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Prevalence of hypothyroidism in pregnant women

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Abstract
Hypothyroidism is a disorder of the endocrine system in which the thyroid gland does not produce enough thyroid hormones. During pregnancy, there is a change in thyroid function and inadequate adaptation to these changes result in thyroid dysfunction. In pregnancy, thyroid gland may enlarge to a greater extent in iodine poor countries. A cross sectional study was conducted on 150 pregnant women to find out the prevalence of hypothyroidism in different trimesters of pregnancy. The prevalence of hypothyroidism among pregnant women was found to be 14.7%. The result showed that there is a high prevalence of subclinical hypothyroidism in first trimester of pregnancy in Lucknow area.

Keywords: hypothyroidism, pregnancy, thyroid

Introduction
Thyroid gland is the largest endocrine gland which wraps around the front of the trachea just below the Adam's apple. It is a butterfly shaped gland weighing about 20 grams in adult but it varies with age, sex and physiological conditions. It stores the hormones in follicular cavity surrounded by the cells [1]. Hypothyroidism is a disorder of the endocrine system in which the thyroid gland does not produce enough thyroid hormones [2]. Thyroid disorder is a most common endocrine disorder seen in pregnancy. The change in maternal thyroid functions in pregnancy and inadequate adaptation to these changes result in thyroid dysfunction [3]. During pregnancy, thyroid gland may enlarge by 10% in countries where iodine sources are insufficient [4]. In pregnancy, there is a high production of thyroid hormones due to which iodine requirement increases by 50% [5]. More often hypothyroidism occurs in female between the age of 15 to 49 years. It also appear as a genetic component as it run in families [6].It has been estimated that about 42 million people in India are suffering from thyroid diseases [7]. The prevalence of hypothyroidism in pregnancy is around 2.5% according to western literature [8]. The fetal thyroid gland begins synthesizing thyroid hormone after 12 weeks of gestation which is the most important hormone for the fetal brain development and it continues till the later gestation [9]. There are various studies which showed that women with normal thyrotropin are associated with complications like preterm birth, abnormal fetal growth and prenatal/postnatal death [10].
Women with hypothyroidism are at increased risk of pregnancy complications such as early pregnancy failure, preeclampsia, placental abruption, low birth weight and still birth [11-13]. According to the American Congress of Obstetricians and Gynaecologists (ACOG) the prevalence of hypothyroidism in pregnancy is 2 to 5%. In India, the prevalence of hypothyroidism ranges from 4.8% to 11% [14]. This study was designed to find out the prevalence of hypothyroidism in pregnant women of all trimesters at Lucknow areas in India.

Materials and Methods
A total of 150 OPD patients were studied who visited Obstetrics & Gynaecology Department at Integral Institute of Medical Sciences and Research hospital (IIMS & R). The cross sectional study was conducted in pregnant women of all trimesters of different age groups. The patients were selected by randomly using purposive sampling technique keeping in view the operational feasibility. The study was conducted from January 2017 to June 2017. The institutional ethical approval and consent from the subjects were taken. The blood sample from all the subjects were collected under aseptic condition and processed in the central pathology of the IIMS & R, Lucknow.
The pregnant women in all the three trimesters were included in the study. Pregnant women with known chronic disorders like diabetes, hypertension and previous bad obstetrics history were excluded from the study.

Collection of sample
3ml of blood was collected using disposable syringe under aseptic condition in serum vial and analyzed for different parameters using automated analyzer (Beckman Coutler).The statistical analysis was done by using SPSS software (20.0 version) and relevant statistical test was applied and statistical significance was determined.

Results

Table 1: Prevalence of hypothyroidism according to age of women

Age in years	No. of women	Prevalence of hypothyroidism				OR (95%CI)	p-value[1]
		Yes		No			
		No.	%	No.	%		
<25	39	6	15.4	33	84.6	1.69 (0.38-7.41)	0.48
25-30	80	13	16.2	67	83.8	1.81 (0.47-6.85)	0.38
>30	31	3	9.7	28	90.3	1.00 (Ref.)	

[1]Binary logistic regression, OR-Odds ratio, CI-Confidence interval, Ref-Reference

Table1 & Fig. 1 shows the prevalence of hypothyroidism according to age of women. The prevalence of hypothyroidism was found to be 16.2% of women age 25-30 years and 15.4% of age <25 years. The prevalence of hypothyroidism was 9.7% of age >30 years. The prevalence of hypothyroidism was 1.81 times insignificantly (p>0.05) higher among the women of age 25-30 years than > 30 years (OR=1.81, 95%CI=0.47-6.85). The prevalence of hypothyroidism was also 1.69 times insignificantly (p>0.05) higher among the women of age <25 years than > 30 years (OR=1.69, 95%CI=0.38-7.41).

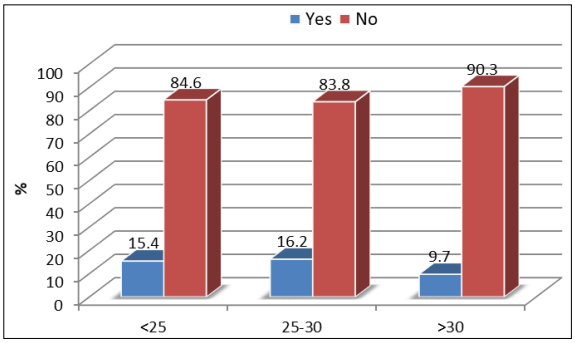

Fig. 1: Prevalence of hypothyroidism according to age of women

Table 2: Prevalence of hypothyroidism according to duration of pregnancy

Duration of pregnancy in months	No. of women	Prevalence of hypothyroidism				OR (95%CI)	p-value[1]
		Yes		No			
		No.	%	No.	%		
<3	41	7	17.1	34	82.9	1.19 (0.34-4.16)	0.78
3-6	75	10	13.3	65	86.7	0.89 (0.28-2.84)	0.84
>6	34	5	14.7	29	85.3	1.00 (Ref.)	

[1]Binary logistic regression, OR-Odds ratio, CI-Confidence interval, Ref-Reference

Table 2 & Fig. 2 show the prevalence of hypothyroidism according to duration of pregnancy.The prevalence of hypothyroidism was found to be 17.1% of women with duration of pregnancy being <3 month and 14.7% with duration of pregnancy being >6 months. The prevalence of hypothyroidism was 13.3% with duration of pregnancy being 3-6 months. The prevalence of hypothyroidism was 1.19 times insignificantly (p>0.05) higher among the women with duration of pregnancy being <3 months than >6 months (OR=1.19, 95%CI=0.34-4.16). The prevalence of hypothyroidism was 13.3% insignificantly (p>0.05) lower among the women of with duration of pregnancy being 3-6 months than >6 months (OR=0.89, 95%CI=0.28-2.84).

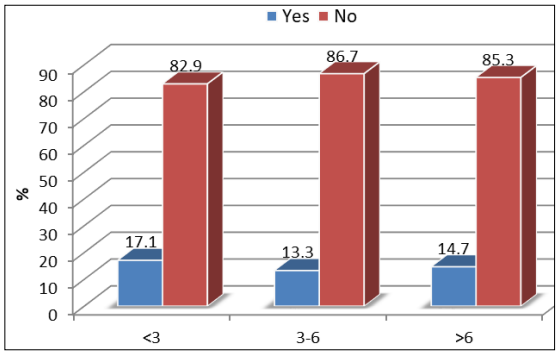

Fig 2: Prevalence of hypothyroidism according to duration of pregnancy

Table 3: Prevalence of hypothyroidism according to trimester of pregnancy

Trimester	No. of women	Prevalence of hypothyroidism				OR (95%CI)	p-value[1]
		Yes		No			
		No.	%	No.	%		
1st	64	7	10.9	57	89.1	0.71 (0.20-2.44)	0.58
2nd	52	10	19.2	42	80.8	1.38 (0.42-4.46)	0.59
3rd	34	5	14.7	29	85.3	1.00 (Ref.)	

[1]Binary logistic regression, OR-Odds ratio, CI-Confidence interval, Ref-Reference

Table 3 & Fig. 3 show the prevalence of hypothyroidism according to trimester of pregnancy.The prevalence of hypothyroidism was found to be 19.2% of women in 2nd trimester and 14.7% in 3rd trimester. The prevalence of hypothyroidism was 10.9% in 1st trimester. The prevalence of hypothyroidism was 1.38 times insignificantly (p>0.05) higher

among the women with 2nd trimester of pregnancy than 3rd trimester (OR=1.38, 95%CI=0.42-4.46). The prevalence of hypothyroidism was 29% insignificantly (p>0.05) lower among the women with 1st trimester of pregnancy than 3rd trimester (OR=0.71, 95%CI=0.20-2.44).

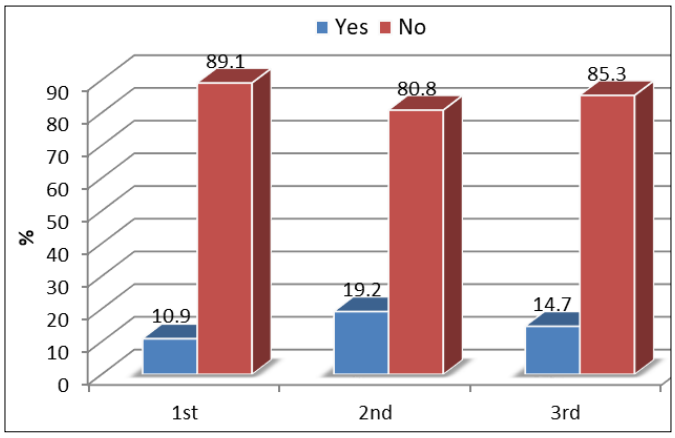

Fig 3: Prevalence of hypothyroidism according to trimester

Table 4: Prevalence of hypothyroidism

Prevalence	No. (n=150)	%
Yes	22	14.7
No	128	85.3

Table 4& Fig. 4 shows the distribution of prevalence of hypothyroidism. The prevalence of hypothyroidism was found to be 14.7%.

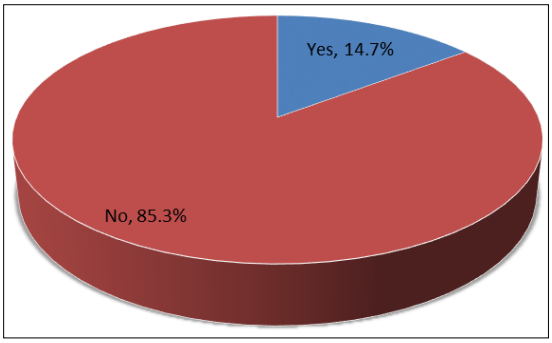

Fig 4: Prevalence of hypothyroidism

Discussion

This study was aimed to evaluate the prevalence of hypothyroidism in pregnant woman. It is important to screen the thyroid hormone test to prevent the birth defects. This study showed that 14.7% pregnant women were having hypothyroidism. In our study, woman having age group of 25-30 years were highly affected with 16.7%, age group <25 years were 15.4% and age >30 years were 9.7% hypothyroidism. The study done by Sahu *et al*., found that the prevalence of hypothyroidism was 6.47% [15]. Our findings are consistent with the study done by Jaya *et al*., where the rate of prevalence was 14.2% [16]. and also similar with another report done by Dhanwal *et al*., who reported 14.3% women in their first trimester were having hypothyroidism [17].

Mostly the high rate of prevalence of hypothyroidism is seen in Asian countries [18]. The study done by Karla *et al*., showed that 15.7% pregnant women were suffered from hypothyroidism in North India [19]. So, our findings are also consistent with other previous studies from India which shows gradual increase of hypothyroidism among Indian pregnant women.

Shah *et al*., found 9% hypothyroidism in pregnant women [20]. However, there are low rate of hypothyroidism in northern and southern part of India which reported as 6.47% and 2.8% respectively [21]. The other findings of hypothyroidism in pregnant women were Aziz *et al*., found 2.5%.,Feki *et al*., showed 3.2%,Varghov *et al*., 5.9%, Casey *et al*., 2.3%, Gay *et al*., 9.5% andAllan *et al*., 2.2% [22-27].These findings have suggested the low rate of prevalence of hypothyroidism in pregnant women which is reversible to our study.

A study done by Vaidya *et al*., reported that the screening done in high risk group would miss about one third of pregnant women with hypothyroidism [28]. The screening of hypothyroidism could help couples with recurrent pregnancy loss to have effective outcome in subsequent pregnancies [29].

Pregnant women should be aware to maintain the thyroid hormone level in pregnancy to prevent the children from having poor intellectual function. The National Neonatal Screening Program has started in most of the developing countries and routinely all the newborn are screened for hypothyroidism. It is still dilemma that whether all the pregnant women should be screened for hypothyroidism is still not resolved [30].

The present study suggests that there is a greater need of screening of hypothyroidism in pregnancy. The untreated hypothyroidism can have adverse effect in pregnant women as well as neonate whereas there is good maternal and fetal outcome when adequately treated and monitored regularly. Further studies are needed to rule out the impact of thyroid disorders during pregnancy in Indian population to conclude the need for universal screening for Indian pregnant women.

Conclusion

This study concludes that there is a high prevalence of hypothyroidism in pregnant women. The maternal thyroid disorder has immense impact on maternal and fetal outcome, prompt identification of thyroid disorders and timely initiation of treatment is essential in pregnant women. Thus, universal screening of pregnant women for thyroid disorder should be considered especially in a country like India where there is a high prevalence of undiagnosed thyroid disorder.

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