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Prevalence and characteristics of injuries to the head and orofacial region in physically abused children and adolescents – a retrospective study in a city of the Northeast of Brazil

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Correspondence to: Alessandro Leite Cavalcanti, Avenida Manoel Moraes, 471/ 802 – Manaíra, 58038-230 João Pessoa, PB, Brasil Tel.: +55 83 3315-3326 e-mail: dralessandro@ibest.com.br Accepted 18 October, 2009 Abstract – The aim of this study was to evaluate the prevalence and characteristics of injuries to the head and orofacial region in physically abused children and adolescents from a city of the Northeast of Brazil, based on the review of forensic medical reports. This retrospective study was undertaken by the analysis of expert medical reports derived from medical forensic exams performed at the Department of Forensic Medicine of the city of Campina Grande, PB, Brazil, between January 2003 and December 2006. From a universe of 11 624 reports issued in this time span, the study sample consisted of 1070 reports referring to children and adolescents aged 0-17 years that were confirmedly victims of physical abuse. Male children (52.8%) in the 13- to 17year-old range (72.4%) were the most frequent victims, with an association between gender and age group (P = 0.039). Most children (58.2%) presented a single type of injury, with a statistically significant association between number of injuries and gender (P = 0.040), but no significant association between number of injuries and age (P = 0.163). The percentage of victims injured in the head and face corresponded to 56.3%, with a statistically significant association between the presence of injury in the head and face and gender (P = 0.046). As much as 12.4% of the children and adolescents presented intraoral injuries, with no significant difference between genders (P = 0.543). However, a statistically significant association was observed between the number of existing injuries and the presence of oral injuries (P = 0.005). The maxilla was predominantly affected (55.6%), most injuries (94.8%) being soft-tissue lacerations located mainly in the upper lip (46.4%). The findings of this survey revealed a high prevalence of injuries to the head and orofacial region of physically abused children and adolescents.

Introduction

Child abuse is prevalent in every segment of society and crosses all social, ethnic, religious and professional strata. It is a problem of major public concern and has gained wide attention among pediatricians, dentists, psychiatrists, social workers, forensic pathologists, and professionals. Physical child abuse is a frequent event and certainly greatly underestimated across Brazil and others countries worldwide. Physical abuse is defined as an act of commission towards the child, by a parent, family member or caregiver, which results in harm or intent-to-harm to the child (1). Physical violence may be classified as mild (few ecchymoses and abrasions), moderate (moderate ecchymoses, burns and a single fracture) and severe (large burns, multiple fractures and other life-threatening injuries) (2).

Prevalence on child abuse has been reported in different countries and reflects multifactorial social and cultural differences. Various studies have shown that as many as 50-75% of all cases of child abuse involve trauma to the mouth, face and head (3–7).

A study developed in the city of Joao Pessoa in the Northeast of Brazil found that females aged 11–15 years old were the most prevalent victims of physical violence.

The areas of head and face were the most affected, abrasions and ecchymoses being the most observed injuries. Intraoral injuries were present in 18.9% of the victims that suffered head and face injuries. Soft tissues were most frequently affected sites (8).

The forensic community has more and more been confronted with cases in which a differential diagnosis between accidental and deliberately inflicted trauma is crucial (9). Therefore, the purpose of the present study was to evaluate the prevalence and characteristics of injuries to the head and orofacial region in physically abused children and adolescents of a city of the Northeast of Brazil, based on the review of forensic medical reports.

Materials and methods

This study was conducted in compliance with the ethical guidelines issued by the Resolution 196/96 of the Brazilian National Health Council/Ministry of Health on research involving human subjects. The research project was independently reviewed and approved by the Research Ethics Committee of the State University of Paraiba, Brazil.

A retrospective study design was undertaken by the analysis of expert medical reports derived from medical forensic exams performed at the Department of Forensic Medicine of the city of Campina Grande, PB, Brazil, between January 2003 and December 2006. From a universe of 11 624 reports issued is this time span, the study sample consisted of 1070 reports (9.2%) referring to children and adolescents of both genders, aged 0–17 years, who were confirmedly victims of physical abuse.

Study-related data (information on the victims' gender and age, number of existing injuries and injured region of the body) were collected by a single examiner and recorded in a specific form. Extraoral injuries were



Fig. 1. Distribution of the victims according to the year.

Table 1. Distribution of the victims according to the gender and age group

categorized as follows: abrasions, ecchymoses, edema, lacerations, burns, bites and fractures. These were all documented with reference to site, namely head, neck or face. Orofacial injuries, if present, were further explored. Intraoral (mouth) injuries were recorded as trauma to teeth and soft tissues. All dental exams were performed by forensic dentists that work at the Department of Forensic Medicine of the city of Campina Grande.

All statistical analyses were performed using the EPI INFO 2007 software (Centers for Disease Control and Prevention, Atlanta, GA, USA). The absolute and percent frequencies were obtained for data analysis (descriptive statistical techniques). The existence of significant association among the variables was verified by means of bivariate analysis (Yates' Chi-squared test) considering a value of $\alpha = 0.05$ for rejection of the null hypothesis.

Results

There was a predominance of male (52.8%) over female (47.2%) physically abused children and adolescents. Fig. 1 presents victim distribution according to the gender and year of study. For the years 2003 and 2005, male and female data were close to each other; however, a higher prevalence of male victims was observed in the years 2004 and 2006.

The age range of children with physical abuse was 11 months to 17 years (mean = 13 years, SD = 4.12). The highest prevalence of children and adolescents victims de physical violence was observed in the 13- to 17-year-old age group (72.4%), followed by children aged 9–12 years (14.0%), 5–8 years (6.8%) and 0–4 years (6.7%). There was a statistically significant association between gender and age group (P = 0.039), as demonstrated in Table 1.

Regarding the number of existing injuries, 58.2% of the children and adolescents presented a single type of injury (e.g.: abrasions), 34.3% had two different types of injuries (e.g.: abrasions and edema) and 7.5% had three or more types of injuries (e.g.: abrasions, ecchymoses and edema). The average of injuries per victim was 1.5 (SD = 0.66). There was a statistically significant association between number of existing injuries and victim's gender (P = 0.040), but no association was found between number of injuries and victim's age (P = 0.163).

Injuries exclusively to the head and face occurred in one-third of the victimized children and adolescents. Nevertheless, the percentage of victims with head and

Gender	Age group									
	0-4		5–8		9–12		13–17		Total	
	п	%	n	%	п	%	n	%	n	%
Male	40	55.6	44	50.2	92	61.3	389	50.2	565	52.8
Female	32	44.4	29	49.8	58	38.7	386	49.8	505	47.2
Total	72	6.7	73	6.8	150	14.0	775	72.4	1070	100.0

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Table 2. Absolute and percent distribution of the most prevalent injured regions of the victim's body

Injured region	п	%
Head-face	354	33.1
Head-face/upper limbs	195	18.2
Head-face/lower limbs	14	1.3
Head-face/upper limbs/lower limbs	40	3.7
Lower limbs	59	5.5
Upper limbs	322	30.1
Upper limbs/lower limbs	86	8.0
Total	1070	100.0

Table 3. Distribution of the victims according to the gender, age group, number of injuries and intraoral injuries

	Intraora					
	Yes		No		<i>P</i> -value	
Variable	п	%	п	%		
Gender						
Male	74	13.1	491	86.9	P = 0.543	
Female	59	11.7	446	88.3		
Age group						
0–4	4	5.6	68	94.4	P = 0.002	
5–8	4	5.5	69	94.5		
9–12	7	4.7	143	95.3		
13–17	118	15.2	657	84.8		
Number of in	ijuries					
1	69	11.1	554	88.9	P = 0.012	
2	45	12.3	322	87.7		
3	17	24.6	52	75.4		
4	2	18.2	9	81.8		

face injured, regardless of the existence of other injured areas in the body, corresponded to 56.3% (Table 2). Regarding the distribution of victims with injuries to the head and face by gender, males were more affected than females (55.5% versus 44.5%). There was a statistically significant association between the presence of head/face injuries and victim's gender (P = 0.046).

As much as 12.4% of children and adolescents presented intraoral injuries, without statistically significant differences between genders (P = 0.543). However, an association was observed between the number of injuries and the age group and between the number of injuries and the presence of intraoral injuries (P = 0.005) (Table 3). Regarding the region, 55.6% of the injuries were in the maxilla, 35.5% in the mandible and 9.0% affected both regions. A total of 133 intraoral lesions from which 94.8% were soft-tissue lacerations, mainly in the upper lip (46.4%), followed by the lower lip (34%) and the oral mucosa (19.6%). In the victims with tooth injuries (5.2%), coronal fracture was present in all cases. Injuries to the maxillary incisors represented 84.6% of the cases of dental trauma. There was no record of injuries to the mandibular teeth.

Discussion

The incidence of confirmed cases of physical violence against children and adolescents that are reported to the authorities increases every year. In the last years, physical child abuse has become a major concern of certain governmental sectors and professionals whose responsibilities include children's education, health care and welfare (10). For all types of child abuse, it is crucial to be able to establish common parameters based on epidemiological information and scientific data in order to create guidelines which may help experts to form an opinion on the actual possibility of a child having been abused (9).

The present study, which focused on interpersonal violence, is probably one of the few studies developed in Brazil with the aim of investigating the characteristics of physical child abuse, especially those involving the orofacial region and more specifically the mouth, as a result of an inflicted trauma. These data are of particular importance to the dentist.

The analysis of gender distribution showed that a higher prevalence of physical abuse to male victims, which is consistent to the findings of previous studies (2, 6, 7, 11). These results differ from those of Cavalcanti (8), who observed a higher prevalence of female victims. Some authors have suggested that there is no gender predilection in physical abuse (4, 5, 12, 13).

In the present study, there was an increase in the number of victims as age increased, corroborating the findings of Trocmé et al. (14). Seventy-two children (6.7%) were at preschool age (<5 years) and 72.4% were aged between 13 and 17 years. Cavalcanti (8) found similar results and reported that physical abuse occurred most frequently in 11- to 15-year-old children and adolescents. However, some authors (4, 6, 7, 15, 16) reported a higher prevalence of physical violence in preschoolchildren. These differences in the age range may be attributed to the fact that our data were collected from the local Department of Forensic Medicine, while the studies by Naidoo (6), Cairns et al. (7), da Fonseca et al. (4) and DiScala et al. (15) were developed in children's hospitals in South Africa, the United Kingdom and United States, respectively. There is a predominance of care to children at an early age in hospital settings because physically abused young children usually need more medical care, which increases the prevalence of abused children under the age of 10 in children's hospitals.

Adolescents commonly challenge parental authority and this may trigger violent responses. In comparison, infants and young children are more likely to be victims of abuse because of their challenging behavior, defenselessness, physical fragility and inability to escape from an angry parent. They also lack the social contacts to keep them away from the stressed caregiver for periods of time. Most of these children are also so young that they have not yet developed the required language or communication skills to describe how their injuries occurred (7).

The number of different types of injuries is an important evidence of the amount of force employed by the aggressor against the victim. This study revealed that 42.8% of the children and adolescents presented more than one type of injury, which is consistent with the findings of previous studies (8, 9). This percentage is

slightly higher than that observed in a study conducted in the United Kingdom (7). Nevertheless, it is important to emphasize that these authors recorded exclusively injuries to head, neck and face, while the present study recorded the occurrence of injuries in all parts of the body. In the present work, there was a statistically significant association between the number of existing injuries and the victim's gender (P = 0.040).

A common finding is that when an individual is physically assaulted for any reason, the head and face regions are frequently involved. It is therefore expected that these regions are injured in physically abused children and adolescents (12). Injuries to the head are the most severe consequence of physical violence against these populations (15, 16).

Injuries to head and face were observed in 56.3% of the victims. These results are close to the results reported by Cairns et al. (7), Cavalcanti (8), Becker et al. (3) and Jesse (5). Male children were more frequently injured in the head and face than female children (P = 0.046). When an individual is attacked for whatever reason, the head, neck and facial areas are often involved. This is because these areas are exposed and accessible, and the head is also considered to be representative of the whole person (7).

The diagnosis of the different injuries and recognition of any alterations should be the task of forensic pathologists, who have the ability to assess whether the injuries are the result of abuse, or due to some form of accident (17). Abrasions and ecchymoses are the most common types of injuries to the head and face (5, 7, 8, 12) in physically abused children and adolescents. Early detection of abuse through recognition of bruising coupled with appropriate intervention can help preventing future and potentially more severe physical assaults (18).

More than 12% of the victims presented intraoral injuries, without statistically significant differences between genders (P = 0.543). This value is considerably higher than that reported by Cairns et al. (7) and Jesse (5), despite the prevalence of facial injuries found in these studies (59.2% and 23.9%, respectively). However, intraoral injuries may be overlooked because of the medical examiner's unfamiliarity with the oral cavity (6).

A significant association was observed between the number of injuries and presence of intraoral injuries (P = 0.005). Regarding the region, 55.6% of the injuries were in the maxilla, 35.5% in the mandible and 9.0% affected both regions. Out of the total of intraoral injuries, 94.8% were soft-tissue lacerations, mainly in the upper lip (46.4%). Cavalcanti (8) also reported a high prevalence of soft-tissue injuries. Among the types of orofacial injuries, lacerations of the internal mucosa of the upper lip, close to the labial frenum are usually the most prevalent (2, 7). All victims with tooth injuries presented coronal fractures. Injuries to the maxillary incisors represented 84.6% of the cases of dental trauma. This result is consistent with those described by Cavalcanti (8), who also reported a larger number of traumatic injuries to the maxillary incisors in cases of physical assault. There was no record of injuries to the mandibular teeth.

The high prevalence of injuries to the head and face observed in the present study and in previous investigations (3–8) reinforce the important role of the dentist in the diagnosis of injuries suffered by victims of physical abuse, especially when these regions are involved. Unfortunately, the number of studies addressing the prevalence of injuries to the head and face of physically abused children and adolescents worldwide is very small. In addition, most of the available studies are developed in children's hospitals (3, 4, 6, 7), which usually treat children under the age of 15. No studies developed in Departments of Forensic Medicine evaluating the occurrence of orofacial injuries in victims of physical violence have been found.

According to the applicable Brazilian legislation, physically abused children and adolescents must be submitted to medical forensic exams at the Department of Forensic Medicine in order to quantify and qualify the existing injuries. This examination is performed by two legal experts: a coroner and a forensic dentist. Therefore, the findings of the present study are extremely meaningful not only because of the small number of published similar studies, but also because these data reproduce in a more reliable fashion the characteristics of physical violence against the victims. The lack of similar studies in Brazil and abroad is obviously a hindrance to a comparative analysis with other groups of victimized children and adolescents. Further research should be undertaken to investigate the prevalence of physical maltreatment at different regions of the country in order to outline a more trustable profile of domestic violence in Brazil.

The high prevalence of orofacial injuries in individuals under the age of 15 is a strong evidence to support a recommendation of including child abuse in the curriculum framework of the Brazilian Dental Schools, as already occurring in the United Sates, in order to qualify dentists (and future pediatric dentists) in the diagnosis, treatment and official reporting of these cases.

The findings of this survey revealed a high prevalence of injuries to the head and face in physically abused children and adolescents. The urgent adoption of protective measures for the victims and their families are therefore mandatory as well as case follow up by the governmental children/adolescent protection services in order to avoid the recurrence of physical abuse.

Children that are victims of physical violence may present intraoral injuries that range from mild injuries, like ecchymoses in the lips to more severe injuries, such as tooth crown fractures. The dentist and the dental staff must be capacitated to diagnose the different types of oral injuries resulting from child abuse, provide the best treatment possible to the victims and notify the authorities responsible for children's protection of any suspicious or confirmed case of abuse.

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