

Intellectual Disability and Psychiatric Diagnoses of Children and Adolescents with a History of Stressful Events and Social Deprivation in Brazil: Preliminary Results. IQ, Depression and Stress

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Abstract:

Background: Studies have shown that stressful events in childhood are associated with impairments in cognitive functions and intellectual disability.

Objective: Compare the intellectual functioning in groups of Brazilian children and adolescents with a history of stressful events with lifetime history of depression and without lifetime history of depression.

Method: 30 children and adolescents underwent psychiatric evaluation and neuropsychological assessment of estimated intellectual quotient (EIQ), verbal knowledge, and visuospatial skills.

Results: 15 patients (50%) had EIQ within the average and 6 had EIQ in the lower average (20%) for Brazilian standardized norms. The other part had at least some degree of intellectual disability and they were classified as: 2 mild mental retardation (6.7%) and 7 borderline (23.3%). Also, half of the sample had at least one lifetime depressive episode, and the performance in EIQ and visuospatial skills was worse in this group.

Conclusion: 50% of the children and adolescents with a history of early stressful events and social deprivation had at least some degree of intellectual disability. In addition, a subgroup with history of depressive episodes had worse EIQ performance when compared to those without depression, possibly due to a greater impairment in visuospatial skills. The specific role of impaired right cerebral hemisphere, corpus callosum, and prefrontal cortex associated with depressive disorders and maltreatment should be investigated in further studies.

Keywords: Stress, children, adolescent, IQ, depression, intellectual disability.

INTRODUCTION

Stressful emotional events cause an abnormal increase in the activity of the hypothalamic-pituitary-adrenal (HPA) – which are associated with impairments in cognitive functions and intellectual disability [1]. HPA-axis deregulation also has the potential to serve as endophenotypic markers of susceptibility to psychopathology [2]. The exposure to early stressful events (ESE) is associated with depression in adolescents [3].

The aim of the present study was to analyze preliminary results regarding ID in children and adolescents with a history of ESE and social

deprivation in Brazil. We aimed to investigate general intellectual functioning, specially verbal and non-verbal performance, as well as the results in association with the occurrence of depression.

METHODS

Thirty children/adolescents between 6 and 17 years of age were evaluated. They were all enrolled in *The Equilibrium Program (TEP)*, from the Department and Institute of Psychiatry of the Medical School of Sao Paulo University [4]. TEP is a multidisciplinary mental health community service specialized in outpatient treatment for children/adolescents with a history of ESE and social deprivation in Brazil [4]. The majority of patients at TEP present psychiatric disorders [5].

Patients underwent clinical psychiatric evaluation by certified and trained child and adolescent psychiatrists.

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All diagnoses were based on the 10th version of the International Classification of Diseases (ICD-10) [5].

ID was evaluated based on the Wechsler Intelligence Scale for Children – Third Edition (WISC-III), translated and adapted for use in Brazil [6]. We used the standardized norms for the Brazilian population to convert raw into scaled scores (by age groups) in each subtest. Scaled scores from Vocabulary and Block-Design subtests were used in order to calculate the Estimated Intelligence Quotient (EIQ) [7]. Patients underwent cognitive evaluation by certified and trained child and adolescent psychologists.

The research protocol was approved by the University of Sao Paulo Research Review Board

(CAPPesq-HC-FMUSP). All patients and responsible (or relatives) signed an informed consent on their participation in this study.

Statistical comparisons were made using unpaired Student's t-test for continuous variables, such as: age, education (in years), and neuropsychological test results (Block-Design and Vocabulary scaled scores, Percentiles, sum of scaled scores, and EIQ). The Kolmogorov–Smirnov test was used to investigate normality of data distributions. The Fisher's Exact Test was used for categorical variables, such as: gender, ethnicity, handedness, and diagnosis. The level of statistical significance was $\alpha = .05$ and all statistical tests were two-tailed. Statistical Package for the Social Sciences (SPSS) for Windows, version 16.0 was used to perform all statistical analyses.

Table 1: Intellectual Disability (ID) Verbal/Non Verbal Functioning, Sociodemographic Characteristics and Clinical Data of Children and Adolescents with a History of Stressful Events and Social Deprivation in Brazil

	Depressed Patients (DP) N=15	Not depressed Patients (NDP) N=15	Total Sample N=30	P value (DP x NDP)
Age ^a	13.20 (2.88)	11.13 (2.67)	12.10 (12.90)	0.05
Education ^a	4.93 (1.90)	4.00 (2.42)	4.47 (2.19)	0.25
Gender (Male/ Female) ^b	7/8	10/5	17/13	0.46
Ethnicity (White/Black) ^b	4/11	9/6	13/17	0.13
Handedness (Right Handed/Left Handed) ^b	13/2	13/2	26/4	1.00
Block-Design Scaled Scores ^a	5.67 (2.09)	7.87 (4.46)	6.77 (3.02)	0.04 ^c
Percentile ^a	11.69 (11.57)	33.62 (29.15)	22.66 (24.58)	0.01 ^c
Vocabulary Scaled Scores ^a	8.60 (3.01)	9.60 (1.59)	9.10 (2.42)	0.26
Percentile ^a	36.53 (30.70)	45.47 (19.23)	41.00 (25.58)	0.34
Sum of scaled scores ^a	14.27 (4.45)	19.40 (8.09)	16.83 (6.92)	0.40
IQ estimated ^a	83.07 (12.69)	92.67 (12.90)	87.87(13.48)	0.04 ^c
Use of psychiatric Medication ^{b,d}	12/3	7/8	19/11	0.12
F32 Depressive Episodes ^e	15	15	30	-
F90 Hyperkinetic disorder ^{b,e}	2	2	4	1
F98. Behavioral and emotional disorders with onset usually in childhood/adolescence ^{b,e}	2	5	7	0.65
F19.2 Mental and behavioral disorders due to multiple drug use ^{b,e}	3	0	3	0.22
F92 Mixed disorder of conduct and emotions ^{b,e}	0	3	3	0.22
F91 Conduct Disorders ^{b,e}	2	1	3	0.22

Note: values regarding neuropsychological tests results are shown as average (mean) and standard deviation (\pm SD); EIQ=Estimated Intelligence quotient; a=Student's t test for independent samples; b=Fisher's Exact Test; c= $p < .05$; d=number of patients with use of any psychiatric medication; e=number of patients diagnosed with psychiatric disorders (as listed in the Table 1), according to CID-10.

RESULTS

Data are shown in the Table 1 and patients were divided in two groups: those diagnosed with depressive episodes (DP; N=15) and those without depressive episodes (NDP; N=15). This division was chosen because half of the sample had at least one lifetime diagnosis of depression, which is considered a high prevalence when compared with other studies [8]. A third column in the Table 1 was inserted to show information about the whole sample.

Data obtained showed no significant statistical differences between DP and NDP groups regarding gender, education, ethnicity and handedness (Table 1). However, DP was slightly older than NDP ($p = .05$). Only two patients were not enrolled in school at the time of evaluation.

26 patients (86.7%) were diagnosed with at least one psychiatric disorder and 19 (63%) were using psychiatric medications. Among the 15 DP patients, nine (60%) were depressed at the time of evaluation and 6 (40%) were stable with medication and were adherent to our multidisciplinary treatment. Data obtained showed no significant statistical differences between DP and NDP groups regarding medication use and presence of comorbid psychiatric diagnoses.

Half of the whole sample (50%) had EIQ within the average and 20% (6) had EIQ in lower average. The other part of the sample presented at least some degree of ID: 2 mild mental retardation (6.7%) and 7 borderline (23.3%). There was no significant difference in the performance between DP and NDP groups in the vocabulary subtest. However, there was a significant difference in EIQ, with worse performance in DP ($p < .05$). Also, DP showed worse performance in the Block-Design subtest, as indicated by the WISC-III scaled scores and percentiles [6]. Finally, the difference in EIQ between currently depressed DP and currently stable DP was not statistically significant.

DISCUSSION

The present study aimed to investigate ID among Brazilian children and adolescents with a history of early stressful events and social deprivation. Our main results indicated that 30% of them were significantly impaired in a measure of ID. In addition, the subgroup with lifetime depression had worse ID when compared to those without depression, possibly due to a greater impairment in visuospatial skills, independent of being currently depressed or not. To our knowledge, this is

the first study to demonstrate the association of ID with depression, ESE, and social deprivation.

Our results indicated a higher prevalence of ID compared to that expected in the general population and ID of children and adolescents corroborates other international studies with maltreated children [9]. This result may suggest both the lack of adequate stimulation by parents, caregivers, and social environment as a whole, as well as may be a consequence of brain neurochemical changes due to ESE, such as exposure to violence, neglect, and living on the streets. ID must be considered in treatment and in rehabilitation settings because it has a negative impact on motivation for learning and school attendance [10]. Also, the high prevalence of psychiatric diagnoses, especially depression, indicates the need for specialized mental care for this population because depression may impair academic performance, learning abilities and social functioning [11].

In the present study the performance in the Vocabulary subtest was better than the performance in Block Design in the total sample and among subgroups. This result can be explained because this verbal subtest seems to be less vulnerable to the negative effects of neuropsychiatric disorders and may be used as a valid estimative of premorbid intelligence [7]. One possible explanation is that Depression is generally associated with frontal [12, 13] and right-posterior brain dysfunction [13]. Also, not only Depression, but also a history of stressful events and maltreatment includes several neuropsychological impairments, associated with neural changes in hippocampus, corpus callosum, prefrontal cortex, and anterior cingulate cortex [1]. Taken together, most functions and brain areas that appear impaired in individuals with depression in addition with maltreatment are essential to good performance in the subtest Block-Design (such as attention and planning), which may explain the worse performance of the DP subgroup.

Our study has some limitations. Firstly, this is a preliminary study with a small sample size and it was not possible to analyze the history of stressful events of each patient. Children and adolescents are referred to TEP either by the group shelter staff or by the Juvenile Court of Sao Paulo, and they frequently shuttle between different foster centers [11]. Communication between these institutions often breaks down, and personal life histories can consequently

become fragmented, which limits access to information [11]. Moreover, we did not measure the intensity of depressive symptoms at the time of evaluation due to lack of instruments covering the entire age range of the study. However, despite the fact that this was a preliminary study, we obtained statistically significant results that emphasizes the need for specialized treatment in this population.

CONCLUSIONS

Our results suggest the need for specialized treatment focused on cognitive and intellectual stimulation, strategies aiming remission of psychiatric symptoms, and psychological techniques to teach how to cope with stressful events and to develop resilient factors to cognitive and emotional development.

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Received on 07-03-2014

Accepted on 01-04-2014

Published on 06-05-2014

DOI: <http://dx.doi.org/10.6000/2292-2598.2014.02.01.5>

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