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A Study On Thyroxine and Thyroid Stimulating Hormone in Women During Pregnancy

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Abstract

Study on 50 pregnant women in Allied Hospital, Faisalabad revealed non significant difference in T4 and TSH levels between women of 2nd and 3rd trimester. Similarly, T4 and TSH levels showed no statistical difference between those women of multivitamins and iodine supplements and those did not used. The correlation between T4 and TSH was higher and negative in women having normal body weight to their height and those did not used multivitamins tablets. However, a positive correlation between T4 and TSH was observed in women those used iodine and negative in women those did not iodine.

Introduction

It has been reported that in Pakistan about 50 million peoples are prevented from attaining their full mental and physical potential due to iodine deficiency (Anonymous, 1995). Iodine is one of the essential micronutrient and has its major role in synthesis of thyroid hormones which are important for growth and development. Various surveys over the world revealed that the total number of population at risk of iodine deficiency disorder (IDD), exceeds 1.5 billion (Tiwari *et al.*, 1995).

Iodine deficiency starts its impact from development of the foetus to all ages particularly during those periods when growth and energy transformation are greater especially during pregnancy (Marine, 1935). Severe iodine deficiency in mothers leads to increase rates of abortion, perinatal death and infant mortality. The babies born to mothers with IDD have defects in nervous system which range from severe mental retardation to decrease in intellectual performance (Ares *et al.*, 1994). Iodine deficiency, therefore, directly affect the "human resource development" which in turn has great impact on productivity as well as country's development (Tiwari *et al.*, 1995). The present study was an attempt to examine pregnant women of rural areas of Faisalabad for iodine deficiency as no such information is available particularly with reference to rural areas.

Materials and Methods

The study was conducted on 50 pregnant women randomly selected from among those visiting Allied Hospital Faisalabad for their antenatal examination. Observations on body weight, height, use of iodine and multivitamin tablets were recorded for these women. Blood sample of 5 ml from each women was collected and serum was separated and stored at -20°C till further studies. Serum analysis was done at Punjab Institute of Nuclear Medicine (PINUM) Faisalabad by using RIA kit (Ortho Clinical Diagnostics

Amersham, UK). The serum analysis included thyroxine IM. 3011/Cat No. 8240608, 100 tests) and they stimulating hormone (TSH, 1MB.5061/Cat No.6800239, tests). The data thus obtained was subjected to one analysis of variance technique and means were computed by using confidence interval test using Minitab corm Software release 10.2 (Anonymous, 1994).

Results

The study revealed non-significant difference between women of 2nd and 3rd trimester in both thyroxine (T4) thyroid stimulating hormone (TSH). Serum T4 and TSH both in 2nd and 3rd trimester each showed need; correlation (Table 1, $r = -0.06$ and $r = -0.12$). The T4 TSH levels in normal weight and under-weight pregnant women also showed non-significant difference. However, (the correlation in normal weight women was higher under-weight women was negative in both (Table 1, $r = 0.30, 0.10$).

Non-significant difference was observed in T4 and levels between women those used iodine and those did not used iodine as supplements. Negative correlation observed between T4 and TSH levels in women who are not used iodine as supplement while a positive correb was observed in those women who took iodine suppler (Table 1, $r = 0.19, 0.16$).

SWomen in study were also grouped according to us multivitamin tablets and those have not used these tal during pregnancy. This also revealed no difference it and TSH levels and the correlation was negative for the hormones in both groups of women (Table 1, $r = -0. 0.04$). Serum T4 and TSH also showed no statis difference between women those used vitamin supplements and those did not used vitamin as supplements and between women those normal weight and under-weight each trimester. Similarly, no statistical difference observed between trimesters in women those used is supplements (Table 2).

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Table 1: Levels of T4 and TSH (means ± SD) along with their correlation having different body weights and those using multivitamins and iodine supplement in women at different stages of pregnancy, iodine supplement

		T4 nmol/L	TSH µIU/ml	Correlation
Trimester	2nd (n = 16)	146.20 ± 39.44	3.62 ± 1.48	-0.06
	3rd (n = 34)	152.54 ± 45.68	2.97 ± 1.54	-0.12
Body weight	Normal	165.38 ± 23.62	3.03 ± 1.07	-0.30
	Under-weight	146.79 ± 46.64	3.28 ± 1.04	-0.10
Iodine	Not using	145.18 ± 42.73	3.36 ± 1.38	-0.19
	Using	165.67 ± 43.64	2.68 ± 1.87	0.16
Multivitamins	Not using	143.75 ± 34.75	3.21 ± 1.46	-0.16
	Using	158.05 ± 45.07	3.10 ± 1.60	-0.04

Table 2: Levels of T4 and TSH (means ± SD) in each trimester in women having different body weights and those using or did not using multivitamins and iodine supplement

		Trimester II		Trimester III	
		T4(nmol/L)	TSH(µIU/ml)	T4(nmol/L)	TSH(µIU/ml)
Body weight	Normal	161.43 ± 23.21	2.62 ± 0.75	167.08 ± 25.42	3.20 ± 1.18
	Under-weight	142.68 ± 42.23	3.85 ± 1.53	148.77 ± 53.32	1.60 ± 1.18
Multivitamins	Not using	149.39 ± 32.83	3.48 ± 1.79	140.67 ± 36.93	3.06 ± 2.132
	Using	144.28 ± 44.53	3.70 ± 1.36	158.21 ± 49.05	2.93 ± 1.66
Iodine	Not using	140.72 ± 38.87	3.51 ± 1.30	147.68 ± 45.30	3.27 ± 1.45
	Using	169.93 ± 39.49	4.07 ± 2.44	164.40 ± 46.74	2.26 ± 1.58

Discussion

The values for both T4 and TSH in serum of pregnant women during present study were within normal range of 65-156 nmol/L and less than 10 µIU/ml, respectively, similar values were reported by Murray *et al.* (1993). However, the values of both T4 and TSH were higher than those reported by Krzyczkowska *et al.* (1993) of 116 nmol/L and 23 µIU/ml of T4 and TSH, respectively. The present findings are in line with those of Bauch *et al.* (1986), they also observed an increase in levels of thyroid hormones during pregnancy.

There was a low correlation (r = -0.06) between T4 and TSH in women of 2nd trimester while a higher negative (r = -0.12) in women of 3rd trimester indicating that with the increase in T4 levels there is a feed back depression of the TSH hormone with the advancing pregnancy. Das and Isichei (1994) also reported negative correlation between these hormones as deficiency of T4 stimulates pituitary gland for the secretion of TSH and vice versa. This indicates that the women under study were having no deficiency of iodine and 14 synthesis and secretion was optimum with advancement of pregnancy. Both these hormones (T4 and TSH) showed higher negative correlation (r = -0.30) in women having normal body weight to their height while the women which were under-weight showed low correlation, indicating no effect of these hormones on each other in under-weight women. Thus, the present study suggested direct bearing of weight on T4 and TSH hormones.

A higher negative correlation between T4 and TSH was observed in women who have not used vitamin

supplements compared with those women who used multivitamins and mineral as supplements. The effect of vitamin supplements does not appear to influence these hormones as low correlation was observed.

Present study revealed that iodine as supplement was taken by 26 percent of women. This proportion of women in Pakistan is almost similar to as reported by Nohr *et al.* (1993). They observed use of iodine supplements in 21 percent women at Randers and 51 percent in Kingkobbing in Denmark. It was interesting to note higher negative correlation both in women of 3rd trimester and those having normal weight to their body height. These both groups have higher percentage of women who have used iodine as supplements, i.e, 20 and 40 percent compared with 6 and 22.5 percent, respectively. However, a positive correlation between T4 and TSH (r = 0.16) in women used iodine as supplement is interesting. It may be that higher iodine intake stimulate the pituitary gland to release TSH hormone which is responsible for the release of T4 hormone from thyroid. This also indicates that the glands were responsive to iodine intake and the level of T4 increased with the increase of TSH levels due to higher availability of iodine.

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