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LETTER TO THE EDITOR

Anxiety, depression, and quality of life in mothers of newborns with microcephaly and presumed congenital Zika virus infection

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Dear Editor,

In Brazil, an unusual increase of newborns with microcephaly has been reported since August 2015 (França et al. 2016), with a strong evidence of association with congenital Zika virus (ZIKV) infection (Martines et al. 2016). In February 2016, the World Health Organization declared the clusters of microcephaly and other neonatal malformations reported in Brazil a Public Health Emergency of International Concern (WHO 2016). In June 2016, the Brazilian Ministry of Health confirmed 1410 cases of microcephaly in the Northeast region, out of which 111 (7.9 %) cases in the Sergipe state, the smallest state of the Brazilian Federation, with ~2 million population (BRAZIL 2016).

Studies have shown an increased risk of microcephaly when mothers are infected with ZIKV during the first trimester of pregnancy (Cauchemez et al. 2016; Johansson et al. 2016). Unfortunately, there is currently no vaccine or medication to prevent ZIKV infection, which may be asymptomatic in an estimate of 80 % of cases (Duffy et al. 2009). Recently, in Colombia, four infants with microcephaly had laboratory evidence of congenital ZIKV whose mothers had asymptomatic infection during pregnancy (Pacheco et al. 2016). Because of growing evidence, experts have suggested safety measures to avoid ZIKV infection during pregnancy, especially in areas where the virus has been circulating.

Brazilian newborns with microcephaly have demonstrated severe abnormalities in the central nervous system including brain dysgenesis and intracranial calcifications consistent with an intrauterine infection (Microcephaly Epidemic Research Group 2016). The expectancy of microcephaly diagnosis may lead to higher levels of parental stress because of the uncertainty regarding the developmental outcome of their children. To the best of our knowledge, there have been no previous studies evaluation anxiety, depression, and quality of life in mothers of newborns with microcephaly and presumed congenital ZIKV infection. We evaluated nine consecutive mothers of babies with microcephaly born in a public maternity in Sergipe state, Brazil, from November 2015 to June 2016. The newborns with microcephaly presented typical alterations indicating congenital infection including intracranial calcifications, cerebral ventricles dilation, or changes in the posterior fossa and other clinical signs found by any image diagnostic method or ZIKV identification in laboratory tests (BRAZIL 2016). We compared data regarding anxiety, depression, and quality of life with those from a concurrent control group of 20 mothers of healthy newborns. Psychometric evaluation of anxiety and depression was performed using the State-Trait Anxiety Inventory and the Beck Depression Inventory, respectively. Quality of life was assessed using the World Health Organization Questionnaire—short version (WHOQOL-BREF). Differences between the groups were compared using the Mann-Whitney test with a significance level of 5 %. All participants signed the informed consent. Data were collected during the first 24 h after birth.

The mothers' age of newborns with microcephaly ranged from 18 to 39 years. Only three mothers were married and all

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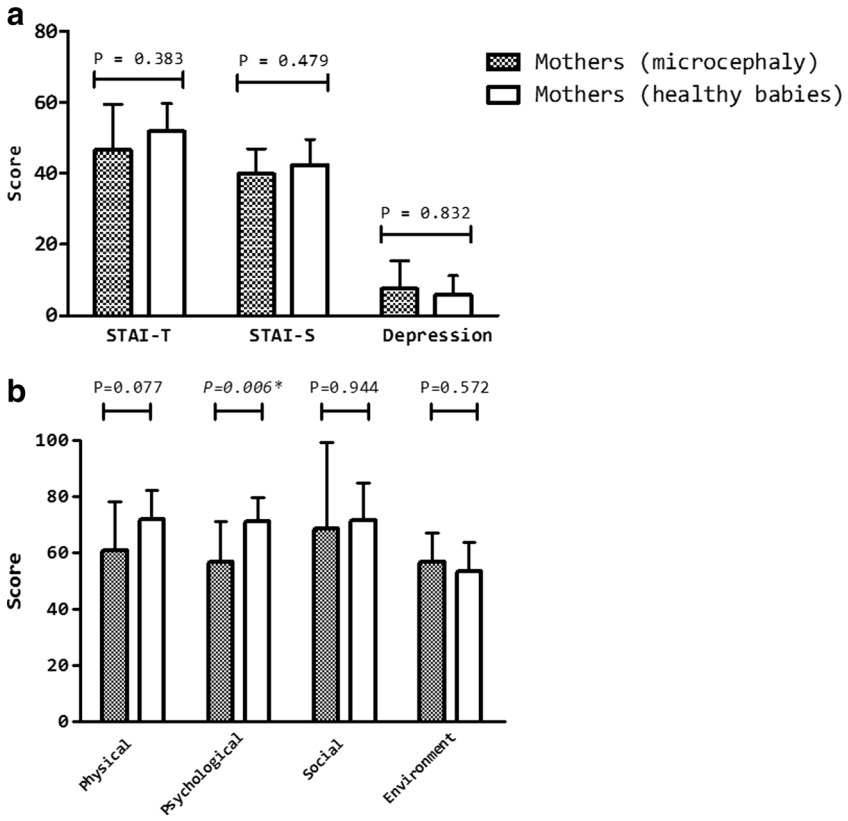

Fig. 1 **a** Psychometric evaluation and **b** quality of life in mothers of newborns with microcephaly compared to mothers of healthy babies

of them had low income. In the control group, the age ranged from 19 to 35 years and most of them had low income (80 %). Most mothers reported to live in rural areas. We found high levels of anxiety (scores >39) in both groups, without statistical difference between them. In both groups, depression scored as normal (0–9) (Fig. 1a). Mothers of newborns diagnosed with microcephaly had significantly lower scores on psychological domain of WHOQOL-BREF compared to healthy babies' mothers ($P = 0.006$). Psychical, social, and environment domains were not different between groups (Fig. 1b).

In this report, we found that ZIKV-related microcephaly is a factor significantly associated with high levels of anxiety and low scores in psychological domain during the first 24 h after birth. The psychological domain includes questions of positive and negative feelings, self-esteem, body image and physical appearance, personal beliefs, and attention. Fear has struck Brazilian maternity since ZIKV was linked to the brain damage in newborns. As most ZIKV cases may cause no noticeable symptoms, women have no idea if they were infected during pregnancy, which may lead to increased levels of anxiety and/or psychological distress. In addition, the fear of stigmatization of microcephaly may negatively affect the parents' emotional and social functioning after birth.

Healthcare providers must be prepared to receive mothers and newborns with microcephaly and should be aware of the latest guidelines on assessment and management of ZIKV and its potential consequences (Burke et al. 2016). Psychosocial intervention programs can make a significant contribution to the short-term maternal mental health including anxiety, depression, and self-esteem (Barlow and Coren 2004). Our study highlights the importance of multidisciplinary counseling and the need to identify psychoeducational strategies for promoting quality of life in mothers of newborns with microcephaly associated with presumed ZIKV congenital infection. Our results are limited to in-hospital outcomes. Future investigations are necessary to evaluate anxiety, depression, and quality of life in a long-term follow-up.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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