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*Citation for published version (APA):*

Bosschaart, T. F. (2018). Recognizing child sexual abuse: An unrelenting challenge

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## The diagnostic utility of the Child Sexual Behavior Inventory for sexual abuse: A systematic review

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Accepted for publication in: *Journal Child Sexual Abuse* 2018. DOI 10.1080/10538712.2018.1477215

## Abstract

Children with alleged child sexual abuse (CSA) need to be assessed systematically. The use of validated instruments during the assessment, like the Child Sexual Behavior Inventory (CSBI), could add diagnostic value. We aim to assess the diagnostic utility of the CSBI to differentiate between sexually abused and non-abused children. We conducted a systematic review. We searched the electronic databases MEDLINE and PsychInfo for studies comparing CSBI-scores in sexually abused children and non-abused children (2-12 years old). Two independent reviewers extracted data and assessed the methodological quality. We included seven (out of 1048) articles. CSBI-total scores were significantly higher in CSA-victims compared with non-abused children (in case-control settings). However, in children with suspected CSA results were ambiguous. One study reported significant differences. Another study reported weak diagnostic ability for the CSBI-3 in children with suspected CSA (a sensitivity and specificity of 0.50, with a positive predictive value of 0.28 and a negative predictive value of 0.72) Research on the diagnostic utility of the CSBI for suspected CSA is limited and shows disappointing results. Until more research is done, the CSBI should not be used on its own to differentiate between sexually abused and non-abused children.

## Introduction

Child sexual abuse (CSA) is a worldwide problem and reported in all strata of society, with estimated prevalence varying from 8-31% for girls and 3-17% for boys<sup>1-3</sup>. Many definitions are being used worldwide and influence the prevalence measured. Used definitions may include non-contact, contact abuse, forced intercourse or a combination<sup>1,3</sup>. Various definitions use various cut-off ages for childhood, age differences between victim and perpetrator and may or may not include sexual violence among peers<sup>1</sup>.

CSA often remains unrecognized due to lack of CSA-specific symptoms and disclosures<sup>1,4-12</sup>. A child's disclosure is of great importance as the child is often the only eyewitness of the abuse. Unfortunately, disclosure of CSA is often delayed, sometimes even until adult age<sup>5,13</sup>. Children can withhold from telling due to feelings of shame and guilt or fear of being blamed<sup>5,13-15</sup>. Likely children are instructed to keep the abuse a secret<sup>16</sup>. Verbal limitations, especially in the younger age group (preschool children), also preclude children from telling<sup>17</sup>.

Possibly, atypical sexual behavior displayed by children is a good indicator for CSA<sup>17</sup>. What is considered 'normal' sexual behavior depends on the developmental stage and gender of a child. Two-year-old children display relatively more sexual behavior when compared with 10 to 12-year-olds<sup>18</sup>. Normal childhood sexual behavior happens spontaneously, intermittently, with mutual consent, and does not cause any distress<sup>19</sup>. When sexual behavior becomes age-inappropriate it can be an indication for CSA<sup>20-22</sup>.

An instrument to assess sexual behavior in children is the Child Sexual Behavior Inventory (CSBI), developed by Friedrich in 1997. The CSBI is commonly used in studies evaluating sexual behavior in children<sup>21,23-28</sup>. Development of the CSBI started in 1983 with the sexual behavior items that were used in the Child Behavior Checklist (CBCL, Achenbach 1991;<sup>29</sup>. The first version of the CSBI with 35 items (CSBI-1) was developed in 1991. This version was further evaluated causing another 6 items to be dropped, 7 to be added and 3 to be rewritten. The result was the second version of the CSBI with 35 items (CSBI-2). The currently used CSBI-3, consists of 38 items, 22 items from the CSBI-2, 13 items were rewritten and 3 new items added<sup>30</sup>. The questionnaire is designed for children aged 2 to 12 years old. The CSBI provides clinical cut-off scores and norms depending on the age (2-5 years, 6-9 years, 10-12 years) and gender of the child.

The CSBI-3 has nine different domains: Boundary Problems, Exhibitionism, Gender Role Behavior, Self-stimulation, Sexual Anxiety, Sexual interest, Sexual Intrusiveness, Sexual Knowledge and Voyeuristic Behavior<sup>30</sup>. The mother or other primary female caregiver

scores each item based on the degree of which the child has shown the specific behavior in the prior 6 months. There is a scale from 0 to 3; 0=never, 1=less than once a month, 2=one to three times a month and 3=at least once a week. The range of the score is 0 to 114.

The CSBI results in three scales. The CSBI-total scale indicates the overall level of sexual behavior the child exhibits. The Developmentally Related Sexual Behavior (DRSB) scale indicates sexual behaviors that can be considered normative for the child's age and gender. The Sexual Abuse Specific Items (SASI) scale indicates sexual behaviors that can be viewed as relatively atypical for the child's age and gender. Because sexual behavior differs between ages and gender, the norms are different for the following subgroups: 2-5 years old, 6-9 years old and 10-12 years old for both boys and girls <sup>30</sup>.

Psychometric properties of the CSBI are good. The internal consistency (alpha coefficient) varies from 0.47-0.86 in normative samples <sup>18,31-33</sup>, and 0.83-0.93 in CSA samples <sup>32-34</sup>. Correlation between two tests in normative samples varies from 0.85-0.91 <sup>32,34,35</sup>. The inter-rater reliability between primary caregivers (mothers and fathers) is good ( $r=0.79$ ,  $p<0.01$ ) <sup>32</sup>. Studies on the external validity show that the CSBI is not generalizable to other countries and cultures. Significant cross-cultural differences in CSBI-scores are reported between Caucasians and African-Americans <sup>36</sup>, Swedish and Americans <sup>37</sup> or Dutch and Americans <sup>38</sup>.

In 2016, the Dutch Society of Pediatrics ('Nederlandse Vereniging voor Kindergerneeskunde') published a national guideline on diagnostics for alleged CSA <sup>39</sup>. While developing the guideline, the need for validated tools and instruments to improve diagnostics in the field of CSA was revealed, to better objectify psychosocial symptoms, such as sexual behavior in children. The CSBI could be one of the possible instruments to use in the diagnostic process. Yet, before the CSBI can be used as a diagnostic instrument in children with alleged CSA, we need to know more about the diagnostic utility when specifically used for assessing suspected CSA. For this purpose, we conducted a systematic review to assess for the diagnostic utility of the CSBI in differentiating between children with and without a history of CSA.

## Methods

### Eligibility

We included original studies if the study comprised children (2 to 12 years old), was comparative in study design and participants were allocated to a case or control group based on respectively the presence or absence of CSA history, and the study reported on the validity of the CSBI to differentiate abused from non-abused children.

Exclusion criteria for this study were specified as no original data available within an article, an article included other types of child abuse than sexual abuse, case reports, conference abstract, and editorials. There were no language restrictions.

Studies considered to best suit our research question (whether the CSBI can differentiate children with and without a history of CSA) were those performed in a clinical setting: cross-sectional studies among children with suspected CSA, comparing CSBI-scores between abused and non-abused children. These studies represent the clinical situations. Nevertheless, we did not expect to identify many studies using this study design. Therefore, we also included other case-control studies, comparing CSBI-scores between preselected abused (cases) and non-abused children (controls), though this design brought a substantial risk of bias because these studies do not resemble clinical situations.

### Search methods

We performed a literature search in Medline (PubMed) and PsychINFO on June 13, 2016. The PubMed search was questionnaire[tiab] OR child sexual behavior inventory[tiab] OR sexual behavior[tiab] AND "Child"[MESH]OR Child\* [tiab] AND sexual abuse\* [tiab]. The search in PsychINFO was child sexual behavior inventory.tiab. OR CSBI.tiab. Additional searches of reference lists from relevant articles were performed to identify studies that may have been missed.

### Data collection and analysis

#### *Selection of studies*

Selection of studies was performed by two authors independently (TFVB, VDS). After removing the duplicates, titles and abstracts were screened for eligibility. Remaining studies were read in full text. In cases where agreement could not be reached, we asked a third author (MWL) to independently assess the study and consensus was reached via discussion.

### ***Data extraction and management***

Two authors (TFVB, VDS) independently extracted the following data from the included studies: purpose of the study, study design, population characteristics, definition/identification of cases and controls, number of participants, the version of the CSBI used and outcome. We evaluated the construct validity (difference in CSBI score between abused and non-abused children, 95% Confidence Interval (CI)) and sensitivity and specificity. Discrepancies were resolved via discussion amongst research team.

### ***Methodological assessment***

The methodological quality of the studies was systematically assessed by two authors (TFVB, VDS), using a standardized checklist based on the New Castle Ottawa Scale for Case control studies <sup>40</sup> (available on request).

The following definitions for CSA were used in order of increasing risk of bias: 1. Abuse confirmed at a case conference or civil or criminal court proceeding or admitted by the perpetrator, independently witnessed or reported by the child; 2. Abuse confirmed by stated criteria including multidisciplinary assessment; 3. Abuse defined by stated criteria; 4. Abuse stated but no supporting details given; 5. Suspected abuse.

Categories for selection of non-abused children (in order of increasing risk of bias): 1. Abuse actively excluded using defined criteria; 2. Random groups; 3. No description.

## Results

### Study selection (Figure 1.)

The literature search identified 1048 unique articles, of which 28 articles were selected for full text reading. Finally, seven articles met our inclusion criteria and were included in our review<sup>20,32-34,36,41,42</sup>. No potentially relevant articles were identified by reviewing the references of these articles. Reasons for exclusion were: internal or external validity of the CSBI is not reported<sup>21,23,24,26-28,31,35,37,38,43-50</sup>; age of included sample >12 years old<sup>51</sup> and the article reported only on a selection of CSBI items<sup>25</sup>.

### Study characteristics

Study characteristics are reported in detail in Table 1. Six studies either compared CSBI-scores between abused and non-abused children<sup>33,34,41</sup>, abused and non-abused psychiatric inpatients<sup>36</sup>, or abused, non-abused and non-abused psychiatric outpatients<sup>32,42</sup>. Two studies compared CSBI-scores in a clinical setting with children with suspected CSA<sup>20,34</sup>.

Drach and colleagues (2001) used a clinical sample of children assessed for suspected CSA. In this study diagnosis of CSA was made by multidisciplinary assessment independent of CSBI-scores. Subsequently, CSBI-scores in abused and non-abused children were compared. Friedrich and colleagues (1992) added a clinical subsample of 37 children with suspected CSA to their cohort<sup>20,34</sup>. Unfortunately, data on how CSA was diagnosed or excluded was not reported for this sample.

### Risk of bias

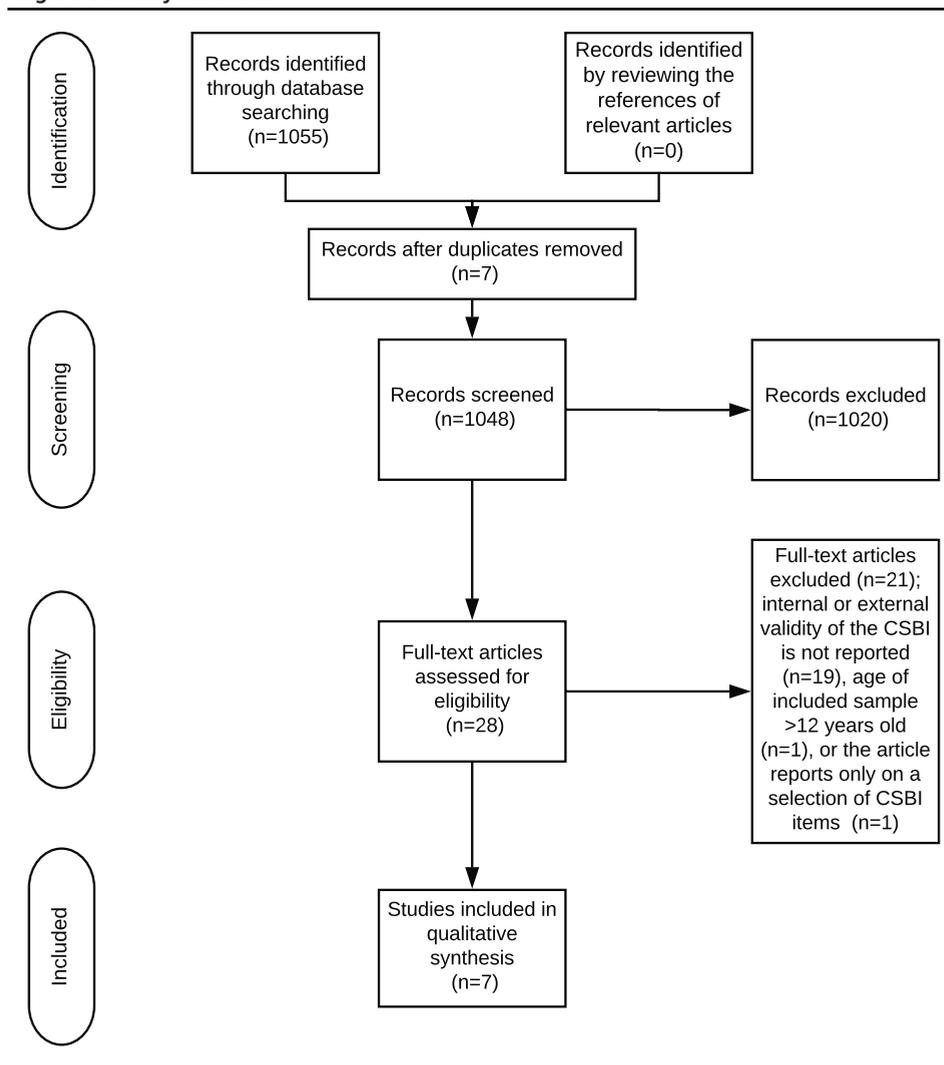
The case definition (CSA-victims) was considered adequate for all included studies<sup>20,32-34,36,41,42</sup> (Table 2). Controls were mainly derived from community samples<sup>32-34,41</sup>. Three of the seven studies scored moderate to high risk of bias due to the fact that definition of groups utilized in the studies reduced the likelihood of accurate results. In these studies CSA was inadequately excluded in the control groups (self-reports (moderate risk of bias)<sup>36</sup> or parent report (high risk of bias)<sup>32,34</sup>). In the study of Jin and colleagues, 2013, it was unclear how CSA was excluded and therefore the risk of bias is unknown<sup>33</sup>.

### Differentiating abused from non-abused by using the CSBI (Table 3.)

#### *Studies performed in case-control setting (CSA vs. no-CSA)*

Evaluating the six studies<sup>32-34,36,41,42</sup> using preselected abused and non-abused children, significant differences in CSBI-total scores were reported. Four studies found significantly higher CSBI-total scores in abused children compared to non-abused children<sup>33,34,36,42</sup>. We were not able to compare distributions because of the different CSBI versions used in these studies.

Figure 1 . Study selection



Allen and colleagues (2016) compared the prevalence of CSA among children with and without sexual behavior problems (SBP). The CSBI-total score and the CSBI-SASI subscale were used to identify children with SBP. They found a significantly higher proportion of sexual abuse among the children with SBP compared to children without SBP (21.6% ( $n=53$ ) vs. 9.1% ( $n=79$ );  $X^2 = 28.6$ ,  $p=0.001$ )<sup>41</sup>.

Comparing children with a CSA history with normative populations the sensitivity varies between 0.70-0.95<sup>32,34</sup> and the specificity varies between 0.35-0.55<sup>32,34</sup> depending on the age-range and gender. However, when comparing a sexually abused sample with a psychiatric sample (non-CSA), sensitivity ranged from 0.40-0.55 and the specificity from 0.78-0.87<sup>32</sup>.

These results suggest that the CSBI is able to distinguish abused from non-abused children. However, the acceptable sensitivity and low specificity reported in these studies suggest that, depending on age and gender, a considerable proportion of CSA cases will be missed and that among the children who are not abused more than half will be falsely labelled as victims of CSA<sup>32,34</sup>. The opposite was found when comparing sexually abused children with a non-CSA psychiatric patients sample as control group<sup>32</sup>.

### ***Studies performed in a clinical setting (children with suspected CSA)***

Two studies used a (sub)sample of children with suspected CSA<sup>20,34</sup>. Friedrich and colleagues, 1992, found significantly higher CSBI-1-total scores in abused children compared to non-abused<sup>34</sup>. They included 37 consecutive referrals to two of the seven clinical sites involved in their study, although it was not stated which ones. It was unclear whether the setting was a pediatric setting or a forensic setting. No CSBI data were used for the initial determination of CSA, however they did not report on how CSA was determined. 22 children were identified as sexually abused and their CSBI-1 total scores differed significantly compared to the non-abused children (mean CSBI-1-total score 23.3 (SD 12.8) vs. 11.5 (SD 7.5),  $p < 0.05$ ). Sensitivity and specificity were not reported<sup>34</sup>.

Drach and colleagues (2001) evaluated the CSBI-3 in 247 children evaluated for suspected CSA. The children included in this study were referred to a community-based multidisciplinary forensic child abuse evaluation center for suspected CSA. They found no significant differences for the CSBI-total score, CSBI-DRSB and CSBI-SASI between abused and non-abused children. Chi-square tests of association between the dichotomized sexual behavior variables (based on the T-scores  $T < 65$  low score,  $T > 65$  high score) and sexual abuse diagnosis were non-significant, the proportion of high scorers and low scorers was approximately equal. The CSBI-3 was found to have a sensitivity and specificity of 0.50, with a positive predictive value of 0.28 and a negative predictive value of 0.72. Authors concluded that the scores for CSBI-total, CSBI-DRSB or CSBI-SASI were not related to the diagnosis or exclusion of sexual abuse<sup>20</sup>.

## Discussion

We conducted a systematic review to assess whether the CSBI is able to distinguish sexual abuse from non-abuse in children, aged 2-12, with suspected CSA. A total of seven studies out of 1048 were included.

Three of the seven studies scored moderate to high risk of bias due to inadequate exclusion of CSA in the control groups, for example, by using parent reports to exclude (alleged) CSA <sup>32,34</sup>. The definition of groups utilized in these studies reduced the likelihood of accurate results. Researchers need to take into account that it is plausible that a parent is not aware of any abuse, or that the parent who answers the questionnaire is the abuser itself and will not report honestly. One study did not report how CSA was excluded <sup>33</sup>, logically introducing a risk of bias.

The included studies were difficult to compare because of the different versions of the CSBI that were used. Ideally, only studies using the most recent CSBI version (CSBI-3) would be included. Provided we had done that, this would have resulted in only three studies to include in our review <sup>20,32,33</sup>.

Based on the available evidence, the validity of the CSBI as a diagnostic instrument in children with suspected CSA remains unclear. In and of itself, the CSBI seems to be a reliable questionnaire to measure sexual behavior in children. The CSBI is known to have a good internal consistency <sup>18,31-34</sup>, test-retest reliability <sup>32,34,35</sup> and inter-rater reliability between primary caregivers <sup>32</sup>. However, the CSBI is not generalizable to other countries and cultures as several studies comparing CSBI-scores between normative populations from different countries or cultural groups within one country show significant cross-cultural differences in CSBI-scores <sup>36,37,50</sup>. Therefore, it is necessary for every country to generate their own normative data.

Our results on sensitivity and specificity show that a considerable proportion of CSA cases will be missed and that among the children who are not abused more than half will be falsely labelled as victims of CSA <sup>32,34</sup>. The opposite was found when comparing sexually abused children with a non-CSA psychiatric patients sample as control group <sup>32</sup>. Probably psychiatric patients display more atypical sexual behavior without a history of CSA.

The determination of the CSBI's accuracy in distinguishing children with a history of CSA from those without such a history requires a different methodology. Namely, there is a need for research using a sample of children with suspected CSA. We only found two studies using this study method <sup>20,34</sup>.

There are several explanations for the limited ability of CSBI to distinguish abused from non-abused children in children with alleged CSA. First, not all sexually abused children display age-inappropriate sexual behavior. A meta-analysis of 13 studies (including studies on preschool children) reports that only one third of the sexually abused children had sexual behavior problems<sup>12</sup>, meaning that two-thirds of the abused children did not display sexual behavior problems.

Second, although atypical sexual behavior in children can point to CSA<sup>20-22</sup>, there is not one specific sexual behavior that is indicative for CSA<sup>52</sup>. Other explanations for the behavior are possible, for instance physical abuse, family violence and other types of maltreatment<sup>17,19,52,53</sup>. As far as we know there is no specific pattern of psychosocial symptoms (including sexual behavior) that indicates CSA<sup>12,54,55</sup>. In about 30% of the children, no psychosocial signs are apparent at all<sup>56-58</sup>. This might be due to specific aspects of the abuse (nature, frequency, duration, severity, and relationship with perpetrator), environmental factors (how safe is the child?), and the child's character<sup>54</sup>.

Third, it is likely that there are several cases of suspected CSA in whom the reason for the suspicion of CSA is based on observed atypical sexual behavior. Possibly the CSBI-scores of the entire sample of children with suspected CSA were higher on average compared to the normative population, as was also reported in psychiatric control samples<sup>32</sup>. This is an important point – there could be circularity that is impacting the accuracy of the CSBI in this context. When atypical sexual behavior is the reason for suspecting CSA this may lead to false positive accusations, as there are numerous other explanations for the displayed behavior<sup>17,19,52,53</sup>.

The so called golden standard to ascertain CSA is forensic evidence of CSA (for example DNA) or CSA recorded on child pornographic images (photographs or videos). In most cases this kind of evidence for CSA is lacking. The second-best reference standard is therefore a multidisciplinary assessment combining forensic, pediatric and psychosocial evaluation of a case. Clinicians need to keep in mind that we do not exactly know the diagnostic value of this approach as it is practically impossible and unethical to investigate.

### **Strengths and limitations**

We performed a systematic review on the CSBI as a diagnostic instrument for CSA. Multiple databases, two independent reviewers, and clear in- and exclusion criteria were used. Data was extracted systematically and studies were critically assessed on risk of bias. Nonetheless, we must acknowledge some substantial limitations.

We chose not to exclude studies based on the CSBI-version used, causing heterogeneity between studies. Secondly the number of included studies was small. Therefore, we were unable to combine results empirically in a meta-analysis. Nevertheless, we believe we were able to formulate clear clinical implications.

### **Clinical implications and future research**

We identified only one study reporting on the diagnostic validity of the CSBI-3 in children with suspected CSA<sup>20</sup>. They reported a sensitivity and specificity both too weak to warrant use of the CSBI as an instrument to differentiate between children with and without a history of CSA. More studies are needed to confirm or reject our findings.

Based on what was published on the reliability of the CSBI in general, the CSBI seems to be a reliable instrument to objectively measure a child's sexual behavior. However, the CSBI measures sexual behavior observed by a caregiver who answers the questionnaire. The CSBI relies on what is observed (and reported) by the caregiver and is therefore not fully objective. Perhaps assessing sexual knowledge instead of sexual behavior is more promising in discriminating CSA from non-CSA children. It is known that most young children only possess certain basic knowledge on genital differences, gender identity, sexual body parts and (non-sexual) functions of the genitals. Their knowledge on pregnancy, birth, reproduction and adult sexual behavior is very limited<sup>17</sup>. In general, the younger the child, the less he or she knows<sup>59</sup>. Sexual knowledge can be measured more objectively compared to sexual behavior. Sexual knowledge is also measured in the CSBI but not extensively.

Knowledge of sexuality is likely to be less dependent on abuse-related variables<sup>17</sup>. Although, there could be a multitude of reasons why sexual knowledge differs between children, such as differences in parental-provided sex education, exposure to sexual-related information from peers and siblings and exposure to sexual media. Sexual knowledge can derive from several sources, just as sexual behaviors can. These limitations would limit the conclusions that could be drawn from an assessment indicating advanced sexual knowledge. Despite the limitations, future research should focus more on instruments to measure children's sexual knowledge and whether sexual knowledge can be a more discriminating and objective measure.

## Conclusion

Research on the diagnostic utility of the CSBI among children with suspected CSA is limited and shows disappointing results. Until more research is done, the CSBI can be used to measure sexual behavior but should not be used on its own to differentiate between children with and without a history of CSA.

## Abbreviations

CBCL	Child Behavior Checklist
CI	Confidence interval
CSA	Child sexual abuse
CSBI	Child Sexual Behavior Inventory
DRSB	Developmentally Related Sexual Behavior
SASI	Sexual Abuse Specific Items
SBP	Sexual behavior problems

**Table 1. Study Characteristics**

<b>Study</b>	<b>CSBI - version</b>	<b>Research question</b>
<b>Clinical setting (suspected CSA)</b>		
Drach, 2001	CSBI-3, 38-items, 1997	Can sexual behavior problems be used as a diagnostic indicator of sexual abuse?
<b>Clinical &amp; Case-control setting</b>		
Friedrich, 1992	CSBI-1, 35 items, 1992	Is sexual behavior related to CSA? Can the CSBI differentiate abused from non-abused?
<b>Case-control setting</b>		
Allen, 2016	CSBI-2, used 26 of 35 items, 1997	Is sexual abuse more prevalent among children displaying sexual behavior problems (SBP)?
Cosentino, 1995	CSBI 48 items, 1986	Can differences in sexual behavior and psychopathology symptoms be demonstrated in abused and non-abused?
Friedrich, 2001	CSBI-3, 38 items, 1997	What is the reliability and validity of the CSBI, by comparing scores in normative, psychiatric and abused children?
Jin, 2013	Korean version of CSBI-3, 38 items, 1997	What is the reliability and validity of the Korean version of the CSBI in Korean children?
Wherry, 1995	CSBI - 43 items, 1991	What are the differences of CSBI-scores between CSA and non-CSA psychiatric inpatients?

SD = standard deviation

\* definition: Strong evidence CSA: the medical findings, interview findings, and historical information taken separately or together provide clear support for an abuse diagnosis;

Study Population		
N	Mean age in years (SD)	% female
247 Strong evidence CSA <i>n</i> :30 Moderate evidence CSA <i>n</i> :28 No evidence CSA <i>n</i> :151 Unclear <i>n</i> :38*	5.9 (2.5)	62%
37 (Clinical sample) CSA: <i>n</i> :22 non-CSA: <i>n</i> :8 unclear: <i>n</i> :7  1156 (Non-clinical) CSA <i>n</i> :276 non-CSA <i>n</i> :880#	range 2-5  CSA 6.3 non-CSA 7.1	68%
1112 CSA <i>n</i> = 132 Physical abuse <i>n</i> = 304 Neglect <i>n</i> = 610 Emotional maltreatment <i>n</i> = 208 No child maltreatment <i>n</i> :422	8	52%
60 CSA <i>n</i> :20 non-CSA <i>n</i> :20 psychiatric non-CSA <i>n</i> :20	CSA 9.6 non-CSA 10.0 psychiatric-non-CSA 9.6	100%
2311 CSA <i>n</i> :620 non-CSA <i>n</i> :1114 psychiatric non-CSA <i>n</i> :577	CSA 7.3 non-CSA 6.0 psychiatric 7.5	51%
280 CSA <i>n</i> :122 non-CSA <i>n</i> :158	CSA 9.11 Non-CSA 9.47	65%
23 CSA (psychiatric) <i>n</i> :8 non-CSA (psychiatric) <i>n</i> :15	9.8	0%

Moderate evidence CSA: the three sources of data provide less clear, but nevertheless convincing evidence supporting a diagnosis of abuse; Unclear: Don't know if CSA occurred: the team cannot determine based on the available data whether or not abuse occurred.

# from <sup>35</sup>.

**Table 2. Methodological assessment of the quality of the studies**

<b>Study</b>	<b>Is the CSA-victim definition adequate?</b> A= Abuse confirmed at case conference or civil or criminal court proceeding or admitter by perpetrator, independently witnessed, reported by the child B= abuse confirmed by stated criteria including multidisciplinary assessment	<b>Representativeness of the CSA-victims?</b> A= consecutive or obviously representative series of cases B= potential for selection biases or not stated	<b>Is the non-CSA definition adequate?</b> A= Actively excluded abused from non-abused used defined criteria B= Random groups
Drach, 2001	B	A	A
Friedrich, 1992	A	B	A
Allen, 2016	A	A	A
Cosentino, 1995	A	A	A

Selection of non-CSA?	Definition of CSA	Definition of non-CSA
C= community H= hospital S= same sample	<p>A community-based multidisciplinary forensic child abuse evaluation center (by forensic pediatrician or nurse practitioner, and an interview of the child by a masters-level forensic social worker). All diagnoses are made in a team discussion format.</p> <p>1.Strong evidence of CSA: the medical findings, interview findings, and historical information taken separately or together provide clear support for an abuse diagnosis.</p> <p>2. Moderate evidence of CSA: the three sources of data provide less clear, but nevertheless convincing evidence supporting a diagnosis of abuse.</p> <p>3. Don't know if CSA occurred: the team cannot determine based on the available data whether or not abuse occurred.</p>	<p>No evidence of abuse: the available data do not support an abuse diagnosis.</p>
C	<p>Confirmed history of CSA, in previous 12 months, by social services or CPS.</p> <p>Clinical sample with suspected CSA, CSBI data were not used for the initial determination of CSA. No data on how CSA was determined.</p>	<p>Parents report no (alleged) CSA (same normative sample as Friedrich 1991 <sup>35</sup>).</p>
C	<p>CPS files between birth and 8 years of age, contained CSA allegations.</p>	<p>No CPS report on CSA allegations.</p>
C&H	<p>At least one documented CSA experience involving oral, anal or vaginal intercourse or genital fondling with a person who was at least 5 year older by CPS.</p>	<p>Psychiatric control group - girls, currently receiving psychiatric treatment, between age 6-12 without documented history of CSA by CPS.</p> <p>Non-psychiatric control group - no (previous) psychiatric outpatient or inpatient contact, no documented history of CSA by CPS.</p>

Table 2. Continued

Study	Is the CSA-victim definition adequate?	Representativeness of the CSA-victims?	Is the non-CSA definition adequate?
	A= Abuse confirmed at case conference or civil or criminal court proceeding or admitter by perpetrator, independently witnessed, reported by the child B= abuse confirmed by stated criteria including multidisciplinary assessment	A= consecutive or obviously representative series of cases B= potential for selection biases or not stated	A= Actively excluded abused from non-abused used defined criteria B= Random groups
Friedrich, 2001	A	A	A
Jin, 2013	A	A	B
Wherry, 1995	A	B	A

Selection of non-CSA?	Definition of CSA	Definition of non-CSA
C= community H= hospital S= same sample	Confirmed history of CSA in past 12 months, confirmed by social services or CPS, and clinic evaluation; confirmation through child's statements, perpetrator confession, medical evidence and/or eye witness testimony.	Parents report no (alleged) CSA.
C	Confirmed history of CSA by clinical evaluation by psychiatrists and forensic nurses, the child's statements, perpetrator confession, medical evidence, and/or eyewitness testimony.	Not stated.
H	Traumatic Antecedents Scale (TAS) = structured clinical interview; CSA was defined as completed or attempted contact by an adult or older sibling and included exhibitionism, fondling of the child, forced fondling of the perpetrator, or intercourse.	Negative TAS for CSA.

**Table 3. Results**

<b>Study</b>		<b>Mean CSBI total (SD)</b>	<b>Mean CSBI-DRSB (SD)</b>	
<b>Clinical samples (suspected CSA)</b>				
Drach, 2001	Total sample (n:247)	68.5 (22.4)	60.7 (17.4)	
	Strong evidence CSA (n:30)	71.1 (24.3)	57.0 (14.3)	
	Moderate evidence CSA (n:28)	66.2 (19.0)	59.3 (17.6)	
	No evidence CSA (n:151)	68.8 (22.7)	61.9 (18.1)	
	Unclear (n:38)	67.3 (22.6)	59.4 (16.6)	
Friedrich, 1992	Clinical sample	CSA (n:22)	23.3 (12.8)	-
		Non-CSA (n:8)	11.5 (7.5)	
		Unclear (n:7)	-	
<b>Non-clinical samples</b>				
Friedrich, 1992	Normative non-CSA (n:880)	Boys 2-6 years	10.60 (7.64)	-
		Girls 2-6 years	11.72 (8.32)	
		Boys 7-12 years	5.56 (5.95)	
		Girls 7-12 years	5.35 (6.14)	
	CSA (n:276)	Boys 2-6 years	20.51 (18.18)	
		Girls 2-6 years	21.19 (18.07)	
		Boys 7-12 years	16.69 (15.37)	
		Girls 7-12 years	11.19 (12.92)	
Allen, 2016	Sexual behavior problems (SBP) (n:245)	8.38 (5.83)	-	
	No SBP (n:867)	1.26 (1.53)	-	
Cosentino, 1995	CSA (n:20)	30.6 (20.3)	-	
	non-CSA (n:20)	10.8 (9.6)		
	psychiatric non-CSA (n:20)	15.2 (9.9)		
Friedrich, 2001	CSA n:620	13.5 (15.2)	-	
	non-CSA n:1114	3.7 (4.5)		
	psychiatric non-CSA n:577	4.8 (7.1)		
Jin, 2013	CSA (n:122)	4.36 (6.47)	-	
	non-CSA (n:158)	0.43 (1.31)		
Wherry, 1995	CSA (psychiatric) (n:8)	13.7 (-)	-	
	non-CSA (psychiatric) (n:15)	4.6 (-)		

\* depending on age and gender

CSBI-SASI	Association with CSA	Sensitivity Specificity
70.7 (24.0)	-	0.50 0.50
73.0 (24.7)		
71.3 (21.9)		
70.3 (24.0)		
70.2 (25.8)		
-	p<0.05	-
-		Boys 2-6 years: 0.92 0.38 Girls 2-6 years: 0.85 0.35 Boys 7-12: 0.90 0.48 Girls 7-12: 0.70 0.55
6.05 (4.1)	CSA-allegations SBP 21.6% vs. No SBP 9.1%, p<0.001	-
0.93 (1.17)		
-	p≤0.05	-
-	P 0.00001	CSA vs non-CSA: 0.88-0.95* 0.40-0.55* CSA vs psychiatric non-CSA: 0.40-0.55* 0.78-0.87*
-	P<0.001	-
-	p = .06	-

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