtained by S Kharb etal (2013) in their study "Correlation of thyroid functions with severity and outcome of pregnancy." which shows negative correlation between TSH and BW.[9]

5. Conclusion

Changes in thyroid function occur during pregnancy as a result of physiological alterations in several factors controlling thyroid homeostasis. Our study conclude that there is a less correlation between Thyroid profile TSH, blood pressure, and blood glucose in hypothyroid pregnant woman and their neonatal outcome. But this work certainly merits further studies with more parameters and higher sample size.

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