

## **EFFECTS OF MATERNAL DEPRESSION ON CHILD LANGUAGE DEVELOPMENT**

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*Vinicius Pierre Matos Gonçalves*

Speech therapist by the Medicine Course of:  
Universidade de São Paulo – FMUSP  
ORCID: 0000-0002-7773-4569

*Daniela Cardilli-Dias*

Doctoral student of the Postgraduate  
Program (Doctorate) in Rehabilitation  
Science of the Department of Physiotherapy,  
Speech Therapy and Occupational Therapy  
of the Medicine Course, Universidade de São  
Paulo – USP  
0000-0002-7615-7974

*Daniela Regina Molini-Avejonas*

Lecturer in Speech Therapy at the Medicine  
Course of: Universidade de São Paulo - USP -  
São Paulo (SP), Brazil  
0000-0002-9768-882X

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(SP), Brazil.

## INTRODUCTION

Depression that occurs after birth is called postpartum depression (PPD), while depression that occurs during pregnancy is called antenatal depression. In international studies, the prevalence of prenatal depression is estimated at approximately 12%, with the highest prevalence in the last two trimesters, while the prevalence of PPD varies from approximately 10-15%, but can reach 30% depending on the criteria used for the diagnosis<sup>1</sup>. In Brazil, in needy populations, they indicated a prevalence between 30 and 40% of PPD<sup>2</sup>. More recently, at the beginning of this pandemic, between February and April 2020, the risk rate of depression in pregnant women was up to 49.3%<sup>3</sup>.

The new Diagnostic and Statistical Manual of Mental Disorders (DSM-5) does not consider that depressive symptoms can develop beyond 4 weeks after delivery. Furthermore, it does not distinguish between a prenatal or postnatal onset of depression, collectively referring to the episodes as “peripartum episodes”. As much as it is widely recognized that 4 weeks after childbirth for perinatal depression is a very limited period and that the term “Maternal Depression” (MD) may be a better descriptor of antenatal, puerperal and postpartum depression, therefore, these other terminologies could be included as specifications of the MD as a whole<sup>4-6</sup>.

In maternal depression, risk factors are multifactorial, including history of anxiety, bipolar disorder, depression, unwanted pregnancy, life stress, history of sexual abuse, domestic violence, low social support, low quality of relationship and low socioeconomic status<sup>7</sup>.

However, one of the factors that stands out is the depressive history, since the symptoms can persist or worsen throughout the pregnancy until the postpartum period,

in addition to the postpartum Blues, which is a more mild PPD, which occurs due to the rapid change in reproductive hormones close to childbirth, and can progress to Chronic Depression<sup>5</sup>. During the COVID-19 pandemic, some factors intensified or emerged, such as the loss of social support, from health professionals, family members, friends, an increase in family fights, and even news about the pandemic, which interfered with mental health, raising levels of concern and anxiety in these mothers<sup>4-5</sup>.

In maternal depression, the symptomatology does not differ qualitatively from what occurs in other stages of life.<sup>8</sup> Symptoms may manifest in the mother as depressed mood, anxiety, compulsive thoughts, loss of control, feelings of inadequacy, inability to cope, irrational fears, fatigue and hopelessness<sup>9</sup>. It is a serious mental illness that not only affects the mother but also the fetus and child. In the literature, it is possible to observe a well-established relationship between untreated maternal depression and impaired child development<sup>10</sup>. Depressed women during pregnancy are less likely to take care of their health and personal well-being, tend to underutilize prenatal care, have greater substance use, poor nutrition, excessive weight gain, which may negatively affect intrauterine life and the short and long term neurodevelopment of the child<sup>1,10</sup>. After childbirth, the risks are related to the maturation of the child, as there is less sensitivity on the part of the mothers and less responsiveness on the part of the babies, with a greater impairment of care activities, such as feeding, sleeping routine, vaccines, safety<sup>11</sup>. In addition, there is the mother-child interaction issue, which turns out to be significantly impaired, due to the reduction in the frequency with which mothers touch their babies, in a less affectionate way, using a more limited vocal

and visual communication, with fewer smiles, face-to-face interactions, and baby-directed speech<sup>12</sup>.

Regarding the effect on language, studies on prenatal depression suggest that there may be interference in the development of this field along with cognition, as stress, depression, and maternal anxiety during pregnancy may result in programming effects on the hypothalamic-hypothalamic axis. pituitary-adrenal, in other words, more reactive to stress<sup>13</sup>. Other studies show that the general trend is that maternal PPD seems to have little effect on receptive language development, while it may have some effect on expressive language development.<sup>14</sup>.

As language is embedded in a subject's cognitive circuitry that interacts with the environment, the impairments are obviously not particular to a developmental field. The fetal formation and/or maturation of the infant when exposed to the possible effects of MD, demonstrate to be affected in several aspects. In the literature, in terms of motricity, there is no consensus on findings that associate an alteration in this field with DM<sup>15</sup>. In relation to cognitive, social and emotional development, there are possible losses to be associated, newborns exposed to maternal depression present more dysregulated behavior, such as disturbed/disorganized sleep and difficult temperament<sup>16</sup>.

However, there are factors that can moderate these symptoms, studies indicate that favorable socioeconomic conditions reduce the effects related to emotional difficulties. Furthermore, greater involvement of the father or other caregivers may attenuate the effects of maternal depression and behavioral impairments. Thus, financial condition and social support are factors that can positively interfere with the condition, but it is still necessary to investigate how this association occurs with regard to the development of cognition and language<sup>17-19</sup>.

Therefore, in the light of the evidence that composes the theme, the role of this work is revealed by adding data and discussions to the debate about the effects of DM on language, given the mother-baby bond.

## **GOALS**

Primary objective: to evaluate the effects of maternal depression in relation to language acquisition and development

Secondary objective: to characterize the effects on the formation of the mother-infant bond, and the existing relationship in different domains of development in this context.

## **METHOD**

The study was carried out in a cross-sectional, descriptive and quantitative approach through online forms prepared by its author. The research was accepted by the Ethics Committee, opinion number CAEE 57009122.1.0000.0068.

Sample with a total N of 47 participants inclusion criteria are: Children aged 6 to 47 months, daughters of mothers with self-reported depression, with availability to fill out the questionnaires. Exclusion criteria: non-consent to the Free and Informed Consent Form (TCLE) and incomplete questionnaires.

Samples identified in the services of the Laboratory of Speech-Language Pathology Research in Primary Health Care (LIF APS) at FOFITO-FMUSP and/or in convenience sampling.

## **MATERIAL**

Two online forms were prepared, the first consisting of a characterization of the sample created by the research author: (Maternal and child age, maternal education level, family income, drug intervention), in addition to the digital adaptation of protocols:

1. Edinburgh Postnatal Depression Scale (EDPNE)<sup>20</sup>
2. *The Postpartum Bonding Instrument* (PBI)<sup>21</sup>
3. *Ages & Stages Questionnaires* (ASQ-3)<sup>22</sup> – quantitative portion In the protocol EDPNE<sup>20</sup>, in its original use if you use it to carry out a specific PPD screening, with 10 questions, each worth 0 to 3 points, with 10 points being the cutoff score, above identifies PPD. However, in this research, PPD was theoretically considered within the conception of Maternal Depression, not making a distinction between Pre, Peri or Post-Gestational Depression, therefore, based on the assumption that all dyads have self-reported depression (DM), we used this instrument as a quantifier of depressive symptoms.

In the instrument: PBI<sup>21</sup> we tried to characterize changes in the mother-baby bond based on the qualification Factor 1 – General alteration of the bond, Factor 2 – Rejection and psychological anger, Factor 3 – Anxiety focused on the baby, Factor 4 – Incipient abuse.

In the second form the instrument: ASQ-3<sup>22-23</sup>, it measures the maturational stage of child development in: Communication: Gestures, sounds or words, dramatic expression, expression and understanding. Fine Motor: Manual activities, which include using small muscles coordinating hands and eyes. Ample Motor: Posture, Locomotion and Body Coordination. Problem solving:

Perception, Adjustment, and Orientation  
 Personal Social: Child's reaction to other people.

## PROCEDURE

Data collection was carried out after acceptance of the Free and Informed Consent Form (TCLE) by the participants, through

virtual questionnaires via sending a link by email and/or Whatsapp due to the pandemic context of the Coronavirus (COVID-19). 19) and later in person according to the easing of the health guidelines at this time. Data were stored and organized on the platform (Google Sheets) for analysis.

## DATA ANALYSIS

A quantitative descriptive analysis was performed to characterize the sample considering a significance level P value of 0.05, Fisher's Exact Test was used to establish dependency relationships. In order to investigate the possible differences in the points of the ASQ-3, PBI and EDPNE questionnaires, average comparison tests were applied to test the equality of a variable in two different publics.

## RESULTS AND DISCUSSIONS

To elucidate the discussion with the results obtained, we will initially analyze the circumstances in which the sample group found itself, in order to later understand how the variables behaved.

According to Table 1, almost half of the sample was composed of subjects belonging to Socioeconomic stratification A and B<sup>24</sup>. In Tables 2, at least 70.2% of the mothers in the sample have completed higher education, in addition to 85.1% having access to higher education, denoting a homogeneous group regarding access to financial resources, knowledge of universities and access to psychiatric care, since 85.1% also received drug treatment, as shown in Table 3.

Thus, it does not faithfully represent the predominant socioeconomic conditions in the population of Brazilian mothers. As argued by Lobato et al (2011), the characterization of this population is fundamental for the interpretation of the results, since these characteristics are close to measures provided

Family income	Registrations
Over R\$ 862,41	4 (8,5%)
R\$ 862,42 to R\$ 1.894,95	2 (4,3%)
R\$ 1.894,96 to R\$ 3.194,33	11 (23,4%)
R\$ 3.194,34 to R\$ 5.721,72	3 (6,4%)
R\$ 5.721,73 to R\$ 10.788,56	5 (10,6%)
R\$ 10.788,57 to R\$ 22.749,24	9 (19,1%)
Over R\$22.749,24	13 (27,7%)
<b>Total</b>	<b>47 (100%)</b>

Caption: According to the Brazilian association of research companies (ABEP), in the publication of the Economic Classification Criteria (CCE) of 2021, it established that the average income of Above R\$22,749.24 is classified as (A), R\$10,788, 56 up to R\$22,749.24 (B1), R\$5,721.72 up to R\$10,788.56 (B2), R\$3,195.33 up to R\$5,721.72 (C1), R\$1,894.95 up to R\$3,194.33 (C2), R\$ \$862.41 to R\$1,894.95 (D), R\$0 to R\$862.41 (E).

Table 1: Characterization of family income

Education level	Registrations
Incomplete Elementary School	1 (2,1%)
High school	6 (12,8%)
Incomplete higher education	7 (14,9%)
Complete Higher Education	33 (70,2%)
<b>Total</b>	<b>47 (100%)</b>

Table 2: Characterization of maternal education level.

Drug intervention during the depression crisis	Registrations
Yes	40 (85,1%)
No	7 (14,9%)
<b>Total</b>	<b>47 (100%)</b>

Table 3: Registrations of drug intervention.

in developed countries, with white populations, from more favored socioeconomic classes, among which the prevalence of PPD is lower than in developing countries, due to example, international averages refer to a proportion of 10-15%, while in Brazil the numbers reach 40%.<sup>1-3</sup>

In this research, there were no statistically relevant relationships of dependency regarding family income with DM and/or formation of a mother-baby bond, however access to drug treatment is strongly dependent on this financial condition Table 4,

explaining a condition of privilege regarding access to this type of treatment. In addition to this logic, according to the present research, dyads under medication had, on average, a lower alteration score in the Personal Social field (Table 5) and Communication (Table 5). According to Lindensmith, R. et al (2018), pharmacological treatment seems to have no effect on the dyad bond, but only on the condition of depression, while greater family involvement plus psychotherapy presents more efficient results for the dyad in general<sup>25</sup>.

Family income	Drug intervention		Total
	No	Yes	
Over R\$ 10.788,56	0	22	22
Up to R\$ 10.788,56	7	18	25
Total	7	40	47
<i>P value</i>	0,010		

Table 4: Relationship between family income and drug intervention.

Drug intervention	ASQ3 Score: Personal Social (Average ± Standard Deviation)	
	DM	DMI
No	23,6 ± 12,8	20,0 ± 10,6
Yes	40,4 ± 12,1	38,2 ± 11,7
<i>P value</i>	0,012	0,014

Table 5: Difference in the average of points of the Social Personal block when there is drug intervention in mothers with DM and AMD

Drug intervention	ASQ3 Score: Communication (Average ± Standard Deviation)	
	DM	DMI
No	30,0 ± 11,9	29,0 ± 14,3
Yes	44,5 ± 15,8	42,6 ± 15,9
<i>P value</i>	0,018	0,103

Table 6: Difference in the mean score of the Communication block when there is drug intervention between mothers with DM and IMD.

In addition, it appears that at the time of the interview, 31.9% of the mothers with self-reported Maternal Depression (MD) were experiencing some depression crisis and 68.1% were not or were unable to answer. The presence of mothers who responded that they were not experiencing a crisis at the time, indicates that they participated in the research asynchronously with depression, while those who did not know, denote the doubts of these women in relation to their condition at that time. But mothers with a crisis at the time would be portraying symptoms that are current in their lives, showing a synchronicity with depression<sup>26</sup>, as shown in Table 7.

In Table 8, of the mothers with DM, 80.9% have symptoms suggestive of severe maternal depression (IMD), while 19.1% have mild symptoms (MBD), which denotes a somewhat homogeneous group in terms of the symptomatic situation of the experience. maternal depression. Table 9 shows that mothers who are not, or who are not sure about their condition when they evoke the symptoms of the moment they had it, tend to mention them less intensely than mothers under the influence, since 100% of the mothers who answered the questions while under the effect of the crisis, showed more severe symptoms.

In Table 10, it can also be seen that the vast majority of mothers, 91.5% of the interviewees, had a crisis when the child was up to 1 year old, and as the child's age progressed, fewer mothers tend to have a crisis. This can be corroborated by the literature, where there is evidence that symptoms tend to progress from severe depression to moderate depression within 6 months, and moderate to mild depression within 1 year, with or without treatment.<sup>27, 28</sup>

For the PBI questionnaire, Table 11, which aims to score the mother-infant bond, the results are shown below in the Tables below.

In general, 53.2% of the links are changed. Studies have shown that maternal depression can be a risk factor in the development of the mother-infant relationship is associated with less structuring, greater maternal disengagement, irritability and hostility<sup>29-30</sup>. In Table 12, the Factors that qualify the bond were correlated with the results of the symptomatic measurement of DM, and it is noted that when the depressive symptoms are more intense, the higher is the average score of change in the bond, being only in factor 4 the impossibility of realizing this association.

However, in Table 13 and Table 14 mothers who were under the effect of the crisis at the time of the research, showed a strong correlation with factor 4, denoting this relationship between the crisis at the time of the research and the presence of this type of bond. Such an association is widely discussed in the literature, in which the difficulty in establishing a bond positively affects maternal abusive behavior, although the correlation of this behavior with Maternal Depression is considered uncertain. On the other hand, there are researches dealing with this relationship DM and abuse in a more intimate way, based on the assumption that the type of bond that the mother develops with the child depends on the emotional health of the mother herself<sup>31 - 32</sup>.

The bond still seems to be affected by the social support variable. In Table 15, 31.9% of the mothers did not receive assistance at some moments, or did not receive assistance at the time of the depressive crisis. Therefore, as shown in Table 16, when correlating how the lack of help affects the dyad bond, a strong association with abusive behavior on the part of mothers is observed, evidencing the importance of support for these mothers on the part of the family and the community. society. There is evidence in the literature that supports this relationship<sup>19,32</sup>, there is

Crisis at the time of research	Registrations
Yes	15 (31,9%)
No	26 (55,3%)
The person was not able to answer	6 (12,8%)
<b>Total</b>	<b>47 (100%)</b>

Table 7: Registration of mothers with crisis at the time of the survey.

EDPNE Results	Registrations
Suggestive of Intense DM	38 (80,9%)
Suggested by DM Branda	9 (19,1%)
<b>Total</b>	<b>47 (100%)</b>

Table 8: Characterization of DM symptoms in mothers.

Crisis at the time of research	EDPNE Results		Total
	Suggested by DM Branda	Suggestive of Intense DM	
No or unable to answer*	9	23	32
Yes	0	15	15
<b>Total</b>	<b>9</b>	<b>38</b>	<b>47</b>

Caption: Due to volumetrics, the categories were not and did not know how to answer the crisis information at the time of the research were grouped. According to Fisher's test with a P value of 0.041, there is a significant dependence relationship between the seizure at the time of the survey and the result of the EDPNE.

Table 9: Relationship between crisis at the time of the research and DM symptoms

Age of the child at the time of the crisis	Registrations (division 47)
0 months up to 12 months	43 (91,5%)
13 months up to 24 months	13 (27,7%)
25 months up to 36 months	3 (6,4%)
37 months up to 47 months	1 (2,1%)
<b>Total</b>	<b>60 (127,7%)</b>

Table 10: Characterization of the child's age at the time of the DM crisis.



<b>PBI Factor 1</b>	<b>Registrations</b>
Normal	22 (46,8%)
Damaged bond	25 (53,2%)
Total	47 (100%)
<b>PBI Factor 2</b>	<b>Registrations</b>
Normal	36 (76,6%)
Rejection and pathological anger	11 (23,4%)
Total	47 (100%)
<b>PBI Factor 3</b>	<b>Registrations</b>
Normal	39 (83%)
Baby-focused anxiety	8 (17%)
Total	47 (100%)
<b>PBI Factor 4</b>	<b>Registrations</b>
Normal	42 (89,4%)
Incipient abuse	5 (10,6%)
Total	47 (100%)

Table 11: Characterization of the mother-baby bond.

<b>EDPNE Results</b>	<b>Point Average (<math>\pm</math> OD) factor 1</b>	<b>Point Average (<math>\pm</math> OD) factor 2</b>	<b>Point Average (<math>\pm</math> OD) factor 3</b>
Suggestive of Mild Maternal Depression	8,3 $\pm$ 5,5	7,1 $\pm$ 3,5	2,9 $\pm$ 1,8
Suggestive of Severe Maternal Depression	14,4 $\pm$ 8	10,4 $\pm$ 4	6,7 $\pm$ 4,1
<i>P value</i> of Test t	0,015	0,029	0,000

Table 12: Difference in the average score of the types of mother-infant bonding when there is DMB and DMI.

Crisis at the time of research	Result PBI Factor 4		Total
	Incipient abuse	Normal	
No or unable to answer	1	31	32
Yes	4	11	15
<b>Total</b>	<b>5</b>	<b>42</b>	<b>47</b>
<i>P value</i>	0,030		

Table 13: Relationship of mothers under the effect of DM crisis at the time of the research with the presence of Incipient abuse.

Crisis at the time of research	PBI Score Factor 4 (Mean ± Standard Deviation)	
	DM	DMI
No or unable to answer	0,2 ± 0,6	0,2 ± 0,4
Yes	0,7 ± 0,9	0,7 ± 0,9
<i>P value</i>	0,054	0,033

Table 14: Difference in the average score of the type of bonding Incipient abuse when there are mothers with a DM crisis at the time of the research in DM and IMD mothers.

Assistance in times of crisis	Registrations
Yes	32 (68,1%)
No	4 (8,5%)
<b>In just a few moments</b>	<b>11 (23,4%)</b>
<b>Total</b>	<b>47 (100%)</b>

Table 15: Records of mothers who obtained social assistance during the DM crisis.

Help from Family/Others	Result PBI Factor 4		Total
	Incipient abuse	Normal	
No or at times only	4	11	15
Yes	1	31	32
<b>Total</b>	<b>5</b>	<b>42</b>	<b>47</b>

Caption: According to Fisher's test with a P value of 0.030, there is a significant dependency relationship between help from family members/others and the PBI result for factor 4 (Incipient Abuse)

Table 16: Relationship between social assistance and *Incipient abuse*.

a dampening effect of parents on maternal mental illness in the face of child attachment when they are involved in the care of the baby, many other studies have included the action of family members in this welcoming process as an intervention, emphasizing even more the benefits of social participation in the care for babies of mothers with DM<sup>33</sup>.

The nodal point in the construction of the hypothesis of this work is how the preceding variables can influence child development, especially in language, and in general, Communication and Social Personnel were the most affected fields, as shown in Table 17. These data were obtained by the ASQ-3 protocol, this instrument is intended to screen child development through a standardization of maturational stages, and not for the purpose of a specific assessment<sup>22</sup>. In other studies that investigated language in DM, the use of instruments such as the Bayley Scales of Child Development (2nd or 3rd edition) or the Mullen Scales of Learning is noted, in which both use receptive and expressive linguistic scores, enabling an assessment more specific<sup>15</sup>.

Despite the limitation in the measurement specificity in this work for this variable, it was still possible to verify how communication behaved on this occasion. It was noticed in Table 18 that when there is incipient abuse, the average score for Communication is lower, although it cannot be said that it is a dependency relationship, but demonstrating that an altered bond is present when there is this decrease in the score. In addition, Table 19 shows a change in the average of the Social Personal field, depending on the result in the Communication field, which denotes a link between the scores, although it is not possible to state that there is a dependency relationship between them.

According to the socio-pragmatic view (Bruner, 1983), children acquire language

through social interaction. The pre-verbal period, described as pure pragmatics, is essential for language acquisition. Thus communication and social-emotional skills are closely connected, there is even recent evidence that communicative skills predict social-emotional skills<sup>34</sup>, and the latter, therefore, together with pre-linguistic skills, is related to children's vocabulary development.<sup>35-37</sup>

In Table 20, Personal Social development is also related to problem solving and in both, the mean score of mothers who are suggestive of DMB is higher than the mean score of mothers who are suggestive of DMI. In Problem Resolution, in Table 21, the score showed a significant relationship with the Rejection and pathological anger attachment disorder. Which may also be related to an inverse effect, that the child is affecting the mother's mental health based on her condition, since the contrast between the expected child and the one that has just been born can significantly affect the maternal function.<sup>38</sup> Regarding the question motor, as well as in the literature, it was not possible to establish dependency relationships with factors related to DM<sup>15</sup>, however, according to Table 22, the average performance of the field decreased when there is an anxiety factor focused on the baby.

## CONCLUSION

From the findings of this research, it was possible to evaluate the maternal symptoms of depression and its effects on language, to characterize the mother-baby bond and the relationship between the fields of development in this context. It was not possible to establish a dependency relationship between depression and communication, suggesting further studies with more specific protocols to analyze this relationship. Favorable family income was not directly related to maternal

ASQ3 Result	Communication	Broad motor	Fine motor	Social Staff	Problem Resolution
Above the Cutoff Point	37 (78,7%)	42 (89,4%)	40 (85,1%)	34 (72,3%)	41 (87,2%)
Below the Cutoff Point	10 (21,3%)	5 (10,6%)	7 (14,9%)	13 (27,7%)	6 (12,8%)
<b>Total</b>	<b>47 (100%)</b>	<b>47 (100%)</b>	<b>47 (100%)</b>	<b>47 (100%)</b>	<b>47 (100%)</b>

Table 17: Characterization of child development.

PBI Factor 4	ASQ3 Score: Communication (Average $\pm$ Standard Deviation)	
	Self-reported	DMI
Incipient abuse	29,0 $\pm$ 8,9	27,5 $\pm$ 9,6
Normal	43,9 $\pm$ 16,0	42,4 $\pm$ 16,2
<i>P value</i>	0,014	0,041

Table 18: Difference in the mean score of Communication when there is the Incipient Abuse factor in mothers with DM and IMD.

ASQ3 Result: Communication	ASQ3 Score: Personal Social (Average $\pm$ Standard Deviation)	
	DM	DMI
Below the Cutoff Point	27,0 $\pm$ 10,3	25,6 $\pm$ 9,8
Above the Cutoff Point	40,8 $\pm$ 12,8	39,0 $\pm$ 12,3
<i>P value</i>	0,002	0,004

Table 19: Difference in the average score of the Personal Social block when there is a change in the Communication block in mothers with DM and IMD

EDPNE Results	Point Average ( $\pm$ SD) Problem Resolution	Point Average ( $\pm$ OD) Personal/Social
Suggestive of Mild Maternal Depression	57,2 $\pm$ 4,4	46,7 $\pm$ 12,2
Suggestive of Severe Maternal Depression	44,3 $\pm$ 13,9	35,8 $\pm$ 13
<i>P value of the Test t</i>	0,000	0,035

Table 20: Difference in the mean points of the Social Personal and Problem Solving blocks when there are mothers with AMD and MBD

ASQ3 Result: Problem Resolution	Result PBI Factor 2		Total
	Normal	Rejection and pathological anger	
Below the Cutoff Point	1	5	6
Above the Cutoff Point	35	6	41
Total	36	11	47
<i>P value</i>	0,002		

Table 21: Relationship between the performance of infants in Problem Solving with the Rejection and pathological anger link type.

Resultad of PBI (Factor 3)	ASQ3 Point Fine Motor (Mean ± Standard Deviation)	
	DM	DMI
Baby-focused anxiety	36,2 ± 11,3	36,2 ± 11,3
Normal	46,5 ± 13,2	45,8 ± 13,8
<i>P value</i>	0,043	0,062

Table 22: Difference in mean fine motor block points when there is the type of link Baby-focused anxiety in DM and DMI.

depression, but with the possibility of drug treatment, while social support directly affected the mother-baby bond. Therefore, it was possible to discuss the issue of child sociolinguistic development in view of the theme of maternal depression in order to increase the data framework regarding this public health issue.

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