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**RETROSPECTIVE STUDY THYROID DYSFUNCTION IN PREGNANCY AND ITS IMPACT
ON OBSTETRIC AND NEONATAL OUTCOME IN SUNGAI BULOH HOSPITAL, MALAYSIA**

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ABSTRACT

Objective

The objective of this study is to

1. Determine number of patients with thyroid dysfunction in pregnancy
2. Determine the obstetric outcome and neonatal outcome of thyroid dysfunction in pregnancy

Methodology

A retrospective study was conducted in Hospital Sungai Buloh from the data obtained by the hospital registry. Data from July 2013 to July 2016 was reviewed and information regarding the patient's socio-demographic data, anthropometry of the neonate, the variation of the neonatal birth weight and maternal thyroid disorder was recorded in a designed data collection form with the sample size of (n=166).

The inclusion criteria for this study are all patients age from 20-40 years old and do not have chronic diseases such as hypertension, heart disease, diabetes mellitus, and neonates are born at term 37 weeks to 42 weeks without congenital anomalies.

The exclusion criteria are patients age less than 20 or more than 40 years old, having chronic diseases such hypertension, heart disease, diabetes mellitus, and neonates born preterm less than 37 weeks of gestational age or with congenital anomalies.

The collected data was analyzed statistically using IBM Statistical Package for the Social Sciences (SPSS) version 20. Independent t-test was used to analyze two variables in which one is categorical and the other is numerical. Chi-square was used to analyze two independent categorical variables. All statistical analyses will use $P < 0.05$ as a significant value.

- Material Method and sample size

All pregnant mother with impaired thyroid function in pregnancy were included from July 2013 to July 2016 . The association of hyperthyroid and hypothyroidism in pregnancy with the following outcome were studied:

1. Thyroid disorder with antenatal complications such as anemia, Gestational Diabetes, Gestational Hypertension, Preeclampsia, Preterm Prelabour Rupture of Membrane and Antepartum Haemorrhage.
2. Gestational age of delivery and mode of delivery
3. Baby's Apgar score and birth weight

- Flow Chart

Patients with thyroid dysfunction in pregnancy less than 40 years old were identified from delivery book
collected July 2013-July 2016

↓
Patient's data collected in patient's data form and data entered in SPSS version 20

CONCLUSION

Based on our study, thyroid disorder in pregnancy did not significantly affect obstetric outcome and neonatal birth weight.

INTRODUCTION

Maternal thyroid disease in pregnancy is common, with hypothyroidism affecting 2.0%–2.5% and hyperthyroidism up to 0.5% of all pregnancies [1]. The most common cause of maternal hyperthyroidism during pregnancy is the autoimmune disorder Grave's disease while for hypothyroidism is the autoimmune disorder known as Hashimoto's thyroiditis [2].

Maternal thyroid disease and neonatal outcomes of pregnancy according to race showed that Non-Hispanic black women with hyperthyroidism had increased odds of low-birth-weight infants at term, and infants of Hispanic women with hyperthyroidism had increased odds of being small for gestational age compared with non-Hispanic black women or Hispanic women without thyroid diseases. [1] Hispanic women with hypothyroidism had increased odds of having infants with low birth weight at term compared with Hispanic women without thyroid disease [1].

In another study, 68 pregnant women with hypothyroidism was compared with a euthyroid pregnant control group showed that low birth weight was present in 22% of women with overt hypothyroidism compared with 6.8% in controls. There was no difference in low birth weight in women in the subclinical hypothyroid group compared with controls [3]. Thus, the aim of this study is to identify maternal thyroid disorders whether hyperthyroidism or hypothyroidism affect the neonatal birth weight. Hyperthyroidism or overactive thyroid is a condition in which the thyroid gland produces too much of the thyroid hormones while hypothyroidism or underactive thyroid is a condition in which the thyroid gland does not produce enough of thyroid hormones. Low birth weight has been defined by the World Health Organization (WHO) as weight at birth of less than 2.500 grams [4].

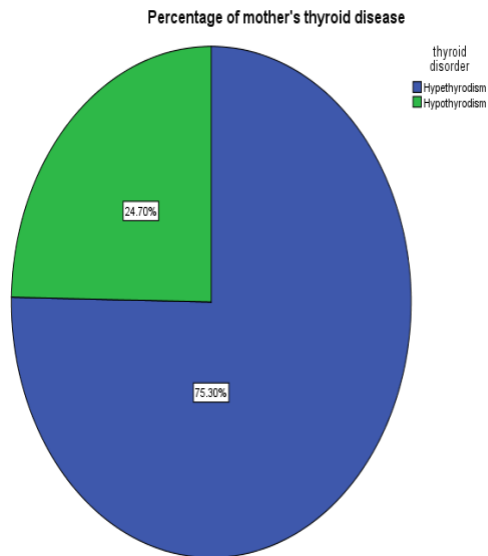
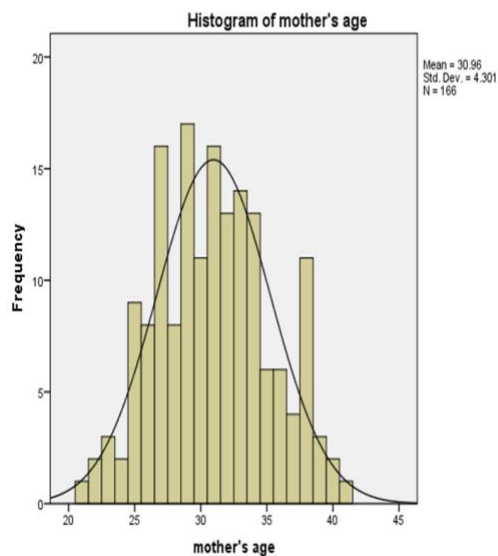
RESULTS

I. Demographic data

From Table 1, among 166 of our respondents, 86.9% of them were Malay, followed by Indian 7.8%, Chinese 5.4% and other native races such as Kadazan and Iban with the percentages of 0.6%. While 86.7% of the respondents were Muslims and then followed by Hindu 7.8% and Chinese 5.4%. 34.2% respondents were mothers between 29-32 years old with the mean age of 30.96 years old.

About 97.0% mothers were married, single (2%) and widowed (3%). Most of the mothers were housewives with the percentage of 79.5% , while the rest (20.5%) were employed.

The mean gravida (frequency of pregnancy) for the mothers were 3 with mean parity of 2 children. Majority of them (71.7%) did not have any history of miscarriage.



Parameter	Item	Frequency (Percentage)	Mean (Standard Deviation)	Median	Range
Age	18-24	6 (3.6%)	30.96 (4.301)	31	18 – 40 years old
	24-28	43 (25.8%)			
	29-32	57 (34.2%)			
	33-37	43 (25.9%)			
	37-40	17 (10.2%)			
Ethnicity	Malay	143 (86.1%)			
	Chinese	9 (5.4%)			
	Indian	13 (7.8%)			
	Others	1 (0.6%)			
Religion	Muslim	144 (86.7%)			
	Buddhist	9 (5.4%)			
	Hindu	13 (7.8%)			
	Others	0 (0%)			
Marital status	Single	2 (1.2%)			
	Married	161 (97.0%)			
	Widowed	3 (1.8%)			
Gravida			3.23 (1.882)	3	1 – 9
Parity			2.38 (1.475)	2	0 - 9
History of miscarriage	Yes	47 (28.3%)			
	No	119 (71.7%)			

II. Antenatal complications

For the complications during pregnancy , 14.5 % of the mothers had gestational diabetes mellitus, 14.5% were anaemic, 6.6% of them had preterm pre-labour rupture of membrane while 3.6%, 3.0% and 1.2% had gestational hypertension, antepartum haemorrhage and preeclampsia respectively.

Antenatal Complication	Yes/No	Frequency(Percentage)
Anemia in pregnancy	Yes	22 (13.3%)
	No	144 (86.7%)
Gestational diabetes mellitus	Yes	24 (14.5%)
	No	142 (85.5%)
Gestational hypertension	Yes	6 (3.6%)
	No	160 (96.4%)
Preeclampsia	Yes	2 (1.2%)
	No	164 (98.8%)
Preterm pre-labour rupture of membrane	Yes	11 (6.6%)
	No	155 (93.4%)
Antepartum hemorrhage	Yes	5 (3.0%)
	No	161 (97.0%)

III. Thyroid disorder

From this study, 75.3% of the mothers had hyperthyroidism, while 24.7% had hypothyroidism. The mean T4 level was 16.74 mmol/L, while the mean TSH level was 1.45 mu/L. About 70.4% of hyperthyroidism mothers were on treatment, while 29.6% were not on treatment. For hypothyroidism mother, 92.7% of them were on treatment, while 7.3% were not.

Variable	Item	Frequency (Percentage)	Mean (Standard Deviation)	Median	Range
Thyroid disease	Hyperthyroidism	125(75.3%)			
	Hypothyroidism	41(24.7%)			
Hyperthyroidism on medication	Yes	88(70.4%)			
	No	37(29.6%)			
Hypothyroidism on medication	Yes	38(92.7%)			
	No	3(7.3%)			
Thyroid Function Test	T4 level		16.74(8.18)	13.9	1.8-64.1
	TSH level		1.45(4.60)	0.04	0.0-40.9

IV. Neonatal Data

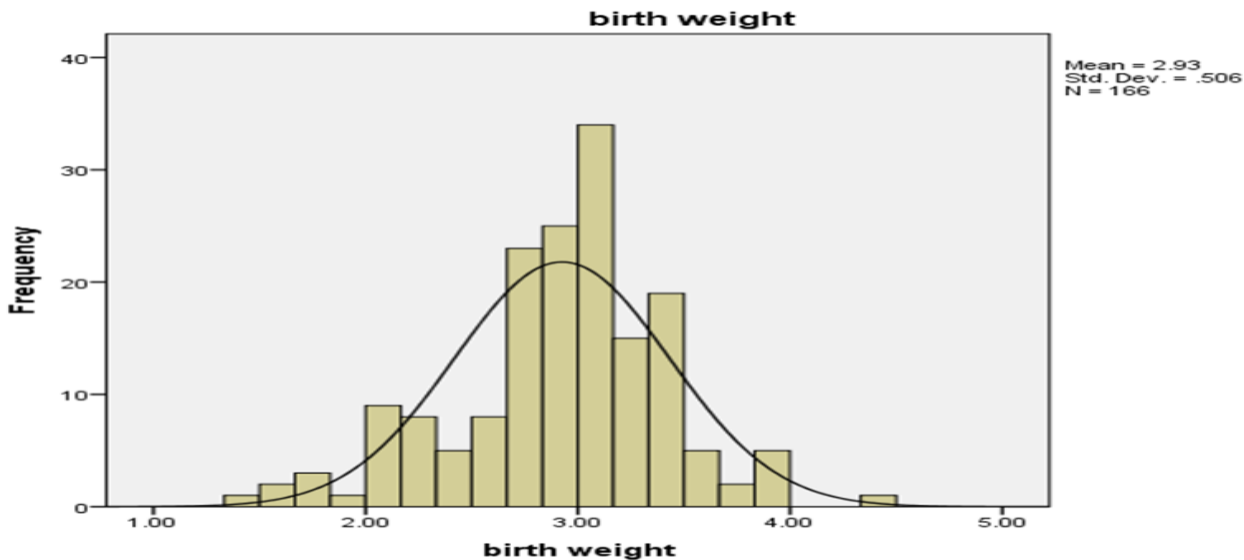
Most of the babies delivered were male (54.8%). The mean of gestational week at delivery was 38.33 weeks and majority were born during 38 -39 of gestational week (54.9%). Majority of the babies were delivered via spontaneous vaginal delivery (66.3%) and 33.7% were delivered via emergency lower segment Caesarean section. The mean birth weight of the baby's delivered was 2.93 kg. Most of the baby (81.9%) born with normal body weight, leaving 18.1% born with low birth weight.

Variable	Item	Frequency (Percentage)	Mean (Standard Deviation)	Median	Range
Gender of baby	Boy	91(54.8%)			
	Girl	75 (45.2%)			
Gestational week at delivery	37	35(21.1%)	38.33(0.956)	38	37 – 40 weeks
	38	62(37.3%)			
	39	48(28.9%)			
	40	20(12.0%)			
Mode of delivery	Spontaneous vaginal delivery	120 (66.3%)			
	ELLSCS	56 (33.7%)			
Apgar score			8.99 (0.779)	9	1 - 9
Birth weight	Low birth weight	30 (18.1%)	2.93 (0.493)	2.98	1.6kg – 4.47kg
	Normal	136 (81.9%)			

Table 3 shows the results of inferential statistics. Based on the objectives of our study, we would like to know the association between thyroid disease during pregnancy with the outcome birth weight of their baby. Our results of analysis showed no significance between thyroid disease during pregnancy with outcome of the birth weight, with X^2 and p value of 1.270 and 0.261 respectively.

Association between Thyroid Disease and Birth Weight (Table 3)

Variables	Birth weight		Total	X^2	df	p value
	Normal	Abnormal (LBW/macro)				
Thyroid disease						
Hyperthyroidism	100 (60.5%)	25 (15.1%)	125 (75.3%)	1.270	1	0.260
Hypothyroidism	36 (21.7%)	5 (3.0%)	41 (24.7%)			
Total	136 (82.2%)	30 (18.1%)	166 (100.0%)			



DISCUSSION

Thyroid disease, as in both hyperthyroid and hypothyroid is profound in pregnancy as pregnancy itself induces several changes to thyroid gland and function; the size of the gland and also the hormone it secretes. Symptoms of both hypothyroid and hyperthyroid however, may be masked by hypermetabolic state of pregnancy. Based on our research, it can be concluded that there is a higher prevalence of hyperthyroid than hypothyroid in pregnancy by ratio of approximately 3:1 which is inconsistent with study done by Diaguez et al that found out prevalence of subclinical hypothyroidism higher than subclinical hyperthyroidism in pregnancy[5]. Another study by Negro et al also found that there is higher prevalence of hypothyroid than hyperthyroid in pregnancy, 4.4% and 0.4% respectively [6]. In another study, also revealed that hyperthyroidism is less common than hypothyroidism and interested only 0.2% of pregnancies [7].

In this study, the percentage of infant with low birth weight in mother with thyroid dysfunction was 18.1%. Study done by Karakosta et al, revealed the prevalence of infant with low birth weight in mother with thyroid dysfunction was 5.4% [8]. As for the percentage of infant with low birth weight in mother with hyperthyroidism in our study was 15.% where as in study done by Phoojaroenchanachai et al. reported that the prevalence of infant with low birth weight in hyperthyroidism mother was 22.9% [9]. The prevalence of infant with low birth weight in hypothyroidism mother was 3.0% in which was quite similar with study done by Idris et al reported that the prevalence of infant with low birth weight in mother with hypothyroidism was 4.8%. [10]

Based on our study as stated in Table 3, there was no significant difference between thyroid disorder and birth weight . Study revealed stated that maternal high-normal FT4 levels in early pregnancy was associated with lower birth weight and an increased risk of small for gestational age (SGA). [11]

Another study done by Nilgün Güdücü et. al also revealed that thyroid disorder in pregnancy was an independent variable affecting birth weight of a newborn, in which it was documented that pregnancy complicated with short for gestational age (SGA) neonates had higher TSH levels in the early first trimester. In the journal, they reported that abnormal placentation was the proposed mechanism for the cause of SGA neonates .

Limitations of this study

Our findings do not correlate with previous studies as our sample was inadequate . This is due to some patients' data were incomplete . For example there are several patients with maternal thyroid disorder in pregnancy had their follow up at Sg Buloh Hospital but unfortunately delivered at other hospitals. Therefore, we could not get the information regarding their newborn babies. Other than that, some of the patients are excluded mainly due to their age (> 40 years old) as this could give us false positive results.

CONCLUSION

In conclusion based on our study, thyroid disorder in pregnancy did not significantly affect obstetric outcome and neonatal birth weight and it is important for patients to have good follow up under combined clinic for them to become clinically euthyroid in pregnancy.



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