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STRESS AND RESILIENCE IN PARENTS OF CHILDREN WITH CEREBRAL PALSY

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ABSTRACT

This study aims to evaluate parenting stress and resilience, to cross-reference quantitative and qualitative ISD variables with the Connor and Davidson Resilience Scale (CD-RISC) and total stress and resilience factors, and to investigate if there is a predictive model for high stress and high resilience. A total of 92 parents of children with cerebral palsy participated in this study. The instruments used were the Socio-demographic Inventory (ISD), the Parenting Stress Index (PSI/SF) and the CD-RISC. The analyses were performed in SPSS version 20.0. The following ISD items ─ time of parents' union, child's age, parents' age, school adjustment, health problems, government benefit, child attending school, and city of residence ─ interacted with the CD-RISC factors of courage/determination, adaptability, social support and control, tolerance for adversity, self-efficacy, social support and confidence, and total resilience, explaining resilience in the different stress level groups. Finally, the present study showed that there was no predictive model of high stress, but it was found that older parents are more likely to showhigh resilience, as is the case with parents of younger children.

INTRODUCTION

Cerebral Palsy (CP) is a non-progressive disorder characterized by motor and/or cognitive impairment. Its etiology is related to events occurring in the prenatal period, during childbirth, or in the first two years of life. The clinical picture of children with cerebral palsy is variable, and may include limitations of activity, mobility or visual impairment, and hearing deficiency, due to changes in the neuropsychomotor development of these children (Rosset, Santos & Galera, 2010). The incidence of CP in developed countries is around two to three cases per 1000 live births (Braccialliet al., 2016). Evidence indicates that lack of access to adequate health services, both in the prenatal period andinadequate care of the mother and the baby in theperi and postnatal periods, increase the incidence of CP (Blume&Loch, 2007; Johnson, 2002; Serdaroglu, Cansu, Özkan,&Tezcan, 2006; Westbom & Nordmark, 2007).

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The highest CP index is among children with extremely low weight and prematurity, occurring in around 19% of cases (Vohr *et al*., 2005). CP happens in a period of accelerated development of the child, and can therefore compromise the process of acquisition of abilities, which can interfere with their functionality, hindering the performance of activities compared to children with typical development. In the same way, in each age group, movement takes on peculiar characteristics and the acquisition or appearance of certain motor behaviors has important repercussions in the child's development, because learning of movements occurs through sensorial experience. Each acquisition of the child influences experience and exchange with the environment in both mental and motor domains (Vilibor and Vaz, 2009). In children with CP, the pattern of learned movements will be influenced by abnormal postures and movements (Zonta, Júnior & Santos, 2011). In the face of this entire peculiar picture of motor, cognitive, postural, and functional impairment, news of aCP diagnosis is marked by expectations, fears, and insecurities, in which parents will need to discard the idea of the dreamed-of child and adapt to the chronic condition of CP. Therefore,

difficulties arising from the sense of unpreparedness for the execution of the parental tasks associated with the incurable, irreversible, and prolonged dependence of the person with CP can cause physical and emotional overload in parental figures, being configured, according to Andrade, de SouzaVieira, and Dupas (2011), as stressors. Stress is considered to be the result of imbalance in the relation between the individual and the environment. Therefore, a stressful situation can generate an inability to solve problems, which is exacerbated through emotional and physical disorders. News of a child with atypical development in the family environment, for example, implies a series of psychological adaptations for the parents that includes the abandonment of the dreamed-of and expected child and adaptation to the new reality (Barbosa, Chaud & Gomes, 2008; Vieira, Mendes, Frota & Frota, 2008). According to Dell'Aglio, Koller, and Yunes (2011), the presence of stress is conditioned to the individual's perception of a given situation, the interpretation given by them to the stressor event, and the meaning attributed to it. Parenting stress may have positive and negative implications in the families of children with cerebral palsy. On the one hand, stress can act by impelling parental figures to search for information about CP, such as specialized care that guarantees the best adaptability of the child to the familial, school, and recreational environment; on the other hand, it can generate biological and psychological symptoms in parents as a consequence of their feelings of incapacity, insecurity, and sadness (Miura & Petean, 2012). Empirical evidence suggests that the way people cope with stressful situations varies. Although some share similar stories, they are differentiated by the fact that some manage to overcome crises while others do not achieve the same success (Pinheiro, 2004). This is possible thanks to the existence of resilient attitudes, in which people confront adversity, with overcoming and personal transformation. In this way, resilience reduces the intensity of stress and negative emotional experiences (Martins, 2014).

Based on the assumption that the concept of resilience corresponds to the relation between the individual and their living environment, it is possible to affirm that resilient behavior results from the individual's ability to adapt positively to adverse situations while respecting human individuality. In this sense, resilience would be the ability to experience and reinterpret stressful situations so that the stressor is no longer seen as such. This situation would enable the individual to face future stress situations more satisfactorily, since a situation of suffering or conflict can strengthen the individual in the face of other similar situations, transforming them and, thus, generating a lower level of stress (Martins, 2014). Resilience manifests in the resilient behavior of each family member individually and collectively, because contact with affectively important characters in childhood, associated with asmall number of stressors and subjective understanding of the stressor are factors that influence the capacity to be resilient (Regalla, Guilherme and Serra-Pinheiro, 2007). Based on this assumption, Franco (2000) carried out a study with 50 mothers of children with CP to identify the main resilient factors in the family, as well as their most relevant needs and problems. The author observed that resilience seems to be related to two fundamental aspects: family cohesion and the strength and psychological resistance of the mothers. The mothers' concerns about the future of these children are evidenced as a fundamental resilient movement toward re-idealization or reorganization of their perspective onthefuture, not unlike what happens with parents of children

with typical development. In this context, Rooke (2015) highlights the importance of resilience within the family context to understand the strengthening of the potential and resources that families have to overcome crises and challenges, which would help to develop the characteristics of the person before risk situations. Resilience will then be decisive in the adoption of stress coping postures, since it is through overcoming difficulties that parents can guarantee the child all the care he or she needs (Martins, 2014). Therefore, considering that it is fundamental to know the common and present processes in families of children with cerebral palsy, the objectives of this research areto (1) evaluate parenting stress, (2) evaluate parental resilience, (3) cross-reference quantitative Socio-demographic Inventory (ISD) variables with Connor and Davidson Resilience Scale (CD-RISC) factors and total stress and resilience, (4) cross-reference qualitative ISD variables with CD-RISC factors and total stress and resilience, and (5) investigate the existence of a predictive model for high stress and high resilience.

Methods

Cross-sectional and descriptive study, whose data were collected between January and December,2014 in the municipality of Belém in the state of Pará. Participant sin this study were 92 parents of children diagnosed with cerebral palsy (ICD-10-G80). The study was carried out with all the parents of children with PC who received care during the period studied. The age of the parents varied between 20 and 55 years, being 48.9% in the age group between 20 and 30 years, 32.6% between 31 and 40 years and 18.5% over or equal to 41 years. The age of the children ranged from 1 to 12 years, being 19.6% between 1 and 3 years, 44.6% between 4 and 7 years, 30.4% between 8 and 11 years and 5.4% over 11 years . Regarding the age of the child when the diagnosis was made, it was observed that the age ranged from 0 to 48 months, and in 85.8% of cases the diagnosis occurred when the child was between 0 and 12 months, 7.6% when had between 13 and 24 months and 6.6% between 25 and 48 months. The research was conducted individually in the waiting room of a referral service offered by a university hospital in Pará, Brazil. This service is composed of a multiprofessional team and has been operating since 2002. It is a reference site for the diagnosis and monitoring of children up to 12 years of age presenting growth and developmental disorders (cerebral palsy, genetic syndromes, epilepsy, etc.). The instruments used were the Socio-demographic Inventory (ISD), the Parenting Stress Index, Short Form (PSI/SF; Abidin, 1983), and the Connor and Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003). The ISD, an instrument built by a team of researchers from the Laboratory of Developmental Ecology–Cerebral Palsy, aimed to characterize the investigated families and children with cerebral palsy. Thus, it was structured in the following dimensions: socioeconomic, history and composition of the family, and characteristics of the child and his/her parents.

The PSI was applied to assess the level of perceived stress of the parents. In this study, the reduced version (PSI / SF; Abidin, 1983) was used, composed of 36 items, validated by Santos (1997), for the population of Portugal. PSI / SF is used worldwide for stress assessment in parents, including research with parents of children with cerebral palsy (Ribeiro, Sousa, Vandenberghe and Porto, 2014). This test covers Total Stress and three subscales (Parental Interference, Dysfunctional

Child-Parental Interfaction, and Difficult Child). The sum of the points varies between 36 points and 180 points. There is a cut-off point for each subscale: 33 in the subscale of Distress Parental, 28 in the subscale of Dysfunctional Interaction of Son-Son and 37 in subscale Difficult Child. High scores (above 94 points in total stress) indicate clinical stress level. it is a five-item Likert scale that goes from totally disagreeing to strongly agreeing). Initially, contact was made with the authors of the CD-RISC, aiming at the permission to use the scale. After agreeing to the terms of use of the scale and submitting the appropriate forms, the Connor-Davidson Resilience Scale was made available by the authors. The CD-RISC assesses the individual's perception of their ability to overcome adversity, obstacles, or other difficulties. Although already validated for Brazilians by Lopes and Martins (2011) and Solano *et al.* (2016), there is still no data in the Brazilian literature about the use of this scale in parents of children with cerebral palsy, object of the present study, so a new factorial analysis was done for the researched population. The version used here is the same as that used by these authors and consists of 25 questions regarding the most recent situation, with orientation to the interviewee that, if the proposed situations have not occurred, they should check the option that shows what they would feel if it had happened. It brings together five factors (personal competence, confidence in one's own instincts and tolerance for adversity, positive acceptance of change, control, and spirituality). The results are obtained according to the score in each of the 25 responses presented on a Likert scale (0–not true, 1–rarely true, 2–sometimes true, 3–usually true, and 4–almost always true), and may vary between zero and 100 points. High scores indicate high resilience (Connor & Davidson, 2003).

This study was approved by the Ethics Committee in Research with human expressed in the opinion 413.140/11.2013, with participation conditional on the respondent signing the Informed Consent form. Initially the parents were explained the objectives of the research and those who agreed completed the ISD, the PSI/SF, and finally the CD-RISC questions. The average collection time was 60 minutes. After the application of the instruments, the data were entered into and analyzed with SPSS® version 20.0. For the PSI analysis, the numerical distribution and percentage of parents with levels of stress lower, equal, or above the cutoff point in each subscale and in Total Stress were evaluated through the Equality of Two Proportions test. As in the original study (Connor & Davidson, 2003) and in those of validation for the Brazilian population (Martins & Lopes, 2011; Solano *et al.*, 2016), for the CD-RISC, factorial analysis was used to obtain the factor loadings determined by the correlations between the questions of the instrument.

This analysis serves to create factors, that is, to group some questions that share some common meaning. In this case, the numerically larger loadings were responsible for the denomination of each factor. In addition, total resilience was also classified as high or low according to the values obtained, that is, those equal to or above the average found in each ISD item were considered high resilience and the below average values were those of low resilience. The Varimax orthogonal rotation method with "Kaiser" normalization was used in the factor analysis, considering only eigen values greater than 1.0. In addition, the Kaiser-Meyer-Olkin (KMO) test was performed to validate the factor analysis (Hair, Black, Babin & Anderson, 2005). The result of this test was 0.629, which

indicated the factor analysis could be performed. Bartlett's test was significant (p <0.001), that is, the null hypothesis was rejected and therefore it was possible to affirm that the correlation matrix was different from the identity matrix, so it was certain that there were correlations between the data. Finally, ISD quantitative and qualitative data were cross-referenced with the high and low dimensions of PSI/SF Total Stress, as well as the CD-RISC factors andCD-RISC Total Resilience. ANOVA was used to compare the mean of the quantitative demographic variables and the chi-square test for the qualitative variables. Finally, logistic regression was performed to detect which socio-demographic variables predisposed participants to the occurrence of high stress and high parental resilience. For all analyses, we considered a significance level of p <0.005.

RESULTS

Parametric statistical tests were used, since the data are quantitative and continuous. In addition, this research presents a sample of more than 30 subjects, which by the Central Limit Theorem, guarantees that the distribution tends to a Normal distribution. Thus, there was no need to test the normality of the residuals, and parametric tests were used directly, since these are more powerful than non-parametric tests (Dancey and Reidy, 2006). In the total of 92 parents of children with cerebral palsy the following were observed: a predominance of female caregivers (98.0%), predominant monthly family income of more than 1 to 2 minimum wages (43.0%), and beneficiaries of government welfare programs (84.9%). As for the frequency of care received at the research institution, 28.0% of parents attended the institution weekly, while 25.8% attended monthly, and 46.2% attended bi-monthly or semi-annually. The findings of this research were organized as follows: (1) assessment of parenting stress using the PSI/SF scale, (2) assessment of parental resilience using the CD-RISC scale, (3) cross-referencing of the ISD quantitative variables with CD-RISC factors and total stress and resilience, (4) cross-referencing of ISD qualitative variables with CD-RISC factors and total stress and resilience, and (5) logistic regression for high stress and high resilience.

Assessment of Parenting Stress

Table 1 shows the distribution of the relative frequency of the 92 participants in each subscale and Total Stress of the PSI/SF. Categorization was made based on the cut-off values of each item. Table 1 shows that only the Parental Distress item was not statistically significant (n = 42; p = 0.238), although this was the subscale with the largest number of stressed parents. In addition, there was a higher percentage of people classified with low stress in all subscales: *Parental Distress* (54.3%), *Dysfunctional Interaction* (59.8%), *Difficult Child* (subscale with the highest number of parents with low stress - 88.0%), and *Total Stress* (63.0%). Table 1 also shows that in *Total Stress*, 37.0% of the parents were stressed.

Assessment of Parental Resilience

Parental resilience was also investigated in the present study through the CD-RISC. For this purpose, a factor analysis was performed using the Principal Components method. For each factor, the variability explained by the factor was considered, besides the accumulated variability, considering the basic theory of the construct.

Table 1. Distribution of the number and percentage of fathers/mothers with PSI/SF in each subscale and in Total Stress. Belém-PA, 2015. (n = 92)

Parenting Stress PSI/SF	Low/Normal≤		High ≥		P-value
	N	%	N	%	
Parental Distress[1]33	50	54.30%	42	45.70%	0.238
Dysfunctional Interaction [2]28	55	59.80%	37	40.20%	0.008*
Difficult Child [3]37	81	88.00%	11	12.00%	<0.001*
Total Stress [4]94	58	63.00%	34	37.00%	<0.001*

[1,2,3,4] cutoff point for each subscale and Total Stress of the PSI/SF scale.
*Statistically significant difference (p<0.05).
Source: Field Research.

Table 2. Distribution of the CD-RISC factors.Belém-PA, 2015. (n=92)

CD-RISC factorsfound[1]		Low Resilience		High Resilience		P-value
		N	%	N	%	
Tolerance for adversity	Factor 1	41	44.6%	51	55.4%	0.14
Courage/Determination	Factor 2	42	45.7%	50	54.3%	0.238
Positive Acceptance	Factor 3	35	38.0%	57	62.0%	0.001*
Self-Efficacy	Factor 4	37	40.2%	55	59.8%	0.008*
Social Support	Factor 5	45	48.9%	47	51.1%	0.768
Adaptability	Factor 6	33	35.9%	59	64.1%	<0.001*
Spirituality	Factor 7	28	30.4%	64	69.6%	<0.001*
Control	Factor 8	37	40.2%	55	59.8%	0.008*
Confidence	Factor 9	41	44.6%	51	55.4%	0.14
Persistence	Factor 10	33	35.9%	59	64.1%	<0.001*
	Total Resilience	42	45.7%	50	54.3%	0.238

[1]names attributed by the researchers to the factors found.
*Statistically significant difference (p<0.05).
Source: Field Research.

Table 3. ISD quantitative data compared to the factors obtained by the CD-RISC, with the dimensions of total stress and total resilience. Belém-PA, 2015. (n = 92)

ISD	CD-RISC Factors	Total Stress	Total Resilience	N	Mean	Standard Deviation	P-value
Time of parents' union at the time of birth of the child with CP (months)[1]	Total Resilience	Low	Low	22	61.4	84.4	0.353
			High	33	83.1	83.9	
		High	Low	17	47.1	64.2	0.917
			High	12	44.7	54.9	
	Courage/determination	Low	Low	22	78.6	98.2	0.762
			High	33	71.5	74.6	
		High	Low	17	26.9	29.4	0.037*
			High	12	73.2	80	
	Adaptability	Low	Low	17	30.7	36.8	0.009*
			High	38	93.9	91.9	
		High	Low	14	43.4	63.9	0.822
			High	15	48.5	57.3	
Parents' age (years)	Total Resilience	Low	Low	22	31.9	7.9	0.116
			High	36	35.5	8.8	
		High	Low	20	29.4	6.6	0.037*
			High	14	34.8	7.8	
	SocialSupport	Low	Low	23	31.1	7.3	0.027*
			High	35	36.1	8.9	
		High	Low	22	32.2	7.4	0.543
			High	12	30.5	8.1	
	Control	Low	Low	25	32.4	7.8	0.182
			High	33	35.5	9	
		High	Low	12	27.3	5.4	0.011*
			High	22	35	7.6	
Child's age (years)	Total Resilience	LowStress	Low RISC	22	6.4	3.2	0.89
			High RISC	36	6.3	2.9	
		HighStress	Low RISC	20	6.7	2.8	0.799
			High RISC	14	6.4	3.4	
	SocialSupport	Low	Low	23	7.3	3.3	0.037*
			High	35	5.6	2.6	
		High	Low	22	6.7	3	0.719
			High	12	6.3	3	

[1]In theTime of parents' union at the time of birth of the childvariable06 participants reported never having had a marital relationship with the biological parent of the child with cerebral palsy. *Statistically significant difference (p<0.05). Source: Field Research

Thus, 10 factors were obtained (groups of questions) from the 25 questions of the CD-RISC scale, where the total variability explained by these 10 factors was 69.5% (out of 100%), considered a good median value (Damásio, 2012).

To facilitate data analysis, each factor obtained was named according to the theme addressed in each group of questions (Table 4), based on the original CD-RISC scale (Connor &Davidson, 2003). In general, Table 2 shows the highest

frequency of parents with high resilience in 54.3% (total resilience) of the cases. Analyzing each of the factors, the same tendency of resilient parents in all factors was observed, with statistical significance for spirituality in 69.6% of the cases (p <0.001), adaptability in 64.1% (p<0.001), persistence (64.1%, p <0.001), positive acceptance (62.0%, p = 0.001), self-efficacy (59.8%, p = 0.008), and control (59.8%, p= 0.008).

Cross-referencing of the ISD Quantitative Variables with the CD-RISC factors and Total Stress and Total Resilience

In the following, ISD quantitative data were compared to CD-RISC factors, PSI/SF Total Stress dimensions (low and high stress), and CD-RISC Total Resilience dimensions (low and high resilience), as shown in Table 3. Table 3 shows the cross-over between quantitative ISD variables, CD-RISC factors, total stress, and total resilience in parents of children with cerebral palsy. In general, it was observed that the parents'union time, the child's age, and the parents' age were found significantly in parents with high and low levels of stress. In addition, the following CD-RISC factors associated with these variables were observed: courage/determination, adaptability, social support and control, and total resilience. Considering the variable "Time of parents' union at the time of birth of the child," no statistical differences were observed in "total resilience" per group of stress levels, but when analyzing the factors it is possible to notice that the mean of this union time was significantly higher in parents with high resilience in the "courage/determination" (73.2 ± 80.0 months; p = 0.037) and "adaptability" (93.9 ± 91.9; p = 0.009) factors, and that this finding was independent of the assessed parenting stress level. In the variable "parents'age," the mean age was higher in the groups with high resilience, regardless of the level of stress assessed. In addition, among those classified as having high resilience in "total resilience" and in "control," the mean age was significantly higher in parents with a high level of stress (34.8 ± 7.8 years, p = 0.037 and 34 ± 7.6 years, p = 0.011, respectively). On the other hand, in the "social support" factor, parents with a more advanced mean age were classified as having low levels of stress (36.1 ± 8.9 years, p = 0.027). Finally, when analyzing the current age of children with cerebral palsy, statistical differences were not observed in "total resilience" per group of stress levels, but in the "social support" factor, parents of older children (7, 3 + -3.3 years; 0.037) showed low resilience and low stress.

Cross-referencing of the ISD Qualitative Variables with CD-RISC Factors and Total Stress and Total Resilience

Continuing the analysis of ISD variables, now the qualitative ones, they were cross-referenced to the dimensions of Total Stress of the PSI/SF(low and high stress) and to the dimensions of Total Resilience of the CD-RISC (low and high resilience), as shown in Table 4. Table 4 shows the cross-over between the ISD qualitative variables, the CD-RISC factors, total stress, and total resilience in parents of children with cerebral palsy. Throughout this analysis the parents were divided into two groups: high stress and low stress. In the group of parents with high stress, four CD-RISC factors (tolerance for adversity, self-efficacy, social support, and confidence) were found to be significantly associated with five qualitative ISD variables: *school adjustment, health problems, government benefit, child attends school presently,* and *city where you live*. In the first factor, "tolerance for adversity,"

there was a predominance of parents with low resilience (77% and 68%, respectively), both in the percentage (61%) of parents who showed there was no adjustment at school for their children, or in those 53% who did not present health problems. The second factor "self-efficacy" reveals that all parents receiving government benefit were classified with low resilience. In addition, the third factor "social support" showed that 83% of parents with high resilience had children who did not currently attend school in 50% of cases. Finally, the fourth and last factor "confidence" appeared related to two variables: *city where you live* and *health problems*. It was observed that in these two cases, parents were considered as having low resilience (83% and 72%, respectively), with 65% of them living in inland cities of Pará and 53% without health problems. In the parents classified with low levels of stress, three factors of the CD-RISC (courage/determination, adaptability, and control) were significantly associated with four variables: *child's gender, government benefit, parents' occupation,* and *there was aseparation*. The first "courage/determination" factor was found in both parents of boys (50%) and parents of girls (50%), but low resilience in parents of girls was observed in 68% of cases. The second factor "adaptability" was associated with the *government benefit* and *parents' occupation* items, especially in parents with high resilience (78% and 70%, respectively). In this case, 84% of parents received benefits from the government and 78% were responsible for home care. Finally, in the third and last "control" factor, 72% of parents reported having separated at some point after the birth of the child with CP, of which the majority (85% of cases) showed high resilience.

Logistic Regression for High Stress and High Resilience

In the logistic regression, it was verified that there is no statistical model to predict the probability of the individual expressing high stress based on ISD variables, while for high resilience, two quantitative variables (age of the parents and age of the child) and two qualitative variables (anoxia and prematurity) of the ISD were found able to predict the parents' chance of presenting high resilience, as shown in Table 5. For the logistic regression interpretation of table 5, the positivity or negativity of the final coefficient should be considered. When this coefficient is positive (in the case of the parents' age - 0,129), the probability is positive, that is, the higher the parents' age, the higher the chances of the parental population having high resilience. Otherwise, if the coefficient is negative, as in the case of the child's age (-0.232), the lower the child's age the higher the parents' probability of having high resilience. This reasoning also applies to qualitative variables, but considering their presence or absence. Thus, the analysis of table 5 shows that the presence of anoxia (prenatal, perinatal, or postnatal) or prematurity in the history of the child with cerebral palsy reduces the chances of parents developing high resilience. The final calculation of the probability of parents of children with cerebral palsy presenting high resilience is expressed by the formula below. In this case, because it is a multivariate analysis, the predictive model of High Resilience is expressed as follows:

$$HighResilience = \frac{exp^{-1,308+0,129*Age\ of\ parents-0,232*Age\ of\ the\ child-1,578*Anoxia-2,272*Prematurity}}{1+exp^{-1,308+0,129*Age\ of\ parents-0,232*Age\ of\ the\ child-1,578*Anoxia-2,272*Prematurity}}$$

The form of filling the model for prediction of high resilience should be performed with the numerical placement of the age of the parents and the child in the places indicated by the

Table 4. Cross-referencing between PSI/SF parenting stress groups, CD-RISC factors, ISD qualitative variables, and total resilience dimensions. Belém-PA, 2015. (n = 92)

Total Stress	CD RISC Factors	ISD		Resilience						P-value
				Low		High		Total		
				N	%	N	%	N	%	
High Stress (N=34)	Tolerance for Adversity	School Adjustment[1]	No	10	77%	1	20%	11	61%	0.026*
			Yes	3	23%	4	80%	7	39%	
		Health Problems	No	13	68%	5	33%	18	53%	0.042*
			Yes	6	32%	10	67%	16	47%	
	Self-Efficacy	Government Benefit	No	0	0%	5	29%	5	15%	0.015*
			Yes	17	100%	12	71%	29	85%	
	Social Support	Child attends school presently	No	7	32%	10	83%	17	50%	0.004*
			Yes	15	68%	2	17%	17	50%	
	Confidence	City where you live	Belém	3	17%	9	56%	12	35%	0.016*
			Other	15	83%	7	44%	22	65%	
		Health Problems	No	13	72%	5	31%	18	53%	0.017*
			Yes	5	28%	11	69%	16	47%	
LowStress(N=58)	Courage/ determination	Child's gender	Female	15	68%	14	39%	29	50%	0.03*
			Male	7	32%	22	61%	29	50%	
	Adaptability	Government Benefit	No	0	0%	9	23%	9	16%	0.029*
			Yes	18	100%	31	78%	49	84%	
		Parents' occupation	home care	17	94%	28	70%	45	78%	0.039*
			Other	1	6%	12	30%	13	22%	
	Control	There was a separation	No	14	56%	28	85%	42	72%	0.015*
			Yes	11	44%	5	15%	16	28%	

[1]In the item School Adjustment, 18 parents reported that their children had attended school at some point in their lives
*Statistically significant difference (p<0.05).
Source: Field Research

Table 5. Coefficients of the Logistic Regression Model (for High Resilience)

ISD	Initial		Final	
	Coef.	P-value	Coef.	P-value
Constant	-8.821	1	-1.308	0.257
Age of the Parents	0.297	0.008*	0.129	0.001*
Age of the Child	-0.587	0.03*	-0.232	0.013*
Anoxia	-5.973	0.006*	-1.578	0.01*
Prematurity	-9.258	0.006*	-2.272	0.002*

*Statistically significant difference (p<0.05).Source: Field Researc

Table 6. Adherence Tests of the Logistic Regression Model (High Resilience)

Method	Initial	Final
Pearson	0.586	0.522
Deviance	0.885	0.210
Hosmer-Lemeshow	0.784	0.634

Source: Field Research

above formula, followed by the placement of one (1) for the presence of anoxia and prematurity and zero (0) for the absence of these qualitative variables. At the end, with all the data filled in the model, it will be possible to predict numerically the probability of parents of children with cerebral palsy developing high resilience. Finally, other statistical tests (Pearson; Deviance, and Hosmer-Lemeshow) can be used to gain greater confidence in the logistic regression model, that is, test the model to see if it can identify (predict) the probability of the participant presenting high resilience, as shown in Table 6. These tests seek to verify the best fit of the model, being: H0 = satisfactory adjustment of the data; H1 = poor adjustment of the data. To reject H0, the value of p must be ≤ 0.05, which is the level of significance adopted. It was verified through the statistical tests applied, as shown in table 6, according to the values of p, that we didnot reject H0, that is, the data showed a satisfactory adjustment regarding the estimated logistic model. Therefore, considering the results presented for the value of p in table 9 for the three tests evaluated, there is sufficient evidence to affirm that the estimated model makes predictions with great confidence, that is, good adherence.

DISCUSSION

The results of this research showed a higher number of parents with a high level of stress in the Difficult Child subscale, which corresponds to the behavioral aspects of the children. Although present, parenting stress was found in low/normal levels in more than half of the parents surveyed, which agrees with a part of the literature that indicates that not all the families that receive a diagnosis of chronic developmental alteration present high levels of stress (Gomes &Bosa, 2004). On this question, this research highlighted a higher percentage of low stress in all subscales (Parental Distress, Dysfunctional Interaction, Difficult Child) and in the *Total Stress* score. On the other hand, regarding resilience, the predominance of the following characteristics was observed in the study population: spirituality, adaptability, persistence, positive acceptance, personal competence, and control in highly resilient parents of CP children. These findings complement the original Connor and Davidson (2003) study, which found five dimensions (personal competence, confidence in one's own instincts and tolerance for adversity, positive acceptance of changes, control, and spirituality) in the general American population, primary caregivers, psychiatric outpatients, subjects from a

generalized anxiety study, and two samples of posttraumatic stress disorder. Vargas *et al*. (2014) conducted a studywith 43 parents of children with cerebral palsy with the aim of investigating family resilience. The authors used a questionnaire based on Walsh's "Key Processes in Family Resilience" (2005) considering CP diagnosis. In addition, they also studied the risk factors, the timing of the diagnosis, and the difficulties encountered by the family in caring for the child. In general, the majority revealed that the diagnosis of CP improved the family relationship, considering them selvesasoptimistic, happier, and already adjusted to the child'sstate of health. Positive aspects included faith, courage, perseverance, and affection, while negative factors included fear, pessimism, guilt, and refusal. Finally, the key processes found were as follows: in the system of Beliefs, the maintenance of aPositiveoutlookand Transcendence and Spirituality. In organizational patterns, flexibility and Social Resources were observed, due to the great support that the majority of respondents received, mainly from the family. In the communication processes, it was found that those responsible for the child became more prone to expressing emotions and tolerating differences (Vargas *et al*., 2014).

Franco (2000) carried out a study with 50 mothers aiming to understand the family's emotional pathway in the face of the disability. The author found that the participants revealed three major factors related to the process of resilience: family cohesion, personal strength and psychological resistance (including self-image), and the child. The research concluded that emotional investment and child-related caring make it possible to cope better with the situation, while concern for the future (and even searching for information about what will happen) is seen as a fundamental resilient movement in the sense of the child's re-idealization (or reorganization of one's perspectiveon the future). Other research on resilience in the context of disability was conducted by Guerra *et al*. (2015). They interviewed six mothers of children with disabilities to identify the main signs of emotional distress experienced by the maternal population. The authors observed narratives of pain, suffering, and overcoming, aspects that are important for them to develop the capacity for resilience, as they reveal the power of overcoming that each of the collaborators presents before their life histories. Although more readily found than research on resilience in families of children with cerebral palsy, investigations of stress in this family context are still scarce, as explained by Ribeiro, Porto, and Vandenberghe (2013) in theirintegrative review on thistheme.

The authors point out the need for longitudinal and qualitative studies that approach thistheme in a specialized way to fill the existing gap on family functioning in the context of parents of children with CP. It is noteworthy that in this study the authors found higher levels of stress in parents of children with cerebral palsy when compared to parents of children without disabilities and that this can affect their health. Finally, they found that although there are behavioral changes, psychological and emotional disturbances as potential generators of stress, some aspects such as social support, satisfaction with the role of father/mother, good family functioning, affective bonding of the father/mother with the child, the support of the spouse, and the feeling of actively participating in social life seem to contribute to the minimization of stressful symptoms. Considering that few studies have approached stress and resilience in an isolated way, it is even more difficult to find research that aims to

correlate these two themes in the context of families of children with CP. In this sense, the present research reveals extremely important data for the understanding of family functioning in the presence of a child with a disability. For example, when correlating stress and resilience in the population surveyed, it was observed that the prolonged union time of parents of children with CP interacted with the factors of courage/determination and adaptability to explain the high resilience found regardless of the level of parenting stress assessed. On the other hand, the control factor seems to explain the high resilience in older, highly stressed parents, while the social support factor would explain the low resilience in parents of older children assessed with low levels of stress. Considering the qualitative variables, it was observed that in parents with high levels of stress, low resilience seems to be explained by the following associations: tolerance for adversity, when there was no adjustment in the children's school and/or health problems, self-efficacy in parents who were beneficiaries of government programs, and confidence in parents residing in inland cities of the state and who had no health problems. Otherwise, in those with high levels of parental resilience, there was a relationship between social support and non-inclusion of children. In parents with low levels of stress, low resilience was explained by the relation between the parenting courage/determination factor and female gender of children with CP.

Meanwhile, high resilience was explained by adaptability in parents receiving benefits from government, those responsible for home care, and by the control shownin parents who had already separated at some point after the birth of the child. Finally, the present research showed that the higher the age of the parents, the higher the chances of the parental population presenting high resilience. On the other hand, the lower the child's age, the higher the likelihood of parents having high resilience. In addition, it was observed that the variables *perinatal anoxia* and/or *prematurity in the birth report of the child with cerebral palsy* decrease the chances of parents developing high resilience.

Conclusion

The contribution of the present research is to show that regardless of the level of stress, high resilience is present in parents of children with CP with a longer union time, provided that it is associated with the courage/determination and adaptability factors. In highly stressed parents, high resilience was explained by the following relations: the control factor and the advanced age of the parents, and the social support factor in those parents whose children did not attend school. On the other hand, low resilience was found in the following situations: the tolerance for adversity factor, when there was no adjustment in school and/or health problems, the self-efficacy factor in parents who were beneficiaries of government programs, and the confidence factor in parents residing in the inland of the state and who had no health problems. Finally, in low stressed parents, children's advanced age was associated with the social support factor that resulted in the low resilience observed. Finally, the present study showed that older parents are more likely to have high resilience, as is the case with parents of older children. In addition, it was observed that the presence of perinatal anoxia and/or prematurity in the birth report of the childwith cerebral palsy reduced the chances of parents developing high resilience. Therefore, the present research provides evidence of

the need to build collective health programs to support families of children with cerebral palsy. The results revealed here attempt to respond to an eminent and growing need of the scientific community and clinical practice to addressfamily repercussions from the presence of a child with cerebral palsy. However, it should be noted that the present study was limited to investigating only one reference institution. In this sense, it is suggested that future research verify the same theme in other national and international institutions to confirm or challenge the data reported here.

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