Child and adolescent abuse in the state of São Paulo, Brazil, 2009

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Summary

Objective: To describe the profile of the reports of child and adolescent abuse in the state of São Paulo in 2009, and to analyze possible associated factors. **Methods:** A total of 4,085 reports regarding children and adolescents younger than 15 years recorded by the Domestic, Sexual, and Other Interpersonal Violence Surveillance System (Sistema de Vigilância de Violência Doméstica, Sexual e Outras Violências Interpessoais – VIVA) were analyzed using a logistic regression model. **Results:** The females comprised 61.4% of the total cases. The most common age group among females was 10 to 14 years (38.8%) and among males was < 5 years (35.8%). Physical abuse accounted for 43.3% of cases in males, and sexual abuse cases accounted for 41.7% of cases in females. The main perpetrators of the abuse were parents (43.8% of the total) and acquaintances (29.4%). Male aggressors were 72.0% of the total. The abuse occurred at home in 72.9% of cases; repeated abuse was reported in 51.4% of cases. Differences between the cases of physical and sexual abuse: a) physical abuse – mostly males (50.9%), parents as perpetrators (48.4%), and women as perpetrators (42.8%), b) sexual abuse – mostly females (77.2%), known aggressors (48.4%), and men as perpetrators (96.1%). Variables associated with physical abuse: male gender (OR: 2.22), age 10-14 years (OR: 1.68), and parents as perpetrators (OR: 2.50). Sexual abuse was associated with female gender (OR: 2.84), age 5-9 years (OR: 1.66), and unknown authors (OR: 1.53). **Conclusion:** Public policies should guarantee that children and adolescents have a healthy and violence-free life. The analysis of the notifications is an important tool to establish prevention strategies.

Keywords: Abuse; external causes; domestic violence; sexual violence.

Study conducted at Centro de Vigilância Epidemiológica/ Secretaria de Saúde do Estado de São Paulo, São Paulo, SP, Brazil

Submitted on: 01/25/2012
Approved on: 07/01/2012

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Conflict of interest: None.

Introduction

It is the right of every child to have a healthy and violence-free life; society and public policies should ensure that right. Nevertheless, estimates of the World Health Organization (WHO) show that millions of children worldwide are victims or witnesses of violence, which can seriously affect their health, quality of life, and full development[1-3]. This is an old problem, as the first scientific article describing a spanked child was a monograph by a French coroner in 1860[4]. There is evidence that abuse, whether experienced or witnessed, can affect the physical and mental health of children not only in the short-term, but also in the medium- and long-term.

These effects include learning disabilities, behavioral and relationship disorders, smoking, harmful alcohol use, depression, and psychological problems, among others[1,5,6]. Particularly, studies on the effects of abuse on brain development in the early stages of childhood have shown that the infant brain, subjected to chronic stress, focus its resources on survival and response to threats from the environment[1]. This mechanism may lead to the accentuated development of the brain regions that respond to anxiety and fear, at the expense of regions responsible for complex thinking, including learning. Moreover, evidence also shows that early intervention may minimize these effects[1].

Although abuse against children and adolescents dates back to antiquity, it only began to be the object of study and research approximately 45 years ago[2]. It was precisely the lack of systematic, reliable, and continuous data that constituted one of the major obstacles for the establishment of policies and actions to fight against it. Although the health sector received a special directive from the Child and Adolescent Statute (Estatuto da Criança e do Adolescente – ECA) in 1990, which is the duty to report cases of abuse, the analysis of this information was not carried out on a regular basis. In 2006, the Brazilian Ministry of Health took an important step in this direction by nationally implementing the Domestic, Sexual, and Other Interpersonal Violence Surveillance System (VIVA), to collect data from surveillance services through a notification form of domestic, sexual, and other types of violence[7].

The present study aims to describe the cases of abuse against children and adolescents younger than 15 years registered in the VIVA system in the state of São Paulo in 2009, and to study possible associated factors.

Methods

The data source used was the VIVA system, which is part of the System of Compulsory Notification of Diseases (Sistema de Agravos de Notificação Compulsória – SINAN NET). The information refers to cases that occurred in 2009, in the state of São Paulo (data extraction date: May 4, 2010). The data collection instrument was the Notification Form of Domestic, Sexual, and Other Types of Violence, which is nationally standardized[7]. A total of 4,085 valid reports of cases of abuse in children and adolescents younger than 15 years of age, carried out by 429 surveillance services, were analyzed. Although this study used secondary data on abuse, from compulsory notification in the country, it was approved by the Ethics Committee of the Reference and Training Center in STD/AIDS – SP.

Typology of abuse – definitions

The term "abuse against children and adolescents" is internationally accepted and refers to any form of physical, emotional, and sexual abuse, neglect, and/or any form of commercial exploitation and other types of abuse[1]. The definitions used in this study to classify the different types of abuse are listed below, and have been taken and adapted from the Notification Form Instruction prepared by the Brazilian Ministry of Health[7] and World Health Organization[3,8]. It is noteworthy that the Notification Form includes other definitions that are not shown here due to their low frequency. Additionally, this tool accepts the registration of one or more types of abuse in each event.

Physical abuse consists of violent acts that use physical force intentionally, not accidentally, with the objective to hurt, injure, cause pain and suffering, or to destroy the individual, whether or not leaving evident marks on his/her body.

Psychological abuse is any form of rejection, depreciation, discrimination, disrespect, exaggerated demands, humiliating punishments, and use of the individual to meet the psychological needs of another. It is any action that endangers or causes damage to the individual's self-esteem, identity, or personal development.

Sexual abuse is forcing someone to witness, maintain, or participate in unwanted sexual intercourse, through intimidation, coercion, or threat of force; to sell or use the individual's sexuality in any way. That is, every action in which a person, whether or not involving any type of power relationship, compels another person to carry out sexual acts against his or her will, by means of physical force, psychological influence, use of weapons, or drugs.

Abuse by neglect/abandonment consists of the omission; failing to provide the basic needs and care for the individual's physical, emotional, and social development. For instance, lack of necessary health care; neglect hygiene; lack of protection from environmental conditions, such as heat and cold; lack of stimulus and environment for school attendance. Abandonment is considered an extreme form of neglect.

Data analysis

First, a descriptive study of the following variables of interest was carried out: 1) demographic data (gender, age, ethnicity, and education); 2) characteristics of the abuse (type of abuse, victim/perpetrator relationship, place of occurrence, and repeated or recurring abuse), and 3) referrals to the service network (referrals to other institutions outside the health care sector).

Data are presented as absolute numbers and percentages. Considering that these data were from surveillance services, rates were not calculated for the state.

To study the association between the types of abuse and associated factors, logistic regression models were designed for the two most common types of abuse (physical and sexual abuse), using the stepwise forward procedure (including one variable at a time); a variable was maintained in the model when the descriptive level of the test was < 0.05 ($p < 0.05$). The dependent variable was the type of abuse compiled into two categories (physical = 1, all other types = 0; sexual = 1, all others = 0). The independent variables were gender, age range, compiled places of occurrence (home = 1, all others = 0), compiled victim/perpetrator relationship (parents, acquaintances, strangers, and others), and repeated abuse. Odds ratios (OR) with 95% confidence intervals (95% CI) were calculated. Tests were performed with a significance level of 5%. The analyses were performed using the Statistical Package for Social Sciences (SPSS) version 13.0 for Windows.

The results shown here refer to 4,085 reports of abuse against children and adolescents younger than 15 years, carried out in 2009, which represented 29.1% of all notifications in that year.

Results

Table 1 shows the predominance of females among the reported cases, which accounted for 61.5% of the total (2,511 cases), while males represented 38.5% (1,574 cases). The age group with the highest number of cases was 10 to 14 years (38.8%), followed by the range of younger than 5 years (32.0%), and 5 to 9 years (29.2%). However, in relation to gender, this distribution was different, as the notifications in the male gender occurred at younger ages than in females; the largest proportion of notifications among males was found in the age range younger than 5 years, whereas among females the predominant age range was 10 to 14 years. Children and adolescents classified or referred to as whites accounted for 60.2% of all victims, while nonwhites were 39.8%; this distribution by gender showed no marked differences. As for the educational level of children aged 7 years or more, most of the reported cases had had between 5 and 8 years of schooling (47.8%), followed by those with 0 to 4 years (47.1%), and 9 years or more (5.1%).

Regarding the nature of the abuse, the most prevalent were cases of physical abuse alone or associated with psychological abuse (34.0%), followed by sexual abuse alone (33.2%), neglect/abandonment (13.9%), other types of abuse and multiple forms (8.8%), sexual abuse associated with physical abuse (7.1%), and psychological abuse (3.0%). The main difference found in relation to gender was the higher proportion of sexual abuse in females (33.2% of total cases in females) than in males (19.5% of total cases in males). In contrast, the frequencies of physical abuse and neglect were higher among males. In almost half of these events (43.8%), the perpetrators of the aggression were the parents of the victims: mother (18.6%), father (14.8%), stepfather (9.3%), and stepmother (1.2%). Acquaintances, including other family members were responsible for 29.0% of the cases, while strangers were responsible for 7.9% of cases. This distribution showed differences regarding gender, highlighting the high proportion of mothers as perpetrators of aggression against males. Most aggressors were males, 72% of the total.

Regarding the place of occurrence of these events, it was observed that home was the most frequent (72.9%) for both genders, but it was more common among females (75.9%) than males (66.4 %). Public streets or other public places, including roads, highways, and squares ranked second, accounting for 13.0% of the total. 5.7% of cases occurred at school. Abuse was reported as repeated abuse in almost half of cases (48.6%), with no significant differences between genders. The evaluation of referral to the care network for individuals in situations of abuse showed that 70.7% of cases were referred to the following institutions: Guardianship Council (GC), Child and Juvenile Courts (CJC), and Public Prosecution Office (PPO) (25.8% of referred cases); special Police Departments and Forensics Institutes (27.5% of referred cases), and other institutions, such as shelters, surveillance programs, and Child Protection and Social Assistance Services (46.7% of referred cases).

Table 2 shows the results of the logistic regression. Regarding the types of abuse, there were statistically significant differences between gender, age ranges, place of occurrence, victim/aggressor relationship, and repeated abuse. Considering the group of reported cases, males were 2.2 times more likely to suffer physical abuse than girls, while the opposite occurred in relation to sexual abuse, where females were 2.8 times more likely to suffer sexual abuse than males. Compared to the age range of 0 to 5 years, children and adolescents aged 10 to 14 years were 1.7 times more likely to suffer physical abuse, whereas those aged 5 to 9 years were more likely to suffer sexual abuse. Physical abuse was 2.0 times more likely to occur in "other places", when compared to home, while

Table 1 – Descriptive analysis of the characteristics of reports of abuse in children younger than 15 years in the State of São Paulo, Brazil, 2009

	Male (n = 1574)		Female (n = 2511)		Total (n = 4085)	
	n	%	n	%	n	%
Age range (years)						
< 5	563	35.8	746	29.7	1309	32.0
5 to 9	523	33.2	670	26.7	1193	29.2
10 to 14	488	31.0	1095	43.6	1583	38.8
Ethnicity						
White	712	58.3	1260	61.4	1972	60.2
Non-white	510	41.7	793	38.6	1303	39.8
Schooling* (years)						
0 to 4	298	60.4	428	40.8	726	47.1
5 to 8	181	36.7	556	53.0	737	47.8
9 and more	14	2.8	65	6.2	79	5.1
Type of abuse						
Physical	681	43.3	708	28.2	1389	34.0
Psychological	49	3.1	74	2.9	123	3.0
Sexual	309	19.6	1047	41.7	1356	33.2
Neglect	307	19.5	259	10.3	566	13.9
Physical + sexual	88	5.6	203	8.1	291	7.1
Others + multiple	140	8.9	220	8.8	360	8.8
Aggressor						
Father	170	13.9	326	15.3	496	14.8
Mother	334	27.3	292	13.7	626	18.6
Stepfather	60	4.9	253	11.8	313	9.3
Stepmother	16	1.3	23	1.1	39	1.2
Acquaintances	345	28.2	644	30.1	989	29.4
Strangers	90	7.3	175	8.2	265	7.9
Others	220	18.0	431	20.2	651	19.4
Gender of the aggressor(s)						
Male	769	66.4	1558	75.1	2327	72.0
Female	284	24.5	408	19.7	692	21.4
Both	106	9.1	108	5.2	214	6.6
Place of abuse						
Home	926	68.1	1659	75.9	2585	72.9
Public space	218	16.0	242	11.1	460	13.0
School	99	7.3	103	4.7	202	5.7
Others	116	8.5	181	8.3	297	8.4
Repeated abuse						
Yes	445	46.6	803	49.8	1248	48.6
No	510	53.4	810	50.2	1320	51.4
Referral to other departments						
GC and/or CJC and/or PPO	470	37.1	583	27.4	1053	31.0
Police department and/or Institute of Forensic Medicine	276	21.8	564	26.5	840	24.7
Others	522	41.2	982	46.1	1504	44.3

*The percentages were calculated for cases with known information. CG, Guardianship Council; CJC, Child and Juvenile Courts; PPO, Public Prosecution Office.

Table 2 – Study of the association between type of abuse (physical and sexual) and gender, age range, place of occurrence, victim/aggressor relationship and abuse repetition. Reports of abuse in children younger than 15 years of age, State of São Paulo, Brazil, 2009

Type of abuse	Physical	Sexual
Variable	Adjusted OR (95% CI)	Adjusted OR (95% CI)
Gender		
Male	2.22 (1.84; 2.69)[a]	1.00
Female	1.00	2.84 (2.33; 3.47)[a]
Age range (years)		
< 5	1.00	1.00
5 to 9	0.80 (0.62; 1.04)	1.66 (1.30; 2.11)[a]
10 to 14	1.69 (1.33; 2.14)[a]	0.89 (0.70; 1.12)
Place		
Home	1.00	1.65 (1.32; 2.07)[a]
Other	2.03 (1.62; 2.54)[a]	1.00
Victim/aggressor relationship		
Parents	2.50 (1.91; 3.28)[a]	0.32 (0.26; 0.42)[a]
Known	1.49 (1.12; 1.97)[b]	1.00 (0.78; 1.28)
Unknown	0.82 (0.55; 1.22)	1.53 (1.06; 2.21)[c]
Others	1.00	1.00
Repeated abuse		
Yes	1.00	1.38 (1.14; 1.67)[a]
No	1.58 (1.30; 1.92)[a]	1.00

[a]$p < 0.001$; [b]$p < 0.05$; [c]$p < 0.01$.

sexual abuse was 1.7 times significantly more likely to occur at home compared to "other places". Compared to the "others" category, parents were 2.5 times more likely to be the perpetrators of physical aggression, whereas strangers were 1.5 times more likely. Among the reported cases, physical abuse was 1.6 times more likely to be non-recurring or repeated, while sexual abuse was 1.4 times more likely to be recurrent.

Discussion

Child abuse is a matter of great complexity, as its dynamics and its determinant factors, as well as effective prevention strategies, differ markedly depending on the age of the victim, the scenario where the abuse occurs, and the relationship between the victim and the aggressor[1]. This fact is an important reason for health professionals to submit notifications, and for subsequent epidemiological analysis and dissemination of results, so that these factors can be better understood and preventive actions can be scientifically established.

Current scientific knowledge shows that these interventions should occur as early as possible in order to prevent potential harm to the physical and mental health of these children and, consequently, to their future. A study showed an association between physical abuse and a diagnosis of attention deficit disorder and disruptive behavior[6].

The findings of the present study show that violence is rooted in the Brazilian family, as home was the place of occurrence of most cases, and parents and stepparents were the main perpetrators of these acts. Moreover, the results are consistent with national data, which also have shown that younger children (aged 0 to 9 years) are the ones that most often suffer abuse, that physical aggression is the most prevalent type of abuse, and that home is where most cases of abuse occur[4,9].

Also noteworthy is a study performed in Salvador, which used the Special Police Departments for the Protection of Children and Adolescents as the data source, where the authors observed that there had been no notifications from health professionals; physical abuse was the most prevalent type of abuse, especially among males, and most aggressors were males[10]. Significant differences were observed regarding the type of abuse and gender of the victim, demonstrating gender issues that deserve further consideration, both from a theoretical standpoint and the necessity to perform more studies to analyze this problem in detail. Special attention should

be given to the proportion of reports of abuse in females, which is related to the subordinate status of women in society, which begins in childhood.

The results presented here are subject to some limitations; the main most important is the incapacity to generalize the data and therefore construct overall rates, as the data were not collected universally, but in surveillance services. Therefore, it should be noted that despite the significant number of cases, the collected data could still be underestimated. As an example, a study carried out in two emergency services in Rio de Janeiro has showed low identification and reporting of cases of abuse in these services[11]. Another aspect concerns the impossibility of performing analyses associating the cases with socioeconomic variables and inequalities, which are seen as structural factors that may favor the occurrence of abuse[9].

Among the positive and promising findings in this study are the significant number of notifications and the finding that 70% of reported cases were referred to institutions outside the health sector, which belong to the care network for individuals in situations of violence. This fact indicates a commitment to the referral of these cases and the existence of some interdisciplinary and intersectoral organization, essential to stop this type of abuse, which, most of the times, is beyond the scope of healthcare actions. Moreover, the role of the health sector regarding this problem is neither easy, nor voluntary. It is understood that the reporting of suspected or confirmed cases is the most important weapon that can be used by the professional, as it starts the process of assistance and aid to the children and families[12]. Conversely, it is recognized that there are difficulties to be faced. Studies carried out among pediatricians indicated possible factors: low level of confidence in the child protection agencies; little or no training on the subject; fear of becoming involved legally; and ignorance that the notification should be performed when suspecting abuse, not upon abuse confirmation[13-16].

It is also known that the great demand for public services may compromise the quality of care given to specific groups[17], but the consultation time must be used to provide public health education[18], and to advise parents and guardians regarding care that goes beyond simple childcare. The results shown here indicate that many health professionals are identifying the suspected abuse, breaking the silence and reporting those cases. It is important to note that these professionals are in a unique position to diagnose, notify, and refer cases to the adequate reference services. Suspected abuse should be part of routine examination of the child. Thus, these professionals can help break the cycle of abuse that jeopardizes the future of many children and their families.

Conclusion

The VIVA system constitutes a source of important information on abuse against children and adolescents. The results of this study provide a general profile of notifications in children younger than 15 years, showing that physical abuse was the predominant type, that main perpetrators of abuse were the parents, and that home was the main location of these occurrences. Given its high prevalence, it is recommended that the diagnosis of abuse be a part of the routine examination of the children. In addition, this study emphasizes the adaptation to the Brazilian context of the abuse module of the Integrated Management of Childhood Illness (IMCI), proposed by the Pan-American Health Organization[19]. Additionally, strategies to prevent abuse should emphasize the interconnection of social and public programs policies with public health policy.

References

1. World Health Organization, International Society for Prevention of Child Abuse and Neglect. Preventing child maltreatment: a guide to taking action and generating evidence. Geneva: World Health Organization Library Cataloguing-in-Publication Data; 2006.
2. World Health Organization, London School of Hygiene and Tropical Medicine. Preventing intimate partner and sexual violence against women: taking action and generating evidence. Geneva, World Health Organization, 2010. [cited 2011 jul 7]. Available from: http://www.who.int/violence_injury_prevention/publications/violence/9789241564007_eng.pdf.
3. Deslandes SF, Assis SG, Santos NC. Violência envolvendo crianças no Brasil – um plural estruturado e estruturante. In: Impacto da violência na saúde dos brasileiros. Brasília (DF): Secretaria de Vigilância em Saúde. Ministério da Saúde; 2005.
4. Aded NLO, Dalcin BLGS, Moraes TM, Cavalcanti MT. Abuso sexual em crianças e adolescentes: revisão de 100 anos de literatura. Rev Psiquiatria Clín. 2006;33(4):204-13.
5. Hill, Terrence D, Schroeder RD, Bradley C, Kaplan LM, Angel RJ. The long-term health consequences of relationship violence in adulthood: an examination of low-income women from Boston, Chicago, and San Antonio. Am J Public Health. 2009;99:1645-50.
6. Abramovitch S, Maia MC, Cheniaux E. Transtornos de déficit de atenção e do comportamento disruptivo: associação com abuso físico na infância. Rev Psiquiatr Clín. 2008;35(4):159-64.
7. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Departamento de Análise de Situação de Saúde. Viva: Vigilância de Violências e acidentes; 2009. Ministério da Saúde, Vigilância em Saúde. Departamento de Analise de Situação de Saúde. Brasília (DF): Editora do Ministério da Saúde; 2010. [cited 2011 jun 27]. Available from: http://portal.saude.gov.br/portal/arquivos/pdf/viva_2008_2009_30_11_2010.pdf.
8. Ministério da Saúde. Secretaria de Vigilância em Saúde. Manual instrutivo de preenchimento da ficha de notificação//investigação individual de violência doméstica, sexual e/ou outras violências. [cited 20 jan 2011]. Available from: http://www.cve.saude.sp.gov.br/htm/cve_dnc.htm.
9. Schraiber LB, D'Oliveira AFPL, Couto MT. Violência e saúde: estudos científicos recentes. Rev Saúde Pública. 2006;40(n. esp.):112-20.
10. Carvalho ACR, Barros SG, Alves AC, Gurgel CA. Maus-tratos: estudo através da perspectiva da delegacia de proteção à criança e ao adolescente em Salvador, Bahia. Ciênc Saúde Coletiva. 2009;14(2):539-46.
11. Moura ATMS, Moraes CL, Reichenheim ME. Detecção de maus-tratos contra a criança: oportunidades perdidas em serviços de emergência na cidade do Rio de Janeiro, Brasil. Cad Saúde Pública. 2008;24(12):2926-36.
12. Barbosa PZ, Pegoraro RF. Violência doméstica e psicologia hospitalar: possibilidades de atuação diante da mãe que agride. Saúde Soc. 2008;17(3):77-89.
13. Bannwart TH, Brino RF. Dificuldades enfrentadas para identificar e notificar casos de maus-tratos contra crianças e/ou adolescentes sob a óptica de médicos pediatras. Rev Paul Pediatr. 2011;29(2):138-45.
14. Pires JM, Goldani MZ, Vieira EM, Nava TR, Feldens L, Castilhos K, et al. Barreiras, para a notificação pelo pediatra, de maus-tratos infantis. Rev Bras Saúde Mater Infant. 2005;5(1):103-8.
15. Bourroul MLM, Rea MF, Botazzo C. Residentes de pediatria diante da violência doméstica contra crianças e adolescentes. Interface. 2008;12(27):737-48.

16. Luna GLM, Ferreira RC, Vieira LJES. Notificação de maus-tratos em crianças e adolescentes por profissionais da Equipe Saúde da Família. Ciênc Saúde Coletiva. 2010;15(2):481-91.
17. Nomura RMY, Benute GRG, Azevedo GA Dutra SEM, Borsari CG, Rebouças MSS, et al. Depressão, aspectos emocionais e sociais na vivência do aborto: comparação entre duas capitais brasileiras. Rev Assoc Med Bras. 2011;57(6):644-50.
18. Mourão PR. Tempo decorrido desde a última consulta: análise de um modelo estatístico aplicado ao caso das mulheres na Espanha. Rev Assoc Med Bras. 2011;57(2):164-70.
19. Santos SR, Ferreira AL, Paixão AC, Pfeiffer LY, Aquino LA, Amaral JJF. Adaptação e aplicabilidade do componente "maus-tratos" à estratégia da atenção integrada às doenças prevalentes na infância no Brasil. Rev Bras Saúde Mater Infant. 2009;9(3):359-66.