

# Prevalence of Postpartum Thyroid Dysfunction in Shiraz

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## Abstract

**Background:** Postpartum thyroiditis (PPT) is an autoimmune disease that usually occurs in the first year after parturition and presents with periods of transient thyrotoxicosis and/or hypothyroidism, and in some cases results in permanent hypothyroidism.

**Objective:** To determine the prevalence of PPT in healthy postpartum women in Shiraz, southern Iran.

**Methods:** Of 460 postpartum women from Shiraz 385 cases who had no history of any medical problem or signs of other autoimmune disorders were selected during 1-8 months of postpartum period, to fill a questionnaire about signs and symptoms of their possible thyroid dysfunction. TSH and Anti-Tpo Ab were measured and FT4 assay was done on samples with abnormal TSH. 100 women at reproductive age were randomly selected as control group.

**Result:** The clinical and biochemical prevalence of PPT were 33% and 11.4%, respectively ( $p < 0.01$ ). Hyperthyroidism was more frequent in early months of postpartum period and hypothyroidism was more frequent in later months. Thyrotoxicosis and hypothyroidism occurred in 34 (8.8%) and 10 (2.6%) mothers, respectively. Positive Anti-Tpo Ab was found in 80% of patients and in 38% of the control group ( $p < 0.0001$ ).

**Conclusion:** Our results showed a high prevalence of PPT in women in Shiraz. This may be due to the transition from low to adequate iodine intake and participation of women in earlier postpartum period. The major difference compared to other studies is the high frequency of thyrotoxicosis.

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**Keywords** • Hypothyroidism • hyperthyroidism • postpartum thyroiditis

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## Introduction

**P**regnancy seems to have a profound effect on thyroid function not only during gestation but also in postpartum period. This relation has long been documented, and evidence from several studies has led to the current recognition of postpartum thyroid dysfunction being autoimmune in origin. Gansson et al, suggested that the presence of Antithyroid peroxidase antibody is of

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prognostic value in the development of postpartum thyroid dysfunction.<sup>1</sup> The transient nature of this dysfunction which usually has mild symptoms, means that many cases go unrecognized. A systematic study is required as to the prevalence of this condition, especially in a population with no history of autoimmune thyroid disease.

According to several epidemiological studies from different parts of the world, the prevalence range of postpartum thyroiditis is between 1.1% and 16.7%. This wide range may be due to differences in ethnicity, geographical area, iodine intake, methodology or the rate of follow-up visits for patients in the first year after delivery. This study was conducted for the first time in Shiraz to find the prevalence and characteristics of postpartum thyroid dysfunction among healthy population of women.

## Subjects and Methods

Four hundred and fifty women, from one to eight months postpartum who referred to three health centers in Shiraz for routine check-up and vaccinations of their infants, were requested to participate in this cross sectional study in September 2000.

At the time of enrollment, women filled a questionnaire giving information about personal and family history of thyroid disease and other endocrine and autoimmune diseases. Excluding 65 women with positive history of previous endocrine and autoimmune disorders of themselves or in their family, and those eliciting signs of autoimmune disorders (e.g., joint swelling, dry mucosa, malar rash) as well as women who refused paraclinical examination, a total of 385 women with mean age of 24.5 years (range: 15-39) participated at the study. According to the time of delivery, the women divided into 8 groups.

Each patient was asked to complete a specific thyroid symptom questionnaire by answering yes or no to a set of fourteen questions; regarding hypo- and hyperthyroidism. Physical examination for signs of thyroid dysfunction and estimation of thyroid size was done by palpation. Thyroid size was classified according to the World Health Organization classification into the following grades: 0) not palpable; 1) palpable but not visible, and 2) visible goiter. Thyroid function tests were performed once during the first eight months of postpartum period.

One hundred women at reproductive age were selected randomly as control group.

### Laboratory measures

All of the mothers were checked for TSH and antithyroid peroxidase antibody (anti-Tpo Ab). TSH was measured by Immuno-radiometric assay (IRMA) (Spectria, Fenzia, Finland) and anti-Tpo by

enzyme linked immunosorbent assay (Radim, Rome, Italy). FT4 assay was done on the samples with abnormal TSH level (higher or lower than normal range) by immuno-radiometric assay (Spectria, Fenzia, Finland). The normal (reference) ranges were chosen as follows:

TSH: 0.3- 4 mu/l, anti Tpo Ab: up to 100 lu/ml and free T<sub>4</sub>: 11.1-21.6 pmol /l.

### Clinical diagnosis

Postpartum thyroiditis presents with typical symptoms and signs of thyrotoxicosis or hypothyroidism usually in first 9 months after delivery.

During the thyrotoxic phase, TSH is suppressed, and during the hypothyroid phase, the level of serum TSH concentration increases.

The serum TSH is a good screening test if the patient's symptoms are mild. If it is abnormal, a free thyroxine index (FTI) or free thyroxine test should be performed. Both the TSH and free thyroxine or FTI should be obtained if the patient is symptomatic. Postpartum thyroiditis is the most likely diagnosis, if the TSH is suppressed and the free thyroxine or FTI is elevated. However these results also are consistent with postpartum Graves' disease. Therefore, the thyroid radioactive iodine uptake (RAIU) test should be performed.

A low RAIU is consistent with PPT. A high value is indicative of post partum Graves' disease, provided that the TSH is still suppressed when the test is performed.

Because of the difficulties associated with interruption of breast-feeding, we did not use radio iodine uptake for differentiation of PPT from Graves' disease and other causes of hyperthyroidism.<sup>2</sup>

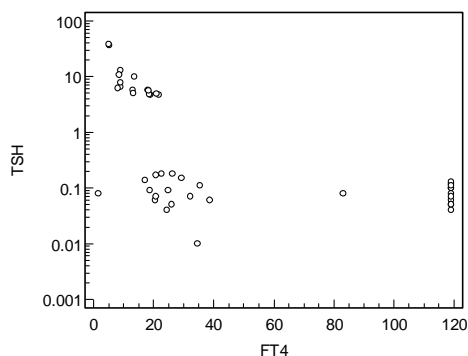
### Statistical analysis

We compared variables by using the  $\chi^2$  and Fisher's exact test to evaluate correlation between variables ( $\alpha=0.05$ ).

## Results

Among the divided 8 groups of women, the second group (2 months postpartum) with 102 cases (26.5%) was the largest group and the fourth group (4 months postpartum) with 34 cases (8.8%) was the smallest one. The prevalence rate of thyroid dysfunction for these groups 1-8 were 10.8%, 14.7%, 18.4%, 11.8%, 13.2%, 7.7%, 4.8% and 7.2%, respectively.

Of the 385 examined women, 44 women (11.4%) had thyroid dysfunction; 34 women (8.8%) were with hyperthyroidism and 10 women (2.6%) were with hypothyroidism. For the control group, thyroid dysfunction, hyperthyroidism and hypothyroidism were observed in 8%, 2% and 6% of the



**Fig.1:** The relation between TSH levels and FT4 for 44 cases with postpartum thyroid dysfunction.

women. In this study, thyroid dysfunction was classified to 3 classes as follows:

1. Subclinical hypothyroidism; included 8 women (2%) having TSH levels higher than 3.8 mu/l and normal FT4.
2. Overt hypothyroidism; included two women (0.6%) with TSH levels higher than 3.8 mu/l and FT4 Lower than 11.1 pmol/l.
3. Hyperthyroidism; included thirty four-women (8.8%) with TSH levels lower than 0.3 mu/l and normal to high FT4 (Fig1).

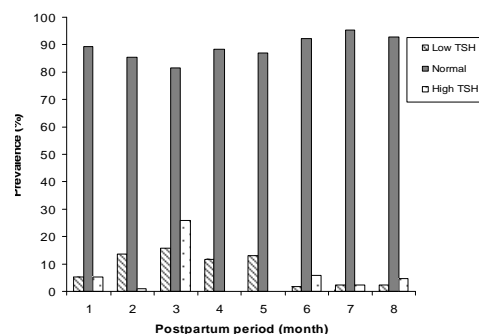
Thirty-five cases (80%) among the 44 women with thyroid dysfunction had positive titers (more than or equal to 100 lu/ml) of anti Tpo Ab. Two hundred and thirty-four cases (68.6%) of the 341-euthyroid women had negative titers and 107 cases (31.4%) had positive titers of anti Tpo Ab ( $p < 0.001$ ).

Eighty percent of women with both hyper- and hypothyroidism had positive titers of anti Tpo Ab (Table 1).

Sixty-two percent of the control group had positive titers of anti Tpo Ab and the remained (38%) had negative titers ( $p < 0.001$ ). The mean of anti Tpo Ab titer was 402.2 lu/l in hyperthyroidism group, 333.9 lu/l in euthyroid group and 772.4 lu/l in women with hypothyroidism.

According to the TSH level (high, normal or low), hyperthyroidism was more common in the third month (15.8%) and hypothyroidism was more common in 6<sup>th</sup> month of postpartum period (5.8%) (Fig 2) ( $p < 0.004$ ).

Based on clinical symptoms, the prevalence of



**Fig.2:** The prevalence of PPTD at different postpartum period

hyperthyroidism and hypothyroidism were 30% and 3% respectively (8.8% and 2.6% by biochemical assay). Comparing with the control group, constipation was the most frequent symptom in with patients hypothyroidism ( $p < 0.14$ ) and palpitation and weight loss were the most frequent symptoms in with patients hypothyroidism ( $p < 0.05$ ) (Table 2).

Visible goiter was found in 21.2% of the patients and in 6.5% of the control group ( $p < 0.01$ ).

**Discussion**

The prevalence of postpartum thyroid dysfunction was 11.4% in this study. Our results showed that postpartum thyroiditis is more frequent in this country. A similar study performed in Tehran is also in keeping with our finding.<sup>3</sup> The prevalence of PPT has been between 1.1% and 16.7% in different studies<sup>4-8</sup> (Table 3). The wide range of prevalence in various reports may be due to differences in ethnic groups, geographic area, iodine intake, methodology, population size and length of follow up.

An overview of the literature shows that PPT affects 3.7 to 5.9 percent of women during the first year after parturition.

This study includes women with negative history of previous thyroid dysfunction and negative family history. The selected women had no history of other autoimmune disorders too. Therefore, the actual prevalence of PPT in Shiraz population may be considered higher than our report. The prevalence rate of thyroid dysfunction in earlier months

**Table 1:** Positive antithyroid antibodies in hypothyroid and hyperthyroid patients with PPT

Types of thyroid dysfunction	No (%)	No. with positive anti-Tpo Ab
Subclinical hypothyroidism	8 (2%)	6
Overt hypothyroidism	2 (0.6%)	2
Thyrotoxic phase	34(8.8%)	27
<b>Total</b>	<b>44(11.4%)</b>	<b>35 (80%)</b>

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**Table 2:** Number of PPTD and controls with symptoms and signs using hypo- and hyper-thyroid indices (matched control and PPTD pairs)

Hypothyroid symptoms	PPTD TSH>4 (n=10)	Control (n=10)	Hyperthyroid symptoms	PPTD TSH<0.3 (n=34)	Control (n=34)
Diminished sweating	0	0	Excess sweating	4	3
Constipation	5	1	Palpitation	12	4
Cold intolerance	3	4	Heat discomfort	4	5
Periorbital puffiness	3	2	Nervousness	13	15
Weight gain	5	4	Weight loss	10	2
Coarse skin	3	4	Tremor	2	3
Dry skin	7	5	Moist hands	8	9

\* $p<0.05$  fisher's exact test

\*\* $p<0.03$  Fisher's exact test

PPTD= Postpartum thyroid dysfunction

of postpartum (1-5 months) was higher than later months (6-8 months).

This difference in prevalence rate may be due to several factors. The number of cases in each group can be one of the affecting factors, e.g. 102 cases (26.5%) for the second group and 34 cases (8.8%) for the fourth group.

Another important reason is the time of postpartum. Perhaps a number of cases with thyroid dysfunction recovered in 6-8 months postpartum.

The prevalence rate of PPT in iodine deficient areas is very low.<sup>4,9</sup> Higher frequency of PPT in Shiraz population may be due to consumption of iodized salts. However in the USA and Japan, where iodine intake is more than the required amount, and in other countries with normal iodine intake, the prevalence of PPT is variable.<sup>6-8,10,11</sup>

In this study, 77.3% of PPT patients presented with thyrotoxicosis and 22.7% with hypothyroidism. Compared to other studies, the high prevalence of thyrotoxicosis is related to the selection of women in earlier postpartum period (except one).<sup>11</sup>

Similar to reports from other countries, there

was no relation between PPT and age, gender of infant, breast-feeding, type of delivery and abortions.

Using clinical assessment ratings of hyperthyroidism and hypothyroidism, no statistical difference was found between women with postpartum thyroid dysfunction and their matched controls that may be due to several factors. First; in some cases, the biochemical abnormality was mild and perhaps expected not to be accompanied by clinical sequelae.

Second; the recent onset of the changing in thyroid biochemistry may confuse clinical assessment.

Third; there are many intercurrent social, psychological and endocrine factors (including hypostrogenism in the lactating women), which may have produced features common to both cases and controls. These suggest that the clinical criteria for thyroid dysfunction currently used are not sufficiently sensitive and specific.

The rate of anti Tpo Ab positive cases in this study is comparable to some studies and sometimes higher than the other studies.<sup>3,7,8,11</sup>

**Table 3:** prevalence of PPT in different studies

Year	Author (reference No.)	Country	Prevalence (%)
1982	Amino (8)	Japan	5.5
1985	Walfish (9)	Canada	7.1
1986	Freeman (10)	USA	6.7
1987	Nicolai (7)	USA	6.7
1987	Lervange(5)	Denmark	3.9
1988	Fung (4)	Britain	16.7
1990	Rasmussen (6)	Denmark	3.3
1990	Rajatanavin (3)	Thailand	1.1
1991	Roti (11)	Italy	8.7
1991	Lobig (12)	Germany	2.0
1992	Walfish(13)	Canada	6.0
1992	stagnaro-Green(14)	USA	8.8
2000	Lucas (15)	Spain	7.8
2000	Furlanctto (16)	Brazil	5.3
2001	Shahbazian (2)	Iran (Tehran)	11.4
	Our study	Iran (Shiraz)	11.4

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We conclude that the rate of PPT in this area is rather high. To have the real incidence of PPT, it is necessary to examine each case several times during the first 8 months postpartum, in a larger number of cases and to include cases with history of thyroid and other autoimmune disorders and just to follow the subclinical patients with thyroid dysfunction and only to treat the symptomatic patients. All the patients should be followed for long term because about 20% of them will develop permanent Hypothyroidism. Postpartum patients with signs and symptoms of depression should be examined for thyroid dysfunction because of similarity between some clinical manifestation of thyroid dysfunction and depression.

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