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PSYCHOMOTOR DEVELOPMENT, SOCIAL-EMOTIONAL FUNCTIONING, QUALITY OF THE RELATIONSHIP WITH THE CAREGIVER AND MENTAL HEALTH IN EARLY CHILDHOOD, UNDER SEVERE RISK

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ABSTRACT. Interpersonal relationships are essential in early childhood and adaptation to interpersonal stress constitutes one of the main adaptive tasks during this period. Sixty-eight infants and toddlers at severe risk were included in our study, in order to investigate the impact of the relationship with the primary caregiver on the child's psychomotor development and mental health. We found significant associations between mental health status and psychomotor development, relationship functioning and psychomotor delay, as well as between social-emotional functioning and severity of the child's developmental delay. Several implications for the clinical practice with infants and toddlers were derived.

Key words: *infant/ toddler mental health, relationship with the caregiver, social-emotional functioning, psychomotor development.*

ABSTRAKT. „Psychomotorische Entwicklung, gesellschaftlich-gefühlsmäßige Arbeitsweise, Qualität der Beziehung mit dem Pfleger und psychische Verfassung in der früheren Kindheit unter ernster Gefahr“- Die zwischenmenschlichen Beziehungen sind wichtig in der früheren Kindheit und die Anpassung zu zwischenmenschlicher Stress bezeichnet eine der wichtigsten Anpassungsaufgaben dieser Zeit. Neunundsechzig Säuglinge und Kleinkinder mit ernster Gefahr wurden in dieser Studie einbezogen, um die Auswirkung der Beziehung mit dem erster Pfleger der psychomotorischer Entwicklung und psychische Verfassung zu untersuchen. Wir haben bedeutende Assoziierungen zwischen der psychischen Status und die psychomotorische Entwicklung, wirkende Beziehung und psychomotorische Retardation, als auch zwischen, gesellschaftlich-gefühlsmäßige Arbeitsweise und die Ernsthaftitgkeit der Retardation des Kindes gefunden. Einige Auswirkungen für das klinische Praktikum mit Säuglinge und Kleinkinder wurden abgeleitet.

Schlüsselwörter: *psychische Verfassung des Säuglings/des Kleinkindes, Beziehung mit dem Pfleger, gesellschaftlich-gefühlsmäßige Arbeitsweise, psychomotorische Entwicklung.*

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In a psychodynamic perspective, infant and toddler mental health disorders originate in disorders of the relationship between the child and the caregiver, namely the mother (Emde, 1983). Maternal rejection, anxiety, hostile motherhood, agression from the mother lead to infantile psychosomatic disorders that affect the child's development. The impossibility of maintainance of an emotional relationship with the mother, the insufficient interaction determine the occurrence of increasingly severe symptomatology (Parke, 1992). Emde (1983) considers that maternal deprivation is the most important factor that affects infant development, while deprivation in other areas (either sensory or motor) can be compensated by the adequate relationship with the mother.

More recent theories of development confirm that the lack of social interaction in the first years of life has important effects on the child's development later in life (Stack, 2004). Though a number of factors from the child's environment are associated with non-organic developmental disorders, among which nutrition holds a privileged place (Pollitt, Gorman and Metallinos-Katsaras, 1992), if the child's emotional needs are being met and proper treatment is insured where necessary, the child can overcome certain obstacles encountered on the developmental path, such as malnutrition, without severe sequelae.

Child institutionalization, though unrecommendable, can become a valid alternative to a disordered mother – child relationship, especially if a proper maternal substitute is found for the child (Bornstein and Tamis-LeMonda, 2004). Thus, maternal deprivation does not necessarely have to be a causal factor for child psychopathology.

Child development in the light of the attachment theory occurs in the context with the sensitive and responsive relationship with the primary caregiver. The attachment figure, that needs to be a consistent presence in the first years of life, fosters development by the three main functions it holds: (1) it represents the target for the proximity seeking behaviors, (2) it constitutes the child's „safe heaven" in difficult periods, (3) it represents the child's „secure base", allowing the child to fulfill his/ her needs in a safe environment (Mikulincer and Shaver, 2007, Wallin, 2010). According to attachment theory, the real or expected dissappearance of the attachment figure generates separation distress. As a reaction to stress, the increase in cortisol level may lead to perturbations in neural functioning, that leads to deficits in the mental functioning, with consequences on the child's adaptive capacity (Mircea, 2008). On the other hand, the interaction with significant persons atenuates the activation of autonomous nervous system and the hypothalamic – pituitary – adrenal axis during stressful experiences, holding regulatory influences on the perception of threat at the cerebral level (Coan, 2008).

According to Bowlby (Bretherton and Munholland, 2008), from the cradle to the grave, the human being mental health is strongly related to the relationship with attachment figures, that provide emotional support and physical protection. Early social relationships influence and are being influenced by developmental psychopathology (DeKlyen and Greenberg, 2008), as they influence the central processes involved in it: construction of cognitive - affective expectancies, emotional and behavioral

regulation ability, stress coping strategies. Attachment security was considered, in the light of the above mentioned arguments, important factor of resilience (DeKlyen and Greenberg, 2008, Weinfield et al., 2008). The influence of attachment on psychopathology needs to be considered within the child and family ecology, the adult's capacity to deliver the responsive and sensitive care that the child needs is strongly influenced by the context (stress, financial difficulties, frequent residence change, violence within the proximal environment) and the way that the mother – child dyad adapts to difficulties in their environment needs to be approached in future research (Kobak and Madsen, 2008).

As a consequence of research on the effects of maternal deprivation on the children, reactive attachment disorder was included in the third edition of the DSM and special attention to early childhood mental health issues was considered necessary, leading to fulminant development of the infant mental health field. The Diagnostic Classification of Mental Health and Developmental Disorders of Infancy and Early Childhood (Zero to Three, 1995, 2005) is considered an important step forward in this field (DeKlyen and Greenberg, 2008), as it includes a special axis on which the parent – child relationship functioning is assessed. The revised edition of the manual used the term „deprivation/ maltreatment disorder" to replace the nosologic category „attachment disorder" specified by the DSM.

As the association between early childhood mental health issues and child development is indisputable and deriving from practical necessities, our study *aimed* at analysing the association between psychomotor delay in infants and toddlers at risk and mental health issues, in the context of parent – infant relationship quality, child emotional and social functioning and characteristics of the family environment and psychosocial stress. We *hypothesized* that: (1) the psychomotor delay is significantly higher in children from inadequate social environments, compared to children from adequate environments, (2) the psychomotor delay is significantly associated with the quality of the parent – child relationship, (3) the psychomotor delay is significantly associated with emotional and social functioning of the child, (4) the quality of the parent – infant relationship is significantly associated with the emotional and social functioning of the child.

Method

Participants

Sixty-eight hospitalized infants and toddlers were selected for a larger study. The whole sample of children came from atypical social environments and suffered from various forms and degrees of malnutrition. Children with severe neurological disorders (cerebral palsy), sensory disability and acute illnesses were excluded from the study sample, with the purpose of obtaining a homogenous sample. *Ethical* principles, referring to confidentiality, avoidance of stigmatization and discrimination, non-intrusiveness of assessment were respected.

The age variance was 2 to 27 months, with a mean age of 8.40 (±5.59), a similar percentage of male children (55.9% of the total number) and female children (44.1%). The sample distribution based on the severity of malnutrition was: 8.8% of the total sample presented first degree malnutrition, 2.9% degree I/II (included in the group with first degree malnutrition), 40.6% second degree, 15.9% degree II/III and 31.9% third degree malnutrition.

Instruments and procedure

Developmental level was established on the basis of semi-structured observation (Costea-Bărluțiu, 2010) for five areas: (1) gross motor; (2) fine motor; (3) cognitive; (4) language and (5) social-emotional. The difference between chronological age and developmental age was considered developmental delay in each area.

Infant mental health screening was performed by means of The Mental Health Screening Tool (children 0 to 5 Years), MHST 0-5 (California Institute for Mental Health, 2000). Detailed *assessment* of infant mental health status was achieved using both the DSM-IV-TR (American Psychiatric Association, 2000) and the multiaxial scheme from the Diagnostic Classification of Mental Health and Developmental Disorders of Infancy and Early Childhood, original and revised editions (DC: 0-3/ DC:0-3R, Zero to Three, 1994, 2005). The five axes of DC:0-3 are: (1) Clinical disorders, (2) Relationship classification (Parent-Infant Relationship Global Assessment, PIR-GAS), (3) Medical and developmental disorders and conditions, (4) Psychosocial stressors, (5) Emotional and social functioning. The assessment tool was designed specifically for the assessment of mental health in early childhood, it is a developmentally oriented instrument that provides a diagnostic profile of the child, guiding the intervention. The assessment was performed during several meetings with the child (3 to 5 observations, 30-60 minutes each) in different contexts and situations and the fulfillment of criteria for a clinical disorder was interpreted as a risk and not as a label for the child. Close cooperation with the child's pediatrician and hospital personnel was essential for the assessment process.

The statistical package used for data analysis was SPSS 13.0 for Windows, statistical procedures were performed according to the study objectives and the type of data gathered. We used Kruskall-Wallis (H), Pearson correlation (r), Cramer's (V) tests and regression analysis (β), depending on the variable type and the required processing.

Results and discussion

All the infants and toddlers in our study were admitted to hospital with nutrition disorders and we found that most of the children presented various degrees of *psychomotor delay*, cuantified as the difference (in months) between chronological and developmental age within five areas: gross motor, fine motor, cognitive, language and social-emotional. Of the five areas investigated, language was the most affected

for the children included in our sample, proving that whereas motor development may progress even in the case of children coming from atypical environments, language development is most probably affected in the case of children lacking the adequate scaffolding.

The severity of psychomotor delay was not significantly different in male and female children ($p>.05$) and was significantly higher as the degree of malnutrition increased, but only for language [$H(3)=7.81$, $p=.05$] and social-emotional [$H(3)=11.39$, $p=.01$] developmental areas, whereas in the case of gross motor, fine motor and cognitive areas the differences were not statistically significant ($p>.05$).

We analyzed the impact of the caregiving environment characteristics on the child's psychomotor delay within the five developmental areas, considering three main characteristics: (1) family economic conditions (precarious/ poverty vs. acceptable/ above poverty level), (2) family cultural level (low vs. medium), (3) family living conditions (inadequate vs. adequate housing). As all the children in our sample came from atypical social environments, the differences at the level of the above mentioned characteristics are small.

The differences found for the severity of psychomotor delay were not significant between children coming from families suffering from poverty (families with no income), as compared with children from families with acceptable economic conditions (employed parents), for any of the five developmental areas we investigated ($p>.05$). Similarly, the family cultural level was not relevant for the differences in severity of the psychomotor delay, the children coming from families with low cultural level (no/ minimum schooling, illiteracy etc.) did not present significantly higher delay within the five developmental areas under investigation ($p>.05$), as compared with children coming from families with medium cultural level (literate parents, with minimum schooling). The family living conditions was not a relevant factor for the severity of psychomotor delay within the five areas ($p>.05$), the differences between children from families with inadequate housing and those from families with appropriate housing were not significant for any of the five developmental areas.

As for the mental health screening, our results show that the psychomotor delay increases as the child's mental health screening score increases. The higher the child's risk for mental health problems, the higher his/ her delay in gross motor ($H=15.03$, $p<.01$), fine motor ($H=12.81$, $p<.05$), cognitive ($H=18.17$, $p<.01$), language ($H=13.12$, $p<.05$) and especially socio-emotional ($H=28.78$, $p<.001$) areas was. The differences were particularly high between the children with 0 to 3 points and those with 4 points to the test. Although all areas of the psychomotor development investigated were affected, the highest differences were found for the social-emotional and cognitive areas.

Most of the study participants presented, of the *clinical disorders* described on axis I of the DC 0-3/R, Deprivation/ matltreatment disorder (47.1%), of which type 1: emotionally withdrawn/ inhibited pattern (26.5%), type 2: indiscriminate/ disinhibited

pattern (17.6%) and type 3: mixed (2.9%). Another clinical disorder detected was Sensory processing regulation disorder (23.5% of the total sample), with two of its subtypes: undersensitive/ underresponsive (14.7% of the participants) and hypersensitive, type A: fearful/ cautious (8.8%). A percentage of 7.4% of the participants presented Multisystem developmental disorder, a percentage of 2.9% Prolonged bereavement/ grief reaction and a percentage of 1.5% Infantile anorexia. A number of 12 participants, representing 17.6% of the total sample, did not fulfil the criteria for any of the clinical disorders described in the manual. Thus, the DC 0-3/R represents a useful instrument for the assessment of infant/ toddler mental health, as it operationalizes an important number of clinical disorders of infancy and early childhood that are not described in the DSM-IV-R (APA, 2000).

Due to small number of participants, the association between clinical disorders, as specified on axis I of the DC 0-3/R, and the psychomotor delay was not possible. The differences found between categories of disorders and the severity of psychomotor delay were not significant for gross motor ($H=3.41$, $p>.05$), fine motor ($H=2.18$, $p>.05$), cognitive ($H=4.10$, $p>.05$) and language ($H=.576$, $p>.05$) areas and significant in the case of the delay within social-emotional area ($H=12.04$, $p<.05$). As shown in figure 1, the delay in social-emotional development for children with regulation disorder of sensory processing, hypersensitive type, as well as for children with deprivation/ matltreatment disorder, inhibited type, is significantly higher than the delay in the case of children with regulation disorder of sensory processing, hyposensitive type, in the case of children with deprivation/ maltreatment, disinhibited type and especially compared with children that do not fulfill the criteria for any clinical disorders described in the DC 0-3/R.

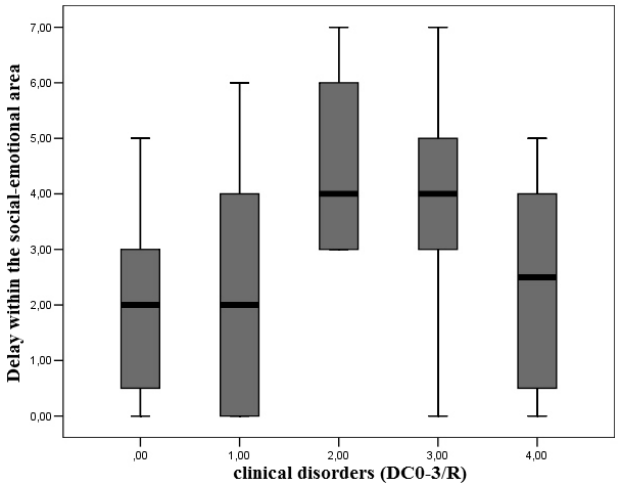

Fig. 1. Comparison between the severity of social-emotional delay (in months), among the most frequent clinical disorders encountered

0 – no disorder;
1 – regulation disorder of sensory processing, hyposensitive type;
2 – regulation disorder of sensory processing, hypersensitive type (fearful/ cautious);
3 – deprivation/ maltreatment disorder (type 1, inhibited);
4 – deprivation/ maltreatment disorder (type 2, disinhibited)

In the case of the association between psychomotor delay and multisystem developmental disorder, prolonged bereavement/ grief reaction, infantile anorexia and deprivation/ maltreatment disorder, combined pattern, we could not derive any general conclusions, due to small sample size. Due to the severity of these conditions, the delay assessed was, not surprisingly, very important (between 11.2 and 13 months in the case of multisystem developmental disorder). Further investigations are needed in the case of these children, in order to detect the impact of the clinical disorders on the child's general development.

The assessment of parent-infant relationship was strongly associated with the severity of psychomotor delay of the child for all the developmental areas we assessed: gross motor ($r=-.36$, $p<.01$), fine motor ($r=-.33$, $p<.01$), cognitive ($r=-.39$, $p<.01$), language ($r=-.38$, $p<.01$) and socio-emotional ($r=-.47$, $p<.01$). The more problematic the relationship with the parent, the more severe the child's psychomotor delay was. The intensity of the correlations is a support for the idea that the relationship between the pairs of variables may be mediated.

The severity of psychomotor delay tends to decrease as the parent-infant relationship approaches the adequate functioning, the differences within the severity of delay among children that had difficulties in the relationship with the primary caregiver and children that had adequate relationships with the primary caregiver are small. Our results are consistent with data from the literature (Zero to Three, 2005), stating that in the case of relationship difficulties, the parent-infant relationship maintains a certain adaptive flexibility, both parent and infant's developmental progress may be unaffected, the difficulty does not generate any symptoms, despite the discomfort and stress it entails.

The severity of problems within social and emotional functioning (assessed globally, on axis V from the DC 0-3R, depending on the child's age) was positively, moderately correlated with the gross motor ($r=.38$, $p<.01$), fine motor ($r=.35$, $p<.01$), cognitive ($r=.38$, $p<.01$), language ($r=.33$, $p<.01$) and socio-emotional ($r=.46$, $p<.01$) delay, in high consensus with data from the literature. Our results confirm that the more affected the infant/ toddler's social and emotional functioning, the more severe the delay within the five areas assessed tends to be. Thus, the psychomotor delay appears to be significantly associated both with the social and emotional functioning and with the relational difficulties. The moderate correlation supports the possibility of a totally or partially mediated relationship.

Thus, the severity of psychomotor delay was not significantly associated with the precarity of living conditions, low family economic and cultural conditions and was significantly associated with infant/ toddler mental health, functioning of the relationship with the caregiver, social and emotional functioning. As such, we consider that relational and emotional factors are most prevalent for development in early childhood, as compared with ecological, socio-cultural factors.

The severity of malnutrition was not associated with the presence or absence of a clinical diagnosis, as specified in the DSM-IV-TR and DC 0-3/R ($p>.05$), the presence of a clinical disorder is related to other factors, independent of the severity of malnutrition. Similarly, the characteristics of the caregiving environment before admittance to hospital were not associated with the presence or absence of a clinical disorder ($p>.05$).

For the functioning of the relationship with the primary caregiver, most of the children of our sample (51.5%) had scores specific to a disordered relationship (less than 40 points at the PIR-GAS), followed by the children that presented features of a disordered relationship (30.9% of the total), exposed to transient risk factors and the children with adequate relationships with their caregivers, prior to admission to the hospital (17.6% of the total sample).

No significant differences were found within the relationship functioning, depending on the child's gender ($p>.05$), severity of malnutrition, while in the case of environmental factors, our results show no significant association between family economic and housing conditions ($p>.05$) and the relationship assessment and significant association with the family cultural level ($V=.40$, $p<.01$). An adequate relationship between parent and infant tends to be more frequent in families with a medium/ high cultural level and difficult to disordered relationship tend to be specific to families with low cultural level. Our results hold great clinical and therapeutic implications, but due to small sample size we recommend caution in generalization.

The qualitative association between the nature of relational difficulties and psychosocial stressors to which the children were exposed (cuantified on axis IV of the DC 0-3/R) revealed that severely disordered relationships were associated with stressors such as: child abandonment, risk of child abandonment due to high number of children in the family, due to parental cognitive impairment, due to single motherhood, child institutionalization (either as a consequence of abandonment by the parent, or due to child withdrawal from the family by the child protection services), parental intellectual impairment, single illiterate mother, child neglect due to high number of children in the family or maternal immaturity (teenager mother), domestic violence. Maternal mental illness was associated with severely disordered relationships with the child if the illness was severe (ex., schizophrenia) and with features of a disordered relationship if the illness was less severe (ex., maternal anxiety). Other stressors associated with features of a disordered relationship were: single motherhood

(mature mother, over 18 years old), frequent hospitalizations of the child and high number of members in the family. Adequate parent – infant relationship was assessed in the case of dyads exposed to stressors such as poverty and inadequate housing, in absence of other psychosocial stressors.

Regarding the nature of the clinical disorders, severe disorders within the parent – infant relationship were assessed for children that presented deprivation/ maltreatment disorder and all its subtypes (on axis I of the DC 0-3/R) and reactive attachment disorder, according to the DSM-IV-TR, with prolonged bereavement/ grief reaction and multisystem developmental disorder, according to the DC 0-3/R (corresponding to pervasive developmental disorder in DSM-IV-TR). The features of disordered relationship were found in children with regulation disorders of sensory processing and infantile anorexia, according to the DC 0-3/R (respectively, in a smaller number of cases, with reactive attachment disorder, dinhibited type, according to the DSM-IV-TR), while adequate relationship with the parent with the absence of clinical disorders, both according to the DC 0-3/R and the DSM-IV-TR. Our data support the ideas that the disorders of sensory processing may affect the parent – infant relationship (Zero to Three, 2005). Surprisingly, in the case of children that had an adequate relationship with the primary caregiver, no clinical disorders as described in either DC 0-3/R or DSM-IV-TR were diagnosed, despite the difficulties that the child encountered, both at the somatic level (the malnutrition and its associated problems) and at the environmental level, factors that can at any time become severe risks for infant/ toddler mental health. Given that most of the children from our sample were exposed to various degrees of psychosocial stress, we cannot infer a causal relationship between these factors and clinical disorders of the child. The association between psychosocial stressors and clinical disorders of the child needs to be further investigated, on larger samples.

The emotional and social functioning (assessed on axis V of the DC 0-3R) was not significantly different for male and female children ($p>.05$) and family environment characteristics (poverty, poor housing) were also not significant factors for the differences found in the child's emotional and social functioning. The severity of malnutrition is, however, a significant factor that accounts for the differences found in the emotional and social functioning of the infants in our study ($H=16.58$, $p<.01$), the emotional and social functioning tends to decrease as the severity of malnutrition increases.

A high level of emotional and social functioning was associated with several of the clinical disorders identified using the DC 0-3/R: deprivation/ maltreatment disorder, disinhibited and mixed types, while a low emotional and social functioning was predominantly associated with: regulation disorder of sensory processing, hypersensitive type (fearful/cautious), multisystem developmental disorder, deprivation/ maltreatment disorder, inhibited type, infantile anorexia, prolonged bereavement. The regulation disorder of sensory processing, hyposensitive type, was associated

both with high and low emotional and social functioning. Of the disorders described in the DSM-IV-TR, without correspondent in the DC 0-3/R, the rumination disorder was associated with adequate emotional and social functioning, while the stereotypic movement disorder with low functioning.

The emotional and social functioning was significanty associated with the quality of the parent – infant relationship ($r=-.63$, $p<.001$), a high correlation intensity showing that the more problematic the child's emotional and social functioning, the more affected his/her relationship with the parent was and vice versa. Moreover, the functioning of the relationship with the primary caregiver holds a significant causal effect on the child's emotional and social functioning ($\beta=-.63$, $p<.001$), a problematic relationship with the parent leads to low emotional and social functioning of the child.

As discussed above, our results show that the child's emotional and social functioning, as well as the quality of the parent – child relationship are significantly correlated with the severity of delay within the five areas we assessed. Due to the low intensity of the correlation, we tested the possibility that this association may be mediated. We also found a significant association between the child's emotional and social functioning and the quality of the relationship with the primary caregiver.

Data for each variable was standardized (Sava, 2004), so that the differences in their measurement were eliminated. Subsequently, we tested the mediation analysis models, according to our hypothesis (relationship quality as an independent variable, psychomotor delay within four areas as a dependent variable and emotional and social functioning as a mediator variable).

Table 1

Regression coefficients of the mediation models

Model	β2 (mediator - dependent)	β3 (independent - dependent)	Aroian test
1 (gross motor delay)	.27	(-.37**) -.20	1.76
2 (fine motor delay)	.26	(-.35**) -.19	1.67
3 (cognitive delay)	.24	(-.40**) -.25	1.64
4 (language delay)	.18	(-.39**) -.28	1.17

Note: **p<.01

The four mediation analysis models were not valid, revealing a direct causal association between the parent – infant relational quality and child gross motor, fine motor, cognitive and language development, without the mediation of the child's emotional and social functioning. Thus, the relational disorders cause delay within the four above mentioned developmental areas as early as the first months of life (due to the maternal understimulation of child development, the child's diminished curiosity for the exploration of the environment, as the adult does not represent a secure base for exploration).

Interestingly, the child's emotional and social functioning was not a significant cause of delay within the four developmental areas, revealing the prevalent role of the relationship with the caregiver over child characteristics on psychomotor development at this age. The task of finding other possible mediators of the causal association between the quality of the relationship with the caregiver and child developmental delay remains a subject for future research.

Conclusions and implications

Although subjected to methodological difficulties, research in the field of early childhood mental health, in association with child development and risk factors contributing to development at this age detains high practical and clinical relevance, given the multiple implications for subsequent development of the child. We recommend caution in the generalization of our results and further research on larger samples for their confirmation and enrichment. As such, the small sample size is one of the main limitations of our study, along with other limitations specific to cross-sectional design and observational design.

Our results confirmed that in the case of children exposed to medical and psychosocial risk, the psychomotor development is strongly associated with the quality of the parent – child relationship and no significant associations were found with factors of the caregiving, family environment, such as poverty, cultural level of the family and housing conditions. We recommend the comparison of children from highly atypical environments, such as those included in our study, with children from regular family environments, much less well represented in our present study. Despite the study limitations, we confirmed the high importance that needs to be given to social, emotional and relational factors by specialists working in early intervention with children with developmental delay. Also, mental health in infancy and early childhood needs to be considered when approaching the developmental needs of these children. Evaluation and treatment planning for infants and toddlers at risk should consider both the assessment and the intervention within the family, besides considering the mental health challenges and developmental disorders, as both relationship quality and family environmental stress contribute to child development and emotional well being, as confirmed by our results.

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