Original Article

Post Partum Depression and Thyroid Function

Farahnaz Keshavarzi MD [1]
Katayoun Yazdchi MD [1]
Mehrali Rahimi MD [2]
Mansour Rezaei MD [3]
Vahid Farnia MD [4]
Omran Davarinejad MD [4]
Nasrin Abdoli Msc [4]
Mahmood Jalili MD [5]

1. Department of Obstetrics & Gynecology, Kermanshah University of Medical Sciences, Kermanshah, Iran
2. Department of Endocrinology, Kermanshah University of Medical Sciences, Kermanshah, Iran
3. Department of Health Services, Kermanshah University of Medical Sciences, Kermanshah, Iran,
4. Behavioral Sciences Research Center, Kermanshah University of Medical Sciences, Kermanshah, Iran
5. Department of Nuclear medicine, Kermanshah University of Medical Sciences, Kermanshah, Iran

Corresponding author:
Vahid Farnia, MD, Behavioral Sciences Research Center, Kermanshah University of Medical Sciences, Kermanshah, Iran
Tel: +98-831-826700,
Fax: +98- 831-8264163,
Email: vahidfarnia@yahoo.com

Objective: Risk of depression is particularly high for women during the prenatal period. Various investigators have attempted to establish a link between thyroid function and post partum depression. This study aimed to investigate whether thyroid function differs in women with postpartum depression compared to a control group.
Methods: In this case-control study, subjects were selected from Obstetrics & Gynecology and Psychiatric clinics of Kermanshah University of Medical Sciences. Forty eight patients suffering from postpartum depression according to Diagnostic and Statistical Manual of Mental Disorders, fourth edition totally revised (DSM-IV-TR), and 65 normal controls underwent diagnostic evaluation by one trained psychiatrist using Structured Clinical Interview for DSM-IV-TR. Then, the demographic questionnaire and the Persian version of Edinburgh Postnatal Depression Scale (EPDS) were completed by the participants. Finally, their thyroid functions were assessed. Data analyses were done using the SPSS program 13.
Results: No statistically significant differences were observed between thyroid function tests and postpartum depression. According to multiple regression analysis with stepwise method, subjects with lower serum TSH, T3RU, T3 levels, younger age and longer period after delivery tended to have higher EPDS scores (P-value=0.008).
Conclusion: The present study reports that those women with postpartum depression had a no greater prevalence of thyroid dysfunction than the control subjects. It seems that thyroid dysfunction should be considered in women with postpartum depression individually, but the role of thyroid as an important cause of this condition is not yet established. This suggests that future studies should concentrate on this concept in postpartum depression.

Keywords: *Postpartum depression, Postpartum period, Thyroid hormone,*

Iran J Psychiatry 2011; 6: 117-120

Risk of depression is particularly high for women during the prinatal period, with 10 to 15 percent of postpartum women experiencing a major depressive episode during this time (1). According to the Diagnostic and Statistical Manual of Mental Disorders, fourth edition totally revised (DSM-IV-TR), (2) an episode of depression is considered to have postpartum onset if it begins within four weeks after delivery. However, onset within three months after delivery is the time frame commonly used by investigators on the basis of epidemiologic studies (3). It may have a deleterious effect on the woman's social and personal adjustment, her marital relationship, and the mother infant interaction.(4) Furthermore, maternal depression early in the infant's life may affect the child's psychological development with significant intellectual deficits as a result.(5-7) Various explanatory models on the etiology have been proposed; probably postpartum depression is a result of an interaction between genetic vulnerability, hormonal changes, and major life events.(8,9). Psychosocial stressors, prenatal risk factors, previous psychiatric history, complications during pregnancy, delivery, and the prenatal period are associated with an increased risk of postpartum depression. (10) Thyroid function is known to be affected during pregnancy (11), while the pathogenesis of postpartum mood disturbances remains unclear. However, various investigators have attempted to establish a link between thyroid function, usually accompanied by autoimmune thyroiditis, with postpartum mood disorders (12-14). Furthermore, both hypothyroidism and hyperthyroidism, even subclinical, may lead to depressive symptomatology (15, 16). This study aimed to investigate whether thyroid function differs in women with postpartum depression compared to a control group.

Materials and Method

We conducted a case-control study to assess thyroid function in postpartum depression. Forty eight patients suffering from postpartum depression according to DSM-IV-TR, and sixty five normal controls entered the study. Subjects were selected from Obstetrics & Gynecology and Psychiatric clinics of Kermanshah University of Medical Sciences from November 2010 to may 2011. Patients and controls were free of any medication and were physically healthy with no previous history of thyroid & mental disorders according to past medical history. Subjects were eligible if they were in 30-90 days after delivery. The written informed consent was obtained from each subject, and they underwent diagnostic evaluation by one trained psychiatrist using Structured Clinical Interview for DSM-IV-TR ; then they completed the demographic questionnaire and the Persian version of Edinburgh Postnatal Depression Scale (EPDS). Finally their thyroid functions were assessed.

The Edinburgh Postnatal Depression Scale is a 10-item self-report scale, specifically designed to screen for postpartum depression in community samples (17). Each item is scored on a 4-point scale (0–3), the minimum and maximum total score ranging from 0 to 30, respectively. The EPDS has been translated into Persian and validated in Iranian people (18). The EPDS cannot confirm a diagnosis of depressive illness, but when selecting this threshold, the sensitivity for the detection of major depression was almost 100% and the specificity was 82%.33. The EPDS is easy to administer, takes only a few minutes to complete, and is well accepted by the women and the staff.

T3 was assessed by Radio Immuno Assay (RIA) kit . Normal values are 1.25-2.50 nmol/L. T4 was assessed by Radio Immuno Assay (RIA) kit . Normal values are 65-138 nmol/L. The Thyroid Stimulation Hormone (TSH) was assessed by Radio Immuno Assay (RIA). Normal values are 0.36–3.98 mIU/L. T3 resin uptake (T3RU) assessed by Radio Immuno Assay (RIA). Normal values are 30-40%. Normal values of FTI are 5-11. All analyses were done using the SPSS program 13. Statistical significance was defined as two-sided

P values using a significance level of 0.05. Differences were tested with Student t-test for normally distributed continuous variables. Chi square tests were used for categorical variables. Multiple regression with stepwise method was used when multiple variables were considered simultaneously.

Results

In this study, 185 women were selected from Gynecology& Obstetric and Psychiatric clinics in their postpartum period and were assessed with Structured Clinical Interview for DSM-IV-TR, the demographic questionnaire and EPDS. Of them, 72 refused to participate in thyroid function testing.

Table 1. The results of thyroid function in postpartum depression and control group

Variables	Postpartum depression	Mean	t-test p-value
T3 RIA nmol/lit	yes	1.73	0.19
	no	1.78	
T4 RIA nmol/lit	yes	93.71	0.24
	no	90.31	
TSH IRMA mIU/lit	yes	2.33	0.16
	no	2.69	
T3RU RIA %	yes	33.43	0.18
	no	34.07	
FTI	yes	7.17	0.53
	no	6.99	

Table 2. Postpartum Depression by Subjects Characteristic: Results of χ^2 Test Analysis

Vaiables	Number	Postpartum depression		P-value
		YES	NO	
Thyroid function	113	48	65	
Euthyroid	90	38(79.2%)	52(80%)	0.97
Hypothyroid	5	2(4.2%)	3(4.6%)	
Subclinical hypothyroid	18	8(16.7%)	10(15.4%)	
Parity				
One	113	48	65	
Two	47	20(41.7%)	27(41.5%)	0.005
Three	26	18(37.5%)	8(12.3%)	
Four and	30	8(16.7%)	22(33.8%)	
more	10	2(4.2%)	8(12.3%)	
Infant feeding				
Breast	113	48	65	
feeding	77	30(62.5%)	47(72.3%)	0.43
Formula	18	10(15.4%)	8(16.7%)	
Both	18	8(12.3%)	10(20.8%)	
Occupation	113	48	65	
Housewife	99	42(87.5%)	57(87.7%)	0.97
Others	14	6(12.5%)	8(12.3%)	
Education	113	48	65	
Elementary	38	16(33.35)	22(33.8%)	0.65
school	57	26(54.2%)	31(47.7%)	
High school	18	6(12.5%)	12(18.5%)	
Academic				
Type of delivery	113	48	65	
Natural delivery	45	22(54.8%)	23(35.5%)	0.26
Cesarean	68	26(54.2%)	42(64.6%)	
Desired Pregnancy	113	48	65	0.07
Yes	85	32(66.6%)	53(18.5%)	
No	28	16(33.3%)	12(18.5%)	
Child gender	113	48	65	
Male	51	18(37.5%)	33(50.8%)	0.16
Female	62	30(62.5%)	32(49.2%)	
Postpartum hemorrhage	113	48	65	
Yes	8	6(12.5%)	2(3.1%)	0.054
No	105	42(87.5%)	63(96.9%)	

Of the other 113 subjects, 48 were in depression group and 65 in control group.

Participants in this study had an age range of 19 to 41 years with a mean of 26.88 and 29.12 years in case and control group respectively (P-value <0.05) . EPDS scores ranged from 1 to 12 in case and 14 to 30 in control group with a mean of 6.34 & 21.02 respectively (P-value <0.05). No statistically significant differences were observed between thyroid function tests and postpartum depression (Table 1). In addition, no correlation was found between postpartum depression and thyroid dysfunction.

According to chi square test analysis of subjects' characteristics (Table 2), only parity had significant relation with postpartum depression (P-value <0.05). According to multiple regression analysis with stepwise method, subjects with lower serum TSH, T3RU, T3 levels, younger age and longer period after delivery tended to have higher EPDS scores (P-value=0.008). The correlation co-efficient (r) was 0.58. The co-efficient of determination, r2, was 0.34. In other words, about 34% of the variability of EPDS scores is associated with these variables.

Discussion

In our study, information regarding a wide range of potential risk factors was collected. Younger age and parity were two risk factors which had significant relation with postpartum depression (PPD). Studies looking at the possible effect of number of parities on PPD are controversial. One study reported no difference in PPD between primipara and multipara women, but reported a two-fold increase in the incidence of postpartum psychosis, with no age correlation (19). Some studies have shown a possible association between the first childbirth and PPD (20) and others did not find an association between the number of deliveries and PPD (21). According to our results other demographic and obstetric factors had no significant relationship with postpartum depression. However, a potential weakness of this study might be a smaller sample size compared to other epidemiological studies.

The present study reports that those women with postpartum depression had a no greater prevalence of thyroid dysfunction than control subjects , and mean thyroid function indexes (T4, T3, TSH, T3RU, FTI levels) had no significant differences between two groups. There are several papers suggesting that the thyroid function of depressed patients is within the normal range (22-27).

On the other hand, some studies showed a relation between thyroid dysfunction and postpartum depression. Thyroid antibody-positive women are prone to hypothyroidism, which is often preceded by transient hyperthyroidism after delivery (28). In addition, lower range total and free thyroxine concentrations during late pregnancy may be related to postpartum depressive symptoms (29). The presence of abnormal thyroid function tests is not related with a distinct clinical picture (30). However, again, the literature is split and the results are inconclusive (31-33).

Our findings showed that T3, TSH and T3RU levels correlated negatively with EPDS scores. One study suggests that women with T4 and FT4 in the lower euthyroid range and higher T3RU had higher EPDS ratings (34); another study suggests that subjects with higher serum TSH tended to have higher EPDS scores (35).

Overall, the review of the literature suggests that there are no conclusive data on the role of thyroid function in postpartum depression. It seems that thyroid dysfunction should be considered in women with postpartum depression individually, but the role of thyroid as an important cause of this condition is not yet established.

The main limitations of this study are the small sample size and lack of thyroid autoimmune assessment. We suggest that studies with larger sample sizes be conducted to further evaluate thyroid autoimmune tests to clarify the role of thyroid function in postpartum depression.

References

1. Berga SL, Parry BL. Special Areas of Interest, Psychiatry and Reproductive Medicine. In: Sadock BJ, Sadock VA, Ruiz P, Kaplan HI, eds. Kaplan and Sadock's comprehensive textbook of psychiatry, 9th. Philadelphia: Lippincott Williams & Wilkins; 2009.
2. Sadock BJ, Kaplan HI, Sadock VA. Kaplan & Sadock's synopsis of psychiatry: behavioral sciences/clinical psychiatry, 10th ed. Philadelphia: Lippincott Williams & Wilkins; 2007.
3. Kendell RE, Chalmers JC, Platz C. Epidemiology of puerperal psychoses. Br J Psychiatry 1987; 150: 662-673.
4. Weissman MM, Olfson M. Depression in women: Implications for health care research. Science 1995;269: 799–801.
5. Cogill SR, Caplan HL, Alexandra H, Robson KM, Kumar R. Impact of maternal postnatal depression on cognitive development of young children. Br Med J (Clin Res Ed) 1986; 292: 1165-1167.
6. harp D, Hay DF, Pawlby S, Schmucker G, Allen H, Kumar R. The impact of postnatal depression on boys' intellectual development. J Child Psychol Psychiatry 1995; 36: 1315-1336.
7. agedahl-Strindlund M. Children of mentally ill mothers: mental development, somatic growth and social outcome. Scand J Soc Med 1988; 16: 121-127.
8. Harris B. Biological and hormonal aspects of postpartum depressed mood. Br J Psychiatry 1994; 164: 288-292.
9. Llewellyn AM, Stowe ZN and Nemeroff CB. Depression during pregnancy and the

puerperium. J Clin Psychiatry 1997; 58 Suppl 15: 26-32.
10. Josefsson A, Angelsioo L, Berg G, Ekstrom CM, Gunnervik C, Nordin C, et al. Obstetric, somatic, and demographic risk factors for postpartum depressive symptoms. Obstet Gynecol 2002; 99: 223-228.
11. Glinoer D. The regulation of thyroid function in pregnancy: pathways of endocrine adaptation from physiology to pathology. Endocr Rev 1997; 18: 404-433.
12. Harris B, Fung H, Johns S, Kologlu M, Bhatti R, McGregor AM, et al. Transient post-partum thyroid dysfunction and postnatal depression. J Affect Disord 1989; 17: 243-249.
13. Pop VJ, de Rooy HA, Vader HL, van der Heide D, van Son M, Komproe IH, et al. Postpartum thyroid dysfunction and depression in an unselected population. N Engl J Med 1991; 324: 1815-1816.
14. Hendrick V, Altshuler LL, Suri R. Hormonal changes in the postpartum and implications for postpartum depression. Psychosomatics 1998; 39: 93-101.
15. MacCrimmon DJ, Wallace JE, Goldberg WM, Streiner DL. Emotional disturbance and cognitive deficits in hyperthyroidism. Psychosom Med 1979; 41: 331-340.
16. Kirkegaard C, Faber J. The role of thyroid hormones in depression. Eur J Endocrinol 1998; 138: 1-9.
17. Cox JL, Holden JM. Sagovsky R. Detection of postnatal depression. Development of the 10-item Edinburgh Postnatal Depression Scale. Br J Psychiatry 1987; 150: 782-786.
18. Montazeri A, Torkan B, Omidvari S. The Edinburgh Postnatal Depression Scale (EPDS): translation and validation study of the Iranian version. BMC Psychiatry 2007; 7: 11.
19. Kendell RE. Emotional, physical factors in the genesis of puerperal mental disorders. J Psychosom Res 1985; 29: 3-11.
20. Tamaki R, Murata M, Okano T. Risk factors for postpartum depression in Japan. Psychiatry Clin Neurosci 1997; 51: 93-98.
21. Posner NA, Unterman RR, Williams KN, Williams GH. Screening for postpartum depression. An antepartum questionnaire. J Reprod Med 1997; 42: 207-215.
22. Fava M, Labbate LA, Abraham ME and Rosenbaum JF. Hypothyroidism and hyperthyroidism in major depression revisited. J Clin Psychiatry 1995; 56: 186-192.
23. Joffe R, Segal Z and Singer W. Change in thyroid hormone levels following response to cognitive therapy for major depression. Am J Psychiatry 1996; 153: 411-413.
24. Haggerty JJ, Jr., Silva SG, Marquardt M, Mason GA, Chang HY, Evans DL, et al. Prevalence of antithyroid antibodies in mood disorders. Depress Anxiety 1997; 5: 91-96.
25. Pop VJ, Maartens LH, Leusink G, van Son MJ, Knottnerus AA, Ward AM, et al. Are autoimmune thyroid dysfunction and depression related? J Clin Endocrinol Metab 1998; 83: 3194-3197.
26. Harris B, Fung H, Johns S, Kologlu M, Bhatti R, McGregor AM, et al. Transient post-partum thyroid dysfunction and postnatal depression. J Affect Disord 1989; 17: 243-249.
27. Joffe RT. Antithyroid antibodies in major depression. Acta Psychiatr Scand 1987; 76: 598-599.
28. Harris B. Postpartum depression and thyroid antibody status. Thyroid 1999; 9: 699-703.
29. Pedersen CA. Postpartum mood and anxiety disorders: a guide for the nonpsychiatric clinician with an aside on thyroid associations with postpartum mood. Thyroid 1999; 9: 691-697.
30. Kent GN, Stuckey BG, Allen JR, Lambert T, Gee V. Postpartum thyroid dysfunction: clinical assessment and relationship to psychiatric affective morbidity. Clin Endocrinol (Oxf) 1999; 51: 429-438.
31. Harris B, Oretti R, Lazarus J, Parkes A, John R, Richards C, et al. Randomised trial of thyroxine to prevent postnatal depression in thyroid-antibody-positive women. Br J Psychiatry 2002; 180: 327-330.
32. Lucas A, Pizarro E, Granada ML, Salinas I, Sanmarti A. Postpartum thyroid dysfunction and postpartum depression: are they two linked disorders? Clin Endocrinol (Oxf) 2001; 55: 809-814.
33. Kuijpens JL, Vader HL, Drexhage HA, Wiersinga WM, van Son MJ, Pop VJ. Thyroid peroxidase antibodies during gestation are a marker for subsequent depression postpartum. Eur J Endocrinol 2001; 145: 579-584.
34. Pedersen CA, Johnson JL, Silva S, Bunevicius R, Meltzer-Brody S, Hamer RM, et al. Antenatal thyroid correlates of postpartum depression. Psychoneuroendocrinology 2007; 32: 235-245.
35. McCoy SJ, Beal JM, Payton ME, Stewart AL, DeMers AM, Watson GH. Postpartum thyroid measures and depressive symptomology: a pilot study. J Am Osteopath Assoc 2008; 108: 503-507.