


Child Development, Maternal Depression and Associated Factors: A Longitudinal Study

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Abstract: Maternal depression can compromise child development, but little about its effects has been investigated since the pregnancy stage. This longitudinal study aimed to compare, in two moments, the development of children of mothers with depressive symptoms and to identify whether these symptoms and other sociodemographic variables were associated with development at 6 and 14 months. One hundred and thirty nine women answered a questionnaire referring to sociodemographic and birth data and the Beck Depression Inventory, in the third gestational trimester, 6 and 14 months after childbirth. At 6 and 14 months of age, children were assessed using the Denver Developmental Screening Test. There was a high percentage of babies at risk at 6 and 14 months. Depressive symptoms were associated with delays in the development of subareas, but not with overall development. It is believed that the relationship between maternal depression and developmental delay is mediated by other variables that indirectly interfere in the process and would need further investigation.

Keywords: depression, child development, mental health, maternity

Desenvolvimento Infantil, Depressão Materna e Fatores Associados: um Estudo Longitudinal

Resumo: Depressão materna pode comprometer o desenvolvimento infantil, mas pouco se investigou seus efeitos desde a fase gestacional. Este estudo longitudinal visou comparar, em dois momentos, o desenvolvimento de filhos de mães com sintomas depressivos e identificar se esses sintomas e outras variáveis sociodemográficas se associaram com o desenvolvimento aos seis e 14 meses. 139 mulheres responderam questionário referente a dados sociodemográficos e de nascimento e Inventário de Depressão de Beck, no terceiro trimestre gestacional, seis e 14 meses pós-parto. Aos seis e 14 meses as crianças foram avaliadas pelo Teste de Triagem do Desenvolvimento de Denver. Observou-se alta porcentagem de bebês em risco aos seis e 14 meses. Sintomas depressivos se associaram com atrasos no desenvolvimento das subáreas, mas não com o desenvolvimento global. Acredita-se que a relação entre depressão materna e atraso no desenvolvimento é mediada por outras variáveis que interferem indiretamente no processo e precisariam maior investigação.

Palavras-chave: depressão, desenvolvimento infantil, saúde mental, maternidade

Desarrollo Infantil, Depresión Materna y Factores Asociados: un Estudio Longitudinal

Resumen: La depresión materna puede afectar al desarrollo infantil, sin embargo, son pocos los estudios sobre sus efectos desde la etapa del embarazo. Este estudio longitudinal tuvo como objetivo comparar, en dos momentos, el desarrollo de los hijos de madres con síntomas depresivos e identificar la posible asociación de estos síntomas y otras variables sociodemográficas con el desarrollo infantil a los seis y a los 14 meses de edad. Ciento treinta y nueve mujeres respondieron un cuestionario con datos sociodemográficos y de nacimiento y también el Inventario de Depresión de Beck, en el tercer trimestre de gestación, a los seis y a los 14 meses después del parto. A los seis y a los 14 meses de edad, se evaluó a los niños mediante la Prueba de Tamizaje del Desarrollo de Denver. Hubo un alto porcentaje de bebés en riesgo a los seis y a los 14 meses. Los síntomas depresivos no se asociaron a retrasos en el desarrollo total, sino en el desarrollo de subáreas. Se estima que la relación entre depresión materna y retraso en el desarrollo está mediada por otras variables que interfieren indirectamente en el proceso y que necesitan más estudios.

Palabras clave: depresión, desarrollo infantil, salud mental, maternidad

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In the trajectory of child development, adversities can occur that make them vulnerable to coping with evolutionary tasks. Several factors can affect its development, from genetic and biological to psychosocial variables (Maria-Mengel & Linhares, 2007). Studies show that they are present in the child (genetic components, complications at birth, temperament), in the mother (age, marital status, number of children and abortions, health complications, way of delivery) in the family (parental history, family dynamics and conflicts) and in the environment

in which she lives (education, socioeconomic level, social support and cultural context) (Cavalcante, Lamy Filho, França, & Lamy, 2017; Ribeiro, Perosa, & Padovani, 2014).

In recent decades, maternal mental health problems, especially depression, have also come to be considered risk factors, which can affect the initial relationships of the dyad and the child development, even when there is remission of the maternal pathology (Goodman et al., 2011). Literature data indicate an association between depression symptoms experienced by women, both during pregnancy and puerperium, with negative outcomes in the childbirth and development conditions (Gerhardt, 2017).

For Thiengo, Santos, Fonseca, Abelha and Lovisi (2012), maternal depression increased the risk of prematurity and low weight. There is evidence that maternal depression is associated with difficulties in breastfeeding (Demirgoren et al., 2017), less commitment to caring for the baby (Taraban et al., 2017), higher level of cortisol in newborns (stress hormone) (Lucci, Otta, David, & Chelini, 2016), and behavior problems in children up to six years old (Gerhardt, 2017; Gerstein, Woodman, Burnson, Cheng, & Poehlmann-Tynan, 2017). Studies have also shown that perinatal depression affects the mother-baby dyad bond (Cavalcante et al., 2017; Gerhardt, 2017; Taraban et al., 2017).

Regarding development, studies focused on impairments for the child's initial development (Gerstein et al., 2017; Popo, Kenyon, Dann, MacArthur, & Blissett, 2017). With older subjects, age ranging from 5 to 12, maternal depression was a risk factor for social development (Villaseñor, Calderón Hernández, Gaytán, Romero, & Díaz-Barriga, 2017). In a longitudinal study that followed children of depressed mothers up to the age of 16, it was observed that in the course of development they had insecure attachment, greater risk for depression in childhood and adolescence, and the boys had worse academic production than the children in the control group (Murray et al., 2010, 2011).

Possibly, the developmental losses in the medium and long term are because women with a history of depression during pregnancy and afterbirth are more vulnerable to new depressive episodes or present persistent depressive conditions (Murray et al., 2010). In Brazil, a study that followed approximately 80 mother/child dyads during the first year of life, observed that, despite the decrease in the percentage of mothers with depressive symptoms during the period, 30.3% had symptoms at four months, 26.4% at eight months and 25% at 12 months after birth (Morais, Lucci and Otta, 2013).

Despite evidence showing that severe and persistent maternal psychological changes impair child development (Murray et al., 2010), in a meta-analysis review, Goodman et al. (2011) observed that there is still a lack of research on the strength of the association of maternal depression with adverse results in the child's behavior and development, its role in relation to other variables that also influence development, as well as the aspects of development that can be most impaired when the mother has depressive symptoms.

Morais et al. (2013), identified that children of mothers with postpartum depression indicators had worse performance in the motor area at 8 and 12 months, but better performance in the areas of fine motor skills and language at 12 months, signaling that depression may have different effect in different areas of development. There are also few studies on the possible differential consequences of gestational and postpartum depression on development (Koutra et al., 2013). Although maternal depression has become the focus of researches and actions in health services, most studies have prioritized postpartum depression, with little research on depression in the prenatal period and rare studies with a longitudinal design (Faisal-Cury & Menezes, 2012; Silva et al., 2012). Considering the aforementioned, this longitudinal design study aimed to compare the development of the children of mothers with depressive symptoms at 6 and 14 months and, as a second objective, to identify whether maternal depressive symptoms (during pregnancy and after birth), as well as sociodemographic, health and first care factors were associated with neuropsychomotor child development, and in the subareas, at 6 and 14 months.

Method

It is a prospective longitudinal study that evaluated depressive symptoms, as well as sociodemographic, health, pregnancy, birth characteristics, first care and support network of users of the Unified Health System (SUS) in three moments, in the third gestational trimester, at 6 and 14 months after birth and the development of babies in two stages, at 6 and 14 months.

Participants

Three hundred and thirty eight pregnant women who were in the third trimester of pregnancy and undergoing obstetric prenatal or morphological ultrasound were invited to participate in public health units in three inland cities of São Paulo State from January 2012 to December 2013. Of these, 322 pregnant women agreed to participate in the study's convenience sample, making up the first stage of the research. In the second stage, at six months, a dyad in which the baby was hospitalized was excluded, 87 mothers were not located, two mothers were unable to attend and 33 mothers refused to continue the study, remaining 200 mother/baby dyads, with a loss of 37.5% of the subjects in the initial sample. In the third stage, 45 mothers were not located, 14 refused to continue and two could not attend, with a loss of 30.5% of the participants in the second stage. The final sample consisted of 139 women who participated in the three study stages.

The characteristics of the mothers in the study were compared with those in the group of losses, identifying that, in the second stage, a greater proportion of women with less education and who had undergone the threat of abortion in early pregnancy did not continue the study and,

in the third stage, a greater proportion of mothers who did not wish to become pregnant did not continue. There were no significant differences regarding depressive symptoms between the groups of losses and the group that composed the final sample.

Instruments

For data collection, two questionnaires designed for this study were used, the Beck Depression Inventory and the Denver Developmental Screening Test -II.

Questionnaire related to sociodemographic (age, marital status, education, family income, number of children) *and health data* (previous abortions and threat of current abortion, health complications during pregnancy, health prior to pregnancy and tobacco use). The pregnant woman was also asked if she and her partner had wanted the baby.

Questionnaire regarding birth (way of delivery and obstetric complications) *and child* (gestational age and birth weight, stay in shared bedroom, breastfeeding in the first hour and length of hospital stay). It was also asked whether, in the early days, she had help with the care of the home and the child, with whom the baby was most of the time, how she considered the task of being a mother (positively or negatively), confidence in the first care of the baby and their perception of the baby's temperament. This last question was categorized as positive (calm, quiet, cheerful) or negative (crying, angry, sick).

The Beck Depression Inventory (BDI) is a self-assessment scale of behavioral manifestations of depression, with no diagnostic purpose, translated and adapted for Brazil by Cunha (2001). Composed of 21 categories of symptoms and attitudes, with four statements each reflecting an increasing degree of severity of depression (from 0 to 3). A total score is obtained by adding the scores corresponding to the alternatives indicated in the 21 items (Cunha, 2001). The BDI's internal consistency was 0.84 and the correlation between test and retest was 0.95 ($p < 0.001$) (Cunha, 2001). A score greater than 18 was used as a cutoff point, as suggested by Oliver and Simmons (as mentioned by Cunha, 2001) for patients who were not diagnosed with psychiatric disorders.

Denver Development Screening Test- II (DDST-II), translated and adapted to Brazil by Pedromônico, Bragatto and Strobilius (1999), consists of a risk *screening* test for developmental problems in children aged from one month to six years, including four areas: gross motor, adaptive motor, language and personal/social skills. The child's performance on each item is assessed according to the percentage of the standardized population that, at the child's age, performed the item, and based on this comparison, their performance is classified as "normal", "delay" or "caution/care". In the final evaluation, it is considered Risk when there are at least two Cautions or a Delay in some area of the test, and Normal when there is no Delay or at most one Caution. The classification of neuropsychomotor development is therefore given as Normal or Risk.

Procedure

Data collection. In the scheduling sector of the Basic Health Units, pregnant women who were in the third trimester were identified, received all information relevant to all study stages and were invited to participate in the research. Those who agreed to participate, after signing the Informed Consent Form (ICF), answered the sociodemographic health and gestational questionnaire and the BDI was applied in a private environment.

When the child was six months old, after a phone call and prior appointment, the first author of this study, a trained psychologist, went to the dyads' residence when the mother answered the second questionnaire and the BDI. On that occasion, the child's neuropsychomotor development was also assessed using the Denver test II. Finally, when the child was 14 months old, a new meeting was scheduled at the residence and on this date, the mother responded to the BDI and a new evaluation of the baby was carried out. For the BDI self-assessment, a research assistant corrected the tests and inserted the results in the database.

In the three moments, the test results were informed to the participants and both, mothers who scored for depressive symptoms and children at risk for neuropsychomotor development, were referred to psychological or psychiatric care in the health units of their cities.

Data analysis. All tests were corrected according to the specific rules of each instrument and, when assessing the DDST- II of premature children, the corrected age was considered (chronological age adjusted to 40 weeks). Before proceeding to inferential statistical analysis, the Shapiro Wilk test was applied to test the normality of variables. All variables were binarized and organized in the *Statistical Package for the Social Sciences* (SPSS, version 21.0; Chicago INc II, USA) database.

Following, a descriptive statistical analysis of the sample characteristics was performed, calculating the frequency and percentage of variables. McNemar's nonparametric test for paired samples was used to compare possible differences in the percentage of depressive symptoms of mothers and in the percentage of children with and without delays.

In order to identify the factors associated with the outcome of Denver II and subareas, first, logistic regression analyses were performed for binary variables, considering as outcomes: the risk for neuropsychomotor development and the delay for development in the subareas, at six and fourteen months. For each outcome, the explanatory variables were selected, which in the bivariate analysis showed $p < 0.20$, which, in a single block, for each outcome, were taken to the multivariate analysis, considering the level of significance in the final model $p < 0.05$.

Ethical Considerations

The project was approved by the Research Ethics Committee of the Botucatu Medical School - UNESP under protocol number 4166-2012, in accordance with CONEP

resolution 466/12 and CNS 510/2016. The collection was authorized by the director in charge of the centers that attended the pregnant women. The collection started only after signing the Informed Consent form.

Results

Of the 139 pregnant women who participated in the prospective longitudinal study, the majority were

multigravid (60%), over 20 years old (83%), had no paid occupation (59%), had more than eight years of study (66%), lived with their partner (83%) and the family income of the vast majority was up to two minimum wages (89%). As for clinical data, 13% of pregnant women were smokers, had some health problem and for 17% the problems appeared during pregnancy. For 62% pregnancy was desired, 18% have had a previous abortion and 8% had a threat of abortion in the current pregnancy (Table 1).

Table 1
Sociodemographic and clinical data of the study sample (N = 139)

Variables		<i>n</i>	%
Parity	Primigravida	55	40
	Multigravida	84	60
Age	< 20 years	24	17
	> 20 years	115	83
Marital status	With Partner	116	83
	Without partner	23	17
Professional Occupation	Yes	57	41
	No	82	59
Education	< eight years	47	34
	> eight years	92	66
Family Income	< two minimum wages	124	89
	> two minimum wages	15	11
Smoker	Yes	18	13
	No	121	87
Health problems	Yes	18	13
	No	121	87
Health problems in pregnancy	Yes	24	17
	No	115	83
Wanted the baby	Yes	86	62
	No	53	38
Previous abortion	Yes	25	18
	No	114	82
Current threat of abortion	Yes	11	8
	No	128	92

Note. *n* = size of the subsamples; % = percentage; minimum and maximum age of participants = 14-42.

Regarding delivery conditions, 45% of women had vaginal delivery and few had any complications during the procedures (10%). As the vast majority of children were born at term, weighing more than 2.500 g, they stayed together in rooming in and 70% breastfed in the first hour after birth. At 6 months, 81.5% of babies spent most of their time with their mothers. Regarding care, 35% of mothers reported that in the first months they felt insecure in administering the first care to the child and 75% had help to take care of the baby or of housework. At six months, 62% described their babies in a positive way, as calm, cheerful, and at 14 months, 84% of babies still spent most of their time with their mother.

As for depressive symptoms, 22% of pregnant women had symptoms in the third trimester of pregnancy, 17% at six months, with 8 being new cases, with a probability of 7.4% of mothers having developed depressive symptoms in that period. At fourteen months after birth, 12% had depressive symptoms, with 6 new cases, and a probability of 5% of mothers having developed depressive symptoms in that period. Regarding the neuropsychomotor development of babies, 40% were suspected of global delay at six months and 31% at 14 months, but the difference was not significant. In the subareas, the percentage of children with adaptive and extensive motor development delay decreased significantly

at 14 months and the percentage of children with language delay increased ($p < 0.001$) (Table 2).

Table 2
Comparison of the percentage of babies at risk for development and with delay in the subareas at six and fourteen months ($N = 139$)

Development	Six months Risk/delay		14 months Risk/delay		<i>p-value</i>
	<i>n</i>	%	<i>n</i>	%	
Global Development	56	40	43	31	0.092
Personal-social	18	13	12	09	0.307
Adaptive Motor	27	19	04	03	< 0.001
Language	06	04	32	23	< 0.001
Broad motor	42	30	19	15	<0.001

Note. *p-value-McNemar's test* = $p < 0.05$; % = percentage.

There was no association between maternal depressive symptoms and delayed neuropsychomotor development at six and 14 months of age. However, maternal depressive symptoms in the third trimester of pregnancy were associated with delay in the Gross motor motor skills subarea at 14 months of age. Maternal depressive symptoms, on the other hand, at six and 14 months after birth, were associated with a delay in the personal-social subarea, at six and 14 months.

In addition to depressive symptoms, at six months, maternal insecurity in the first care, length of hospital stay, and positive perception of the baby were associated with Gross motor skills development. At the same age, not breastfeeding in the first hour of life was associated with delayed language development. At 14 months, more children were associated with personal-social delay and higher income decreased the chances of delay in this area. Low schooling was associated with delay in the Gross motor subarea and not smoking during pregnancy and positive the task of being mother (Table 3).

Table 3
Risk and protective factors for developmental delay at 6 and 14 months ($N = 139$)

Associated factors at six months	OR	95%CI	<i>p-value</i>
Personal-social Area			
Symptoms of depression 6 months after birth	6.126	1.537; 24.410	0.010
Feeling of Insecurity in the 1 st care	3.405	1.060; 10.940	0.040
Broad motor area			
Baby hospitalization	3.753	1.126; 12.506	0.031
Positive maternal assessment of baby's behavior	0.289	0.105; 0.792	0.016
Area: Language			
No breastfeeding in the first hour of life	32.497	1.587; 665.352	0.024
Associated factors at fourteen months			
Personal-social Area			
Symptoms of depression 14 months after birth	13.282	1.128–156.386	0.040
>Family Income	0.176	0.033–0.946	0.043
Parity	6.801	1.138–40.644	0.036
Broad motor area			
Depressive symptoms in the 3rd trimester	13.638	1.167; 159.360	0.037
< Maternal Education	19.161	1.038; 353.822	0.047
Does not smoke during pregnancy	0.000	0.000; 0.194	0.018
Considers as positive the task of being a mother	0.065	0.005; 0.833	0.036

Note. *p-value - Logistic Regression test* = $p < 0.05$; OR = Odds Ratio; CI = Confidence Interval.

Discussion

The 139 women who participated in the three study stages had a profile very similar to that of samples from other national studies that assessed the mental health of pregnant women and women who had recently given birth (Faisal-Cury & Menezes, 2012; Morais et al., 2013). Contrary to data from Faisal-Cury and Menezes (2012) and Zaconeta, Queiroz, Amato, Motta and Casulari (2013), the percentage of women

with symptoms of gestational depression was significantly higher than that of women with symptoms of depression at six and 14 months after childbirth. It can be hypothesized that the reduction of depressive symptoms in the postpartum period was associated with favorable conditions for birth, social support in the early days, both to take care of the child of and domestic chores. However, the difference in results can also be attributed to the instruments used to assess depression in different researches. If Zaconeta et al. (2013) used the Edinburgh

Postpartum Depression Scale - EPDS, a specific instrument to assess depression up to six months after birth, in the work by Faisal-Cury and Menezes (2012) depression in pre and postnatal period was measured with the Self Report Questionnaire (SRQ-20), a screening tool to identify common mental disorders, not specific for depression. In this study, BDI was chosen because women would be evaluated at 14 months, when there is no indication for the use of EPDS.

Regarding neuropsychomotor development, it was found that a high percentage of children were at risk at 6 and 14 months. Despite the difficulty of comparing studies with samples with very different age groups, the prevalence of risk for neuropsychomotor development was close to or greater than that of other studies that used the same screening instrument (Maria-Mengel & Linhares, 2007; Pilz & Schermann, 2007; Ribeiro et al., 2014). As the percentage of babies who were at risk fell from 6 to 14 months, the fact that the children are being cared for in the first months by biological parents, the majority with a stable union and more than eight years of schooling, allows us to suppose that these children can have been benefited from good stimulation conditions, overcoming the losses observed in the first assessment, especially in the gross and adaptive motor skills (Maria-Mengel & Linhares, 2007).

The gross motor subarea was the one with the highest percentage of children with impairments at 6 months and the language area at 14 months. During the first year of life, there is an accelerated pace of changes in the motor area, easily observed by parents and professionals, while in relation to language, the changes are more observed after the first year of life, when the intentional communicative procedures gain momentum, which allows greater precision in the identification of delays, difficult to observe in previous periods of development. It is worth remembering that, for children of this age, their performance in various items in the language area is obtained from the report of parents or guardians (Pedromônico et al., 1999).

There was no association between maternal depressive symptoms and risk of neuropsychomotor development at 6 and 14 months. Likewise, no variables related to maternal and child health, as well as sociodemographic and care factors were associated with neuropsychomotor development. However, both depressive symptoms and some sociodemographic, clinical and care variables were significantly associated with subareas of development: personal-social, language and gross motor skills, both at 6 and at 14 months.

At six months, symptoms of maternal depression were associated with a delay in the area of personal-social development, possibly because depressed mothers offer, primarily, basic care such as food and hygiene, but they interact little and not very warmly with the baby (Cavalcante et al., 2017; Piccinini, Frizzo, Brys, Lopes, & 2014). According to Piccinini et al. (2014), if at times they are apathetic, at other times they are intrusive, not allowing the child to explore the environment, which impairs the development of autonomy and results in less independent and sociable children.

At fourteen months, the association of maternal symptoms of postpartum depression with delays in personal-social development was significant. As the percentage of new cases in the postpartum period was low, several women possibly had this condition since pregnancy, and these were persistent depressive conditions. There is evidence that chronic or recurrent depressive conditions adversely affect the mother-child interaction and its effects can be maintained for a long period, which ends up indirectly impairing child development (Fernandes & Cotrin, 2013; Piccinini et al., 2014).

At fourteen months, depressive symptoms in the third trimester of pregnancy were associated with delay in the gross motor area. Morais et al. (2013) and Popo et al. (2017) also identified symptoms of maternal depression as indicators of delay in gross motor development at 12 months of age. According to Koutra et al. (2013) the consequences of gestational and postnatal depression are diverse for the different subareas of development. In the case of gestational depression, its effect on development may be mediated by the alteration of hormones that accompany disturbances in the maternal emotional state, such as the level of cortisol, causing damage to the fetal brain development, increasing the chances of cognitive and motor delay during the first year of life. On the other hand, postpartum depression would be more related to educational practices and maternal involvement, indirectly leading to damage to the child's social insertion.

With regard to other variables that showed a significant relationship with developmental delays in the sub-areas, low maternal education was associated with impairments in the gross motor area, confirming that mothers in these conditions live, in a less favored social and environmental context, can impair the acquisition of their children's motor skills (Demirci & Kartal, 2018). The baby's hospitalization after birth was also associated with delayed gross motor development at six months, possibly because they were children with possible immaturity of the organic systems or who suffered injuries and neonatal complications. It has been proven that children who have a history of biological vulnerability have a higher risk of presenting motor development problems (Moreira, Magalhães, & Alves, 2014).

As for the association between not breastfeeding in the first hour after birth and language delay at six months, Sampaio, Bousquat and Barros (2016), showed that placing the baby on the breast immediately after birth increases the chances of success in breastfeeding which, in turn, is a favorable moment for mother/baby communication, favoring the acquisition and development of the child's language (Medeiros, Batista, & Barreto, 2015).

Maternal insecurity in care was associated with delays in personal-social development at six months, possibly because these mothers had low self-confidence in their ability to organize and perform baby care, which in turn may have influenced their behavior and entailed risks for child development (Pilz & Schermann, 2007). At 14 months, the children of mothers with more numerous offspring showed impairments in the personal-social area and low maternal education was associated with delays in the gross motor area. There are studies

showing impairments in the development of children whose mothers live in vulnerable environments, have a greater number of children, little social support and little education. They are environments that are poor in stimulation for children to explore and overworked mothers, with less availability to offer care to the child (Morais et al., 2013; Murray et al., 2010).

If the variables presented so far seem to lead to losses for subareas of neuropsychomotor development, a positive perception of the baby and satisfaction in care appeared as protective factors for a gross motor development at six months and personal-social at 14 months. The mother who positively evaluates her child and feels pleasure in performing the maternal function, is probably a responsive mother, who performs activities with the child, which ends up favoring an adequate development (Piccinini et al., 2014).

At 14 months, children of mothers who had more than eight years of schooling performed better in the personal-social area, possibly because families with higher education can contribute to a more adequate stimulation, and, consequently, better child performance (Souza, Dourado, & Lemos, 2015). As for the fact that the mother does not smoke, it may have increased the chances of a full-term pregnancy, with fewer complications with the newborn (Zhang et al., 2011), factors that enhance the possibilities of good motor development.

Some methodological considerations can help to better understand the results. Regarding the sample, despite several measures taken to minimize losses, the high physical mobility and socioeconomic conditions of most mothers made it difficult to locate them and there was a considerable reduction in participants in the two final phases of the study, one of the great difficulties of longitudinal researches. The fact that women with higher education remained in the second stage may have influenced the results, since it is a protective factor for development. However, the fact that no significant differences were observed in the groups in relation to depression allows us to suppose that the loss did not contribute to a selection bias in relation to this explanatory variable.

Another study limitation may result from the use of screening and not diagnosis instruments. In addition to the considerations already made about the BDI, in relation to the Denver Test-II, which is widely used and internationally recognized, there are flaws in its predictive validity and sensitivity (Drachler, 2000). The test places little emphasis on emotional and self-regulatory aspects, which according to Feldman (2015) is one of the aspects most affected by maternal mental health. In future studies, it would be interesting to review whether there are new validated instruments for assessing mental health in women in the perinatal period, including clinical assessments, such as DSM IV, in addition to developmental assessment scales that are not limited to assessing motor, cognitive, social and language aspects.

Despite these limitations, the longitudinal design showed that the percentage of women with depressive symptoms was much higher in the gestational period and decreased significantly in the postpartum period, confirming recent studies that identified a high frequency of depressive symptoms during

pregnancy and signaling the need to create interventions still in the prenatal period, with the objective of preventing possible risks in the conditions of delivery, newborn's health and later development (Arrais & Araújo, 2017; Gerstein et al., 2017).

Maternal depressive symptoms, in the pre- and postnatal periods, were differentially associated with delays in the development of subareas, but contrary to expectations, there was no association between any of the variables, including maternal depressive symptoms, and delayed global development at 6 and 14 months of age. For some authors, the relationship between maternal depression and developmental delay may not be direct, but mediated by other variables that indirectly interfere in the process, such as mother/child interaction, which would need to be further investigated in future studies, as well as resorting to analyses that consider development as a multifactorial process, which suffers the effects of multiple individual, contextual and interactive variables acting simultaneously, requiring more complex forms of analysis in future works (Gerstein et al., 2017; Morais et al., 2013).

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