Development of a questionnaire for the assessment of sexual abuse in children and estimation of its discriminant validity: a case-control study

Edila Pizzato Salvagni,[1] Mário Bernardes Wagner[2]

Abstract

Objectives: To develop an instrument to determine the probability of child sexual abuse and to estimate the questionnaire's discriminant validity.

Methods: Case-control study of 201 children seen at pediatric clinics and referral centers for the victims of sexual violence, between March and November 2004. Cases comprised children who had either been reported or suspected of being sexually abused and controls comprised children with no such suspicion. We applied a questionnaire to a parent or guardian of each child that consisted of 18 items, each with five Likert scale responses, dealing with the behavior and physical and emotional symptoms exhibited by the children. We excluded nine children for lack of sphincter control. One question was discarded since very few people replied to it. We evaluated the discriminant validity and internal consistency of the items, calculating correlation coefficients (Pearson, Spearman and Goodman-Kruskal), Cronbach's a coefficient and area under the ROC curve. We calculated likelihood ratios and positive predictive values for the five items on the questionnaire that performed best.

Results: The questionnaire comprises the five items that best discriminate sexually abused children from non-abused children in two contexts. The score resulting from the sum of responses weighted at 0 to 4 points (overall amplitude of 0 to 20) indicates the post-test probability of sexual abuse by means of the application of Bayes theorem (likelihood ratios).

Conclusions: The instrument is easy to apply and helps in the identification of sexual abuse victims. A cutoff point was defined to indicate the probability of sexual abuse, which can be very useful to guide management of children.

J Pediatr (Rio J). 2006;82(6):431-6: Domestic violence, child victimization, sexual violence.

Introduction

Child sexual abuse is defined as any sexual activity involving a child who is unable to give his/her consent, including vaginal/anal intercourse, genital-oral contact, genital-genital contact, stroking/petting of intimate areas, masturbation and exposure to pornography or to adults having sexual relations, and is considered by the World Health Organization (WHO) to be one of the largest public health problems worldwide.[1] The WHO estimates that 40 million children aged 0 to 14 years suffer abuse and negligence globally and that the prevalence of sexual abuse is from 7 to 34% among girls and from 3 to 29% among boys.[2] Records of the Hospital de Clínicas de Porto Alegre (HCPA) Child Protection Program (which provides care to HCPA pediatric patients suspected of having

suffered negligence or physical, emotional or sexual violence) show that 29% of referrals between 1999 and 2003 were for sexual abuse, 36% of girls and 20% of boys.

Data from the Rio Grande do Sul (Brazil) State Department for Children and Adolescents (Departamento Estadual da Criança e do Adolescente, DECA), which deals with victims of violence, indicate that between January 2002 and July 2004, 3,688 children were victims of violence, of whom 2,377 suffered sexual violence.[3] These data, while shocking, are far from reflecting the true situation, since most cases remain hidden as a result of accommodation syndrome and are not reported.[4,5]

When dealing with child victims of sexual abuse, pediatricians are faced with a problem with enormous magnitude and which is a diagnostic challenge. The literature suggests that only in a minority of cases does physical examination lead with confidence to a definitive finding of sexual abuse. Even in confirmed cases, physical findings of sexual abuse are surprisingly uncommon. Studies have demonstrated that medical evaluation does not reveal specific signs in 50 to 90% of girls who have been confirmed as victims of sexual abuse.[6] Some forms of abuse do not cause physical injuries and in those circumstances it is not expected that any evidence of this nature be detected.[7-9]

Sexual abuse is not merely a diagnosis. It is an event or a series of events that take place within a relationship involving the child. Nevertheless, the physical or psychological consequences can be "diagnosed" and considered consistent with sexual abuse.[10] In such circumstances it is sometimes necessary to determine the possibility that sexual abuse has occurred on the basis of the behavior and emotional state of the child.[11,12]

In this situation, pediatricians often need to make extremely subtle distinctions between what is normal and abnormal, for which they require instruments that can aid them to recognize these differences objectively.[13] Few questionnaires exist that have been designed to assess the probability of child sexual abuse.[14] We therefore developed and evaluated the discriminant validity of a questionnaire covering behavior and physical and emotional symptoms to aid in the diagnosis of child sexual abuse.

Methods

A case-control study was carried out with 201 children aged 2 to 12 years of age who had attended consultations at pediatric clinics and referral centers for victims of sexual violence from March to November, 2004. Nine of the 201 children initially enrolled were excluded due to lack of sphincter control (anal and vesical), with 192 children completing the study.

Cases comprised children suspected of having suffered sexual abuse (sexually transmitted diseases) or who were reported to have suffered sexual abuse (including rape and indecent assault). These children were referred to the Child Protection Program at the HCPA and the Infant-Youth Care Referral Center (Centro de Referência em Atendimento Infanto-Juvenil, CRAI) at Hospital Presidente Vargas, Porto Alegre (Brazil). Clinical examinations and laboratory tests were performed for all of the children in this group. Data on the abuse itself were also collected.

Controls were children receiving routine care at the pediatric outpatient clinics at the HCPA and the Hospital Materno-Infantil Presidente Vargas. Children were excluded from this group if their complaint involved the genitalia.

We developed an instrument entitled the "Questionnaire for the assessment of the behavior and physical and emotional symptoms of children aged 2 to 12 years," comprising 18 items, two of which referred to the children's parents. The questionnaire was designed on the basis of items cited in the literature and focuses on signs of generalized alterations (behavioral and emotional changes, problems at school and with sleeping, fear, crying easily and changed play habits), physical signs and symptoms (genital/anal injuries, enuresis and encopresis) and sexualization symptoms (abnormal interest in sex, excessive masturbation and sexual aggression).

Introductory items related to the child (age, sex and education) and family structure. The items making up the questionnaire itself were related to the areas of behavior and of physical and emotional symptoms. Each item had five Likert scale responses (*no*, *I don't think so*, *perhaps*, *I think so*, and *yes*). The questionnaires were applied by the author in interviews with one parent or guardian of each child, without the child being present.[15] When interviewing for the case group, care was taken that the person interviewed was not suspected of being responsible for the abuse.

In applying the questionnaire, all items were read out exactly as printed. If interviewees gave responses other than those on the scale, the available options were read once more and the interviewee requested to choose that which best matched.

In the absence of a gold standard for diagnosing sexual abuse, we employed the criteria of discriminant validity to validate the questionnaire. We examined the capacity of the questionnaire to discriminate between two extreme groups of patients (cases and controls), who, we postulated, would behave differently with respect to the object of study. We also evaluated the internal consistency of items using a sequential process involving: (a) calculation of correlation coefficients (Pearson, Spearman and Goodman-Kruskal) for each item and overall; (b) calculation of Cronbach's α coefficient for the questionnaire; (c) recalculation of Cronbach's α coefficient with the removal and addition of each item; and (d) calculation of the area

under the ROC curve (receiver operator characteristics) for the permutations produced in step (c). This process led to the creation of a second questionnaire.

With the second questionnaire, we calculated the likelihood ratio (LR) to five levels, ordered according to intensity of the symptoms presented. Starting from two distinct values for presumed prevalence of sexual abuse (prior probability) and combining them with the LR obtained previously, we were able to estimate the probability of sexual abuse according to the score produced by the questionnaire. We defined LR > 1 as associated with sexual abuse, and LR < 1 as not associated. Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 12.0.

In order to make the use of the questionnaire viable in pediatric clinical practice, we assumed two scenarios:

1. Children seen at a pediatric clinic with a 5% presumed prevalence of sexual abuse.

2. Children seen at referral centers for victims of sexual violence with a 40% presumed prevalence of sexual abuse.

Thus, in a routine consultation at a pediatric clinic, the assumption of a 5% prevalence (prior probability) of sexual abuse, together with the sum of points scored for the child on the questionnaire, will indicate the conditional probability, or positive predictive value (PPV), using Bayes theorem (using the LR). In the same manner, at a referral center for the victims of sexual violence, to which children are sent when suspected of having suffered sexual abuse or as a result of reported sexual abuse, the assumed prevalence will be very much greater, at 40%. When the questionnaire is applied, the sum of the points scored, by means of the same theorem, will indicate the conditional probability (PPV).

Ethical considerations

The study was approved by the Research Ethics Committees at the hospitals where it was carried out. Information was obtained from parents or guardians, after informed consent had been signed.

Results

One hundred and ninety-two of the original total of 201 children participated in the study, divided between the case group (n = 97) and the control group (n = 95). In the group of abused children, 63% were girls. Most questionnaires in this group were answered by the mother (81.2%). The most significant abuse occurred between 6 and 10 years of age (65%).

In 70% of cases abuse was intrafamily, with the perpetrator being a family member or someone who lives with the child. Children who suffered extrafamily abuse

had been victimized by teachers, neighbors and, in some cases, strangers.

In most cases the children themselves reported the abuse (83%). The majority of the abusive experiences reported were in the form of physical contact, with manipulation and genital-anal contact standing out.

Physical examination failed to identify physical signs of abuse in 80% of children in the sexual abuse group. It should be pointed out, however, that the item on genital-anal injuries referred both to ongoing situations and occurrences prior to application of the instrument. Therefore, positive responses to that item on the questionnaire do not imply that injuries were detected on examination. Children who had already been examined at another service (2%) were not subjected to examination again. Examination of the genital-anal region was not carried out (4%) if children did not allow it, in order to avoid re-victimization. In these cases the results from forensic medical examinations were used instead. Most of the laboratory tests for sexually transmitted diseases (syphilis, HIV, hepatitis, chlamydia, trichomoniasis and gonorrhea) in children referred for assessment were normal (86%).

One of the 18 items initially included was eliminated because so few people replied to it. The item-total score correlation, Cronbach's α coefficient and Goodman-Kruskal Gamma coefficient were obtained for 17 items. Subsequently, using Cronbach's coefficient and the ROC curve, we obtained the following results: for the 17 items, $\alpha = 0.78$ and ROC curve area = 0.88; for the best 10 items, $\alpha = 0.75$ and the ROC curve area = 0.88; and for the five best, $\alpha = 0.71$ and ROC curve area = 0.85. Considering it preferable to apply as short a questionnaire as possible, we opted to use those items that best discriminated the children in the case group from those in the control group (Figure 1).

The five items selected (Figure 2) represent those with the best performance according to the statistics employed (Cronbach's, the Goodman-Kruskal Gamma and area under the ROC curve). Each child was scored according to the sum of all items, each receiving 0 to 4 points, according to the Likert scale, resulting in a total with amplitude of 0 to 20.

The pre-test probability was adjusted based on the location of interview (pediatric clinic or referral center for child sexual violence victims) and on the pre-calculated LR for each of the five score ranges (Table 1). Thus, children seen at a pediatric clinic with a 3 to 5 questionnaire score (LR = 0.78 and PPV = 3.9) would have their pre-test probability practically unaltered; those scoring from 6 to 9 points (LR = 2.39 and PPV = 11.2) would exhibit a mild increase; those at 10 to 13 points (LR = 6.86 and PPV = 26.5) a moderate increase; and those with 14 or more points (LR = 23.51 and PPV = 55.3) a very substantial
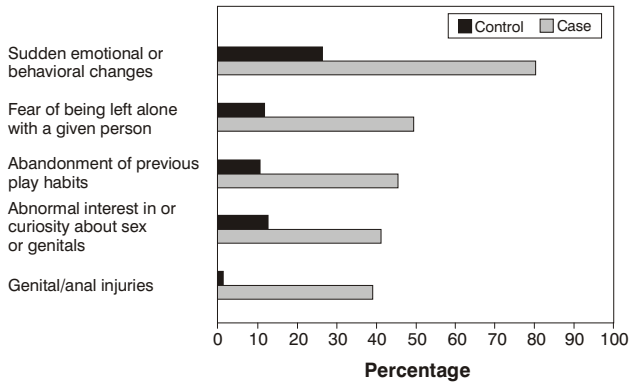
Figure 1 - Percentage of responses to short questionnaire for cases and controls

increase. The scores of children seen at referral centers for child sexual violence victims can be interpreted in a similar manner.

Discussion

The investigation of children suspected of being the victims of sexual abuse is extremely complex and challenging. The literature indicates that it is insufficient to base diagnosis of sexual abuse solely on the physical examination. This was confirmed in the present study, in which most children (80%) did not present any abnormal findings on physical examination.[1,8,16] Additionally, the laboratory tests added little, with normal results in 86% of cases. Physical examinations, therefore, should be

interpreted within the context of how a particular child has been abused, of the child's perception of that abuse and of the process through which abuse was disclosed.[17] When sexual abuse is disclosed by child victims themselves, is discovered by other people[18,19] or by clinicians who treat them, it is recommended that other children in the same family environment be investigated too,[20,21] primarily because 70% of abuse is committed by family members or someone who frequents the family home.[5,7,22-24]

We emphasize that, in the present study, parents of children in the case group were more concerned and sensitized to the behavior, signs and symptoms exhibited by their children than were the parents of the children selected for the control group when attending routine consultations. This could be considered a possible bias to their responses to the questionnaire. In order to minimize this, we informed them that the questionnaire dealt with the behavior and physical and emotional symptoms of children in general. The questions were written in a clear and unambiguous manner, using language understandable by the study population.

A short questionnaire allied to history related by parents or guardians can be an extremely useful tool for assessing children. This study allowed us to develop and evaluate the discriminant validity of a questionnaire, comprising five items, for the assessment of child sexual abuse.[15] Cronbach's α for the questionnaire's internal consistency was 0.71, which is considered satisfactory for comparing groups.[25] The items that best discriminated the children in the case group from those in the control group were: sudden emotional or behavioral shifts (80.4% of the cases vs. 26.3% of the controls),[24,26] fear of being alone with a given person (49.5% of cases), abnormal

Instructions: Have you observed your child exhibit any of the following?	No (0)	I don't think so (1)	Perhaps (2)	I think so (3)	Yes (4)	Points
1. Abnormal interest in or curiosity about sex or genitals						
2. Fear of being left alone with a given person						
3. Sudden emotional or behavioral changes						
4. Abandonment of previous play habits						
5. Genital/anal injuries						
Total						

Figure 2 - Short questionnaire on signs and symptoms associated with sexual abuse

Table 1 - Probability of sexual abuse, according to questionnaire score, for pediatric outpatient clinics or referral centers for child victims of sexual violence

Points	LR (95%CI)	Clinic (PP = 5%)	Referral center (PP = 40%)
0-2	0.17 (0.09-0.32)	0.9 (0.5-1.7)	10.2 (5.7-17.6)
3-5	0.78 (0.47-1.31)	3.9 (2.4-6.5)	34.2 (23.9-46.6)
6-9	2.39 (1.16-4.93)	11.2 (5.8-20.6)	61.4 (43.6-76.7)
10-13	6.86 (2.11-22.23)	26.5 (10.0-53.9)	81.8 (58.4-93.7)
≥ 14	23.51 (3.24-170.29)	55.3 (14.6-90.0)	94.0 (68.4-99.1)

95%CI = 95% confidence interval; LR = likelihood ratio; PPV = positive predictive value; PP = pre-test probability or prevalence.

interest in sex or genitals (41.2% of cases vs. 12.6% of controls),[10,27] changes to play habits (45.4% in the case group vs. 10.5% in the control group)[11,12] and genital-anal injuries (39.2% of cases vs. 1% of controls). The questionnaire, therefore, demonstrated evidence of discriminant validity, since the group of abused children returned different results from the children in the group without sexual abuse.[15]

For this questionnaire to be applied in practice, the prevalence of sexual abuse is a powerful determinant. When we estimate a 5% prevalence for children seen at a routine pediatric consultation, even though history may indicate the possibility that that child is suffering sexual abuse, we can, by applying the questionnaire, modify this probability (to reassuring levels or otherwise). In the case of a child seen at a referral center for the victims of sexual violence, where prevalence is estimated at the much higher level of 40%, this too can be modified after the questionnaire is applied, to figures that may or may not increase the estimated probability of sexual abuse. Therefore, the interpretation of this questionnaire is highly dependent on the location of application, or, in other words, it is of fundamental importance to contextualize the results.

Even in these two extreme situations, there are intermediate possibilities that call for different conduct. Considering that these two situations occur in clinical practice, we may infer that prevalence exerts great influence over the diagnostic process.

At a pediatric clinic, reports of generalized alterations (sleep disorders, enuresis, encopresis or phobias) and complaints related to the genitalia, allied to abnormally sexualized behavior, should warn of the possibility of sexual abuse.[27,28] In this context children scoring 3 to 5 points would be classified, a priori, as not being abused, with children with intermediate scores from 6 to 9 or 10 to 13 requiring close observation. Children scoring 14 or more points, however, would possibly be suffering sexual abuse and require multidisciplinary supplementary assessment in order that legal measures can be applied with confidence.[26] Nevertheless, even in such cases as these it would be necessary to first detail the family dynamics and rule out other diagnostic possibilities such as physical and emotional abuse, which could be responsible for some of these manifestations[16] and should be resolved with the appropriate management and guidance.

At referral centers for sexual violence victims, the same alterations, when combined with report or suspicion of sexual abuse, call for different conduct. In this context, children scoring 2 points or less would have strong evidence to be classified a priori as not being abused, although close observation would still be warranted due to the prior report or suspicion of sexual abuse. Those children scoring 3 to 14 (or more) points present strong evidence of sexual abuse, imposing an immediate requirement for multidisciplinary assessment in order to confirm this and, if necessary, indicate immediate legal protective measures.

There are limitations to this study that should be taken into account when its results are assessed or extrapolated. We defined children referred to a referral center due to suspicion or revelation of sexual abuse as cases and children attending routine pediatric consultations as controls.[29] This being so, it is possible that children who had been victims of sexual violence, but presented for routine consultations at a pediatric clinic were enrolled as

controls. Equally, children seen at referral centers for child victims of sexual violence due to initial suspicion of abuse may have been enrolled as cases without having actually been abused. A problematic issue arises here, in that there is no gold standard for sexual abuse that is capable of defining these groups with certainty. Perhaps, that which most approximates to such a standard is long-term follow-up of victims.[30]

Further studies, with larger samples of children, are nevertheless necessary to enable us to better estimate LR and PPV and to better evaluate the possibility of using the questionnaire proposed here. It is always worth remembering the need for multidisciplinary assessment, with input from law, social service, psychology and psychiatry professionals.

References

1. Johnson CF. Abuse and neglect of children. In: Behrman RE, Kliegman RM, Jenson HB. Nelson textbook of pediatrics. 17th ed. Pennsylvania: Elsevier Science; 2004. p. 121-32.
2. Information Office Press Release, WHO Recognizes Child Abuse as a Major Public Health Problem. WHO/20 8 April 1999. http://www.who.org. Access: 23/05/2005.
3. Brasil. Secretaria da Justiça e da Segurança do Rio Grande do Sul. DECA - Departamento Estadual da Criança e do Adolescente da Polícia Civil.. Relatório anual de 2002/2003/2004.
4. Neto DB. Abuso sexual na infância. In: Lippi JRS, ed. Abuso e negligência na infância: prevenção e direitos. Rio de Janeiro: Editora Científica Nacional; 1990. p. 101-11.
5. Braun S. A violência sexual infantil na família: do silêncio à revelação do segredo. Porto Alegre: AGE; 2002.
6. Muran DJ. Mini-review: the medical evaluation in cases of child sexual abuse. J Pediatr Adolesc Gynecol. 2001;14:55-64.
7. Fernández JP, Espana AR, Masmitja LC, Rafat P, Fanes MI, Marill JB. Abuso sexual: experiencia en una unidad funcional de abusos a menores. An Esp Pediatr. 2001;54:243-50.
8. Dubé R, Hébert M. Sexual abuse of children under 12 years of age: a review of 511 cases. Child Abuse Negl. 1988;12:321-30.
9. Johnson CF. Child sexual abuse. Lancet . 2004;364:462-70.
10. Babiker G, Herbert M. The role of psychological instruments in the assessment of sexual child abuse. Child Abuse Rev. 1996;5:239-51.
11. Hornor G. Sexual behavior in children: normal or not? J Pediatr Health Care. 2004;18:57-64.
12. Wells R, McCann J, Adams J, Voris J, Ensign J. Emotional, behavioral and physical symptoms reported by parents of sexually abused, nonabused, and allegedly abused prepubescent females. Child Abuse Negl. 1995;19:155-63.
13. Brilleslijper-Kater SN, Friedrich WN, Corwin DL. Sexual knowledge and emotional reaction as indicators of sexual abuse in young children: theory and research challenges. Child Abuse Negl. 2004;28:1007-17.
14. Wells R, McCann J, Adams J, Voris J, Dahl B. A validational study of the Structured Interview of Symptoms Associated with Sexual Abuse (SASA) using three samples of sexually abused, allegedly abused, and nonabused boys. Child Abuse Negl. 1997;21:1159-67.
15. Streiner DL, Norman G. Health measurement scales: a practical guide to their development and use. New York: Oxford University Press Inc.; 1995.
16. Guidelines for the evaluation of sexual abuse of children: subject review. American Academy of Pediatrics Committee on Child Abuse and Neglect. Pediatrics. 1999;103:186-91.
17. Heger A, Ticson L, Velasquez O, Bernier R. Children referred for possible sexual abuse: medical findings in 2384 children. Child Abuse Negl. 2002;26:645-59.
18. Rey C, Salomon J, Herzhaft-Bouccara J, Bohu D, Messerschmitt P. Examen des victims d'agression sexuelle de moins de cinq ans. Arch Pediatr. 2005;12:664-5.
19. Ullman SE, Filipas HH. Gender differences in social reactions to abuse disclosures, post-abuse coping, and PTSD of child sexual abuse survivors. Child Abuse Negl. 2005;29:767-82.
20. Furniss T. Abuso sexual da criança: uma abordagem multidisciplinar, manejo, terapia e intervenção legal integrados. Porto Alegre: Artes Médicas; 1993.
21. Smith DW, Letourneau EJ, Saunders BE, Kilpatrick DG, Resnick HS, Best CL. Delay in disclosure of childhood rape: results from a national survey. Child Abuse Negl. 2000;24:273-87.
22. Goodman-Brown TB, Edelstein RS, Goodman GS, Jones DP, Gordon DS. Why children tell: a model of children's disclosure of sexual abuse. Child Abuse Negl. 2003;27:525-40.
23. Drezett J, Caballero M, Juliano Y, Prieto ET, Marques JA, Fernández CE. Estudo de mecanismos e fatores relacionados com o abuso sexual em crianças e adolescentes do sexo feminino. J Pediatr (Rio J). 2001;77:413-9.
24. Rimsza ME, Berg RA, Locke C. Sexual abuse: somatic and emotional reactions. Child Abuse Negl. 1988;12:201-8.
25. Bland JM, Altman DG. Cronbach's alpha. BMJ. 1997;314:572.
26. Deeks JJ, Altman DG. Diagnostic tests 4: likelihood ratios. BMJ. 2004;329:168-9.
27. Friedrich WN. Sexual victimization and sexual behavior in children: a review of recent literature. Child Abuse Negl. 1993;17:59-66.
28. Adams JA. Evolution of a classification scale: medical evolution of suspected child sexual abuse. Child Maltreat. 2001;6:31-6.
29. Browne A, Finkelhor D. Impact of child sexual abuse: a review of the research. Psychol Bull 1986;99:66-77.
30. Sackett DL, Haynes RB. The architecture of diagnostic research. BMJ. 2002;324:539-41.

Correspondence:
Edila Pizzato Salvagni
Rua Professor Guerreiro Lima, 733
CEP 91530-190 – Porto Alegre, RS – Brazil
Tel.: +55 (51) 3339.1039, +55 (51) 9999.0759
E-mail: edilaps@brturbo.com