Research article

Psychological evaluation of children victims of sexual abuse: development of a protocol

Natali Maia Marques [a], Gabriel Okawa Belizario [b], Cristiana Castanho de Almeida Rocca [c], Fabiana Saffi [a], Daniel Martins de Barros [a], Antonio de Pádua Serafim [c,d,*]

[a] Department and Institute of Psychiatry, Forensic Psychology Program, University of São Paulo School of Medicine, São Paulo, Brazil
[b] Department and Institute of Psychiatry, Bipolar Disorder Research Program (PROMAN), University of São Paulo Medical School, Sao Paulo, Brazil
[c] Department and Institute of Psychiatry, Neuropsychology Unit, University of São Paulo School of Medicine, São Paulo, Brazil
[d] Department of Psychology, Methodist University of São Paulo, São Bernardo do Campo, Brazil

ARTICLE INFO

ABSTRACT

Sexual abuse (SA) is associated with significant psychological problems in childhood, making it increasingly important to develop evaluation protocols. This study examined clinical aspects and cognitive measures of 49 children (24 with SA history and 25 controls). It employed a SA assessment questionnaire, clinical evaluations of posttraumatic stress disorder, risk indicators and neuropsychological tests in order to elaborate a specific forensic psychological evaluation protocol for this population. Conflicting couples (80%), separated parents (68%) and parents' alcohol/drug abuse (76%) were revealed as major risk factors. Fathers represented the primary perpetrator (24%). The main cognitive complaint was difficulty concentrating. Regarding the association between clinical and cognitive variables, it was observed that children who were anxious or referred to having fear, difficulties with operational memory and difficulty sleeping, had more trouble performing tasks that required attention and memory (operational, immediate and late). Children with SA history demonstrated inferior performance in visual attention/task switching and memory; with an emphasis in the loss of set in the Wisconsin test. The findings suggest the possibility of a primary attention deficit in children with SA history, possibly influencing the performance of other cognitive functions.

1. Introduction

1.1. Child sexual abuse and maltreatment

Child sexual abuse (SA) is one of the most prominent global public health issues according to the World Health Organization (WHO, 1999). It is characterized by the presence of acts that coerce or motivate children to participate in sexual practices. Among the most common practices are compelling sex or pornography, masturbating in public, posing erotically for photos and movies, performing sexual touches and caresses, and engaging in genital, anal and oral sex (Matos et al., 2018). Child sexual abuse presents itself as a continuous epidemic phenomenon and its occurrence is independent of culture and society, affecting a significant number of children and adolescents throughout the world, in most cases with serious consequences for the physical and mental health of the victims and causing school dropout Shrivastava et al. (2017); Diette et al. (2017); Clayton et al. (2018).

There is evidence that early exposure to traumatic situations such as SA significantly increases the risk of major depression, eating disorders, conduct disorders, bipolar disorder, schizophrenia, posttraumatic stress disorder (PTSD), alcohol and drug use, suicide and homicide, as well as the development of cognitive impairments (Catani and Sossala, 2015; Ramirez and Milan, 2016; Turner et al., 2017; Ellenbogen et al., 2018; Hodgdon et al., 2018; Hailes et al., 2019). In addition, SA has the potential to compromise the social-emotional development of the survivor, resulting in increased vulnerability to difficulties regulating emotions (Coyle et al., 2014; Hébert et al., 2018).

1.2. Consequences of childhood abuse and maltreatment

The adverse effects of childhood maltreatment on mental health as well as on cognition have been discussed in the literature (Harpur et al., 2015; O'Brien et al., 2016; Münzer et al., 2016). In a cohort study, researchers found that negligence in childhood and all forms of abuse were

---

* Corresponding author.
  E-mail address: a.serafim@hc.fm.usp.br (A.P. Serafim).

associated with poorer mental health of the child, and a history of abuse appears to be more consistent with cognitive difficulties, including memory, verbal fluency, and speed of information processing (Geoffroy et al., 2016).

Barrera et al. (2013) compared 13 children with SA and PTSD symptoms, 26 children with SA without PTSD symptoms and 37 healthy children. The authors concluded that SA in childhood is associated with a reduced ability to inhibit automatic responses measured by the Stroop test, regardless of PTSD condition. These findings indicate possible difficulties in inhibiting attention in children victims of sexual abuse, which may help to explain the psychopathology associated with the experience.

1.3. Childhood abuse and maltreatment in Brazil

According to Guedes, Bott, Garcia-Moreno and Colombini (2016), in South America about 13% of boys and girls are sexually abused. In Brazil, a survey conducted by the Brazilian Institute of Geography and Statistics (IBGE, 2016) indicated that 4% answered that they experienced sexual intercourse against their will, in which 32.6% of the perpetrators were family members, 11.9% were parents/stepfathers, 26% were boyfriends/ex-boyfriends and 21.8% were friends. Another Brazilian study with 205 victims of sexual abuse showed that girls were the main victims (63.4%). The riskiest age range for girls was from 7 to 10 years (48.5%), and from 3 to 6 years (54.6%) for boys. Fathers are the primary perpetrators (38.1%) followed by stepfathers (29.3%). Boys and girls show high risk for depression and posttraumatic stress disorder (PTSD) symptoms. Girls tend to be more sexualized whilst boys tend to isolate themselves (Serafim et al., 2011). Given the complexity of the behavioral, cognitive and emotional aspects, the literature refers to the need for complex procedures to evaluate these victims (Leonard, 2015).

The problem of violence against children and adolescents in Brazil, in addition to the health context, also leads to the demands of lawsuits. One of the legal issues is the use of psychological evaluation protocols to support judicial authorities in decision-making. This information is derived from the number of requests for psychological evaluations of children suspected to have suffered sexual abuse received at the outpatient clinic of psychiatry and forensic psychology of the Institute of Psychiatry of the Clinical Hospital, Faculty of Medicine, University of São Paulo. Faced with this reality, the need arose to develop an evaluation protocol that combines sociodemographic, clinical and cognitive data that allow a psychosocial profile to be drawn, aiming at the possible interventions for these cases to be drawn.

2. Hypothesis

The main hypothesis of this study is that children who have suffered sexual abuse will present a greater cognitive impairment in relation to the comparison group.

3. Objective

3.1. Main objective

- Assess the use of a forensic psychological evaluation protocol for children victims of sexual abuse

3.2. Specific objectives

- Verify the relationship between clinical variables and the result of cognitive tests
- Compare performance between group 1 (children victims of sexual abuse) and comparison group (children who did not suffer sexual abuse)

4. Material and methods

4.1. sample

The sample consisted of 49 non-randomized children aged between 7 and 12, divided into two groups. The group of victims consisted of 24 children (M age = 9.88, SD = 1.87) with a history of SA who attended an outpatient clinic of Psychiatry and Forensic Psychology of a university hospital in the city of São Paulo. The history of sexual abuse was assessed using the information contained in legal proceedings and a Sexual Abuse assessment questionnaire The comparison group (healthy) was composed of 25 children (M age = 9.60, SD = 1.84) with no history of SA, recruited from primary (9 years of scholarization) and secondary (11 years of scholarization) schools of the state network in the metropolitan region of São Paulo.

4.2. Instruments

We sought in this study to establish a protocol to evaluate cases of sexual abuse in relation with neuropsychological variables, so we chose the following instruments:

1) Demographic data: A questionnaire was conducted to collect socio-demographic data: gender, age, years of schooling, occurrence of abuse (once or multiple times), who made the complaint and who was the abuser. These data were organized in terms of frequency.
2) Sexual Abuse Assessment Questionnaire (elaborated by the authors) was conducted to collect the behavioral and emotional alterations associated with sexual abuse history (supplementarymaterial)
   - Cognitive Measures: The selection criteria for the cognitive evaluation battery followed the patterns identified in previous studies regarding the cognitive deficits present in children and adolescents victims of violence, which point out the need to evaluate intelligence quotient, abstraction capacity, verbal skills, attention, memory/learning, planning and mental flexibility. To this end, the protocol included the following instruments:
   - The Wechsler Digit Span Task (forward and backward) was used to investigate auditory attention span and verbal working memory.
   - Similarities, Vocabulary and Block Design (The Wechsler Intelligence Scale for Children – Third Edition – WISC-III): to assess verbal reasoning, ability to describe the nature or meaning of words (vocabulary level), visuospatial reasoning and visuoconstructional ability.
   - Trail Making Test (A and B): The TMT-A mainly assesses visuo-perceptual abilities, and TMT-B primarily verifies working memory and task-switching ability.
   - The Rey–Osterrieth Complex Figure Test (ROCF): This test consists of two conditions: copy and delayed recall. It assesses visuospatial constructional ability and nonverbal memory skills.
   - Wisconsin Card Sorting Test: The WCST evaluates abstract and perseverative thinking, concept formation, and response strategies to changing contextual contingencies.
   - The Verbal Fluency Test (VFT-FAS; Controlled Oral Word Association Test, COWAT): to assess verbal fluency performance, inhibitory control and ability to hold rules in mind.
   - Selective Reminding Test (SRT) for evaluating verbal learning and memory, following specific measures: LTR – Long-Term Retrieval; LTS – Long-Term Storage; CLTR – Consistent Long-Term Retrieval; RLTR – Random Long-Term Retrieval; STR – Short-Term Retrieval.

4.3. Procedures

The protocol was performed in four stages:

(I) We initially randomly assigned 35 legal cases of suspected instances of sexual abuse (group of victims). To sort it randomly, we

listed each case from 1 to 30. With the information of the case, we contacted the relatives or guardians by telephone and explained the reasons for the study; 28 families agreed to participate.

(II) In this stage, we interviewed the 28 parents or guardians using the Sexual Abuse Assessment Questionnaire (elaborated by the authors), with the objective of identifying a set of psychological and behavioral signs that could be associated with SA in children referred by the judicial system. After applying the questionnaire, four cases presented inconsistent data, in relation to information on the occurrence of sexual abuse and absence of judicial data and were excluded, so we had a final sample of 24 participants from the group of alleged victims.

(III) In the third stage, a neuropsychological battery, composed of intelligence quotient, abstraction capacity, verbal skills, attention, memory/learning, planning and mental flexibility, was applied to verify the cognitive performance of children referred by the judicial system.

(IV) In the fourth stage, we invited parents and guardians of children with no or unknown history of sexual abuse recruited from primary and secondary schools of the state network in the metropolitan region of São Paulo. Thirty-five children participated in this stage and were submitted to the same measures as the group of victims (questionnaire on SA with parents and application of a neuropsychological battery). At the end of this stage we numbered each participant from 1 to 30 and sorted 25 to randomly compose the control group.

The outcome measures were posttraumatic stress disorder (PTSD) symptoms, behavioral problems, and impairments in cognitive performance.

Data were collected individually. All parents/guardians read and signed a Term of Free and Informed Consent. Participants over 12 years old signed the term of assent. Participants from both groups were guaranteed confidentiality and psychological support. This study was approved by the Ethics Committee for Analysis of Research Projects at the Clinical Hospital of the Faculty of Medicine of the University of São Paulo (CAPPesq) protocol no. 0047/1.

4.4. Statistical analysis

A Kolmogorov-Smirnov test was conducted to assess normality. The study employed Chi-square and Student's t-tests to investigate the presence of significant differences in the cognitive performances between the victims and control groups. A Bonferroni correction for multiple comparisons was employed in order to diminish the probability of falsely rejecting the null hypotheses, and significance was set at $p <= 0.0022$ (0.05/22). The software used to perform the statistical analysis was the IBM SPSS 21.0. A logistic regression model was conducted to explain the relationship between cognitive variables and the groups. All analyses considered $p < 0.05$ as statistically significant.

5. Results

5.1. Sample characteristics

The data in Table 1 show that in both groups, the estimated IQ was in the middle range (IQ = 90–109, Average or normal intelligence). The SA group (Mage = 9.88, SD = 1.87) had a higher prevalence of girls 75% (N = 18) in relation to boys 25% (N = 6) and an average of 4.80 years of schooling (SD = 1.80). The control group (Mage = 9.60, SD = 1.84) also presented a higher prevalence of girls 60% (N = 15) in relation to boys 40% (N = 10) and an average of 4.72 years of schooling (SD = 1.83). In the victims group, sexual abuse occurred in multiple episodes in 92% (23) of the cases.

Still in Table 1, in relation to the history of abuse, the results of this study showed that the father represents the leading perpetrator (25.0%),

followed by other relatives such as uncle/grandfather (20%), then stepfather (20.8%), the mother (8.3%) and others (20.8%). The main behavioral changes were anger/irritability (60.0%) and the main emotional response was fear (52.0%). The main cognitive complaint was difficulty concentrating. As for the risk indicators for SA, conflicting couples (80%), separated parents (68%) and alcohol/drug abuse were most prevalent (76.0%.)

5.2. Cognitive measures

The analysis of mean differences in cognitive performance between the victims and control groups is expressed in Table 2. The results revealed that children with SA had inferior performance in the following tests: selective remedy test, specifically in STR and RLTR processes, attention fluctuation in the WCST and the Trail Making Test A and B ($p = .0022$, Student's t-test, Bonferroni correction for multiple comparisons).

To determine the cognitive variable effects on the probability of an individual belonging to the victims group, a binomial logistic regression was conducted (Table 3). As our objective was to search for a better detail of the cognitive impact on the victims of sexual abuse, we used a cutoff point for this analysis of 50%. The logistic regression model was statistically significant, $\chi 2 (3) = 45,118$, $p < .0005$. The model attained a Nagelkerke R^2 of 80.2%, which represents the proportional reduction in the absolute value of the log-likelihood measure, correctly classifying 95.9% of cases (sensitivity: 91.7% and specificity: 100%).

Regarding the association between clinical and cognitive variables, it was observed that children who were anxious or referred to having fear, difficulties with operational memory and difficulty sleeping had more

Table 1. Demographics data of the children participating in the study.

	Victims	Control
Gender	**N (%)**	**N (%)**
Female	18 (75)	15 (60)
Male	6 (25)	10 (40)
Age	**M (SD)**	**M (SD)**
	9.60 (1.83)	9.88 (1.87)
Years of Schooling	**M (SD)**	**M (SD)**
	4.72 (1.83)	4.80 (1.80)
Estimated IQ	**M (SD)**	**M (SD)**
	97 (4.76)	100 (6.12)
Occurrence of SA	**N (%)**	
One time	2 (8.0)	
Multiple	22 (92.0)	
Denouncer of SA	**N (%)**	
Mother	16 (66.6)	
Father	2 (8.3)	
School	2 (8.3)	
Others	5 (20.8)	
Abuser	**N (%)**	
Father	6 (25.0)	
Mother	2 (8.3)	
Uncle	5 (20.8)	
Grandfather	2 (8.3)	
Stepfather	5 (20.8)	
Unknown	5 (20)	
Behavioral and emotional alterations	**N (%)**	
Anger/Irritability	16 (64.0)	
Sleep Disorders	15 (60.0)	
Fear	13 (52.0)	
Risk Factors	**N (%)**	
Conflicting couples	20 (80.0)	
Divorced parents	17 (68.0)	
Alcohol and drug abuse	19 (76.0)	

trouble performing tasks that required attention and memory (operational, immediate and late). Children who reported anxiety or fear needed a longer time to complete TMT-A, i.e., they showed lower processing speed (victims: M = 72.6, SD = 32.1 and control: M = 41.3, SD = 14.8). When it was necessary to switch attention quickly, both anxiety and memory difficulties interfered with performance; in other words, anxious children with memory difficulties needed a longer time to complete TMT-B (victims: M = 173.4, SD = 98.4 and control: M = 74.8, SD = 22.8). Anxiety was also a factor which showed association with performance in item *RLTR – Random Long-Term Retrieval*, but it was also associated with the report of difficulty sleeping.

Other variables considered in the model, but that did not show significance, were sadness, suicide attempts, isolation and difficulty concentrating. The cognitive variables Verbal fluency, ROCF, WCST and SRT were not related to the chosen clinical variables (see Table 4).

6. Discussion

The purpose of this study was to evaluate the use of a protocol for assessing children who are victims of sexual abuse, in order to verify the relationship between clinical variables and the results of cognitive tests. On the one hand, with the use of this protocol, it was possible to analyze the cognitive difficulties of children with a history of abuse were determined from the comparison with a group of children without a history of abuse, but with similar sociodemographic variables, with statistically significant analyzes. In addition, this protocol allowed the identification of clinical and behavioral aspects relevant to an evaluation of children victims of sexual abuse. Thus, it will serve as a model to be replicated in several sectors of attention to children victims of violence in Brazil, thus collaborating, for a standardization of data collection in this population.

The main results are congruent with previous literature regarding the prevalence of gender-related victims, with girls being more frequently the victims (Serafim et al., 2011; Senn et al., 2012; Merrick et al., 2018). The abuser is a member of the family, thus highlighting a configuration of intrafamily sexual abuse (Platt et al., 2018). Literature is consistent in claiming that frequently the main perpetrator is the parent or someone emotionally close to the child, such as the stepfather. What makes it clear that the sexual abuse was not committed by someone unrelated to the child, since the father, mother, uncle, grandfather and step-father have predominated as main abusers (Platt et al., 2018).

And as risk factors, we show that in addition to issues concerning conflicting couples, divorced parents, alcohol and other drug use were also present. These findings suggest that the reality of these families generally involves low income, unemployment, fragmented social network, and alcoholism (Walsh et al., 2013; Geoffroy et al., 2016; Clayton et al., 2018).

The emotional impact observed in this study constitutes a serious repercussion regarding the psychological functioning of the victims, since most SA incidents occur in the family environment, which a priori should be a safe haven, but becomes a threatening environment, triggering in the victim a sense of helplessness, fear and abandonment. In this scenario, the identification of irritability symptoms is an important part of the emotional context of victims of sexual abuse which may also lead to recurrence of aggressive behavior (Serafim et al., 2011; Van der Put, Lanctô, Ruiter and van Vugt, 2016).

The present study also investigated other aspects of the emotional impact of a threatening domestic environment, in which the child frequently experiences fear, identified in the sexual abuse assessment, and which may lead to impairments in their interpersonal relations (Coyle et al., 2014; Asscher et al., 2015; Powers et al., 2015).

Regarding the results of cognitive functions, in memory evaluation, we identified impairments in the victims group when compared to

Table 2. Cognitive measurements for the two groups.

Tests	Victims (n = 24)		Control (25)		p-value	Efecct Size
	M	SD	M	SD		
Similarities (WISC-III)	8.5	3.4	9.4	2.5	0.403	0.240
Verbal Fluency Test (FAS)	34.9	8.0	40.1	8.2	0.030	0.640
ROCF (copy)	26.7	7.6	28.8	4.9	0.244	0.336
ROCF (recall)	14.0	7.9	19.6	5.9	0.008	0.792
Selective Remiding Test – total	87.1	21.0	92.3	21.1	0.394	0.246
Selective Remiding Test LTR	749	27.4	82.5	27.2	0.336	0.278
Selective Remiding Test STR	12.3	6.7	7.0	1.9	0.000	1.076
Selective Remiding Test LTS	85.3	20.7	82.6	21.6	0.659	0.127
Selective Remiding Test CLTR	57.1	26.6	64.0	27.8	0.382	0.252
Selective Remiding Test RLTR	18.2	12.0	12.2	4.5	0.026	0.653
Selective Remiding Test Recall	7.9	2.3	9.1	1.9	0.048	0.580
WCST – Categories Achieved	2.5	1.1	2.5	0.58	0.937	0.023
WCST – perseverative errors	14.6	8.2	12.8	5.0	0.360	0.263
WCST – non-perseverative errors	6.0	3.0	5.1	2.0	0.202	0.369
WCST – failure to maintain set	1.2	1.0	0.08	0.2	0.000	1.509
TMT – A	72.6	32.1	41.3	14,.0	0.000	1.252
TMT - B	173.4	98.4	74.8	22.8	0.000	1.379
Digit Forward (WISC-III)	6.5	2.1	6.9	2.04	0.484	0.202
Digit Backward (WISC-III)	3.0	2.0	3.6	1.1	0.184	0.383
Digit span	7.8	4.0	9.6	2.4	0.070	0.528
Block Design	9.5	4.0	9.2	2.6	0.759	0.088
Vocabulary (WISC-III)	10.,4	2.9	10.7	2.3	0.693	0.113
Estimated IQ	19.9	6.2	19.9	4.7	0.999	0.000

* Significant: $p \leq 0,0022$ (Student's t test). Bonferroni correction for multiple comparisons (Armstrong, 2014).
TMT = Trail Making Test; WISC-III = Wechsler Intelligence Scale for Children 3rd edition; ROCF = Rey–Osterrieth Complex Figure Test; WCST = Wisconsin Card Sorting Test; LTR = long-term Recall; STR = short-term recall; LTS = long-term Storage; CLTR = consistent long-term recall; RLTR = random long-term recall.

Table 3. Binomial logistic regression.

	Anxiety		Fear		Difficulty in operating memory		Difficulty sleeping	
	χ^2	P value	χ^2	P value	χ^2	P value	χ^2	P value
Trail making test – part A	2.730	0.0129	2.206	0.0392				
Trail making test – part B	3.036	0.00653			3.484	0.00234		
RLTR	-3.625	0.0018					-3.650	0.0017

The logistic regression model (p < .0005).

Table 4. Logistic regression predicting likelihood of presence of abuse, based on Selective Reminding Test (STR), WCST, and TMT.

	B	S.E.	Wald	Df	sig	Exp(B)	95% C.I for Exp(B)	
							Lower	Upper
Selective Reminding Test STR	0.343	0.171	4.026	1	**0.045**	1.409	1.008	1.969
WCST – failure to maintain set	2.378	1.117	4.535	1	**0.033**	10.787	1.208	96.296
TMT – B	0.029	0.013	4.844	1	**0.028**	1.030	1.003	1.057
Constant	-7.135	2.346	9,248	1	**0.002**	0.001		

Note: reference category: abuse victim's group. All tests were two-tailed. Bold data corresponds to the level of significance.

control, in terms of both verbal and visual contents. The Selective Reminding Test was chosen as the test to evaluate verbal memory because it is considered an instrument that involves greater mental work, since the subject needs to recall the previous information to obtain better performance, which requires more attention. As for verbal aspects, we identified impairments in the processes of short-term retrieval and inconsistent retrieval in the long term; these processes are related to attention difficulties, as well as anxiety and difficulty sleeping (Barrera et al., 2013). It is well known that sleep deprivation and anxiety adversely affect the ability to perform cognitive tasks. Theories of sleep deprivation suggest the presence of a general decline in cognitive functioning due to the reduction of stability in attentional networks to specific deficits in various cognitive domains or processes (Ratcliff and Van Dongen, 2018).

As to the differential findings of the study, first in the attentional domain, we verified in the Trail Making Test that the victims group presented below-expected results in comparison to the control, and we observed that the higher the complexity of the activity, the worse the performance. For this kind of attention, the person needs to use the resources of information processing and switching attention to visual content, as well as emotional aspects, from which it is speculated that the experience of the abuse possibly interferes in this function.

With respect to performance in the scope of attention, another statistically significant finding was in relation to the aspect of attentional fluctuation found in the Wisconsin test. The victims group presented significant results regarding the set loss number, suggesting a failure to maintain context, meaning the child was presenting correct answers but then makes an error, i.e., an attentional fluctuation occurs. Thus, in a test initially aimed to measure the capacity for mental flexibility, it was possible to identify attentional fluctuation of the children who suffered sexual abuse, which makes it an important instrument in the evaluation protocol of this population.

Finally, regarding the associations between clinical aspects and cognitive performance, the results were significant in the attentional domain: a significant increase in execution time (110 s) in the Trail Making Part B test, when the child presents the emotional change of fear and anxiety. Similarly, in the Trail Making Part A test, also in the presence of such emotional change, an increase in the execution time occurred, although smaller when compared to part B.

Thus, to date, our findings have demonstrated how critical the use of cognitive tests is to evaluate this specific population, when associated with a structured clinical interview that allows for the evaluation of sexual abuse. We emphasize that this association of cognitive tests and clinical interview, besides improving the processes of identification of possible damages in the cognitive, emotional and behavior of children victims of abuse, also corroborates the development of intervention programs as a way to reduce the damages resulting from this type of violence.

Furthermore, larger studies including tests that allow emotional aspects of sexual abuse victims to be evaluated, through the use of scales, studying comparisons between both aspects (emotional and cognitive) and even instruments that evaluate both aspects (emotional and cognitive), such as, for example, tests involving face recognition, would enable greater clarification of the associations and consequences between the emotional and cognitive aspects in children victims of sexual abuse.

In addition, we emphasize the importance of evaluating such attention deficits during the follow-up of children victims of sexual abuse.

Other than that, our results indicate important difficulties regarding AS children's attention performance. The presence of attention-related difficulties, observed in this study, can be considered a relevant variable, that certainly reflects on the children's' academic performance in school. Nonetheless, this finding also corroborates the necessity of including the evaluation of possible attention deficits during SA children's counseling. In this context, these results indicate that the cognitive evaluation protocol used in this study, is a sensible measure to identify possible cognitive deficits in Young SA victims. It also allows the inclusion of other effective measures of evaluation of SA victims (Barrera et al., 2013; Feeney et al., 2013; Geoffrey et al., 2016).

In fact, the literature highlights the impact of sexual abuse on cognition (Barrera et al., 2013). However, the findings of this study suggest the presence of attention deficit as the primary diagnosis in this population of sexually abused children, which, if true, would negatively influence their performance in memory functions and, consequently, in the child's learning process.

In view of the above, we understand the need to continue the research of this association, which certainly adds knowledge to develop interventions, complementing the training of professionals, as well as to develop programs and practices aimed at preventing, coping with and reducing SA.

7. Limitations

Regarding limitations of the study and future research proposals, a larger sample and further clarification of epidemiological, clinical and risk factors that negatively influence the cognitive performance of the

population of children victims of SA is preferred. Another limitation can be of false complaints with conviction from the law system, considering the SA accusation, due to the high number of separated and conflict between the parents of the sample. Evaluations by emotional tests, and/or scales and batteries associated with the evaluation of sexual abuse may expand the investigation of this correlation between the emotional and cognitive aspects in this population.

8. Conclusions

The impact arising from violent situations, such as sexual abuse, has been broadly discussed in the literature, since there is a significant relationship between the consequences of traumatic experiences in childhood and changes in developing cognitive, emotional and behavioral disfunctions, which can last until adulthood. Sexual abuse (SA) constitutes a continuous, epidemic phenomenon and its occurrence is independent of culture and society. Brazil still needs more studies on how to evaluate the emotional and cognitive aspects in victims of SA, since there is also an increase in requests for evaluations in the judicial context.

Overall, psychologists are more familiar with clinical assessments compared to near absence of judicial training (Leonard, 2015). Thus, conducting a forensic psychological evaluation requires not only a deep knowledge and mastery of the grounds, purpose and application of psychological instruments, but also knowledge acquired on normal and pathological psychological functioning in individuals and a notion of the law. It also requires consistent domain of psychopathology, developmental psychology, personality (traits and disorders), cognitive psychology (psychological processes of attention, memory, thought, etc.), evaluation techniques and protocols of forensic interview with abused children.

Mastering these areas will allow the psychology professional to be able to identify the way a person thinks (which is associated with cognitive processes), the way a person feels (which depends on their emotional organization and psychological traits) and how they modulate the pattern of interaction with the environment. Therefore, the possibility of systematizing the evaluation of this population through establishing a referential protocol will allow greater evidence of clinical, social and cognitive issues, more effectively subsidizing referrals, assisting in judicial matters, and conducting preventive work in schools and in the field of mental health for SA victims.

Declarations

Author contribution statement

Natali Maia Marques: Performed the experiments, Wrote the paper.

Gabriel Okawa Belizario: Analyzed and interpreted the data, Wrote the paper.

Cristiana Castanho de Almeida Rocca: Analyzed and interpreted the data; Wrote the paper.

Fabiana Saffi, Daniel Martins de Barros: Contributed reagents, materials, analysis tools or data.

Antonio de Pádua Serafim: Conceived and designed the experiments; Analyzed and interpreted the data; Wrote the paper.

Competing interest statement

The authors declare no conflict of interest.

Additional information

Supplementary content related to this article has been published online at https://doi.org/10.1016/j.heliyon.2020.e03552.

References

Armstrong, R.A., 2014. When to use the Bonferroni correction. Ophthalmic. Physiol. Opt. 34 (5), 505–508.

Asscher, J.J., Van der Put, C.E., Stams, G.J.J.M., 2015. Gender differences in the impact of abuse and neglect victimization on offending behavior. J. Fam. Violence 30, 215–225.

Barrera, M., Calderón, L., Bell, V., 2013. The cognitive impact of sexual abuse and PTSD in children: a neuropsychological study. J. Child Sex. Abuse 22 (6), 625–638.

Catani, C., Sossala, I.M., 2015. Child abuse predicts adult PTSD symptoms among individuals diagnosed with intellectual disabilities. Front. Psychol. 6, 1600.

Clayton, E., Jones, C., Brown, J., Taylor, J., 2018. The aetiology of child sexual abuse: a critical review of the empirical evidence. Child Abuse Rev. 27 (3), 181–197.

Coyle, E., Karatzias, T., Summers, A., Power, M., 2014. Emotions and emotion regulation in survivors of childhood sexual abuse: the importance of "disgust" in traumatic stress and psychopathology. Eur. J. Psychotraumatol. 5.

Diette, T.M., Goldsmith, A.H., Hamilton, D., Darity Jr., W.A., 2017. Child abuse, sexual assault, community violence and high school graduation. Rev. Behav. Econ. 4 (3), 215–240.

Ellenbogen, S., Colin-Vezina, D., Sinha, V., Chabot, M., Wells, S.J.R., 2018. Contrasting mental health correlates of physical and sexual abuse-related shame. J. Child Adolesc. Ment. Health 30 (2), 87–97.

Feeney, J., Kamiya, Y., Robertson, I.H., Kenny, R.A., 2013. Cognitive function is preserved in older adults with a reported history of childhood sexual abuse. J. Trauma Stress 26 (6), 735–743.

Geoffroy, M.C., Pinto Pereira, S., Li, L., Power, C., 2016. Child neglect and maltreatment and childhood-to-adulthood cognition and mental health in a prospective birth cohort. J. Am. Acad. Child Adolesc. Psychiatry 55 (1), 33–40.

Guedes, A., Bott, S., Garcia-Moreno, C., Colombini, M., 2016. Bridging the gaps: a global review of intersections of violence against women and violence against children. Glob. Health Action 9, 31516.

Hailes, H.P., Yu, R., Danese, A., Fazel, S., 2019. Long-term outcomes of childhood sexual abuse: an umbrella review. Lancet Psychiatr. 6 (10), 830–839.

Harpur, L.J., Polek, E., van Harmelen, A.L., 2015. The role of timing of maltreatment and child intelligence in pathways to low symptoms of depression and anxiety in adolescence. Child abuse Negl. 47, 24–37.

Hébert, M., Langevin, R., Oussaïd, E., 2018. Cumulative childhood trauma, emotion regulation, dissociation, and behavior problems in school-aged sexual abuse victims. J. Affect. Disord. 225, 306–312.

Hodgdon, H.B., Spinazzola, J., Briggs, E.C., Liang, L.J., Steinberg, A.M., Layne, C.M., 2018. Maltreatment type, exposure characteristics, and mental health outcomes among clinic referred trauma-exposed youth. Child Abuse Negl. 82, 12–22.

IBGE, 2016. Ministério do Planejamento, Desenvolvimento e Gestão. Instituto Brasileiro de Geografia e Estatística –IBGE. Diretoria de Pesquisas. Coordenação de População e Indicadores Sociais. Pesquisa nacional de saúde do escolar. Coordenação de População e Indicadores Sociais.

Leonard, E.L., 2015. Forensic neuropsychology and expert witness testimony: an overview of forensic practice. Int. J. Law Psychiatr. 42 (43), 177–182.

Matos, K.J.N., Pinto, F.J., Stelko-Pereira, A.C., 2018. Violência sexual na infância associa-se a qualidade de vida inferior em universitários. J. Bras. Psiquiatr. 67 (1), 10–17.

Merrick, M.T., Ford, D.C., Ports, K.A., Guinn, A.S., 2018. Prevalence of adverse childhood experiences from the 2011-2014 behavioral risk factor surveillance system in 23 states. JAMA Pediatr. 172 (11), 1038–1044.

Münzer, A., Fegert, J.M., Goldbeck, L., 2016. Psychological symptoms of sexually victimized children and adolescents compared with other maltreatment subtypes. J. Child Sex. Abuse 25 (3), 326–346.

O'Brien, J.E., White, K., Wu, Q., Killian-Farrell, C., 2016. Mental health and behavioral outcomes of sexual and nonsexual child maltreatment among child welfare-involved youth. J. Child Sex. Abuse 25 (5), 483–503.

Platt, V.B., Back, I.C., Hauschild, D.B., Guedert, J.M., 2018. Sexual violence against children: authors, victims and consequences. Ciênc Saúde Coletiva 23 (4), 1019–1031.

Powers, A., Etkin, A., Gyurak, A., Bradley, B., Jovanovic, T., 2015. Associations between childhood abuse, posttraumatic stress disorder, and implicit emotion regulation deficits: evidence from a low-income, inner-city population. Psychiatry 78 (3), 251–264.

Ramirez, J.C., Milan, S., 2016. Childhood sexual abuse moderates the relationship between obesity and mental health in low-income women. Child. Maltreat. 21 (1), 85–89.

Ratcliff, R., Van Dongen, H.P.A., 2018. The effects of sleep deprivation on item and associative recognition memory. J. Exp. Psychol. Learn. Mem. Cognit. 44 (2), 193–208.

Senn, T.E., Carey, M.P., Coury-Doniger, P., 2012. Mediators of the relation between childhood sexual abuse and women's sexual risk behavior: a comparison of two theoretical frameworks. Arch. Sex. Behav. 41 (6), 1363–1377.

Serafim, A.P., Saffi, F., Achá, M.F.F., Barros, D.M., 2011. Demographic, psychological and behavioral characteristics of child and adolescent victims of sexual abuse. Arch. Clin. Psychiatry 3, 148–152.

Shrivastava, A.K., Karia, S.B., Sonavane, S.S., De Sousa, A.A., 2017. Child sexual abuse and the development of psychiatric disorders: a neurobiological trajectory of pathogenesis. Ind. Psychiatr. J. 26 (1), 4–12.

Turner, S., Taillieu, T., Cheung, K., Afifi, T.O., 2017. The relationship between childhood sexual abuse and mental health outcomes among males: results from a nationally representative United States sample. Child Abuse Negl. 66, 64–72.

Van der Put, C.E., Lanctô, N., de Ruiter, C., van Vugt, E., 2016. Child maltreatment among boy and girl probationers: does type of maltreatment make a difference in offending behavior and psychosocial problems? Child Abuse Negl. 46, 142–151.

Walsh, K., Messman-Moore, T., Zerubavel, N., Chandley, R.B., De Nardi, K.A., Walker, D.P., 2013. Perceived sexual control, sex-related alcohol expectancies and behavior predict substance-related sexual revictimization. Child Abuse Negl. 37, 353–359.

World Health Organization, 1999. WHO recognizes child abuse as a major public health problem. Lancet 353 (9161), 1340.