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Relative Frequency of Thyroid Dysfunction (Hypothyroidism and Hyperthyroidism) In Pregnant Women Referred to Shahid Fotros Clinic in Khorramabad.

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ABSTRACTS

Thyroid disorders Hyperthyroidism and Hypothyroidism are relatively common in pregnancy.During pregnancy the increase of HCG leads to thyroid glance reaction and decrease of TSH density. The prevalence of Hyperthyroidism and hypothyroidism are seen in 5 and 3 per thousand pregnancy women. Hyperthyroidism in pregnancy during leads to tachycardia, accelerated bone destruction and Intrauterine growth restriction (IUGR) fetus. However, women with hypothyroidism during pregnancy may be associated with infertility or recurrent miscarriage. Thus, diagnosis and treatment of this disease during pregnancy is very important. The aim of this study was to evaluate the level of thyroid hormone in pregnant women referred to Khorramabad. This cross-sectional study was performed in 2014 at the medical center of Khorramabad fetros. In this study, 810 pregnant women who were referred to this center for pregnancy care service were examined in TSH hormone serum level the using ELISA during the first three months of pregnancy. The prevalence of hypothyroidism in pregnant women was obtained 27.59% (221/810 patients). The most of patients has shown thyroid hormone in range of 1.5-5.1. The highest average age with disease was observed at 20-25 years. Women who had hyperthyroid were 23 (10.40%) and those with hypothyroid were 38(17.19%). hypothyroidism and hyperthyroidism are common diseases in pregnant women and due to its harmful effects on the fetus during pregnancy and preventable disease, particularly determination of TSH hormone check in pregnancy during should be part of routine tests.

Keywords: hypothyroidism , hyperthyroidism, Pregnancy, ELISA

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INTRODUCTION

Thyroid gland produces two important hormones triiodothyronine (T3) and thyroxine (T4) that play important roles in the development of embryonic cells and regulating body metabolism in adults. The thyroid gland obtains iodine from various foods and stores it to release T4 hormone (1). In case of problem in the functioning of the gland, the low level of T4 in the body causes some changes in weight, appetite, sleep patterns, body temperature, etc. Hypothyroidism is considered as one of the most common chronic diseases in the world, and the symptoms of this disease may not appear until after the cessation of the thyroid gland function. It should be noted that about two-thirds of people with this disease are unaware of their disease (2). The incidence of hypothyroidism in women is twice that of men. In newborns congenital hypothyroidism may emerge. Thyroid hormone is critical for functioning and normal development of brain in fetus and infant. Failure to diagnose hypothyroidism and timely treatment of this disease in the first few days (and maximum in the first few months of babies life) and continuance of hypothyroidism causes severe impairment in mental and physical development along with mental retardation and physical abnormalities in person which is called "Cretinism". In the first months of pregnancy (especially until weeks 20 of pregnancy) fetal thyroid gland is not still active and a fetus is highly dependent on maternal thyroid hormones (3, 4).

The growth of older children who are suffering from hypothyroidism may suddenly be stopped. If the treatment with thyroid hormone to be started late, disorders in mental development and learning will remain forever. Although the hyperthyroidism does not lead to infertility in women because sometimes this disorder is not severe, but if a woman becomes pregnant with hyperthyroidism, there are chances of miscarriage, mental retardation, preterm delivery, congenital disorders and high blood pressure during pregnancy. Thyroid disease in our country is very common, especially in women, and on the other hand, many women of childbearing age who are suffering from hypothyroidism, are not aware of their condition. Hypothyroidism is the most common diseases in women and its prevalence varies in different regions. This disease occurs due to different reasons of which iodine deficiency is one of the most important causes in poor and developing countries; therefore expanding screening programs in all countries in the region is essential. The secretion of thyroid hormone from anterior pituitary is regulated by thyroid stimulating hormone (TSH) (5).

TSH secretion is also controlled through negative feedback by the secretion of thyroid hormones (6). This means that the reduction in thyroid hormone increases TSH secretion and vice versa. Primary hypothyroidism in pregnancy can be diagnosed by increase in the amount of blood TSH (7). Early diagnosis and treatment of thyroid disorders can prevent brain damage and mental retardation (8). Because of the importance and severe complications caused by increase and decrease in thyroid hormone levels as well as disorders that occur in mother and fetus during pregnancy, the use of thyroid hormone measurement methods has better efficacy for early screening of patients with thyroid disorders. The aim of this study was to determine the relative frequency of thyroid hormone in pregnant women referred to Shahid Fotros clinic in Khorramabad in 2015.

MATERIALS AND METHODS

This cross-sectional study was conducted in Shahid Fotros clinic of Khorramabad in 2015. The study population consisted of all pregnant women living in the city of Khorramabad who were referred to the center for special care assessment of pregnancy. The study inclusion criteria included all pregnant women referred to Shahid Fotros clinic of Khorramabad who were in their first trimester of pregnancy. In the present study, sample size estimated with Cochran's C test for prevalence studies and a total number of 810 people were determined with convenience sampling method. The aim of the project was explained to the pregnant women referred to Shahid Fotros clinic and demographic data were recorded in checklists which had been prepared beforehand. Then, after obtaining the informed consents, 5 ml blood was taken from pregnant women and the samples were kept at 4°C in the refrigerator in order to measure serum TSH level.

The TSH levels were measured with ELISA method and using commercially available kits employing monoclonal antibodies. In this method the wells is coated by antibodies against an antigenic index of a molecule in patients' samples. Patients' samples were added into the wells to interact with coated antibodies, and then anti-TSH secondary antibody conjugated to HRP enzyme was added to the wells. The amount of immune complex formation in the wells is proportional with TSH concentrations in the samples. Then the wells were washed and chromogenic solution containing hydrogen peroxide (H_2O_2) was added to each well. The

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intensity of blue color in the wells is directly proportional to the amount of immune complex formation. With the addition of stop solution, the blue color turns to yellow. Finally the light absorbance was measured at 450 nm (9).

The patients' demographic information along with test results was collected. In the end, the data entered into the computer and was analyzed using statistical SPSS software version 20. All pregnant women with TSH higher than 2.5u/ml were considered to have hypothyroidism and those with less than 0.3u/ml TSH were considered to have hyperthyroidism.

RESULTS

In this study, 810 pregnant women with a mean age of 36.5 ± 10 years were studied. The age range of the subjects was 15-46 years, among them 26 women (11.8%) were younger than 20 years and 45 women (20.4%) were over 35 years old. In Figure 1, the frequency of women age groups is shown.

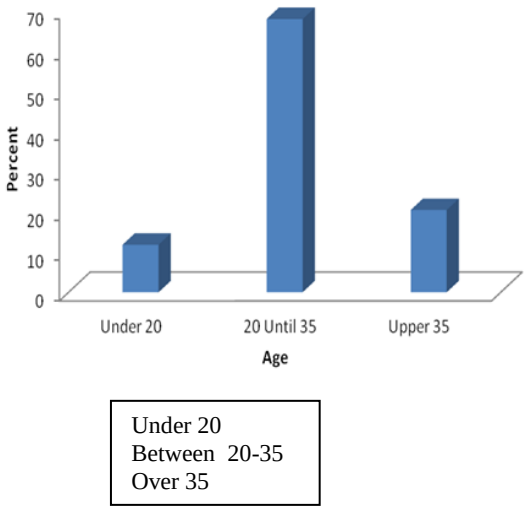

Figure 1: Frequency of age group

In terms of educational level, 5 People (4.4%) were illiterate and high school diploma with the frequency of 120 people (54.29%) was the most common level of education among the women. The frequency of educational level is shown in Figure 2.

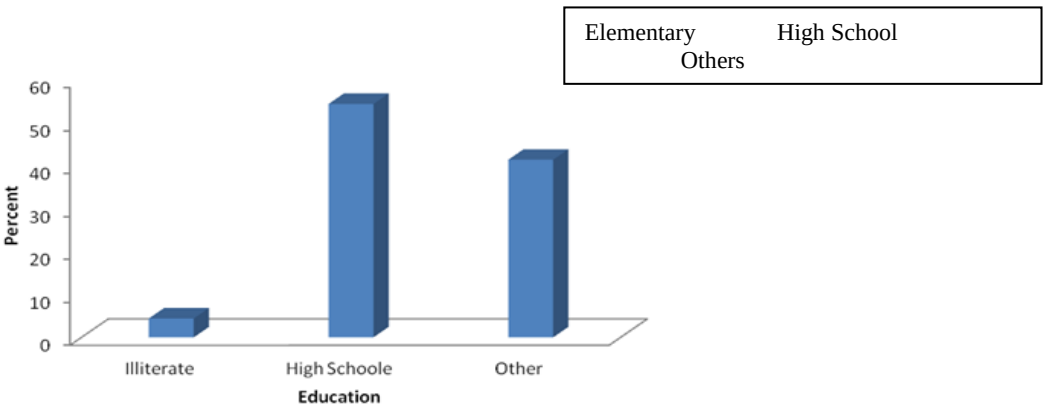

Figure 2: Frequency of educational level

In this study, 73.30% (162 people) were not aware of their thyroid disorders. The frequency of unawareness of the thyroid disease in women is shown in figure 3.

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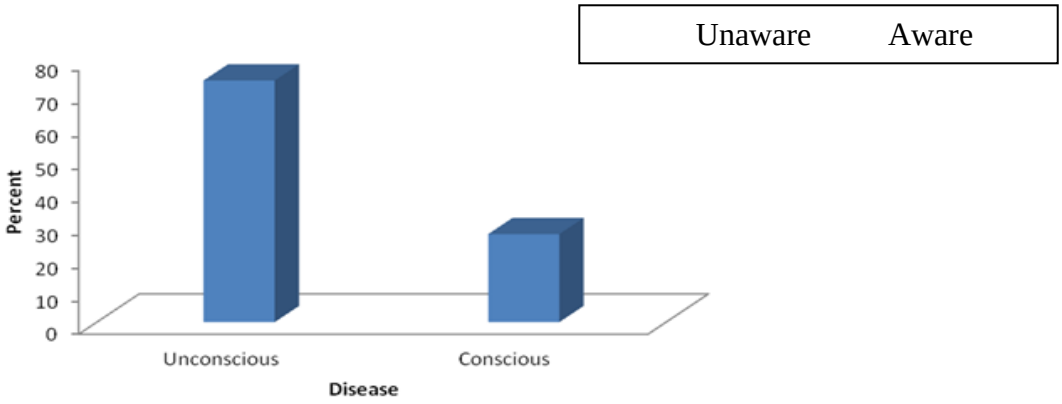

Figure 3: Frequency of unawareness of the disease

The prevalence of thyroid disorders in this study was 27.59% (221 out of 810 patients). According to the obtained results, the women with 0.0 level of thyroid hormone (9%) had the highest frequency while the women with different levels of TSH hormone had the lowest frequency (1%). The findings indicates that women under 20 years of age (11.8%) and women aged between 20-25 years (25.3%) had the lowest and highest frequency, respectively (Table 1). In total, 23 people (10.40%) had hyperthyroidism and 38 people (17.19 %) had hypothyroidism.

Table 1: The number and frequency of TSH hormone levels in different age groups

Serum Level of TSH	Features	Age groups					Total
		<20	20-25	26-30	31-35	>36	
<0.3	Number	1	8	7	1	6	23
	The expected number	2.7	5.8	7.5	4.1	4.7	23
	Percent (%)	4.3	34.8	30.4	4.3	26.1	100
0.3-2.5	Number	2	8	7	2	3	22
	The expected number	2.6	5.6	5.5	3.9	4.5	22
	Percent (%)	9.1	36.4	31.8	9.1	13.6	100
2.6-5.1	Number	19	27	37	26	29	138
	The expected number	16.2	35	34.3	24.4	28.1	138
	Percent (%)	13.8	19.6	26.8	18.8	21	100
>5.1	Number	4	13	4	10	7	38
	The expected number	4.5	9.6	9.5	6.7	7.7	38
	Percent (%)	10.5	34.2	10.5	26.3	18.4	100
Total (%)	Number	26	56	55	39	45	221
	The expected number	26	56	55	39	45	221
	Percent (%)	11.8	25.3	24.9	17.6	20.4	100

The serum levels of TSH in the range of 2.5-5.1 u/ml and 3.0 to 2.5 u/ml was observed in 138 (62.44%) and 22 (9.95%) people with the highest and the lowest frequency, respectively (Figure 4).

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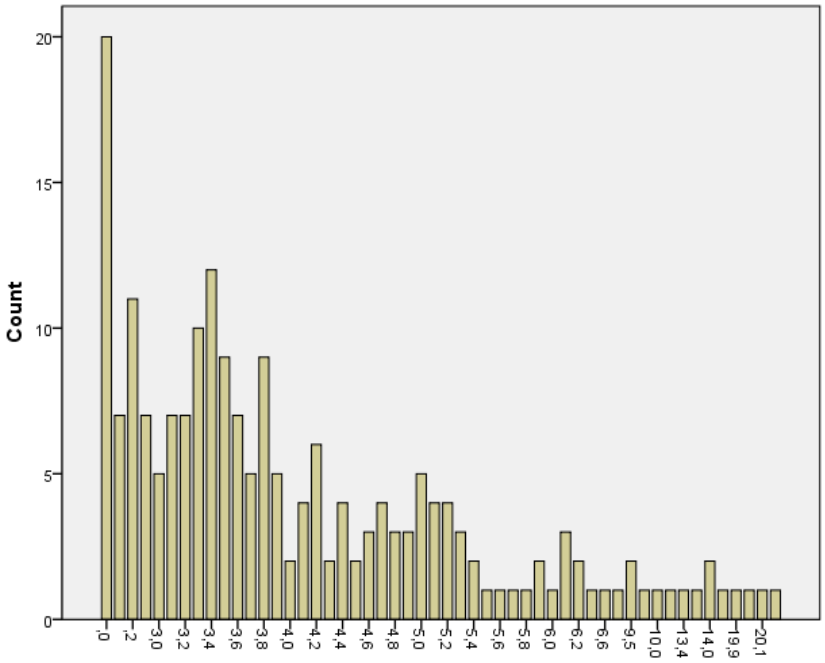

Figure 4: Serum levels of TSH

The result of Chi square test was 16.56 and the level of significance was 0.167. As the P value is higher than 0.5, then it can be concluded that the null hypothesis of independence is confirmed, so there is no statistically significant correlation between the age of participated people with thyroid hormone levels (Table 2).

Table 2: Results of chi-square test in participants

	Chi-square test		
	Degrees of freedom (DF)	Amount	P value
Pearson chi-square test	12	16.56	0.167
Likelihood	12	18.57	0.099
linear by linear association	1	0.058	0.809
Number		221	

DISCUSSION

During the first three months of pregnancy, the fetus has total dependence on the mother's thyroid hormones, and these hormones pass from the placenta to the fetus until the end of the first trimester that fetal thyroid gland becomes activated and starts producing thyroid hormone. After first trimester until the end of pregnancy the fetus needs iodine to produce thyroid hormone, which is transmitted from the mother to the fetus (10). Hypothyroidism in pregnancy causes complications including preterm delivery, abortion (especially in the first trimester of pregnancy), placental abruption, fetal distress, fetal death in the uterus, the risk of premature birth and low birth weight.

Complications of hyperthyroidism in pregnancy include the risk of preterm delivery, increased risk of miscarriage, intrauterine fetal death, premature fetus delivery, low birth weight, maternal heart failure, the risk of pre-eclampsia (pregnancy induced hypertension and pregnancy poisoning), the risk of thyroid and heart disease in the fetus and newborn (11, 12). Gallego et al (2010) in a study conducted in Australia reported that maternal hypothyroidism can cause complications in fetal nervous system (13). The aim of this study was to determine serum levels of TSH in pregnant women in the first trimester of pregnancy. According to the results of our study, 221 (20.28%) out of 810 people referred to the Shahid Fotros clinic in Khorramabad were diagnosed with thyroid disease, of whom 10.4% (23 people) had specified and subclinical hyperthyroidism and 17.19% (38 people) had specified and subclinical hypothyroidism. As aforementioned, in this study serum

levels higher than 5.2u/ml and less than 3.0u/ml were regarded as hypothyroidism and hyperthyroidism, respectively.

In line with our study, Naghshineh (2011) reported that the prevalence of hypothyroidism in pregnant women was 36.9% (407 out of 1,100 people had positive thyroid antibody titers). In the study by Naghshineh, titers higher than 2.5 was considered as hypothyroidism. Considering the 2.5 titer, 72.21% (176 out of 810) of the participants in our study had hypothyroidism (14). In line with our study, Taghavi et al (2009) in a study conducted in Mashhad reported that 7.4% of the subjects had subclinical hypothyroidism and 2.4% had specified hypothyroidism (15). Guan et al (2006) in a study performed in China reported that the prevalence of thyroid disorders in women during pregnancy was 7.8% (16) and in another study by Oken et al (2009) thyroid disorder was assessed 6.2% (17). In a study by Xing Jinfang et al (2016) which was carried out on 2540 women who were in their first, second and third trimesters of pregnancy and 237 healthy and non-pregnant women in China, the levels of TSH, FT4Ab, TBGAb and Anti-TPO was measured using Chemiluminescence immunoassay. RI of TSH hormone in the first trimester of pregnancy was higher than 2.5 U/ml and in second trimester was higher than 3 U/ml while the results of thyroid function in first, second, third trimester of pregnancy and in control samples (non-pregnant) for TSH and FT4 were as follows: 67.90–8.7, 16.21– 8.13, 8.12- 9.16, 5.78 – 0.69, 5.40 - 0.48, 4.53 – 0.27, 3.96 – 0.07, 8.24 – 16.61 (18). A study entitled “identifying the risk factors indicating the presence of thyroid disorders in Iranian pregnant women” was performed by Dehghani-Zahedani in Bandar Abbas. Of the 608 women, 519 people had normal thyroid function, 72 people (85.4%) had sub-clinical hypothyroidism, 3 people (11.8%) had clinical hypothyroidism, and 14 people (0.5%) had clinical hyperthyroidism (19). In our study, there was no significant correlation between serum TSH levels and the number of pregnant women with thyroid disease in first trimester of pregnancy. In addition, in this study, no significant association was observed between miscarriage and the risk of thyroid disorders while some other studies have shown that there is a significant association between hypothyroidism and recurrent miscarriage. In the study by Bahrami et al (2008) at Shahid Beheshti University of Medical Sciences it was shown that there is a significant relationship between the level of anti-thyroid antibodies and miscarriage (20).

According to the results of our study prevalence of TSH serum levels in pregnant women was 27.59% which indicates that maternal and fetal complications can only be identified by laboratory testing. Hence, it is better that this hormone to be measured in all pregnant women alongside other routine tests during pregnancy in order to prevent the early and late complications of hypothyroidism and hyperthyroidism for the fetus and mother during the first trimester of pregnancy. Considering the high prevalence and complications of maternal hypothyroidism on maternal and fetal health and that the complications can be prevented, the routine screening of pregnant women for diagnosis and treatment of thyroid disorders seems essential.

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