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THYROID DYSFUNCTION IN PREGNANT FEMALE IN TERTIARY CARE CENTRE OF CHHATTISGARH

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ABSTRACT Thyroid dysfunction is one of the commonest endocrine abnormality encountered in pregnant females. This study was aimed to access thyroid function tests in pregnant female. Hundred and twenty-five pregnant female were recruited for the study and their thyroid function tests including T3, T4 and TSH levels were estimated. Association between thyroid status and various factors was studied. Hypothyroidism was found to be having significant higher frequency in third trimester and significantly higher frequency of hyperthyroidism was noted in second trimester subjects. Thus, we concluded that there is high prevalence of hypothyroidism in our population and this prevalence is significantly higher in third trimester.

KEYWORDS :

INTRODUCTION

Thyroid dysfunction is next most common endocrine disorder during pregnancy following gestational diabetes. The background prevalence of spontaneous hypothyroidism is between 1% and 2% in iodine-replete communities and 10 times more common in women than in men. (Vanderpump, 2011) subclinical hypothyroidism, defined as a raised serum thyroid stimulating hormone (TSH) levels in presence of normal thyroid hormone levels, affects about 8% of women. (Vanderpump, 2011) Thyroid dysfunction (TD) has varied impact on pregnancy outcome which includes increased risk of miscarriage, irreversible neurological deficit in the offspring, pregnancy loss as well as fetal thyroid dysfunction.

The prevalence of hypothyroidism in pregnancy is around 2.5% (LeBeau and Mandel, 2006) and that of thyroid autoimmunity (TAI) is around 5–10% (Hollowell *et al,* 2002). Data on the prevalence of TD during pregnancy is lacking in Asian- Indian population. Hence, this study was planned to establish the prevalence of TD in pregnancy.

We thus aimed to access thyroid function tests in pregnant female, to detect prevalence of thyroid dysfunction in pregnant female, to access difference in thyroid function tests in various trimester of pregnancy and to associate thyroid dysfunction with trimester of pregnancy.

MATERIAL AND METHODS

This cross-sectional descriptive study was carried out in centre for Genetic Diseases and Molecular Biology, Department of Biochemistry, Pt. J.N.M. Medical college, Raipur. The participants were One hundred twenty five consenting antenatal women attending at OPD of Dr. B. R. Ambedkar Memorial Hospital (BRAMH), Raipur aged of antenatal women 18 years and above.

Relevant history was elicited and physical examination was performed. Three milliliters of venous blood sample was collected from ante cubital vein and serum was use for estimation of various parameters.

TSH and thyroid hormone levels were estimated using automated Electrochemiluminescence analyser (Roche Cobas e 411, Roche Diagnostics™, Mannheim, Germany) using manufacture protocol and TSH (cat no. 11731459 lot 311038) T3 (cat no. 11731360, lot No. 23816603), T4 (cat no. 12017709, lot No. 248077) Roche™ Diagnostics GmbH, Mannheim Germany. Data was expressed as percentage and mean ± S.D. Kolmogorove-Smirnove analysis was performed for checking linearity of the data. Student's t-test was and Mann Whitney U test was used to check the significance of difference between two parameters ANOVA followed by Tukey's HSD test was used to test the significance of difference between more than two parameters in parametric data. Pearson correlation analysis was performed to check the correlation between two categorical variables. Fischer's exact test or Chi square test was used to analyze the significance of difference between frequency distribution of the data. P value <0.05 was considered as statistically significant. SPSS© for windows™ Vs 17, IBM™ Corp NY and Microsoft excel™ 2007, Microsoft® Inc USA was used perform the statistical analysis.

OBSERVATION AND RESULTS

Table 1: General characteristics of study subjects.

Characteristics		Mean/frequency	SD/Percentage
Age (Years)		24.31	3.37
Height (cm)		149.34	6.35
Wt (Kg)		49.18	8.51
Hb (gm%)		10.71	1.06
Trimester N (%)	1	12	9.6
	2	50	40
	3	63	50.4
Para N(%)	0	60	48
	1	48	38.4
	2	17	13.6
Gravida N (%)	1	45	36
	2	54	43.2
	3	22	17.6
	4	4	3.2

Table2: Thyroid status in study subjects

Thyroid status	Frequency	Percent
Hypothyroidism	14	11.5
Subclinical hypothyroidism (SCH)	30	24.0
Normal	74	59.2
Hyperthyroidism	7	5.6
Total	**125**	**100.0**

Table 3: Association of various characteristics with thyroid status

Characteristics		Thyroid status				P Value
		Hypothyroidism (N=14)	**SCH (n=30)**	**Normal (N=14)**	**Hyperthyroidism (N=7)**	
Para	**0**	5 (35.71%)	18 (60.00)	34 (45.94)	3 (42.85)	0.543
	1	5 (35.71%)	9 (30.00)	31 (41.89)	3 (42.85)	
	2	4 (28.57%)	3 (10.00)	9 (12.16)	1 (14.28)	
Gravida	**1**	8 (57.41%)	10 (33.33)	24 (32.43)	3 (42.85)	0.127
	2	3 (21.43%)	24 (80.00)	36 (48.64)	1 (14.28)	
	3	2 (14.29%)	05 (16.67)	12 (16.21)	3 (42.85)	
	4	1 (7.14%)	1 (3.33)	2 (2.70	0 (0)	
Trimester	**1**	3 (21.43%)	2 (6.67)	6 (8.10)	1 (14.28)	0.101
	2	7(50.00%)	12 (40.00)	25 (33.78)	6 (85.71)	
	3	4 (28.57%)	16 (53.33)	43 (58.10)	0 (0)	
Total		**14 (100)**	**30 (100)**	**74 (100)**	**7 (100)**	**125**

Table 4: Comparison of various parameters between subject with different thyroid status

Characteristics	Thyroid status	N	Mean	S.D.	S.E.	95% C.I.		F	P Value
						Low	Upper		
Age (Years)	Hypo	44	23.64	3.16	0.48	22.67	24.60	1.41	0.248
	Normal	74	24.65	3.34	0.39	23.87	25.42		
	Hypert	7	25.00	4.65	1.76	20.70	29.30		
Height (cm)	Hypo	44	148.05	5.10	0.77	146.49	149.60	1.4322	0.243
	Normal	74	150.07	6.53	0.76	148.56	151.58		
	Hypert	7	149.86	10.49	3.97	140.15	159.56		
Weight (Kg)	Hypo	44	50.80	8.41	1.27	48.24	53.35	1.336	0.267
	Normal	74	48.45	8.02	0.93	46.59	50.30		
	Hyper	7	46.86	13.23	5.00	34.62	59.10		
Hb (gm/dl)	Hypo	44	10.75	1.08	0.16	10.43	11.08	0.351	0.705
	Normal	74	11.66	1.06	0.12	10.41	10.90		
	Hypert	7	10.98	1.02	0.39	10.04	11.93		

General characteristics of study subjects are depicted in **Table 1.** Thyroid status in study subjects is listed in **Table 2**. Hypothyroidism was found to be present in 44 subjects (35.2%).

Association of various pregnancy associated factors was performed with thyroid status in subjects. Para and gravida status or trimester of study subjects was not found to be having any significant association with thyroid status. **(Table 3)**

Comparison of demographic parameters and Haemoglobin levels between study groups was performed and no significant difference was observed between study groups regarding these parameters. **(Table 4)**

DISCUSSION

Our study was able to demonstrate the high prevalence of thyroid dysfunction at (35.2); with hypothyroidism being the most common among third trimester pregnant women (45.5%) followed by second trimester (43.2%) and in first trimester (11.4%).

There are few studies carried out globally assessing thyroid dysfunction among pregnant women. Most of the studies have been carried out in Europe, Asia and few in Africa. A cross-sectional study in a referral hospital in Spain among 2509 pregnant women in the first trimester (median gestation 8 weeks, range 4–13 weeks) reported a prevalence of thyroid dysfunction at 16% (Diéguez *et al*., 2016). The high prevalence could be attributed to the use of national reference ranges used for TSH and FT4 which are higher than the reference ranges recommended by the American Thyroid Association (Stagnaro-Green *et al*., 2011).

A cross-sectional study among 1311 pregnant women within the first and third trimesters in Belgium documented a prevalence of thyroid dysfunction at 15.3%. The prevalence was higher in the first than third trimester. The study used the ATA trimester-specific reference ranges. The high prevalence of thyroid dysfunction in this study was attributed to iodine deficiency. (Rodrigo *et al.,* 2013).

In Chi na, a multicenter cohort study among 2899 pregnant women enrolled during their first trimester of gestation demonstrated a high prevalence of thyroid dysfunction at 10.2%. This study did not use the trimester specific reference ranges recommended by American Thyroid Association (Wang *et al.,* 2011).

A prospective observational study in India among 1000 pregnant women attending a tertiary public hospital in the first trimester reported a prevalence of thyroid dysfunction at 14.3%, with subclinical hypothyroidism being the most common (Dhanwal *et al.,* 2013) and was associated with adverse fetal and maternal outcomes. The possible reasons for the high prevalence was presence of goitrogens in diet such as selenium or iron deficiency that may cause hypothyroidism and goiter (Dhanwal *et al.,* 2013). Similarly, another prospective study among 400 pregnant Indian women between 13 and 26 weeks of gestation reported a high prevalence of thyroid dysfunction at 13.5% with the majority being subclinical hypothyroidism. This study used the ATA trimester-specific reference ranges (Ajmani *et al*., 2014).

There have been only three African studies carried out on the prevalence of thyroid dysfunction among pregnant women. In Sudan, cross-sectional hospital-based study among 500 pregnant Sudanese women aged 15-45 years in all trimesters, found a prevalence of 9.4% which is higher than our study and this could be attributed to the use of national reference ranges instead of the American Thyroid Association trimester specific reference ranges (Saeed *et al.,* 2015).

A cross-sectional study carried out in Tunisia among 1519 pregnant women in all trimesters demonstrated a high prevalence of thyroid dysfunction at 9.7% which was attributed to iodine deficiency. This study used the ATA trimester specific reference ranges (Feki *et al*., 2008).

In Nigeria, a prospective case control study among of 300 pregnant women and 100 age-matched non-pregnant controls reported a prevalence of thyroid disorders at 5.3% and 5%, respectively (El-Bashir *et al.,* 2015). This study used trimester specific population reference values. Majority of the participants were in the second and third trimester. The high prevalence of thyroid disorders could be attributed to the fact that the TSH upper reference value used in that study was high at 4.0 μIU/L irrespective of trimester.

Our study found a prevalence of thyroid dysfunction at 5.6% among pregnant women in the third trimester, using the ATA reference ranges. Other studies (Saeed *et al.,* 2015; Ajmani *et al.,* 2014; El-Bashir *et al.,* 2015) have reported a prevalence of between 9.4-15.3%. This prevalence is lower than that found by two African studies; in Sudan and in Tunisia (Feki *et al.,* 2008). The difference between our study and the Sudanese one was the fact that Saeed *et al* used their population-specific refence ranges as opposed to the ATA trimester specific reference ranges (Saeed *et al.,* 2015). The study carried out among Tunisian pregnant women (Feki *et al.,* 2008) was similar to our study as it was a cross-sectional study and it also recruited participants from all trimesters but it recorded a higher prevalence at 9.7%. The high prevalence in the Tunisian study was attributed to iodine deficiency unfortunately our study did not set out to establish the cause of thyroid dysfunction. According to American Thyroid Association, targeted screening of thyroid dysfunction is the preferred method due to cost-effectiveness, but a cohort study done in the United Kingdom reported that targeted screening would miss about one third of pregnant women with overt/subclinical hypothyroidism (Vaidya *et al.,* 2012) and advocated for universal screening. Other studies that have also documented a high prevalence of thyroid dysfunction among pregnant women have recommended universal versus targeted screening (Feki *et al*., 2008;Saeed *et al*., 2015;Vaidya *et al.,* 2012) Despite the high prevalence of thyroid dysfunction among pregnant women in this study we cannot recommend policy change to universal screening due to the small sample size.

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