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Multidimensional scale for child sexual abuse (MSCSA): Development and psychometric properties

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ABSTRACT

Background: In recognition to the rising incidences of child sexual abuse in India, various challenges of existing trauma measures and absence of indigenous efforts at development of comprehensive impact assessment scale, present study was conceptualized.
Objective: To develop and establish psychometric properties of Multidimensional Scale for Children with Sexual Abuse.
Participants and Settings: Outpatient department of government hospitals, non-governmental organizations and child care institutes were primary data setting from which a total of 457 participants were sampled.
Methods: The scale development process consisted of identifying impact themes from 59 qualitative research participants and item pooling from available scales; item writing followed by content and face validity analysis from 18 experts; and pilot testing on 30 children. The scale was then applied to 200 children with CSA and 150 children without sexual abuse. The factor structure of the scale was obtained using exploratory factor analysis. Internal consistency, split-half reliability, and validity (convergent, divergent, discriminant) were evaluated. Cut-off scores were obtained using the receiver operating characteristics curve and percentile analysis.
Results: The scale consisted of 62 items across 5 domains. It has high reliability (Cronbach's α 0.93; split-half reliability 0.89), high content, and discriminant validity. Convergent and divergent validity are satisfactory. Scale cut-off score of 31 has high sensitivity.
Conclusion: To our knowledge, this scale is the first such psychometrically robust self-rated scale for young children with sexual abuse in the Asian country. Available in both Hindi and English language, the scale provides a quick measure of trauma across multidimensional functioning.

1. Introduction

Child sexual abuse (CSA) is on a sharp rise across the world with devastating consequences on the psychosocial health of children (WHO, 2014). Studies conducted worldwide report an extensive range of symptoms owing to its conception, perpetuation, and escalation due to CSA (Finkelhor and Browne, 1985; Van der Kolk et al., 1991). In recognition of the magnitude of problem, clinicians and researchers are increasingly geared up to the development and use of standardized assessment measures to enhance their understanding on the nature of traumatic experiences and its impact on children.

A recent CSA assessment tool review (Satapathy et al., 2017) revealed that the primary indicators of trauma in most scales are behaviour manifestations and symptoms of post-traumatic stress disorder (PTSD). Thematic constructs captured in each of the 52 scales reviewed circled around five major domains, i.e., history of traumatic events, PTSD symptoms, generic impact of trauma, correlated of trauma or the impact of trauma on parents and families. Trauma has been thus treated as a singular concept incorporating trauma related to various categories of adverse events than those specific to CSA context. For example, "sexualized behaviour" or the specific social stigma and discrimination are unique experiences observed specifically in children after CSA and must be captured in a specific way.

In addition to raising various challenges on psychometric properties, authors reported a trend towards development of scales for children above 13 years of age which may be attributed to ease in cognitive or language competency in the expression of trauma. This however leaves young children's voices largely unexpressed or peripherally expressed through parent and clinicians, which could be misleading due to the range of subjective biases involved in the rating (Besharov, 1994). A

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larger issue raised has been on determining the dimensionality of trauma measured. While many researchers focused on specific symptom presentation, it was widely argued that trauma affected more than one aspect of child's functioning (Friedrich, 1994). In fact, the bio-psychosocial approach also advocates identifying the complex interaction between biological, psychological, and social dimensions of illness as a means to understand patients subjective experiences as an essential contributor to their accurate diagnosis, health outcome and human care (Borrell-Carrió et al., 2004). Though the debates determining the dimensions and its pathways of trauma impact is ongoing, it certainly necessitates an assessment of its nature (Babiker, and Herbert, 1998).

Since trauma and healing happen within a context, socio-cultural factors could have a significant role in determining the nature of CSA trauma (Kleinman and Kleinman, 1991). Emotional experiences vary widely depending on the basic tenets of a culture. For example, socio-centric cultures tended to give rise to a more social feeling of shame after CSA, in contrast to private feeling of guilt in egocentric cultures (Zimmerling, 2003). Especially, in an Asian country such as India, despite national data indicating a high prevalence of CSA among young children (Kacker et al., 2007), socio-cultural factors (stigma, poor awareness, lack of access to the health care facility, financial difficulties, fear of public exposure upon disclosure and fear of receiving a culturally insensitive response from people) limits timely reporting or treatment-seeking (Gilligan and Akhtar, 2005). The silence of researchers on understanding the nature of CSA trauma, or attempting to develop or adapt an existing CSA assessment tool is serious (Satapathy et al., 2017).

In such a scenario, a dire need for the development of a culturally sensitive measure of trauma for early screening for clinical referral for diagnosis and treatment purpose was realized which is expected to be multidimensional, psychometrically robust, culturally competent and easy to administer.

To fulfil the gaps in the literature, Multidimensional Scale for Children with Sexual Abuse (henceforth, referred as MSCSA) has been designed to assess the nature and extent of trauma in children from 7 to 13 years of age with history of sexual abuse. Since literature reports that memories of experiencing trauma are prone to alterations caused by various internal and external factors such as mood, mental state, cognitive abilities etc (Barry et al., 2018), prolonged duration since the occurrence of CSA sexual trauma may increase the chances of such memory falsifications and we may not be able to capture the trauma impact of trauma with reliability. Thus, the duration within which the duration of sexual abuse occurred was conceptualized to be 2 years. The purpose of the present study is to describe the development of this scale and to present findings on its psychometry properties.

2. Methods

The Institute Ethics Committee approval was obtained before starting the study. Permission was also sought from the Ministry of Women and Child Development (MWCD), Govt. of India for data collection. The consolidated seven ethical criteria for conducting a study on CSA in India (Dayal et al., 2018) were considered, National Study on Child Abuse (2007) consolidated checklist for ethical guidelines were consulted along with aligning with all the Indian directives on researching with minors and survivors of sexual abuse (MWCD, 2013; Juvenile Justice Act, 2015). International ethical guidelines were followed by maintaining close compliance to guidelines on "Ethical Principles, and Risks in Collecting Data on Violence against Children" (CP MERG, 2012), and WHO (2017) recommendations in "Responding to Children and Adolescents Who have been Sexually Abused."

2.1. Study population

Based on the literature's recommendations for the fair sample size to conduct factor analysis (Comrey and Lee, 2013), 200 participants were recruited in the CSA group. Participants were included if they were between 7–13 years of age with a history of CSA (as per Protection Of Children against Sexual Offence Act, 2012) from 0 weeks to 2 years with IQ $\geq$ 90, psychological treatment naïve, ready to give assent and have a consenting parent, caregiver or a legally authorised representative (LRA). Participants were excluded if they had a history of other forms of abuse but not sexual abuse; diagnosed with intellectual disability; a medical diagnosis of any chronic illness or sensory impairment and were unwilling to participate.

For CSA group recruitment, a total of 333 potential data were identified and screened on selection criteria which excluded 108 children. Out of eligible 225 cases, 25 cases were further excluded due to either non-willingness and short duration of stay at child-care institutes (CCI). 200 eligible, available, willing and consenting participants were recruited within time period of 15 months (Fig. 1).

For Non-CSA group recruitment, a total of 240 potential participants were identified out of which 34 were excluded based on selection criteria, 3 further refused consent, and 17 were absent on the day of the assessment. Thus, only 186 data were eligible, willing, and available for the study out of which 150 children were recruited within a span of 2 months (Fig. 2).

2.2. Study setting

For the CSA group, the sample was collected primarily from case referrals to the department of psychiatry, pediatric, pediatric surgery, and gynaecology of a tertiary care hospital. Further, due to under-reporting of the CSA in India, the universe of the present study extended to include cases from CCI and NGOs working for the rehabilitation of CSA in India. For the non-CSA group, participants were recruited from a neighbourhood community.

2.3. Measurement tools

Socio-Demographic Performa was constructed for the study consisting of 2 major sections. First, was the personal history regarding a child's age, gender, socio-economic status (SES), and school history. Kuppuswamy scale was used for SES assessment (Tabassum and Rao, 2017). The second section on family history included information on the age, education, and income of parents or head of the family, family history of psychiatric or physical illness, type of family, number of family members, living space, history of substance use, history of other forms of abuse, history of exposure to parental violence or any other significant life events.

Abuse Form: The first section included incident information on child's age at the time of the abuse, frequency of abuse, time since the abuse, and type of abuse. Disclosure information was the second section which included details on time taken for disclosure, threat for disclosure, and sources of support after disclosure.

*Child PTSD Symptom Scale (CPSS) (*Foa et al., 2001*):* CPSS assesses on a 4-point likert scale, the frequency of PTSD symptoms within the past month for a child who has experienced a traumatic event. The scale had satisfactory internal and test-retest reliability along with adequate convergent validity with other PTSD measures. WHO guideline for scale translation was followed to translate the scale into the Hindi language.

*Children's Impact of Events Scale –13 (CRIES-13) (*Horowitz et al., 1979*):* It comprises of 13 items on 4 point likert scale to assesses PTSD symptoms in children between age range of 7–16 years. The scale has satisfactory internal consistency. WHO's guidelines for scale translation were followed to translate the scale into the Hindi language.

*Developmental Psychopathology Checklist (DPCL) (*Kapur et al., 1995*):* DPCL is an Indian adapted version of the Child Behaviour Checklist (CBCL) by Achenbach and Edelbrock, consisting of 6 subsections. In the present study, sub-scale psychopathology was only used.

Children's Global Assessment Scale (CGAS): The CGAS is a clinician completed numeric scale ranging from lowest (1) to highest (100)

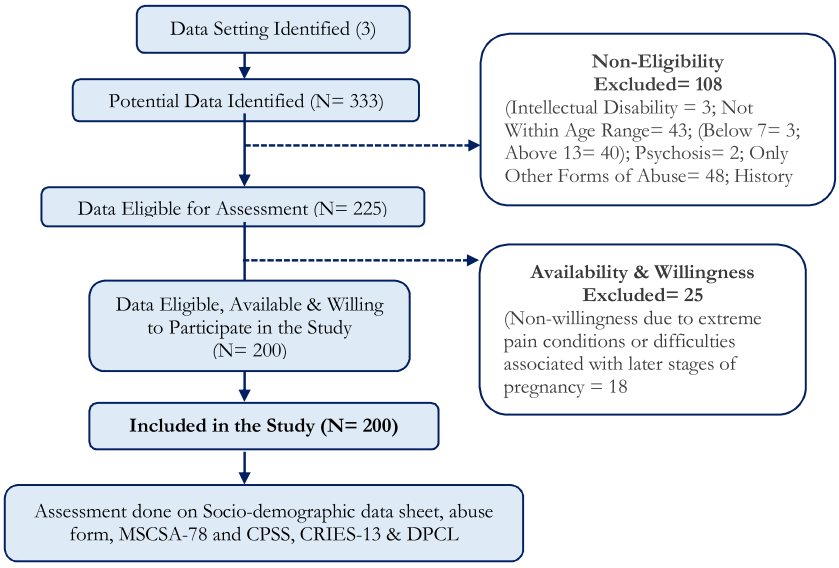

Fig. 1. Flowchart for Sample Selection in CSA Group.

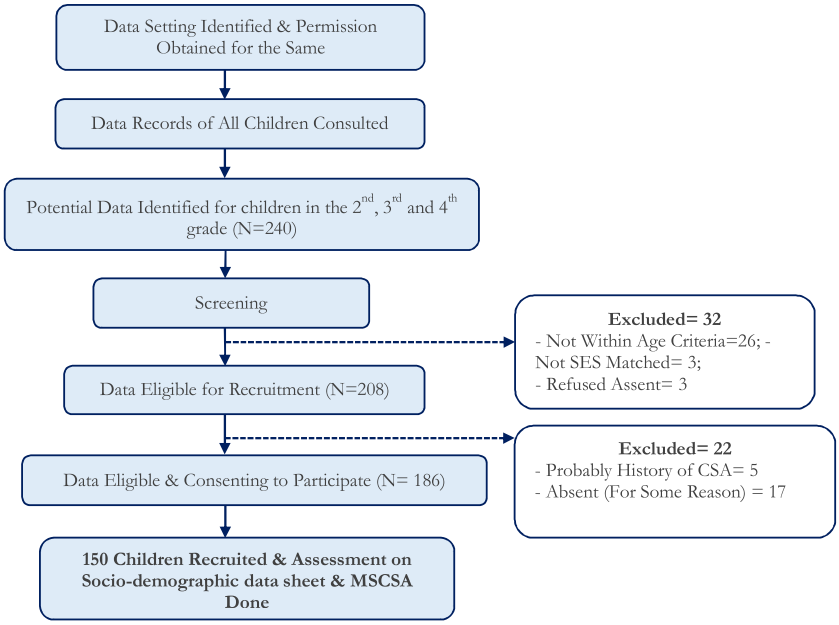

Fig. 2. Flowchart for Sample Selection in Non-CSA Group.

functioning. It captures behavioural descriptors of functioning within the last month for children that is independent of specific mental health diagnosis.

2.4. Development and description of MSCSA scale items

Scale item was developed across four distinct phases (Fig. 3).

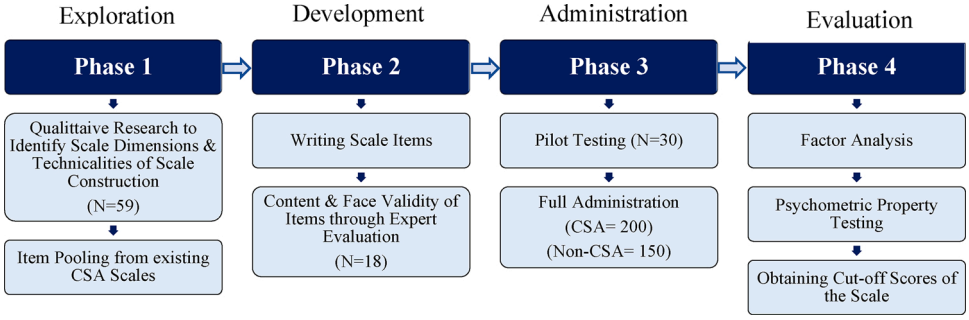

Fig. 3. Four Phases of MSCSA Development.

In Phase I of Exploration, the impact of trauma was identified using qualitative research and item pooling from a review of existing CSA scales. Qualitative research included an in-depth interview from 11 children with CSA and seven focused group discussions (FGD) with 21 parents/caregivers of children with CSA and 27 health professionals with at least 1 year experience of working in CSA. The group of professionals were either mental health professionals (clinical psychologists, child psychologists, counsellors, psychiatrists, psychiatric social workers, and psychiatric nurses) or medical professionals (paediatricians, pediatric surgeons, gynaecologists and those from the department of emergency medicine, forensic and toxicology). They were recruited from a tertiary care hospital (hospital name masked) and non-governmental organizations (NGO) by individually approaching them and screening on the selection criteria.

Thematic analysis of data gathered from 59 participants indicated six broad impact domains: behavioural difficulties, poor emotional functioning, poor cognitive & academic functioning, psychopathology, poor biological functioning, and disrupted social functioning (Choudhary et al., 2019). Professional's perspective on technicalities of scale construction was also obtained in FGD. For item pooling, 110 items from 16 scales were consider out of which 6 were finally sampled (Choudhary et al., 2019).

Phase 2 of Development was about writing the scale and obtaining it's content and face validity. After closely considering parameters of scale constructions as emerged from FGD, 102 items were developed and 6 were pooled from existing scales thus making a total of 108 items on a 3-point Likert scale displayed using both numerical and visual graphics. All items were positively worded to ensure unidirectionality, to avoid confusion of children in understanding, and for ease of scoring. Items were framed in small, simple sentences, in "Hindi" language for easy and quick understanding of young children. A certified translator assisted in preparing the English version of the scale following WHO back translation guidelines. For obtaining content and face validity, 25 CSA experts from 10 institutes, hospitals, and NGOs were contacted. Item-specific and overall scale feedback were obtained. In total, 18 (72 %) forms were collected. All items received more than 50 % of the expert's agreement (Lawshe, 1975). Length of scale and item repetitiveness were considered in detail to refine the scale accordingly. Further, content validity ratio (CVR) was calculated for each item where items scoring between 0.8–1 were only retained. Those in between 0.5–0.8 were taken up for discussion and retained based on the clinical significance or suggested refinement by experts. Those below 0.5 were discarded altogether. Thus, in total 85 items were finalized at this stage.

Phase 3 of Administration was pilot testing of 85 item MSCSA on a sample of 30 children with CSA between the ages range from 7 to 13 years. Analysis of reliability, inter-item, and inter-domain correlation along with descriptive analysis of socio-demographic characteristics were done. Analysis reduced item from 85 to 78 after merging/deletion of 7 items, out of which, 6 items were found to be irrelevant to the CSA context and 2 further items were merged into one due to conceptual overlap. Additionally, the feedback received from the children indicated adequate feasibility of the scale administration. 95 % of participants confirmed feasibility and the relevance of the scale items (Choudhary et al., 2018). MSCSA consisting of 78 items were administered on 200 children with CSA and 150 without CSA.

Phase 4 of Evaluation included conducting exploratory factor analysis on the obtained data from 200 children with CSA to find out the factor structure of MSCSA. The scale was then subjected to a series of tests for establishing its psychometric properties. Cut-off scores on the newly developed scale was obtained using Receiver Operating Characteristics (ROC) curve and percentile analysis.

2.5. Procedure

All assessments were conducted by the first author who is a trained clinical psychologist.

At the beginning, rapport building was initiated. Only when a child felt comfortable and expressed readiness to discuss their experiences, purpose of conducting study was introduced in simple words. If child agreed to participate, verbal and written assent was obtained along with obtaining consent from at least one parent or legally authorised representative, whenever applicable. Assessment was then completed on all the scales which took approximately one hour for each. The testing session were closed by conducting the debriefing session followed by gradual shift to the neutral topics. If the child reported feeling emotionally overwhelmed at any point during the assessment, a supportive session was immediately held. If after the testing, the child continued reporting symptoms of distress, concerned treating team of mental health professionals were informed so that timely management of the distress could be initiated.

2.6. Statistical analysis

Reliability: Reliability of the full-scale MSCSA as well as its domains, were assessed by using Cronbach Alpha (α). Additionally, split-half reliability corrected with the Spearman-Brown formula was assessed by comparing the odd versus even items of the scale.

Validity: Content validity of each MSCSA item was obtained using CVR (Lawshe, 1975). For convergent validity, Pearson's correlation coefficient was calculated between MSCSA and CPSS, and CRIES-13 while for divergent validity correlation between DPCL sub-scales and MSCSA was obtained. For discriminant validity, a student's *t*-test was used to ascertain if scores on MSCSA vary significantly between CSA and non-CSA group.

Factor Analysis: Values of the Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity (BTS) was obtained to ensure that the data was adequate and appropriate for conducting factor analysis, while Kolmogorov-Smirnov (K–S) was done to check normalcy of the distribution. Exploratory Factor Analysis (EFA) was done using principal component analysis (PCA). The varimax method of orthogonal rotation was used for rotating factors. Factors having eigenvalue more than 1 were extracted with a minimum factor loading of 0.40 for retention of items.

Determining Cut-off Scores: For conducting Receiver Operating Characteristics (ROC) Curve, a comparative analysis of CSA with a non-CSA group was undertaken on three major statistical measures, i.e., sensitivity and specificity analysis, analysis of Area Under the Curve (AUC) and Youden Index (J). Additionally, cut-off scores for trauma severity were also estimated based on percentile values of the scale.

3. Results

3.1. Demographics & abuse characteristics

Mean age of 30 children recruited in pilot group were 10 years and 66 % belonged to upper lower socio-economic status. All children registered a case of penetrative sexual assault under POCSO, in 56 % cases perpetrator was a known person, 24 % were survivors of incest and in 20 % cases, abuse was committed by an unknown person. In majority of the participants, frequency of abuse was once and disclosure of the incident of sexual abuse was immediate.

For CSA Group of 200 participants, 87.5 % were females, 36 % children were between 11–12 years, 13 % were 7–8 years, 25 % were between 9–10 years, and 26 % were 13 years old. While 79.5 % of children belonged to upper lower SES, a majority of sampled children (67.5 %) was studying between education grade 2–5. 69.5 % of children had a nuclear family background, however, had a large family with 5–7 members (42 %) in the family and were living in a small space of not more than 1 room (70 %). History of other forms of child abuse (59 %) and substance abuse (69 %) was found in the majority of the participants.

Analysis of abuse forms indicated that 84 % of children reported

penetrative sexual abuse which occurred primarily in the age range of 11–12 (42 %) followed by age range 9–10 (28 %), 7–8 (15.5 %), and 13 (14.5 %). The incident took place 2–5 months ago for 42 % of children, it was very recent (within a period of 1 month) for 22.5 %, for 21 %, the incident took place for more than 10 months up to 2 years and only in 14.5 % of children incident happened 6–9 months before. The frequency of the occurrence of abuse was once for 59 %, 2–5 times for 24 %, 6–10 times for 10.5 %, and more than 10 times in 6.5 % cases. Half of the children (50 %) reported the incident perpetrated by a family member, an unrelated known person in 37.5 % cases, and an unknown person in 12.5 % of cases. Disclosure of the incident was delayed in 69 % of cases and immediate in only 31 % of cases. The threat of disclosure was present in 79 % of cases. However, support after disclosure of abuse was perceived by 64.5 % of the cases

Mean age of children in Non-CSA group was 10 years (1.76). Comparative analysis indicated that there was no significant difference in the mean age and socio-economic status of children with CSA and without CSA trauma.

3.2. Factor structure

KMO of 0.821 was adequate for conducting EFA. BTS was found to be significant ($p < 0.0001$), thus indicating a high enough proportion of significant correlations among the items. K-S value was significant which was normalized using square root transformation. Cronbach α of 0.95 for 78 item scale indicated excellent internal consistency. Cronbach α value after each item deletion rendered no significant change in α values. Results of the initial EFA analysis extracted 22 factors which explained 68.93 % of the variance in the data. Out of 22, 8 factors had a single item, while another 5-factor had only 2 items. Since the present study aligned to the recommendation of keeping 3 items per factor to be retained as a construct in scale development (Raubenheimer, 2004), 13 factors could not be included. A scree plot was consulted (Fig. 1) which indicated 4 points of inflection, i.e., 3,5, 6 & 22 (Fig. 4).

Since retention of 3 factors was too few to explain the variance in data and retention of 22 factors was leading to difficulties explained above, retention of either 5 or 6 factors was concluded. Further, three criteria were considered for the deletion of items at this stage, i.e., cross-loading of items, factor loading should be above 0.40 and must explain at least 50 % of the total variance in the data. Upon conducting fixed factor EFA on MSCSA-78, 16 items were suppressed and deleted. The clinical relevance of the deleted items was verified to avoid losing any essential item. From subsequent EFA on 62 items, 5 coherent categories were retained (Table 1).

The first factor "psychopathology" consists of 27 items on symptoms of PTSD, depression, anxiety, and somatization. The second factor, "socio-emotional difficulties" included 14 items on sub-factors, guilt, shame, emotional reactions due to critical comments or due to stigma, and discrimination. The third factor, "externalizing behaviour" included 7 items on sub-factors, aggression, self-harm, and other difficult behaviour. The fourth factor, "sexualized behaviour and pain" included 7 items on sub-factors, sexual self-stimulation, sexual stimulation of others, and pain in private parts. The fifth factor "academic difficulty" included 7 items on sub-factors- declined interest in studies, deteriorating academic performance, poor academic self-efficacy, and reduced attention and concentration. Though most items distributed on factors were clinically and conceptually relevant to it, however, seven items loaded on the factor domain irrelevant to the allocated category which were re-shuffled based on cross-loading values and clinical relevance. Subsequently, factor naming was done based on a review of the underlying construct. The 62 item scale had a mean score of 51.75 and standard deviation of 22.25. Values of its skewness (0.241) and kurtosis (-0.45) were within an acceptable range and the data was normally distributed.

3.3. Cut-off scores

ROC analysis of MSCSA-62 item scale revealed an AUC of 0.79 (95 % CI 0.74−0.84), thus showing the acceptable discriminative capacity of MSCSA. The cut-off point which best discriminated between children with and without CSA specific trauma was 31 with a sensitivity of 84.5 % and specificity of 62.0 % and a J value of 0.47 (Fig. 5).

The range of scores on MSCSA was 0−124. And a score of 32 or above indicated a significant impact of CSA trauma while score ≤ 31 indicated a non-significant impact of CSA trauma. Further, percentile analysis revealed that scores between 0–31 indicated non-significant CSA trauma; 32–51 indicated the mild impact of CSA trauma, 52–71 indicated the moderate impact of CSA trauma, and a score of 72 & above

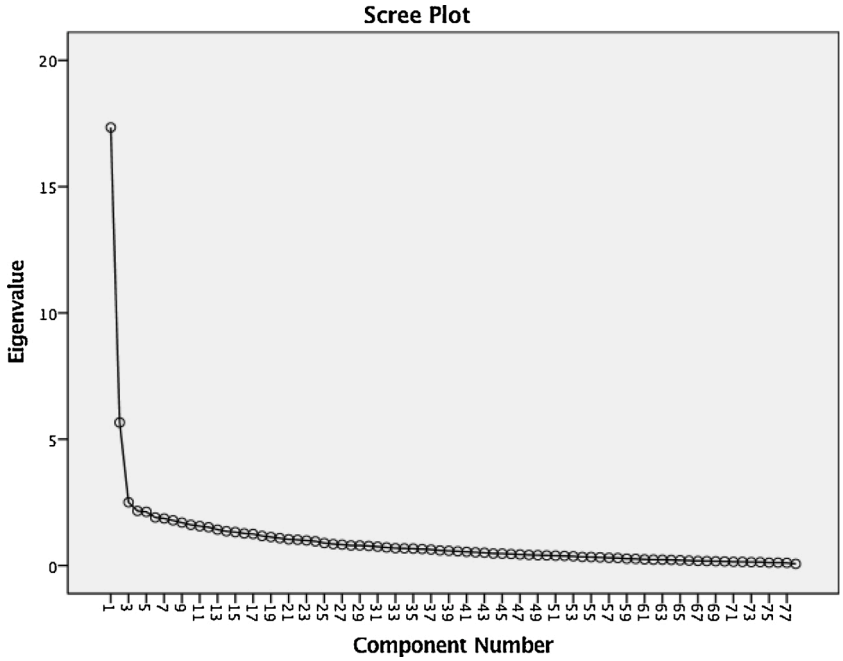

Fig. 4. Scree Plot.

Table 1
Factor Loading Across Five Factors on EFA.

S. No	Item Name	Factor 1 Psychopathology	Factor 2 Socio-Emotional Difficulty	Factor 3 Externalizing Behaviour	Factor 4 Sexualized Behaviour & Pain	Factor 5 Academic Difficulty
1.	Bed Wetting	0.723				
2.	Loneliness	0.696				
3.	Feeling of Dirtiness in Body	0.674				
4.	Faints Often	0.670				
5.	Intrusive Thoughts about the Incident	0.621				
6.	Repetitive Flashbacks of the Incident	0.606				
7.	Suicidal Wishes	0.594				
8.	Avoidance of the Place of Abuse	0.577				
9.	Anger (Generalized)	0.568				
10.	Sadness	0.566				
11.	Night Terror (Nightmare)	0.564				
12.	Generalized Anxiety	0.551				
13.	Anger (Upon Touching)	0.548				
14.	Inability to Trust Anyone	0.541				
15.	Anger (Towards Perpetrator)	0.536				
16.	Anhedonia	0.505				
17.	Hypervigilance	0.499				
18.	Worthlessness	0.499				
19.	Repetitive Flashbacks of the Incident	0.495				
20.	Sleep Difficulties	0.448				
21.	Reduced Concentration	0.445				
22.	Reduced Talkativeness	0.437				
23.	Recurring Pain in Body	0.432				
24.	Headache	0.412				
25.	Hypersensitivity	0.400				
26.	Avoids Talking About Incident	0.400				
27.	Avoidance of the Trauma Memories	0.400				
28.	Social Blaming		0.650			
29.	Blames Self for Family's Compromised Security		0.605			
30.	Blames Self for Family distress		0.565			
31.	Dislike Discussing Abuse		0.559			
32.	Blames Self for Family Shame		0.523			
33.	Fear of Critical Comments		0.510			
34.	Perceives Self-blame		0.484			
35.	Hopelessness		0.416			
36.	Fear of Abuse Reoccurrence		0.429			
37.	Teasing		0.409			
38.	Self-blame		0.400			
39.	Dislike/Avoidance Others Sympathy		0.400			
40.	Shame		0.400			
41.	Anxiety of Novel Stimuli		0.400			
42.	Verbally Abusive			0.544		
43.	Physical Fights in Anger			0.529		
44.	Stubbornness			0.469		
45.	Screaming in Anger			0.430		
46.	Self-Harm			0.427		
47.	Peer Avoidance			0.409		
48.	Nail Biting			0.407		
49.	Pain in Private Parts				0.615	
50.	Likes Talking About Sex				0.533	
51.	Likes Sexual Stimulation by Touching others' Genitals				0.524	
52.	Likes Frequent Masturbating				0.520	
53.	Likes Sexual Self-Stimulation				0.446	
54.	Pain During Urination & while Passing Stool				0.444	
55.	Likes Sexual Acts with Others				0.400	
56.	Reduced Interest in School					0.616
57.	Dislike Peer Interaction at School					0.507
58.	Regular Stomach Upset in School					0.474
59.	School Withdrawal					0.454
60.	Reduced Academic Performance					0.441
61.	Poor Self-efficacies (In Academics)					0.438
62.	Trouble Concentrating					0.437

indicated the severe impact of CSA trauma.

3.4. Reliability

Cronbach α for MSCSA-62 remained excellent, i.e. 0.947 (against 0.952 in MSCSA-78) and unaffected after the removal of 16 items. α value of factor 1, 2, 3 and 5 domains also remained high, i.e., 0.912, 0.843, 0.717 and 0.76 respectively. Factor 4 had α of 0.69, which is comparatively lower, however, since it was still higher than the recommended minimum α value of 0.60 (Robinson et al., 1991) it was

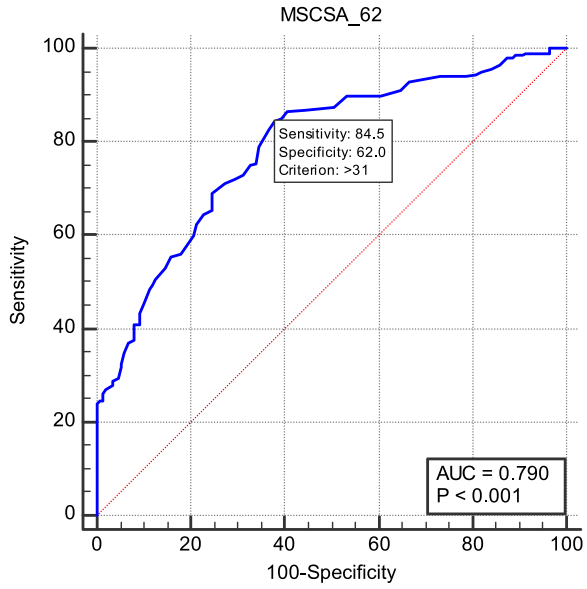

Fig. 5. Receiver Operating Characteristics (ROC) Curve.

retained. Split-half reliability remained as good, i.e. 0.894.

3.5. Validity

For convergent and divergent validity, the following Person's correlation between various scales and sub-scales were obtained (Table 2).

For convergent validity, MSCSA-62 had significant positive correlation with CPSS ($r = 0.62$, $p < .01$), CRIES-13 ($r = 0.53$, $p < .01$) and DPCL (Emotionality, Somatization and Psychotic Symptoms). The size of the correlation was interpreted using the criteria proposed by Hinkle & Wiersma (2003). Additionally, MSCSA-62 had statistically significant correlations with various conceptually similar sub-domains of DPCL such as emotionality ($r = 0.46$, $p < .01$), somatization ($r = 0.34$, $p < .01$) and psychotic symptoms ($r = 0.31$, $p < .01$). Further, it can be seen that MSCSA-62 also shared a statistically significant correlation with DPCL ADHD ($r = 0.29$, $p < .01$). However, considering the criteria for the size of the correlation coefficient, there was a negligible correlation between the two. Thus, overall, the scale had adequate convergent validity. For divergent validity, it was found that MSCSA-62 shared non-significant correlation with DPCL conduct ($r = 0.08$), DPCL SLD ($r = 0.16$) and DPCL OCD ($r = 0.06$) which were conceptually distinct concepts than those measured in MSCSA-62.

The mean score difference on MSCSA total between children with CSA (Mean = 51.75, SD = 22.25) and those with no history of CSA (Mean = 29.43, SD = 16.09) was found to be significant ($t = 10.41$, $p < 0.01$), which demonstrated the high discriminatory ability of MSCSA.

4. Discussion

4.1. Five factor structure

The five-factor model of MSCSA demonstrated the multidimensionality of the scale. Finding on factor psychopathology expands the psychiatric impact of CSA beyond the PTSD model which is well supported by a fairly large body of researches (Kendall-Tackett et al., 1993; Khadr et al., 2018). Abundant quantitative and qualitative studies (Holigrocki and Raches, 2006; van Duin et al., 2018) demonstrates consistent support for the finding on the second factor, externalizing behaviour. For the third factor, academic functioning, shreds of evidence exists in CSA literature for attentional inhibition (Barrera et al., 2013) and poor academic performance (Zainudin & Ashari, 2018), it was never included as distinct category in trauma scales reviewed so far. From a socio-cultural point of view, academic achievement is most often tied to a child's self-worth and further to family pride, assessment of success in parenting, or status symbol in Asian society (Sue, 1998). Hence, any failure or difficulty is taken seriously, and usually, this is the point when any form of consultation is sought. Therefore, it remains a priority trauma impact domain or improvement parameter. The next two categories domains present an amalgamation of constructs falling within a single factor on EFA. While the domain, "sexualized behaviour, and pain" shares outward manifestation of trauma impact, "socio-emotional difficulties" presents an absolute blend of two domains considered to be distinct in literature (Fontes et al., 2017). Closer examination highlights crucial role played by socio-cultural factors in determining the nature and extent of emotional difficulties experienced. For example, the construct self-blame is not only due to the occurrence of abuse but holding self, responsible for family's distress, compromised security, diminished honour, and shame.

4.2. Psychometric measures

MSCSA was further designed to provide a psychometrically sound measure for CSA trauma impact and severity. MSCSA, in our knowledge, is the first child-rated scale for young children with sexual abuse, which measures the multidimensional impact of trauma. With an Cronbach's α of 0.947 and split-half reliability of 0.894, MSCSA has excellent reliability. In fact, Cronbach α for MSCSA is superior to Trauma Symptom Checklist for Children (TSCC) estimated to be between 0.82 to 0.89 (Briere et al., 2001) and at par with Child PTSD symptom scale (CPSS, Foa et al., 2018). Further, as with TSCC and CPSS, MSCSA was obtained to have adequate support for its validity measures with high CVR, high correlation with conceptually similar scales and poor correlation with

Table 2
Correlation Between MSCSA Total Score and CPSS, CRIES-13 and DPCL.

Scales No.	Measures	1	2	3	4	5	6	7	8	9	10	11
1	MSCSA Total Score	1										
2	CPSS	0.62**	1									
3	CRIES-13 Total	0.53**	0.82**	1								
4	CRIES-13 Intrusion & Avoidance	0.52**	0.81**	0.98**	1							
5	DPCL ADHD	0.29**	0.29**	0.23**	0.24**	1						
6	DPCL Conduct	0.08	0.07	0.06	0.06	0.23**	1					
7	DPCL SLD	0.16	0.25	0.20	0.20	0.36	0.15	1				
8	DPCL Emotionality	0.46**	0.55**	0.54**	0.52**	0.17*	0.13	0.13	1			
9	DPCL OCD	0.06	0.17	0.17	0.17*	0.20	0.03	0.14	0.12	1		
10	DPCL Somatization	0.34**	0.48**	0.34**	0.34**	0.46**	0.13	0.32	0.42**	0.24	1	
11	DPCL Psychotic Symptoms	0.31**	0.57**	0.58**	0.54**	0.13	−0.01	0.10	0.48**	0.15	0.34**	1

Note: MSCSA = Multidimensional Scale for Child Sexual Abuse; CPSS = Child PTSD Symptom Scale; CRIES-13= Children's Impact of Event Scale-13; DPCL = Developmental Psychopathology Checklist; ADHD = Attention Deficit Hyperactive Disorder; SLD = Specific Learning Disorder; OCD = Obsessive Compulsive Disorder.
** Correlation is significant at the 0.01 level.
* Correlation is significant at the 0.05 level.

those diverse, and the ability to discriminate between trauma in CSA and non-CSA group.

Though MSCSA demonstrated satisfactory correlation with CRIS-13, CPSS, and DPCL sub-domains emotionality and somatization, it shared unexpectedly high correlations with two DPCL sub-scales, i.e., ADHD and Psychosis. Analysis of DPCL scale characteristics indicated that cut-off points were too low for sub-domains diagnosis such that chances of false-positive were high which was increased further due to dichotomous responding on scale items. DPCL was still selected as it was the only available indigenous scale. However, the sensitivity of DPCL cut-off scores demands re-examination.

The obtained cut-off point of 31 discriminates between children with and without CSA trauma with a higher sensitivity (84.5 %) than specificity (62.0 %). Retention decision was yet taken to avoid the possibility of missing any child with significant impact. Moreover, the criteria score of 31 was also considered accurate as the scale's AUC lies within the range of high accuracy (Kraemer et al., 2004). With other measures of trauma such as CRIES-13, a similar approach has been adopted which well screens children for recruitment in treatment programs. However, it would require a second level screening as children progresses through treatment to clearly delineate those who no longer fits a category. This necessitates large-scale prospective studies using MSCSA to track how scores varies with developmental trajectories of children (Perrin et al., 2005).

4.3. Clinical significance

MSCSA, offers quick and comprehensive assessment of both the nature as well as extent of trauma impact in children with CSA. The scale can be used by mental health professionals after brief training on scale administration and scoring. Thus, MSCSA finds direct clinical applicability across a wide range of settings such as CCI, schools, primary, secondary and tertiary care hospitals, and NGOs. With its sound psychometric properties, it also offers useful relevance for progress and outcome evaluation of CSA intervention studies.

4.4. Limitations & directions in future research

To enhance the scale generalizability, a larger sample may be more helpful. Male children were underrepresented as the authorities provided data collection permission in female CCIs only. Hence, a significant perspective on gender differences remained marginalized.

For future research, MSCSA can be translated into vernacular Indian languages to establish its cross-cultural competency. Scope for applicability testing in other countries can be explored. A parent or clinician version can be developed to assist children and further obtain a holistic perspective of trauma impact. CFA is awaited to confirm model fit as emerged in MSCSA.

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Declaration of Competing Interest

All authors declare no conflict of interest.

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