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ISSN: 2392-7674

J Mind Med Sci. 2019; 6(1): 103-109
doi: 10.22543/7674.61.P103109

Received for publication: November 28, 2018
Accepted: January 15, 2019

Research article

Postpartum depression and thyroid dysfunction– should pregnant women be screened for thyroid disorders?

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Abstract

The relationship between thyroid dysfunction and postpartum depression has been investigated for quite some time now, but no consensus has been reached regarding the need for screening for thyroid function during pregnancy. This paper aims to investigate whether thyroid hormone screening in pregnancy might contribute to the diagnosis of postpartum depression.

Depression was assessed using the Edinburgh Postnatal Depression Scale (EPDS) - one of the most widely used measures in detecting postpartum depression and anxiety. Thyroid function was measured using the commonly recommended thyroid laboratory tests.

A structured questionnaire was given to 61 patients closely monitored during their pregnancy and at least one year after giving birth, including for thyroid and depression disorders. The questionnaire was completed anonymously online by the patients and had three sections: one containing the EPDS questions, one assessing thyroid function, and a demographic section.

The interdependency between thyroid and depression was analyzed in SPSS using the Pearson chi-square test of independence. The results show no statistically significant relationship between thyroid dysfunction and depression. In other words, women suffering from thyroid dysfunctions have no greater rate of depression compared to women without thyroid dysfunction. As a result, it screening for thyroid disorders during pregnancy may not provide relevant information for detecting postnatal depression.

Keywords : Postpartum depression (PPD), thyroid dysfunction, Edinburgh Postnatal Depression Scale (EDPS)

Highlights

- ✓ This study found no difference in postpartumdepression for women with thyroid dysfunction compared to women without thyroid dysfunction.
- ✓ The study pinpoints the need for appropriate and constant assessment of postpartum depression in Romania and the creation of an appropriate medical structure to identify and mitigate the risks of postpartum depression.

To cite this article: Simionescu AA, Marin E. Postpartum depression and thyroid dysfunction– should pregnant women be screened for thyroid disorders? *J Mind Med Sci*. 2019; 6(1): 103-109. DOI: 10.22543/7674.61.P103109

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Introduction

Postpartum depression (PPD) is defined as a non-psychotic depressive episode that can last from one month up to one year after birth (1). If left undiagnosed, the disorder may have negative consequences, on both the mother and the child. It is estimated that PPD affects 10 to 15% of new mothers (2, 3). Mothers' postpartum mood disturbance may lead to an increased risk of affecting the child's cognitive capacity, social skills, and long-term affections. (4). However, less than half of postnatal depression cases are detected through routine clinical practice (5).

Thyroid disorders are among the most common endocrine pathologies during pregnancy and the postpartum period. The prevalence of thyroid dysfunction in postpartum ranges between 1.1 % and 16.7 % across the country (6). Studies have shown that maternal thyroid autoimmunity was associated with postpartum depression (7). The majority of women predisposed to develop postpartum thyroiditis have subclinical thyroid autoimmune disease manifestations early in the pregnancy (e.g. hyperemesis gravidorum). At the postpartum visit, thyroiditis does not necessarily manifest clinically and thus it is important that physicians be aware of the risks of thyroid disorders.

Nevertheless, in everyday practice there are insufficient data to recommend universal screening for thyroid in pregnancy, and, in the absence of clinical symptoms, treatment is unnecessary (8, 9).

In Romania, screening for neonatal hypothyroidism has been performed at birth since 1979. The incidence of hypothyroidism is 1 in 3,409 new-born babies (10).

Currently, several postpartum screening tools are used for identifying depression, such as Hamilton Depression Rating Scale – HDRS, developed by Hamilton in 1960; Cronhom – Ottoson scale, also introduced in 1960; Melancholia Scale – introduced by Bech and Rafaelse in 1980; Montgomery – Asberg Depression Rating Scale – MADRS, developed in 1976, as well others, many based on the Hamilton scale.

The Edinburgh Postnatal Depression Scale (EDPS) was developed by Cox and collaborators in 1987 (11). The aim of the scale was to identify women suffering from postpartum depression. The scale was initially tested in Edinburgh and Livingston and consisted of 10 questions with responses on a Likert scale (see Figure 1). Studies conducted on the scale's validity showed that almost 92 percent of women suffering from postpartum depression are correctly diagnosed using the EDPS. However, the scale is used only as a screening tool and not as a diagnostic tool in the public health system, i.e., a diagnosis of depression should be made only by specialized healthcare providers. Nevertheless, the EPDS scale is a useful tool for providing preliminary information.

The objective of this article is to test whether there is a relationship between thyroid dysfunction (diagnosed before, during, or after pregnancy) and postnatal depression.

The analysis is performed based on questionnaires completed by mothers one year or more after birth, retrospectively assessing their postpartum depression at 3 months after birth, based on the Edinburgh Scale and also answering questions related to thyroid disorders. The aim is to assess if patients known for thyroid pathologies or those who later discovered their thyroid problems are more likely to suffer from postpartum depression, thereby establishing a link between the two disorders. If so, the need for screening for thyroid disorders during pregnancy might be justified.

Materials and Methods

We performed a structured questionnaire-based study on 61 women at least one year after birth, our goal being to assess the relationship between thyroid dysfunction and postpartum depression.

The two variables - thyroid function and postpartum depression - were measured as follows: the first used T3, T4, and TSH laboratory tests; the second, depression, was assessed using the Edinburgh Postnatal Depression Scale – EDPS.

Women were tested during pregnancy for thyroid function (T3, T4 and TSH) and monitored for at least one year after birth (including thyroid dysfunction and psychiatric disorders). We included only women with full-term birth; we excluded patients with high risk pregnancies: prematurity, malformations, etc. that might lead to depression. Patients with thyroid carcinoma or undergoing hormonal replacement therapy were excluded as well.

The questionnaire was distributed to 65 women in February 2017, and 61 valid anonymous surveys were introduced in the data base. Consent forms for the use of personal data in this study were signed beforehand.

The questionnaire was structured in three sections: one containing socio-demographic questions, one assessing the thyroid function, and one regarding self-assessed well-being based on Edinburg depression Scale – completed one year or more after birth regarding their state at 3 months after giving birth.

Regarding demographic aspects, respondents were mainly from Bucharest and neighboring counties. At the time of child birth, the youngest mother was 21 and the oldest 41 years. The average mother's age at delivery was 30.6 years – close to the median age of 30 years (indicating that half of the mothers are 30 years old or younger and the other half are 30 years old or more).

The section related to thyroid gland functioning was summarized in the following three variables:

- Variable 1 – a variable showing if the patient had or did not have thyroid issues before pregnancy;
- Variable 2 – a variable showing if the patient underwent or did not undergo treatment for the thyroid before pregnancy;
- Variable 3 – a variable showing if the patient underwent or did not undergo treatment for the thyroid during pregnancy or immediately after (in the first year after giving birth).

The last of the three sections was based on the Edinburgh Postnatal Depression Scale (EPDS). This test to evaluate postpartum depression consists of ten questions answered by the mother. Responses have four possibilities, scored from 0 to 3, with overall scores linked to the severity of the symptoms. The cut-off scores for depression have typically ranged from 9 to 13 points. Based on the score, the patients in our sample were included in one of the two categories: With or Without depression, with 10 points serving as the cut-off point).

The EPDS results were cross-tabulated against the three thyroid-related variables. The Pearson Chi squared test was used to test whether depression (Yes/ No based on the EPDS scale) and thyroid dysfunction (hypo- or hyperthyroidism - before or after pregnancy) are associated. This test was chosen as each of the two/paired variables are measured on a categorical or ordinal scale, and the two variables consist of two or more categorical independent groups. Data analysis was performed using SPSS Software.

Results

The assessment of depression based on the ten EPDS questions is summarized in Figure 1. Each question is separately presented as well as an overall distribution of responses.

Responses to questions 1, 2, and 4 are scored 0, 1, 2, or 3 according to increased severity of the symptom. The rest of the questions are marked with an asterisk (*) meaning that they were reverse scored (i.e. 3, 2, 1, and 0).

Q1 Was able to laugh and see the funny side of things	No of pacients	Percentage
As much as I always could	34	55.7%
Not quite so much now	17	27.9%
Definitely not so much now	9	14.8%
Not at all	1	1.6%

Q2 Have looked forward with enjoyment to things	No of pacients	Percentage
As much as I ever did	44	72.1%
Rather less than I used to	13	21.3%
Definitely less than I used to	4	6.6%
Hardly at all	0	0.0%

Q3* Have blamed yourself unnecessarily when things went wrong	No of pacients	Percentage
Yes, most of the time	16	26.2%
Yes, some of the time	21	34.4%
Not very often	10	16.4%
No, never	14	23.0%

Q4 Have been anxious or worried for no good reason	No of pacients	Percentage
No, not at all	20	32.8%
Hardly ever	18	29.5%
Yes, sometimes	19	31.1%
Yes, very often	4	6.6%

Q5* Have felt scared or panicky for no very good reason	No of pacients	Percentage
Yes, quite a lot	5	8.2%
Yes, sometimes	12	19.7%
No, not much	15	24.6%
No, not at all	29	47.5%

Q6* Things have been getting on top of me	No of pacients	Percentage
Yes, most of the time I haven't been able to cope at all	18	25.0%
Yes, sometimes I haven't been coping as well as usual	18	25.0%
No, most of the time I have coped quite well	18	25.0%
No, have been coping as well as ever	18	25.0%

Q7* Have been so unhappy that I have had difficulty sleeping	No of pacients	Percentage
Yes, most of the time	5	8.2%
Yes, sometimes	8	13.1%
Not very often	13	21.3%
No, not at all	35	57.4%

Q8* Have felt sad or miserable	No of pacients	Percentage
Yes, most of the time	4	6.6%
Yes, quite often	8	13.1%
Not very often	18	29.5%
No, not at all	31	50.8%

Q9* Have been so unhappy that I have been crying	No of pacients	Percentage
Yes, most of the time	5	8.2%
Yes, quite often	6	9.8%
Only occasionally	15	24.6%
No, never	35	57.4%

Q10* The thought of harming myself has occurred to me	No of pacients	Percentage
Yes, quite often	1	1.6%
Sometimes	1	1.6%
Hardly ever	4	6.6%
Never	55	90.2%

Figure 1. Assessing depression - distribution of answers to the EPDS questions. Question 10 is important due to signaling the potential suicidal behavior. The data show that two out of the 61 patients often thought about harming themselves. The total score is determined by summing up the scores for each of the 10 items. The score distribution is presented in Figure 2.

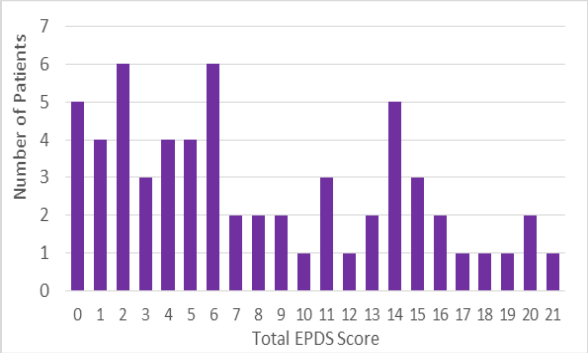

Figure 2. EPDS score distribution for the group of patients

According to the literature, the cut-off score is between 9-13 – higher values signaling the possibility of post- partum depression. In our sample, a score of 10 was considered the cut-off score, thus erring on the side of caution. The chart below shows that, although most of the patients' scores are on the lower side of the scale, 38% scored above 10, indicating symptoms of postpartum depression (see Figure 3).

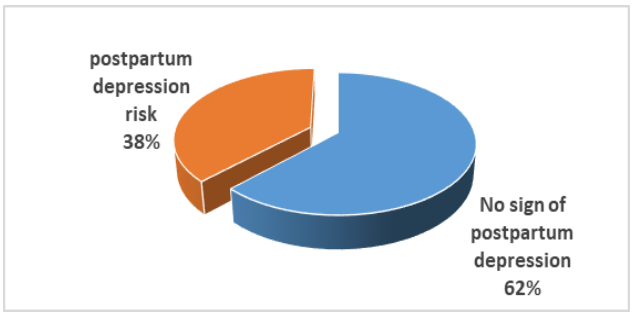

Figure 3. The postpartum depression risk structure of patients

Responses to questions assessing thyroid disorders before, during, or after pregnancy are summarized in Table 1.

Table 1. Summary of thyroid disorder-related questions

	No	Yes	Don't Know/ Don't answer
Variable 1: thyroid issues before pregnancy	75.4%	11.5%	13.1%
Variable 2: treatment for thyroid before pregnancy	85.2%	11.5%	3.3%
Variable 3: treatment for thyroid during pregnancy or immediately after (in the first year after birth)	85.2%	13.1%	1.6%

Of the 61 mothers, only seven had had thyroid-related medical issues before pregnancy and consequently underwent appropriate treatment. The number increased to eight with thyroid disorders who underwent treatment during or after pregnancy.

We cross-tabulated these two variables to assess their interdependency, with results presented in Figure 4. None of the three analyses were significant. Consequently, these two variables, postpartum depression and thyroid disorder, occurred independently of one another.

Figure 4. SPSS Results of Pearson chi-square test of independence

EDS _Depression_Yes/No_3 months * before pregnancy thyroid problems? Cross-tabulation

		Before pregnancy thyroid problems?			Total
		No	Yes	Don't know	
EDS_Depression _3mo*	No	29	4	5	38
	Yes	17	3	3	23
Total		46	7	8	61

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.090[a]	2	.956
Likelihood Ratio	.089	2	.956
Linear-by-Linear Association	.000	1	.985
No. of Valid Cases	61		

EDS _Depression_3 months * treatment before pregnancy Cross-tabulation

		Thyroid treatment before pregnancy			Total
		No	Yes	Don't know /Not sure	
EDS_Depression _3 mo*	No	33	4	1	38
	Yes	19	3	1	23
Total		52	7	2	61

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.238[a]	2	.888
Likelihood Ratio	.233	2	.890
No. of Valid Cases	61		

EDS _Depression_3 months * Treatment pregnancy or after Cross-tabulation					
		Treatment pregnancy + after			Total
		0	1	9	
EDS _Depression _3 mo	No	33	4	1	38
	Yes	19	4	0	23
Total		52	8	1	61

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.150[a]	2	.563
Likelihood Ratio	1.476	2	.478
No. of Valid Cases	61		

Discussion

The results demonstrate the complexity of postpartum depression. From the total of 61 women, 23 had a score of 10 or more out of a possible 30 points. In other words, 38% of the patients presented signs ofpostpartum depression three months after giving birth. Moreover, the last question in the EPDS scale identified two patients who exhibited suicidal risks.

In terms of thyroid disorders, all patients were monitored during pregnancy. Seven (11.5%) had had pre-pregnancy thyroid disorders. One patient was diagnosed and treated for thyroid disorders during pregnancy and displayed no signs of depression.

From the seven patients diagnosed with pre-pregnancy disorders, three had an EPDS score indicating depression signs, and four were not affected by postpartum depression.

Although the interaction mechanism between thyroid dysfunctions and psychological disorders is not fully understood, clinical investigations have recognized the interdependency between the two disorders (7). The association between thyroid function and postpartum mood disorders was seen in Greek women, where lower levels of FT3 and FT4 serum were linked to increased mood disturbances in the first postpartum week (12).

Our aim was to identify signs of interdependency between thyroid dysfunctions before or during pregnancy or after giving birth and postpartum depression measured by the Edinburgh Postnatal Depression Scale (EPDS). However, our data indicate no relationship between thyroid disorder and postpartum depression, as indicated by the Chi Square test.

These results are similar to other research works. Iseme et al. showed no association between depression and thyroid autoantibodies, based on a group of 2,049 subjects (13). Moreover, treatment with thyroxine administered to thyroid antibody positive women showed no impact on reducing the incidence of postpartum depression (14). Rather, postpartum depression may be more associated with other factors, including psychosocial stressors, previous psychiatric history, complications during pregnancy, or the delivery process itself (15, 16).

The study has limitations, as it was performed on a relatively small group of 61 patients, and the number of patients diagnosed with thyroid disorders was even smaller (seven patients with existing disorders before pregnancy plus one person diagnosed with thyroid disorder during pregnancy). Moreover, patients were predominantly from Bucharest or nearby Ilfov county (65.6 percent of the overall number), the rest being from other counties. The geographic distribution of postpartum depression is fairly similar to the total distribution. In terms of thyroid disorder, of the seven patients diagnosed before pregnancy, four were from Bucharest, one from Ilfov, and two from other counties. The size of the group did not allow identification of endemic regions for thyroid disorders (17-19).

Another limitation of the study could be the retrospective assessment of depression using the EPDS questions. Specifically, patients were asked to evaluate their depression at three months after birth, but the EPDS questions were answered one year after birth. Additional data were not available as to whether patients had received any psychological counselling during or after pregnancy (20, 21).

Conclusions

The relationship between postpartum depression (measured on the EPDS scale, three months after birth) and thyroid dysfunctions (discovered and treated before pregnancy or during pregnancy) was investigated and statistically tested in order to assess any relationship between these variables.

This study found no relationship between postpartuem depression and thyroid dysfunction. Thus, thyroid screening during pregnancy may not be useful. Nevertheless, the study shows a percentage of women suffering from postpartum depression (an estimate of 38%), exceeding the 10 to 15 percent reported in other studies. At the same time, postpartum depression is not regularly screened for in Romania. The study identifies the possible need for appropriate and constant assessment of postpartum depression and the establishment of an

appropriate medical structure to identify and mitigate the risks of postpartum depression.

Conflict of interest disclosure

There are no known conflicts of interest in the publication of this article. The manuscript was read and approved by all authors.

Compliance with ethical standards

Any aspect of the work covered in this manuscript has been conducted with the ethical approval of all relevant bodies and that such approvals are acknowledged within the manuscript.

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