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Letter to the Editor

# Maternal thyroid function during late pregnancy is not a risk factor for postpartum depression

Dear Editor,

Postpartum depression (PPD) is a serious psychological disorder characterized by a series of symptoms such as depression, grief, crying, irritability, and even suicide or infanticide occurring after delivery for the first time. Depression affects all ages, but the postpartum period is a distinct physiological period in which hormone levels significantly change. Pregnancy can increase the vulnerability of mental, physical and psychological health of women and their fetuses. Also the stress caused by lifestyle changes makes the postpartum period a susceptible period to depression. The etiology of PPD is most likely multifactorial in which thyroid dysfunction has been proposed as a factor. Thyroid dysfunction can manifest with various psychiatric disorders: hyperthyroidism has been associated with anxiety, depression and cognitive deficits and hypothyroidism has an increased incidence of depression. Some reports have shown a relationship between thyroid dysfunction and depression during the postpartum period. However, it remains unclear whether gestational TSH level is able to predict the occurrence of D. Hence we designed this prospective study to investigate the relationship between maternal TSH in late pregnancy and the occurrence of PPD, and to analyze the risk factors for PPD. Subjects ($n$ = 96) were recruited from a single hospital, and demographic data was collected using a standardized questionnaire. Maternal blood samples and neonatal blood samples were collected. All samples were measured for serum thyroid-stimulating hormone (TSH) and free thyroxine (FT4). A Chinese version of the Edinburgh Postpartum Depression Scale (EPDS) was used to evaluate postpartum depression at three days (3d) and four weeks (4 w) postpartum. The incidence of depression at three days and four weeks were 14.58% and 7.29%, respectively. There was no significant difference in PPD occurrence between TSH > 2.5 mIU/L and TSH ≤ 2.5 mIU/L groups. Prenatal serum TSH and FT4 levels did not significantly correlate with EPDS-3d nor with EPDS-4 w. There was a significant linear relationship between EPDS-3d and EPDS-4 w point. Socioeconomic such as employment status and neonatal factors were not associated with PPD. The incidence of postpartum depression decreased at 4 w. There was no association between the level of TSH in prenatal and PPD. This study focused on the relationship between maternal TSH, FT4 in late pregnancy and the occurrence of PPD. In contrast, previous research evaluated the thyroid function in patients with depression or determined whether patients with thyroid function disorder are prone to depression (Sylvén et al., 2013). In other words, these studies compared thyroid function with depression at one time-point (correlation relationship), while this study explored whether the TSH in late pregnancy can be predictive of postpartum depression occurrence, and to analyze whether the occurrence of depression is the result of TSH (causal relationship). Our study found no relationship between prenatal TSH and PPD; prenatal TSH cannot predict the occurrence of PPD. In the follow-up EPDS assessment, we found that 10 out of the 14 subjects who were initially diagnosed with PPD spontaneously recovered, and those who were initially non-depressed may become depressed some time later. The reason for the higher incidence of depression at three days after delivery than at four weeks after delivery is multifactorial. At three days after delivery the condition of the mothers may be volatile from the emotional and physical stress of birthgiving; however, after four weeks of self-adjustment and support from family and friends, the depressive symptoms may alleviate. Gleicher et al. have shown that in primiparous women the highest risk period for PPD is observed at 10–19 days postpartum and the risk remains elevated for up to 3 months (Gleicher et al., 2007). Falah-Hassani et al. believed that postpartum depression occurs within 4–6 weeks after childbirth, and may last several months or even a year (Falah-Hassani et al., 2015). Therefore, the prevalence of PPD at four weeks postpartum may be more accurate than at three days postpartum. Hence, depression in the early postpartum period may be transient, but mothers who are not depressed in the early period should continue with follow-up. Pedersen et al. reported women with antenatal total and free thyroxine concentrations in the lower euthyroid range may be at greater risk of developing postpartum depressive symptoms (Pedersen et al., 2007). Stewart et al. reported that free thyroxine were higher and TSH levels lower in women who developed psychotic mood disorders during the first several months after parturition (Stewart et al., 1988). However, regardless of whether PPD remission or occurrence at the four weeks after delivery, we found no relationship between prenatal TSH level and PPD incidence. This shows that TSH > 2.5 with high EPDS scores at three days postpartum should not be an indication for prophylactic use of thyroid hormone medication. The neuroendocrine system as well as the dysfunction of the hypothalamic-pituitary-thyroid axis is closely related to the occurrence of PPD. The 5-HT hypothesis of depression suggests that a decrease in 5-HT secretion from the central nervous system leads to a decrease in 5-HT levels in the synaptic cleft, which has a severe impact on the normal conduction of nerve impulses. Thyroid hormone has the function of 5-HT, so decrease in secretion of thyroid hormone decreased may lead to dysfunction of 5-HT receptor and subsequent depressive symptoms. However, we didn't find any correlation between prenatal thyroid function and PPD incidence, indicating that there are other mechanisms to regulate PPD. Despite limitations, our study came to the novel conclusion that prenatal TSH level cannot predict the occurrence of PPD; and depression and TSH > 2.5 at three days postpartum should not be an indication for prophylactic use of thyroid hormone medication. We also raised a question worthy of further discussion on the relationship between maternal thyroid function during late pregnancy and postpartum depression.

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