

# Mother-Child Bond and Mental Health Problems in Preschool Children in Southern Brazil

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## Abstract

**Background:** Child development occurs from the interaction of a set of factors. The initial experiences are predictors of the acquisition of a range of skills such as child's behavior and affective and social capacities. In this context, mental health problems like behavioral or emotional difficulties may arise early. There is a consensus that the weak mother-child bond has a negative influence on the emotional and behavioral development of the child, but is a significant lack of studies evaluating this hypothesis.

**Aim:** To verify the association between the quality of the mother-child bond and mental health problems of preschooler's children born from adolescent pregnancies in a city in southern Brazil.

**Methods:** This is a cross-sectional study nested in a cohort study that followed adolescent pregnant women who received prenatal care through the Brazilian public health system of a city in Southern Brazil and their children at 4 and 5 years and 11 months. The Strengths and Difficulties Questionnaire (SDQ) was used to identify children's mental health problems and the protocol for assessment of mother-child bonding to evaluate the mother-child bond.

**Results:** Children of mothers with weak bonding presented an odds of 4.3 (95% CI: 1.9; 9.9) more emotional problems and an odds of 2.1 (95% CI: 1.1; 4.0) more conduct problems when compared to children of mothers with a strong bonding.

**Conclusion:** With early identification, interventions focusing on the adequate development of the mother-child bond in the gestational and postpartum period may be performed, seeking to prevent adverse outcomes for the child.

**Keywords:** Mother-Child Bond; Child Mental Health Problems; Preschoolers; Children Born from Adolescent Pregnancies

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## Introduction

Child development occurs from the interaction of a set of genetic, biological, environmental, and psychosocial factors. The first years of life are decisive since in this period there is an intense neuronal activity and the initial experiences are predictors of the acquisition of a range of skills. These skills are related not only to the sensory-motor, language, and cognition spheres, but also to the child's behavior and affective and social capacities [1-4]. In this context, behavioral or emotional difficulties may arise early, which are considered mental health problems.

Child mental health problems can be classified as internalizing or externalizing. While internalizing problems are characterized by emotional issues, such as anxiety, withdrawal behavior, and depression, the externalizing problems involves behavioral issues, such as challenging behavior, impulsivity, aggression, and hyperactivity [5].

Among the most prevalent child mental health problems, emotional, conduct, relationship, and hyperactivity problems are the most prominent. These problems trigger conflicts in the family and/or school environments, resulting in impairments for the child's adaptation to environmental demands, and the acquisition of new skills, as well as interpersonal functioning and parental relationship [6].

Studies show that there are some risk factors for the development of child mental health problems. Some of them are the presence of maternal psychopathology [7], unfavorable socioeconomic conditions, low parental education [2,8, and 9], be male child, and mother age [10-12].

In addition, some studies suggest that the mother-child bond can also be a predictor of mental health problems in children. Lower quality of the mother-child interaction and an ambivalent attachment of the child were predictors of externalizing problems [13], while children



with secure attachment to their mothers presented less difficulties regarding prosocial behavior, hyperactivity, and relationship with peers [12]. However, although there is a consensus that the weak mother-child bond has a negative influence on the emotional and behavioral development of the child, there is a significant lack of studies evaluating this hypothesis [14,15].

The maternal bond has been described as the quality of the emotional bond between mother and child, complementing the attachment relationship that the child develops during the first year of life [16]. According to Nóbrega [17], the mother-child bond is externalized according to different social influences, which can be related to positive or negative characteristics of the mother, the father, the couple, and the child itself, like temperament and individual aspects.

Studies investigating the factors associated with impairments in the mother-child relationship have shown that mothers with lower income and less education may have negative patterns regarding the ability to respond to the needs of their children [18-20] and women with mental disorders, such as depression and anxiety, they can have difficulties in establishing the mother-child bond [21,22].

In Brazil, approximately one in five women has their first child before the age of 20, which is a high proportion and has remained the same for the past ten years [23,24]. Although still controversial, studies show that women who become mothers during adolescence may interact less with their children, have less strengthened affective bonds, have higher levels of stress, tend to be less confident, and have more depressive disorders [11,25, and 26].

Considering that early interactions between young mothers and their children are essential for child mental health, this study aimed to verify the association between the quality of the mother-child bond and mental health problems of preschoolers children born from adolescent pregnancies in a city in southern Brazil. We also investigated whether the mothers' satisfaction with their relationship with their children had an impact on the children's mental health. Our hypothesis was that the weak mother-child bond and that lower mother satisfaction in the relationship with the child would be associated with more chances of mental health problems in the children.

## Methods

This is a cross-sectional study nested in a cohort study that followed adolescent pregnant women who received prenatal care through the Brazilian public health system of a city in Southern Brazil from October 2009 to March 2011. Our sample was composed of these women and their children at 4 and 5 years and 11 months. We excluded those mothers who presented cognitive inability to answer and/or understand the instruments and those who did not live in the urban area.

We used the Strengths and Difficulties Questionnaire (SDQ) [27,28] to identify children's mental health problems. This scale is composed of 25 items about positive and negative psychological attributes, divided into four domains for the difficulties (emotional problems, conduct problems, attention deficit hyperactivity disorder and problems in interpersonal relationships with peers) and one domain for the strengths (prosocial behavior) of the child. Each domain has five affirmatives. Since it is considered a positive attribute, we did not include the domain of prosocial behavior because it does not correspond to the main objective of this study. In each difficulty domain, the score ranges from zero to ten. The maximum scale total score is 40 points and higher scores are indicative of mental health problems. We used the cut-off points published in the literature and

available in the Internet [29] in order to define 'normal', 'borderline' and 'abnormal' punctuations. For analysis purposes, the categories 'normal' and 'borderline' were grouped.

To evaluate the mother-child bond, we used the protocol for assessment of mother-child bonding proposed by Nóbrega [17]. This protocol comprises 13 items with dichotomous responses (no/yes), corresponding to 0 and 1 point, respectively. Each "yes" answer denotes the presence of an attribute or indicator of weak bonding. The total sum of the answers ranges from 0 to 13 points, and a total score of five or more points is considered a weak bond. During its application, through the mother's history, it is possible to observe the indicators of the mother-child bond quality. These indicators refer to significant events for her, such as childhood, adolescence, gestation, childbirth, postpartum and current events (professional, personal, marital, and family satisfaction).

To measure the level of satisfaction of the mother with her relationship with the child, we used the Face Scale of Andrews [30]. This is a visual scale that contains seven figures with stylized faces representing expressions ranging from extreme happiness to extreme sadness (the mouth in each face varies from a half-circle facing up to another half-circle facing down). The mother should point out the face figure that resembles the most the way she feels about her relationship with her child. The figure representing extreme happiness corresponds to 1 point, while the figure representing extreme sadness corresponds to 7 points. Based on that, the lower the declared value, the greater the degree of satisfaction of the mother with her relationship with the child. Although there is no validation study for the Brazilian population, the scale has been widely used, as well as being an easily understood instrument [31-33]. In the present study, the values were divided into the following categories: '1', '2', and '3 to 7', which were later nominated 'very satisfied', 'satisfied', and 'indifferent to very dissatisfied', respectively.

The classification of the Brazilian Association of Research Companies (ABEP) [34] was used in order to assess socioeconomic status. It is based on the accumulation of material goods and education level of the household head. The ABEP classifies individuals into five classes (A, B, C, D or E). The letter "A" refers to the highest economic class and "E" refers to the lowest. For this study, we grouped classes A and B into one category (high), and classes D and E into another one (low). In addition, the following characteristics were evaluated: mother's age (18 to 22 years / 23 to 26 years), maternal education (up to 3 years / 4 to 7 years / 8 to 10 years / 11 years or more), sex of the child (female / male), and presence of the paternal figure (yes / no).

The data were analyzed in the statistics program SPSS 22.0. An univariate analysis was performed to calculate absolute and relative frequencies, and the chi-square test was used in the comparison between proportions. We included in a logistic regression all variables with a p-value  $\leq 0.20$  in bivariate analysis, accounting for possible confounding factors. We considered as statistically significant a p-value  $\leq 0.05$ .

## Results

In the present study, 423 dyads completed the instruments. The majority of mothers were aged between 23 and 26 years old (53.1%), 67.0% were middle socioeconomic status, and had between 4 and 7 years of education (40.9%). Most children were female (50.8%) and 37.8% had no presence of paternal figure. Regarding the mother's satisfaction with her relationship with the child, 6.8% of them were



classified as indifferent to very dissatisfied. The prevalence of mothers that presented indicative of having a weak bond with their children was 16.9%.

Table 1 shows the sociodemographic and psychosocial characteristics of the mothers and the children. The prevalence of children's mental health problems was: 10.1% (n = 41) for emotional problems, 29.5% (n = 119) for conduct problems, 35.8% (n = 144) for hyperactivity/inattention, 7.6% (n = 31) for peer relationship problems, and 23.8% (n = 91) for total mental health problems. The Table 1 also presents the bivariate analysis.

In the adjusted analysis, the mother-child bond was associated with emotional and conduct problems. Children of mothers with weak bonding presented an odds of 4.3 (95%CI: 1.9; 9.9) more emotional problems (p = 0.001) and an odds of 2.1 (95% CI: 1.1; 4.0) more conduct problems (p = 0.020) when compared to children of mothers with a strong bonding. The mother's satisfaction with her relationship with the child was associated with emotional problems, conduct problems, hyperactivity/inattention, and the total mental health problems of the child. Children of satisfied mothers had an odds of 3.2 (95%CI: 1.3; 7.9) more emotional problems (p = 0.012), and an odds of 3.4 (95%CI: 1.7; 6.7) more total mental health problems (p < 0.001). Children of mothers who felt indifferent to very dissatisfied with their relationship with them had an odds of 5.7 (95%CI: 1.8; 18.2) more emotional problems (p = 0.003), 3.7 (95%CI: 1.5; 9.1) more conduct problems (p = 0.004), 3.2 (95%CI: 1.3; 8.0) more hyperactivity/inattention (p = 0.012), and 6.8 (95%CI: 2.6; 18.0) more total mental health problems (p

< 0.001) when compared to children of very satisfied mothers (Table 2).

Furthermore, the sociodemographic characteristics remained associated with some mental health problems of children after the multivariate analysis. The odds of hyperactivity/inattention problems were 1.7 (95% CI: 1.1; 2.9) greater in children of mothers with 18 to 22 years old (p = 0.019) than children of mothers with 23 to 26 years old. There was an association between the socioeconomic status and children's conduct problems. The odds of conduct problems were 4.0 (95% CI: 1.5; 10.6) higher among children of mothers belonging to the middle status (p = 0.006), and 4.4 (95% CI: 1.4; 13.5) higher among those whose mothers belonged to the low status (p = 0.010) when compared with children whose mothers belonged to the high status. Maternal education was also associated with hyperactivity/inattention, peer relationship, and total mental health problems in children. Children of mothers with 8 to 10 years of education had an odds of 2.4 (95% CI: 1.1; 5.1) more hyperactivity/inattention (p = 0.022) when compared to children of mothers with 11 or more years of education. Children of mothers with up to 3 years of education had an odds of 15.8 times (95% CI: 1.5; 164.7) more problems in the peer relationship (p = 0.021) and children of mothers that had between 4 to 7 years of education presented an odds of 9.1 (95% CI: 1.2; 69.4) more problems in the peer relationship (p = 0.034). Moreover, children of mothers with 4 to 7 years of education had an odds of 3.4 (95% CI: 1.3; 8.8) more total mental health problems (p = 0.011) when compared to children of mothers with 11 or more years of education (Table 2).

**Table 1:** Sociodemographic and psychosocial characteristics of the mother and the child and their association with mental health problems between 4 and 5 years and 11 months of age, Southern Brazil.

	Emotional problems		Conduct problems		Hyperactivity/Inattention problems		Peer Relationship problems		Total Problems		
	N (%)	N (%)	p-value	N (%)	p-value	N (%)	p-value	N (%)	p-value	N (%)	p-value
<b>Mother's age</b>			0.895		0.913		0.079		0.181		0.186
18 to 22 years	206 (48.7)	21 (10.3)		60 (29.7)		79 (40.1)		19 (9.4)		51 (26.7)	
23 to 26 years	217 (51.3)	20 (9.9)		59 (29.2)		65 (31.7)		12 (5.9)		40 (20.9)	
<b>Socioeconomic status*</b>			0.155		<0.001		0.025		0.381		0.008
High	66 (17.3)	05 (7.6)		07 (10.8)		15 (23.1)		04 (6.1)		07 (10.9)	
Middle	256 (67.0)	23 (9.2)		79 (31.6)		91 (36.4)		18 (7.1)		60 (25.0)	
Low	60 (15.7)	10 (16.9)		24 (41.4)		26 (46.4)		07 (12.1)		18 (35.3)	
<b>Maternal Education (in years of study)*</b>			0.062		0.014		0.019		0.010		<0.001
Up to 3 years	17 (4.2)	01 (6.3)		08 (47.1)		09 (56.3)		03 (18.8)		06 (40.0)	
4 to 7 years	167 (40.9)	25 (15.2)		57 (35.0)		62 (38.3)		19 (11.6)		53 (34.2)	
8 to 10 years	149 (36.5)	10 (6.9)		39 (27.3)		56 (38.6)		08 (5.5)		24 (17.8)	
11 years or more	75 (18.4)	05 (6.8)		13 (17.3)		16 (21.9)		01 (1.4)		08 (11.3)	
<b>Sex of the child</b>			0.177		0.571		0.074		0.518		0.844
Male	208 (49.2)	16 (8.1)		61 (30.7)		79 (40.1)		17 (8.5)		43 (23.2)	
Female	215 (50.8)	25 (12.1)		57 (28.1)		64 (31.5)		14 (6.8)		47 (24.1)	
<b>Presence of paternal*</b>			0.036		0.801		0.881		0.378		0.227
No	156 (37.8)	22 (14.1)		46 (30.3)		56 (36.4)		14 (9.2)		40 (27.2)	
Yes	257 (62.2)	19 (7.6)		73 (29.1)		88 (35.6)		17 (6.7)		51 (21.8)	
<b>Mother's child satisfaction relationship*</b>			<0.001		<0.001		0.002		0.744		<0.001
Very satisfied	318 (77.8)	20 (6.4)		75 (24.2)		96 (31.1)		22 (7.0)		52 (17.7)	
Satisfied	63 (15.4)	12 (19.7)		25 (41.0)		28 (45.2)		06 (9.8)		23 (39.0)	
Indifferent to very dissatisfied	28 (6.8)	8 (29.6)		17 (60.7)		16 (61.5)		02 (7.4)		15 (60.0)	
<b>Mother-child Bond*</b>			<0.001		<0.001		0.042		0.269		<0.001
Weak	67 (16.9)	18 (27.3)		31 (48.4)		30 (45.5)		07 (11.1)		25 (42.4)	
Strong	329 (83.1)	20 (6.2)		82 (25.4)		103 (32.4)		23 (7.1)		63 (20.5)	
<b>Total</b>	423 (100.0)	41 (10.1)		119 (29.5)		144 (35.8)		31 (7.6)		91 (23.8)	

\*variables with missing data



**Table 2:** Multivariate analysis for children's mental health problems between 4 and 5 years and 11 months of age according to sociodemographic and psychosocial characteristics of the mother and the child, mother-child bond, and the mother's satisfaction with her relationship with the child. Southern Brazil.

	Emotional problems		Conduct problems		Hyperactivity/Inattention problems		Peer Relationship problems		Total Problems	
	OR (CI 95%)	p-value	OR (CI 95%)	p-value	OR (CI 95%)	p-value	OR (CI 95%)	p-value	OR (CI 95%)	p-value
<b>Mother's age</b>										
18 to 22 years	.	.	.	.	1.7 (1.1; 2.9)	<b>0.019</b>	1.4 (0.6; 2.9)	0.422	1.5 (0.8; 2.6)	0.161
23 to 26 years	.	.	.	.	1.0	.	1.0	.	1.0	.
<b>Socioeconomic status</b>										
High	1.0	.	1.0	.	1.0	.	.	.	1.0	.
Middle	0.7 (0.2; 2.4)	0.609	4.0 (1.5; 10.6)	<b>0.006</b>	1.6 (0.8; 3.3)	0.184	.	.	1.9 (0.7; 4.9)	0.192
Low	0.8 (0.2; 3.3)	0.739	4.4 (1.4; 13.5)	<b>0.010</b>	2.3 (0.9; 5.6)	0.079	.	.	2.4 (0.8; 7.6)	0.122
<b>Maternal Education (in years of study)</b>										
Up to 3 years	0.3 (0.0; 4.6)	0.420	2.7 (0.8; 9.7)	0.120	3.4 (0.9; 12.1)	0.055	15.8 (1.5; 164.7)	<b>0.021</b>	3.7 (0.8; 16.3)	0.080
4 to 7 years	3.3 (0.8; 12.9)	0.082	1.8 (0.8; 3.9)	0.152	1.9 (0.9; 4.1)	0.101	9.1 (1.2; 69.4)	<b>0.034</b>	3.4 (1.3; 8.8)	<b>0.011</b>
8 to 10 years	1.5 (0.4; 6.2)	0.580	1.6 (0.7; 3.6)	0.232	2.4 (1.1; 5.1)	<b>0.022</b>	4.2 (0.5; 34.0)	0.182	1.8 (0.7; 4.7)	0.252
11 years or more	1.0	.	1.0	.	1.0	.	1.0	.	1.0	.
<b>Sex of the child</b>										
Male	0.6 (0.3; 1.3)	0.209	.	.	1.4 (0.9; 2.2)	0.160	.	.	.	.
Female	1.0	.	.	.	1.0	.	.	.	.	.
<b>Presence of paternal</b>										
No	1.9 (0.9; 4.2)	0.096	.	.	.	.	.	.	.	.
Yes	1.0	.	.	.	.	.	.	.	.	.
<b>Mother's child satisfaction relationship*</b>										
Very satisfied	1.0	.	1.0	.	1.0	.	.	.	1.0	.
Satisfied	3.2 (1.3; 7.9)	<b>0.012</b>	1.7 (0.9; 3.3)	0.097	1.8 (0.9; 3.3)	0.076	.	.	3.4 (1.7; 6.7)	<b>&lt;0.001</b>
Indifferent to very dissatisfied	5.7 (1.8; 18.2)	<b>0.003</b>	3.7 (1.5; 9.1)	<b>0.004</b>	3.2 (1.3; 8.0)	<b>0.012</b>	.	.	6.8 (2.6; 18.0)	<b>&lt;0.001</b>
<b>Mother-child Bond</b>										
Weak	4.3 (1.9; 9.9)	<b>0.001</b>	2.1 (1.1; 4.0)	<b>0.020</b>	1.0 (0.5; 1.9)	0.954	.	.	1.6 (0.8; 3.2)	0.191
Strong	1.0	.	1.0	.	1.0	.	.	.	1.0	.

OR = Odds ratio; CI = Confidence interval.

## Discussion

The main objective of this study was to verify the association of the quality of the mother-child bond and the mother's satisfaction regarding her relationship with the child with mental health problems of preschoolers children born from adolescent pregnancies in a city in southern Brazil. Our results showed that children whose mothers had a weak mother-child bond were at increased odds of emotional and conduct problems. Also, the odds of emotional, conduct, hyperactivity/inattention, and total problems were higher in children whose mothers had less satisfaction regarding their relationship with the child.

Since the mother is the one with whom the child establishes its first relationship, it is possible to conclude that this relationship will serve as a basis for its psychological development, determining all kinds of interpersonal relationships that the child will establish [17]. Thus, the weaker the bond between mother and child in the first years of life, the more difficulties this child will have in terms of social competence, which hinders his healthy development [35].

Although the majority of researchers suppose that the quality of the early bond established between mother and child has an impact on children's behavioral outcomes, this hypothesis is underestimated, especially concerning longitudinal studies [14]. Although the present study has a cross-sectional design, the aspects involved in the mother-child bond assessment protocol take into account issues that precede the relationship with the child itself, such as the mother's childhood,

pregnancy, professional, personal, and family issues. Thus, giving an idea of cause and consequence between the mother-child bond and children's outcomes. In the study by Fuchs A, et al. [14], the mother-child bond at 14 months of age proved to be a significant predictor of child behavior problems. It is important to note that, in this study, the authors assessed only the total number of children's behavioral problems, which differs from what we present in our study, where we addressed the specific domains of emotional and conduct problems in addition to the total problems.

In another study, Mason ZS, et al. [36] examined a low-income urban sample of 232 first-time mothers and found that the maternal bonding at infant age of 2 months mediated the negative effects of postpartum depression on the child's social-emotional development at 6 months. However, we consider important that this association should be also evaluated in older children.

No studies were found on the investigation of the association between the mothers' satisfaction with their relationship with their children and children's mental health problems. In our study, we found that children of less satisfied mothers had more emotional and conduct problems, hyperactivity/inattention and total mental health problems. Despite this is a cross-sectional study, this association presents important information for planning psychotherapeutic interventions so that they are not only focused on children's difficulties, but that also encourage the stimulation of a better relationship between mother and child.



Concerning our other findings, we found that children of younger mothers had more hyperactivity/inattention. The literature reports that younger mothers tend to have a more negative response capacity and to be more restrictive in controlling their children. They are less favorable, less adequate in guiding their children, and generally less responsive compared to older mothers [37,38]. Besides, the children of younger mothers tend to experience higher levels of maternal depression, marital conflict, and family disturbance, factors that have been associated with attention deficit and hyperactivity [39-41].

In our results, children of the middle and low socioeconomic status presented more conduct problems. In another study conducted with adolescents in the same city, the authors also found that in a multivariate model, a lower socioeconomic status was one of the significant independent predictors for conduct problems [42]. We can approach this topic through cultural theories that can explain how income impacts the behavior of parents and children. Thus, economically disadvantaged individuals are influenced by a “culture of poverty”, so that living in persistent poverty encompasses specific norms, values, beliefs, and cultural practices in poor families and communities. It is possible that disadvantage affects cultural norms and expectations about the behaviors of parents and the children. These expectations influence how parents raise their children and, consequently, how children behave [44].

We also found that children of mothers with less years of education had more hyperactivity/inattention, peer relationship and total mental health problems. In this perspective, Lamy Filho M, et al. [43] concluded that the quality and quantity of environmental stimuli are fundamental for the global development of children. Therefore, the low education of parents can affect this development as it is directly related to the responsiveness and quality of maternal stimulation offered to the child.

However, we should consider our findings in light of some limitations. The first one is the study design. Since it is a cross-sectional study, it is not possible to state that children’s mental health problems are consequences of the mother-child bond. The second one is the possibility that the mothers could omit or not remember accurately previous experiences. Although we tried to reduce the limitations of our study design with a mother-child bond evaluation protocol addressing retrospective issues, we should also consider that this kind of approach may have a recall bias.

Nevertheless, our study also had strengths. We had a relatively large sample size with a specific population of mothers who had children during adolescence. Thus, the present study allows a better understanding of the mental health of children who were born during maternal adolescence and the quality of the mother-child bond as a predictor of negative outcomes in childhood.

Finally, we suggest that longitudinal studies should be conducted to monitor the development of children’s mental health problems and associated factors. Through early identification, interventions focusing on the adequate development of the mother-child bond in the gestational and postpartum period may be performed, seeking to prevent adverse outcomes for the child.

## Ethical Statements

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the conduct of the research and/or preparation of the article.

## Ethical approval

The study was approved by the Research Ethics Committee at the Catholic University of Pelotas (protocol 2011/19) in accordance with the existing regulations (CONEP-Res466/12).

## Informed consent

Informed consent was obtained from all individual participants included in the study.

## Authors’ contribution

Coelho FT: Conceptualization, Formal analysis, Writing - Original Draft, Writing - review and editing.

Pires AJ: Project administration, Investigation, Writing - review and editing.

Scholl CC: Writing - review and editing.

Rubin BB: Writing - review and editing.

Pinheiro RT: Project administration, Resources, Funding acquisition, Writing - review and editing.

Quevedo LA: Supervision, Project administration, Writing - review and editing.

de Matos MB: Supervision, Formal analysis, Writing - review and editing.

## Conflict of Interest

The authors declare that there are no conflicts of interest.

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