Depressive severity associated with cesarean section in young depressed individuals

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To the Editor: Major depressive disorder (MDD) is among the leading causes of youth suicide. Cesarean section (C-section) affects not only mother but also the children, including babies’ cognitive and brain development as well as other physical diseases.1 Many diseases affecting children have been found to be related to C-section delivery, mainly due to lacking vaginal microorganisms and the squeezing pressure experienced by infants during normal vaginal birth.1 However, there have been few reports of an association between depressive severity and C-section delivery in young patients with MDD. Therefore, we aimed to analyze the primary association between depressive symptoms and C-section delivery in young depressed patients.

This cross-sectional study recruited consecutively 347 patients (178 males, 169 females) aged 19 to 30 years with a diagnosis of MDD according to Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V) criteria who underwent in-person interviews, the mini international neuropsychiatric interview, and physical examinations by experienced psychiatrists at Division of Neuropsychiatry, Department of Neurology, Xuanwu Hospital of Capital Medical University (Beijing, China) between August 20, 2015, and December 28, 2018. All patients were excluded with anemia, thyroid dysfunction, mental retardation, neurologic conditions, bipolar disorders, schizophrenia, and other mental disorders. Depressive symptoms were assessed with the Hamilton rating scale for depression (HAMD-17) by three experienced psychological testing technicians who were blinded to all subjects’ birth delivery types at the Neuropsychological Center of Department of Neurology of Xuanwu Hospital. The study was conducted in accordance with the Declaration of Helsinki and was approved by the Ethics Committee of Xuanwu Hospital. As a retrospective study and data analysis were performed anonymously, this study was exempt from the informed consent from patients.

The HAMD-17 total and its five domains, including anxiety, weight, cognitive dysfunction, retardation, and sleep disturbance, were assessed. The information on all participants who were born full-term by vaginal delivery or full-term by C-section delivery, provided by patients and/or their parents. Age of onset, gender, marriage, educational level, occupation, and disease course were collected from all patients and/or their family members during their first visit to the outpatient clinic. The disease course referred to the length of time from the onset of the patients’ disease to the first time they were diagnosed as MDD. The highest educational level and qualifications responses were dichotomized to categorize participants as either having a high school diploma or not. This corresponds to the criteria of 9 years of education.
Based on the total score of the HAMD-17, patients were divided into two depressive groups, such as moderate with 17 to 23 of HAMD and severe with ≥24. Non-parametric tests and Chi-square tests were used to assess the differences of continuous variables and categorical variables between two groups, respectively. Multivariate logistic regression was utilized to investigate the associations of depressive severity with delivery type, adjusted for age of onset, gender, marital status, educational level, occupation, and disease course. Data analysis was conducted between April 15, 2019, and April 18, 2019 using SPSS for Windows Version 15.0 (SPSS Inc., Chicago, IL, USA) with two-tailed P values set at 0.05.

Statistical significance was observed for the association of depressive severity with age of onset, occupation, disease course, marital status and delivery type (all \( P < 0.01 \)), as shown in Supplementary Table 1, http://links.lww.com/CM9/A60. Further multivariate logistic regression model was used to explore the impact of delivery type on depressive severity adjusted for above-mentioned covariates, and found those with C-section delivery were more likely to suffer from severe depression (odds ratio 3.50, 95% confidence interval, 1.72–7.14; \( P < 0.01 \)).

In this study, the age of participants was 25.7 ± 3.0 years, and a total of 58% of the recruited MDD participants were born by C-section delivery. And those born by C-section had a greater severity of depression compared to the vaginal delivery group.

Compared with the moderate depressive patient group, the severe group had older age of onset, higher proportion of C-section delivery, shorter disease course, and higher the divorced rate. Our results added on the previous reported findings mainly focusing on the risk factors that increasing the severity of depression, such as mental or physical comorbidities, low education level or social status, and high living pressure.\(^{2}\) We also found that depressive severity in young patients with MDD correlated with age of onset, gender, marital status, occupation, disease course, and delivery type. Moreover, we showed that C-section significantly increased the risk of severity of depression in young depressed patients. The route of delivery had a close association with the development of an individual’s physical and cognitive functioning in the future.\(^{3}\) C-section has been shown to influence the composition of the vaginal and intestinal microflora as an increased risk of MDD, because these organisms can synthesize and transport neuroactive substances that participate in the gut-brain axis.\(^{4}\)

Interestingly, this preliminary study indicated that depressive severity in young patients with MDD correlated with C-section which might be an important factor contributing to depression. However, due to the cross-section study design, further investigations need to highlight the relationship among depressive severity, mechanism, pathogenesis, and C-section birth delivery.

**Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patients have given their consent for their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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**Conflicts of interest**

None.

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