

# Indicators of problems evaluated by parents and children stratified by birth weight

## *Indicadores de problemas avaliados por pais e crianças estratificadas pelo peso ao nascer*

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### Abstract

Studies on the impact of birth weight on child development require the participation of children as informants. The objective of this study was to compare the indicators of behavioral problems and depression in a cohort of school-age children stratified by birth weight and to investigate possible associations between the indicators of behavioral problems, evaluated by the parents, and depression, evaluated by the children. A total of 665 children, aged 10-11 years, distributed into five birth-weight groups were evaluated. The parents responded to the Strengths and Difficulties Questionnaire, and the children responded to the Children's Depression Inventory. It was found that there were: (a) significantly more indicators of hyperactivity and depression in the children born with very low birth weight; (b) associations between the indicators of childhood depression and the indicators of overall behavioral problems in all weight groups evaluated, except for the very low birth weight group. There was good consistency between the ratings of problems by children and parents.

**Keywords:** Behavior; Birth weight; Depression; Parent-child relations.

### Resumo

*Estudos sobre o impacto do peso ao nascer para o desenvolvimento infantil carecem da inclusão das crianças como informantes. Objetivou-se comparar os indicadores de problemas comportamentais e de depressão apresentados por crianças, em idade escolar, de uma coorte estratificada pelo peso ao nascer, e verificar as possíveis associações entre os indicadores comportamentais, avaliados pelos pais, e de depressão, informados pelas crianças. Foram avaliadas 665 crianças, aos 10-11 anos de idade, distribuídas em cinco grupos de peso ao nascer. Os pais responderam ao Questionário de Capacidades e Dificuldades, e as crianças responderam ao Inventário de Depressão Infantil. Constatou-se: (a) significativamente mais indicadores de hiperatividade e de depressão nas crianças nascidas com muito baixo*

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peso; (b) associações entre os indicadores de depressão infantil e os problemas comportamentais gerais para todos os grupos de peso, com exceção do muito baixo peso. Verificou-se consistência na avaliação de problemas por parte das crianças e pais.

**Palavras-chave:** Comportamento; Peso ao nascer; Depressão; Relações pais-filho.

Low birth weight is recognized as an important biological risk factor for child development with possible implications in different domains throughout the life span (Goulart, 2004; Masten & Gerwitz, 2006). When compared with children born with normal weight, low birth weight children are more vulnerable to cognitive deficits (Oliveira, Magalhães, & Salmela, 2011; Orchinik et al., 2011), learning disabilities (Rodrigues, Mello, & Fonseca, 2006; Tanabe, Tamakoshi, Kikushi, & Murotsuki, 2014), behavioral disorders (Fan, Portuguez, & Nunes, 2013; Pettersson et al., 2014; Reijneveld et al., 2006; Scott et al., 2012; Singh, Kenney, Ghandour, Kogan, & Lu, 2013), and emotional disorders, including depression (Conrad, Richman, Lindgren, & Nopoulos, 2010; Hayes & Sharif, 2009; Lieshout & Boylan, 2010).

In addition to the biological risk factors associated with low birth weight, there are various environmental factors that must also be considered since they can either reduce or aggravate neonatal risk conditions. Studies on the negative effects of low birth weight and their association with environmental risk factors have confirmed the correlation between biological risk factors and social adversities (Bohnert & Breslau, 2008; Conrad et al., 2010; Saur, 2012; Vanderbilt & Gleason, 2010).

Accurate information is of fundamental importance for the study of this phenomenon. Accordingly, the use of different sources of information is considered as a paradigm of psychological assessment of children since it is more reliable and broadly representative of the children evaluated (Hughes & Gullone, 2010; Michels et al., 2013).

However, with regard to the potential implications of low birth weight in the behavioral and emotional development of children, several studies are based solely on reports by parents (Espírito Santo, Portuguez, & Nunes, 2009; Gallo

et al., 2011; Pettersson et al., 2014; Singh et al., 2013) or reports by parents and teachers (Conrad et al., 2010; Scott et al., 2012), without including children's self-report.

Parents are the most common informants since they generally demonstrate knowledge of their children's behavior in different situations, including those that occur infrequently and at different times, enabling them to get to know their children's habitual behavior well (Rothbart & Bates, 2006). Therefore, parents are able to provide a wide range of relevant information about their children (Rochette, 2008; Rothbart & Bates, 2006). Teachers' participation in these evaluations is also frequently required because they can provide normative data based on daily interaction with different children in more structured situations than those of family context (Berg-Nielsen, Solheim, Belsky, & Wichstrom, 2012).

Although less frequently involved as active participants, children have been reported in several studies as reliable informants regarding their own thoughts, emotions, and behaviors (Achenbach, McConaughy, & Howell, 1987; Zukauskienė, Pilkauskaitė-Valickienė, Malinauskienė, & Krataviciene, 2004), especially when reporting internalizing problems since, according to Achenbach (1992), these problems, e.g., depression, are often less frequently identified by other informants than by the child itself because they are related to the child's inner world and are thus more difficult to be identified. Moreover, school-age children develop self-knowledge of their own capacities and become more introspective (Stegge & Terwogt, 2007), improving their ability to understand and control their emotions (Hourigan, Goodman, & Southam-Gerow, 2011).

Several studies have included adolescents' self-report, Vederhus et al. (2015) investigated the behavioral outcomes of preterm or extremely low

birth weight children at 10 and 18 years of age and compared them to the behavior of children born at term. Data were collected through the Child Behavior Checklist (CBCL), completed by the parents in both evaluations and by a self-report by 18 year-old adolescents. The parents of children born preterm or with extremely low birth weight rated their 10 and 18 year old children lower (in all scales) than the parents in the control group. In the self-evaluation, the male adolescents rated themselves with scores similar to those of the control group; the female adolescents rated themselves lower on anxiety/depression and social competence.

Dahl et al. (2006) aimed to identify emotional and behavioral problems and difficulties related to social competence in a cohort of very low birth weight adolescents aged 13 to 18 years and to compare them to normal weight adolescents. The parents completed the Child Behavior Check List (CBCL) and the adolescents completed the Youth Self-Report. The parents reported more behavioral and emotional problems and lower social competence in the very low birth weight adolescents than those in the normative group. In contrast, the very low birth weight adolescents reported fewer behavioral and emotional problems and higher or similar social competence to that of normal birth weight adolescents.

These studies indicate the need to understand the consistency between the reports by parents and younger children since the data collected from multiple informants lead to more reliable and comprehensive information, especially regarding the identification of problems that are difficult for parents to detect. On the other hand, these studies reported poor consistency between the parent and children ratings, which is due to variables such as children personal characteristics (age and gender), type of problem, and parents' characteristics, e.g., gender and the presence of psychopathology (Hack et al., 2011).

According to Vanderbilt and Gleason (2010), different perceptions should also be considered since the parents perform the evaluation from an adult's perspective, comparing the situations and their children with other children and situations,

while the children assess themselves based on the behavioral and emotional patterns as perceived by them. In this regard, children may be more sensitive to minor changes and report them, even if such changes have little impact and are less visible to parents (Van Roy, Groholt, Heyerdahl, & Clench-Aas, 2010).

The differences between the reports by parents and children do not imply poor judgment by any of the informants. To the contrary, it suggests that the information given by the parents and the information given by the children do not replace one another in the psychological assessment of children. According to the literature, self-reports are more commonly used with adolescents instead of young children.

This study aims to bridge that gap and contribute to the understanding of the possible impact of low birth weight on the behavioral and emotional development of children, as well as verify the consistency between the reports by parents and younger children, by pursuing the following objectives: (a) describe and compare socioeconomic variables and indicators of behavioral problems and depression in a cohort of school-age children stratified by birth weight; (b) based on the variable birth weight, determine the possible associations between the indicators of behavioral problems, especially emotional symptoms, reported by the parents, and the indicators of childhood depression, reported by children.

## Method

This is a population-based prospective cohort study with a correlational approach used for the comparison between groups of children stratified by birth weight. It is part of a broader cohort study carried out in the city of *Ribeirão Preto, São Paulo, Brazil*, funded by *Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP, São Paulo Research Foundation)* (Process nº 2000/09508-7). The design of the broader study and the general characteristics of the cohort population were previously detailed by Cardoso et al. (2007) and Silva et al. (2011).

## Participants

The present study included 665 children aged 10-11 years; 50.8% (n = 338) were male and 49.2% (n = 327) were female. Organização Mundial da Saúde (1994) reference values were used to distribute the children into five birth-weight groups as follows: Very Low Birth Weight - VLBW (<1500 g, n = 23); Low Birth Weight - LBW (1500 - 2499 g, n = 120); Insufficient Birth Weight - IBW (2500 - 3000 g, n = 160); Normal Birth Weight - NBW (3001 - 4250 g, n = 343); and Very High Birth Weight - VHBW (> 4250 g, n = 19).

After cohort stratification, the distribution of the male children in each weight group was as follows: VLBW - 60.9% (n = 14); LBW - 45.0% (n = 54); IBW - 44.4% (n = 71); NBW - 53.6% (n = 184); VHBW - 78.9% (n = 15).

The broader study was conducted in two stages. The first stage was conducted in 1994 with the participation of 2 846 children. The evaluations included medical record information about pregnancy, delivery, and birth of the children, infants' anthropometric measurements (weight and length), and socioeconomic characteristics of the families, which was obtained through interviews with the mothers.

In the second step, the evaluations included data obtained from the general student records of State Secretariat for Education, which enabled to identify 1 138 children for the clinical and psychological assessments. The present study is part of this stage, and it included 84.18% of the sample evaluated in the second stage of the broader study. This is due to two reasons: 1) lack of sufficient birth information, such as birth weight and socioeconomic data, and 2) the evaluations were not carried out specifically for this study.

## Instruments

- Strengths and Difficulties Questionnaire (SDQ), answered by the mother/guardian, used for the behavioral assessment of the children. This instrument was developed by Goodman (1997) aiming to identify children's mental health problems,

according to the Diagnostic and Statistical Manual of Mental Disorders - Fourth Edition (DSM-IV) criteria. It indicates the presence of behavioral problem indicators divided into five scales: emotional symptoms, conduct problems, hyperactivity, peer relationship problems, and pro-social behavior (Goodman, 2001). The SDQ was adapted to Brazilian sociocultural characteristics by Fleitlich, Córdazar, and Goodman (2000). The information related to the translation and to the psychometric data about the validity and reliability of this instrument in Brazil were described by Woerner et al. (2004), showing satisfactory psychometric parameters (discriminant validity [ $\chi^2 = 13.1$ ,  $p < 0.001$ ]; paired  $t$  - test,  $p = 0.148$ ).

- Children's Depression Inventory (CDI), developed by Kovacs (1983), answered by the children during the self-assessment of childhood depression. It is a screening instrument that identifies changes related to emotions, mood, hedonic capacity, vegetative functions, self-evaluation, and interpersonal behaviors in children and adolescents. The CDI was translated, adapted, and standardized for Brazilian sociocultural characteristics by Gouveia, Barbosa, Almeida, and Gaião (1995). Numerous psychometric studies have demonstrated the good reliability and validity of the CDI and recommended it for use in Brazil, reporting values of total variance between 31.8% and 49.6% (factor analysis) and between 0.80 and 0.91 for the Cronbach's alpha (analysis of internal consistency) (Coutinho, Carolino, & Medeiros, 2008; Cruvinel, Boruchovitch, & Santos, 2008; Golfeto, Veiga, Souza, & Barbeira, 2002; Wathier, Dell'Aglio, & Bandeira, 2008). It is worth to mention that the construct depression can refer different levels of depression. In the present study, childhood depression was considered as the identification of depression symptoms by children.

- Supplemental Socioeconomic Questionnaire was administered to the mothers/guardians, who answered a wide range of questions: marriage status of the mother, parents' level of education, occupation of the head of household, number of people in the household, and social class, based on the criteria established by Associação Brasileira de Empresas de Pesquisa (2008).

## Procedures

This study was approved by the Research Ethics Committee of the *Hospital das Clínicas da Faculdade de Medicina de Ribeirão Preto, da Universidade de São Paulo* (Clinics Hospital of Ribeirão Preto Medical School, University of São Paulo (Protocol nº 6828/2004) and complied with the requirements of the Informed Consent. Therefore, the participants were given the option to have feedback and referrals whenever necessary.

Parents or guardians responded to the SDQ by writing down their own answers in the presence of a researcher in individual sessions. Socioeconomic data of the families were obtained from medical records and information provided by the mothers in the Supplemental Questionnaire, which was applied by a research assistant who worked on the broader study.

The children were evaluated individually and sometimes in small groups (three maximum). The CDI's directions and items were read aloud by the researcher to the children, while they followed along on an inventory Protocol. The researcher marked on the answer sheet the responses chose by the children. The CDI was administered to the children in their classrooms or in a room in the Clinics Hospital of *Ribeirão Preto* Medical School, University of *São Paulo*.

The data obtained through these instruments were coded according to their respective propositions and were compared to Brazilian normative data. With regard to the SDQ, a total score higher than 16 was considered as an indicator of a problem. For the classifications of the total score and subscales, the terms "without difficulty" were used for borderline and normal behavior categories, and the terms "with difficulty" were used for the abnormal behavior category. As for the CDI, a total score higher than 17 was considered as an indicator of a problem and the terms "absence of depression" and "probable depression" were used.

Non-parametric statistics was used since the distribution of the variables did not follow a normal

distribution (Shapiro-Wilk test,  $p > 0.10$ ), and the significance level of  $p \leq 0.05$  was adopted.

In order to characterize the profile of the cohort studied, the socioeconomic characteristics of the families were subjected to descriptive analysis using absolute and relative frequencies. The absolute and relative frequencies of the behavioral problems and childhood depression were also calculated. The Chi-square test and Fisher's exact test were used to compare the percentage distributions of each variable, based on the five birth-weight groups, were used. When statistically significant differences were observed, Adjustment for Multiple Comparisons by Bonferroni was used.

In order to identify the correlations between the indicators of behavioral problem, reported by the parents, and the indicators of childhood depression, reported by the children, in the five birth-weight groups, the Spearman correlation coefficient was used. The correlations identified were classified using the classification system proposed by Primi, Muniz, and Nunes (2009): weak ( $\rho = 0 - 0.25$ ), moderate ( $\rho = 0.26 - 0.50$ ), strong ( $\rho = 0.51 - 0.70$ ), and very strong ( $\rho > 0.70$ ).

## Results

### Socioeconomic characteristics of the families of the children in the cohort

The socioeconomic characteristics of the families are presented in Table 1.

In all birth-weight groups, it was observed predominance of: married mothers or domestic partners; parents with level of education of 0-8 years; and skilled and semi-skilled manual workers. The majority of the families were lower-class families, and the maximum number of people in the household was four, except for the VHBW group, in which there were significantly more children living with five or more people than in the NBW group ( $\chi^2 = 10.349$ ,  $p = 0.02$ ); this was the only statistically significant difference observed.

Table 1

Socioeconomic characteristics of the families and the children stratified into five birth weight groups (n = 665)

Variables	VLBW		LBW		IBW		NBW		VHBW		Total		Statistical tests $\chi^2/p$
	f	%	f	%	f	%	f	%	f	%	f	%	
<i>Mother's marital status</i>													
Married/domestic partnership	29	82.6	95	82.6	122	81.9	290	87.9	14	82.4	540	85.2	$\chi^2 = 4.019$
Single	4	17.4	20	17.4	27	18.1	40	12.1	3	17.6	94	14.8	$p = 0.403$
<i>Mother's level of education (years)</i>													
0-8 years	10	43.4	74	66.6	100	65.4	185	60.4	8	47.1	377	61.8	$\chi^2 = 7.004$
9 years or more	13	56.5	37	33.4	53	34.6	121	39.6	9	52.9	233	38.2	$p = 0.136$
<i>Father's level of education (years)</i>													
0-8 years	12	57.1	60	62.5	83	64.3	167	57.6	6	40.0	328	59.5	$\chi^2 = 4.470$
9 years or more	9	42.9	36	37.5	46	35.7	123	42.4	9	60.0	223	40.5	$p = 0.346$
<i>Occupation of the head of household</i>													
Unskilled manual/unemployed	5	21.7	18	16.2	26	17.4	50	15.2	4	23.5	103	16.4	$\chi^2 = 1.551$
Non-manual/skilled and semi-skilled manual	18	78.3	93	83.8	123	82.6	278	84.8	13	76.5	525	83.6	$p = 0.818$
<i>Social class</i>													
C, D, E classes	15	65.2	78	65.5	95	60.1	204	60.2	11	57.9	403	61.2	$\chi^2 = 5.123$
A, B classes	8	34.8	41	34.5	63	39.9	135	39.8	8	42.1	255	38.8	$p = 0.275$
<i>Number of people in the household</i>													
1-4	14	60.9	69	61.6	97	64.2	237	71.4	7	41.2	424	66.8	$\chi^2 = 10.349$
5 or more	9	39.1	43	38.4	54	35.8	95	28.6	10	58.8	211	33.2	$p = 0.035$

Note: VLBW: Very Low Birth Weight; LBW: Low Birth Weight; IBW: Insufficient Birth Weight; NBW: Normal Birth Weight; VHBW: Very High Birth Weight. Statistical tests: Chi-square test or Fisher's exact test ( $p \leq 0.05$ ).

## Indicators of behavioral problems and childhood depression in the cohort of children studied

Table 2 shows the indicators of behavioral problems of the children in the five birth-weight groups assessed using the SDQ and the classification termed "with difficulty" as reference. This table also shows the indicators of childhood depression, obtained through the CDI using the category "likely depression" as reference.

The Very Low Birth Weight group showed significantly more children with indicators of hyperactivity when compared to all other groups, except for the LBW, (LBW [ $\chi^2 = 5.945$ ,  $p = 0.015$ ], NBW [ $\chi^2 = 6.714$ ,  $p = 0.01$ ], and VHBW [ $\chi^2 = 9.236$ ,  $p = 0.002$ ]) groups and significantly more indicators of Likely Depression when compared to the other groups (LBW [ $\chi^2 = 7.922$ ,  $p = 0.005$ ], IBW [ $\chi^2 = 24.709$ ,  $p < 0.001$ ], NBW [ $\chi^2 = 30.131$ ,  $p < 0.001$ ], and VHBW [ $\chi^2 = 8.164$ ,  $p = 0.004$ ]). In the LBW group, there was significantly more children with emotional symptoms when compared to the NBW group ( $\chi^2 = 6.746$ ,  $p = 0.009$ ).

## Correlations between the indicators of behavioral problems and childhood depression

Table 3 shows the statistically significant correlations between the indicators of behavioral problems, reported by the parents, and the indicators of childhood depression, reported by the children, using birth weight as reference.

There were no statistically significant correlations in the VLBW group. In the LBW group, there were moderate positive correlations between the total scores of overall behavioral problems, emotional symptoms, and peer relationship problems, as well as a weak positive correlation between the indicators of depression and hyperactivity scores. In the IBW group, there was a weak positive correlation between the scores of childhood depression and the scores of overall behavioral problems and conduct problems.

As for the NBW group, it was found that there was a weak positive correlation between the scores of childhood depression and overall behavior problems and hyperactivity. In the VHBW group,

Table 2

Indicators of behavioral problems and childhood depression identified in the cohort of children stratified into birth-weight groups (n = 665)

Indicators	VLBW		LBW		IBW		NBW		VHBW		Total		Statistical tests $\chi^2/p$
	f	%	f	%	f	%	f	%	f	%	f	%	
<i>SDQ</i>													
Total Score	12	52.2	52	43.3	57	35.6	128	37.3	4	21.1	253	38.1	$\chi^2 = 6.174$ $p = 0.187$
Emotional Symptoms	9	39.1	77	64.2	95	59.4	173	50.4	8	42.1	362	54.4	$\chi^2 = 11.703$ $p = 0.020$
Conduct Problems	5	21.7	42	35.0	43	26.9	126	36.7	5	26.3	221	33.2	$\chi^2 = 6.758$ $p = 0.149$
Hyperactivity	11	47.8	34	28.3	38	23.8	81	23.6	1	5.3	165	24.8	$\chi^2 = 11.580$ $p = 0.021$
Peer Relationship Problems	6	26.1	35	29.2	45	28.1	87	25.4	4	21.1	177	26.6	$\chi^2 = 1.166$ $p = 0.884$
Pro-social Behavior	0	0	5	4.2	8	5.0	11	3.2	0	0	24	3.6	$\chi^2 = 2.729$ $p = 0.604$
<i>CDI</i>													
Likely Depression	8	34.8	14	11.7	7	4.4	17	5.0	0	0	46	6.9	$\chi^2 = 37.007$ $p = 0.000$

Note: VLBW: Very Low Birth Weight; LBW: Low Birth Weight; IBW: Insufficient Birth Weight; NBW: Normal Birth Weight; VHBW: Very High Birth Weight; SDQ: Strengths and Difficulties Questionnaire; CDI: Children's Depression Inventory.  
Statistical tests: Chi-square test or Fisher's exact test ( $p \leq 0.05$ ).

Table 3

Significant correlations between indicators of behavioral problems (SDQ) and indicators of childhood depression (CDI) identified in the cohort of children stratified into birth-weight groups (n = 665)

Groups		Variables	<i>rho</i>	<i>p</i>
LBW	CDI ↑	SDQ Total Overall Score ↑	0.242	0.008
		SDQ Emotional Symptoms Score ↑	0.252	0.005
		SDQ Hyperactivity Score ↑	0.180	0.049
		SDQ Peer Relationship Problems Score ↑	0.260	0.024
IBW	CDI ↑	SDQ Total Overall Score ↑	0.179	0.023
		SDQ Conduct Problems Score ↑	0.186	0.018
NBW	CDI ↑	SDQ Total Overall Score ↑	0.131	0.015
		SDQ Hyperactivity Score ↑	0.150	0.005
VHBW	CDI ↑	SDQ Total Overall Score ↑	0.640	0.003
		SDQ Conduct Problems Score ↑	0.657	0.002
		SDQ Hyperactivity Score ↑	0.633	0.002

Note: *rho*: Spearman correlation coefficient ( $p \leq 0.05$ ). ↑: increased; ↓: decreased.

SDQ: Strengths and Difficulties Questionnaire; CDI: Children's Depression Inventory; LBW: Low Birth Weight; IBW: Insufficient Birth Weight; NBW: Normal Birth Weight; VHBW: Very High Birth Weight.

there were strong positive correlations between the scores of childhood depression and overall behavior problems, conduct problems, and hyperactivity. In this group, none of the children evaluated met the

instrument criteria to be classified in the category "likely depression" and only one child met the criteria to be termed "with difficulty", in terms of hyperactivity.

## Discussion

The findings indicated a homogeneous distribution of the socioeconomic variables in the five birth-weight groups; thus, they can be compared to the variables of the indicators of behavioral problems and childhood depression.

The comparison of these indicators in terms of the five birth-weight groups showed greater vulnerability of children in the VLBW group when compared to the children in the other groups since they had significantly more behavioral problems related to hyperactivity, according to the parents' reports, and more indicators of childhood depression, according to the children self-reports. Moreover, it was also observed that the children in the LBW group had more indicators of emotional symptoms when compared to the children in the NBW group.

These results are in agreement with those of other studies available in the literature, which reported greater vulnerability of low birth weight children exposed to risk factors of behavioral problems, especially hyperactivity (Pettersson et al., 2014; Scott et al., 2012; Singh et al., 2013) and childhood depression (Conrad et al., 2010; Hayes & Sharif, 2009; Lieshout & Boylan, 2010).

With regard to the consistency between the reports by parents and children, there was an association between the indicators of emotional symptoms and the indicators of childhood depression only in the LBW group. However, there was association between the indicators of childhood depression and the indicators of overall behavioral problems in all birth-weight groups, except for the VLBW group, in which no significant correlation was found.

Based on the results of the LBW group, the children who rated themselves high on indicators of depression and overall behavioral problems were also rated high on emotional symptoms and overall behavioral problems by their parents. The association between the indicators of emotional symptoms and the indicators of childhood depression in the children in the LBW group may be related to the fact that although there was no

significant difference, this group had more girls than the VLBW and NBW groups. It is known that girls are more likely to have emotional symptoms than boys and that, in general, parents identify more depressive symptoms in female children (Reijneveld et al., 2006).

It was observed that the children in the LBW, IBW, NBW, and VHBW groups, who rated themselves high on indicators of depression, were also rated high on overall behavioral problems by their parents. Therefore, it seems that the depressive symptoms perceived by the children were identified by the parents as behavioral problems, with different types and characteristics.

Differences between the parents and children reports were also found in studies available in the literature (Dahl et al., 2006; Vederhus et al., 2015). These results support the findings of Achenbach (1992), who argue that internalizing problems are less frequently perceived by the parents than by the children themselves because they are related to their inner world and are therefore less clear, while externalizing problems are more frequently identified by the parents since they are more visible. Thus, it is possible that only part of the symptoms exhibited by the children (the most visible symptoms) was identified by the parents, and they were reported as overall behavioral difficulties.

Furthermore, according to Zukauskienė et al. (2004), the apparent divergence between the parental reports about internalizing problems of children may reflect the common co-occurrence of internalizing and externalizing problems in children, indicating comorbidity or that some externalizing symptoms, such as difficulty concentrating, can also be part of internalizing problems.

As for childhood depression, there is a range of different symptoms in different age groups. Depressed school age children and adolescents are often irritable and unstable and may burst into a fit of rage (Bahls, 2002). Such behaviors may be misinterpreted by parents as disrespect, temper tantrum, bad mood, which may lead them to perceive these behaviors as indicators of difficult children or children with hyperactivity or conduct disorders.



These findings confirm the need to consider the different perception of the informants. As stated by Vanderbilt and Gleason (2010), parents evaluate the vulnerability of their children from the perspective adults and compare them to other children, while children take into account the behavioral patterns as perceived by them. As for the VLBW group, no significant correlation was observed, which can be explained by the behavioral problems identified in this group.

Some limitations of this study are: the small number of children in the VLBW and VHBW groups compared to that of the other groups and the use of instruments that do not focus on the same indicators.

On the other hand, some strengths of this study are: the research design adopted, a prospective cohort study, which enabled the evaluation of the long-term outcomes of low birth weight; the stratification of the cohort into five birth-weight groups, which enabled the identification of the characteristics of each group; and the use of easily applicable screening instruments, such as the SDQ and CDI, which were adapted and standardized to the Brazilian population and allowed the identification of indicators of behavioral problems and childhood depression.

## Final Considerations

It was found greater vulnerability of children born with VLBW to childhood depression and behavioral problems, especially hyperactivity. The association between the indicators of emotional symptoms, reported by the parents, and childhood depression, reported by children, was observed only in the LBW group. There was association between the indicators of childhood depression and indicators of overall behavioral problems in all groups, except for the VLBW group. The association between the indicators of depression, reported by the children, and the indicators of behavioral problems, reported by parents, suggest consistency in terms of problem identification.

These findings highlight the relevance of early identification (school age) of difficulties that

are common during adolescence, period of developmental transition often marked by the emergence of more problems. Therefore, we emphasize the importance of the evaluation of indicators of children's problems by different informants, including children, especially when focusing on the identification of internalizing problems, which are more difficult for parents to detect.

It can be said that the early and consistent identification of behavioral and emotional problems related to the exposure to biological risk factors associated with low birth weight can contribute to the development of prevention and treatment programs for the promotion of children's mental health.

## Contributors

C.M. RODRIGUES-PALUCCI and S.R. LOUREIRO contributed to the conception, study design and final editing of the article.

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