

ORIGINAL ARTICLE

Review of 89 autopsies of child deaths from violence and neglect in the Suez Canal area, Egypt[☆]

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Abstract In Egypt there are no true data about the incidences of child deaths from violence and neglect. The study aims to investigate child deaths associated with violence or neglect. Cases of suspected child deaths from 2000 to 2007 in the Suez Canal area were retrospectively reviewed. Cases were collected from the database of the Forensic Institution of Port-Said. A medico-legal autopsy had been carried out for all cases. Of the 89 cases, 56 were males and 33 were females. Results revealed that child deaths were 41.6% in newborns less than one month old, 29.2% in the age group between 15 and 18 years old, and 5.6% in the age group between 10 and 14 years old. The majority of perpetrators were unknown (44.95%), followed by victim's colleagues and neighbors (22.47%). Neglect with no outward signs represented the majority of child deaths (41.57%). Blunt trauma used in an abusive manner during street arguments was the second cause of homicidal deaths (19.1%). The highest rate of child deaths was in newborns and early youth. There is need for further examination of child fatality profiles associated with abuse and neglect in this age group and an increase in community outreach efforts to prevent fatal child abuse in Egypt.

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1. Introduction

Cruelty to children has existed as long as humanity has existed. The way children are treated has always been a faithful mirror reflection of the level of progress in the civility of mankind.¹ Deaths from childhood injury are a public health problem worldwide. The death of a child is a sentinel event in a community, and a defining marker of a society's policies of safety and health. Child death as a result of abuse and neglect is a tragic outcome that occurs in all nations of the world. The true incidence of fatal child abuse and neglect is unknown. The most accurate incidence data of such deaths have been obtained from countries where multi-agency death review teams analyze the causes of child fatalities, as is done in the United States and Australia.²

Child homicides, although relatively rare, represent a social and medico-legal problem which attracts public attention worldwide; such cases are also among the most difficult and challenging for forensic pathologists.³ The incidence and other characteristics of these homicides may be closely related to social and economic changes within a particular society.⁴ Child maltreatment is a complex problem that stems from a variety of factors, including stress, poverty, substance abuse, and mental illness.⁵

Fatal child abuse is defined as the death of a child resulting from acts of physical violence or neglect of a child, perpetrated by a family member, caregiver or unknown perpetrators.⁶ Many researchers and practitioners believe that child deaths due to violence and neglect are still underreported. Although, it is well recognized through the medical literature, the true prevalence of infant and child homicide is very difficult to assess.⁷ Studies in Nevada and Colorado have also estimated that as many as 50–60% of child deaths resulting from violence or neglect are not recorded.^{8,9} Child homicide is a significant cause of child mortality through inflicted abusive injuries in several countries.^{10–12}

Physical child violence was defined as physical aggression directed at a child by an adult, and child neglect was defined as the situation where the responsible adult fails to adequately provide for various needs, including physical (failure to provide adequate food, clothing, or hygiene), emotional (failure to provide nurturing or affection), or educational (failure to enroll a child in school).¹³

In Egypt, a death certificate is the official record of death. Death certificates include a determination of the cause and manner of death and are often used to summarize the mortality burden of injuries and diseases. It is, however, well documented that these vital records underestimate the magnitude of fatal child maltreatment. In Egypt there are no true data about the incidence of fatal child deaths from violence and neglect, and there are difficulties in classifying deaths from maltreatment and the reality that such deaths are not always apparent, and do not fit into any particular pattern. So, the aim of this research was to ascertain the incidence and demonstrate other epidemiological and medico-legal characteristics of such cases in this area over a 7-year period from 2000 to 2007, which in turn can help in generating a base of knowledge for monitoring and evaluating child maltreatment and domestic violence cases.

2. Material and methods

The aim of this study is to investigate infant and child deaths associated with violence and neglect. This is a retrospective

study done on suspicious criminal child deaths from Port-Said and the North Sinai governorates in Egypt. Forensic medical autopsy in Egypt is conducted if there is evidence or suspicion of a crime, when the death is caused by external factors, but no crime is suspected or if the identity of the deceased is unknown. Thus, all injured or unknown infant deaths subject to forensic autopsy are included in the study.

The present research encompassed all autopsies carried out at the institute of Forensic Medicine in the Suez Canal district within 7 years. All cases were autopsied according to attorney requests at the Port-Said Forensic Institute. Between January 2000 and December 2007, a total number of cases were enrolled in accordance with the provisions of the Criminal Law. All victims aged younger than 18 years were selected as the Egyptian law considers the subject as a child up to 18 years.^{14,15} Accordingly, 89 cases were identified. A retrospective chart review was performed on all cases. The results were analyzed in terms of number and subject characteristic (age, gender and residency), factors related to deaths (type of injury and cause of death and injury), mortality rate where possible, relation to the perpetrators and characteristics of the perpetrators. Data of death reports were transferred into a basic data sheet as numbers and percentages and evaluated statistically using the SPSS version 15 (SPSS Inc., Chicago, IL, USA). Probability value (*P*-value) was done and considered statistically significant at < 0.05.

3. Results

The total number of deaths in Port-Said and North Sinai during the period from 2000 to 2007 was 3,265 (including all age groups and deferent gender). Autopsied child cases were 89 in the same period representing 2.73% of total deaths in the studied period.

The number of cases in 2000 was 15 (16.9%); 2001 was 13 (14.6%); 2002 was 10 (11.2%); 2003 was 11 (12.4%), 2004 was 7 (7.9%); 2005 was 11 (12.4%); 2006 was 12 (13.5%); and in 2007 was 10 (11.2%), with a mean of child deaths of 11.125/year.

The percent of distribution of male child deaths was 73.3%, 69.2%, 40%, 54.5%, 57.1%, 54.5%, 83.3%, and 60% respectively in the years 2000, 2001, 2002, 2003, 2004, 2005, 2006 and 2007, while the female child deaths was 36.4%, 30.8%, 60%, 45.5%, 42.9%, 45.5%, 16.7% and 40% in the years 2000, 2001, 2002, 2003, 2004, 2005, 2006 and 2007 respectively (Table 1).

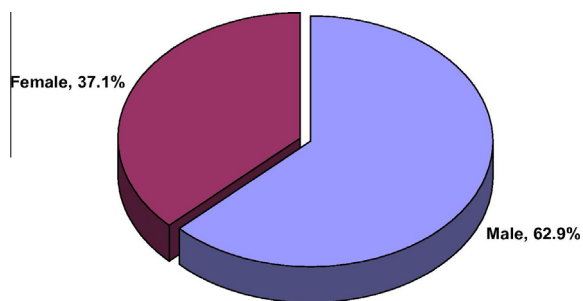
The total number of male children over the study period was 56 (62.9%) and female children was 33 (37.1%) with a ratio of 1.7:1 (M:F) (Graph 1).

Table 1 Distribution of child death cases from violence and neglect according to sex from the year 2000 to 2007.

	2000 No (%)	2001 No (%)	2002 No (%)	2003 No (%)	2004 No (%)	2005 No (%)	2006 No (%)	2007 No (%)	Total No (%)
Male	11 (73.3%)	9 (69.2%)	4 (40%)	6 (54.5%)	4 (57.1%)	6 (54.5%)	10 (83.3%)	6 (60%)	56 (62.9%)
Females	4 (36.4%)	4 (30.8%)	6 (60%)	5 (45.5%)	3 (42.9%)	5 (45.5%)	2 (16.7%)	4 (40%)	33 (37.1%)
Total	15 (16.9%)	13 (14.6%)	10 (11.2%)	11 (12.4%)	7 (7.9%)	11 (12.4%)	12 (13.5%)	10 (11.2%)	89 (100%)
P-value	0.09 (NS)	0.1 (NS)	0.7 (NS)	0.9 (NS)	0.9 (NS)	0.9 (NS)	0.004*	0.7 (NS)	0.001*

NS: no statistically significant difference.

* Statistically significant difference.



Graph 1 Gender distribution among the studied cases (male to female ratio).

3.1. Age and gender of decedent children

Table 2 and Graph 2 show the age and gender distribution of the studied cases. Child death cases were divided into 5 groups according to their age as follows: newborns (<2 months); 2 months; 5 years; 10 years; and early youth (15–18 years).

The percentage of male victims' age group: <2 months (44.7%), 2 months (10.7%), 5 years (10.7%), 10 years (1.8%) and 15–18 years (32.1%).

The percentage of female victims' age group: <2 months (36.4%), 2 months (12.1%), 5 years (15.2%), 10 years (12.1%), and 15–18 years (24.2%).

Graph 3 shows the distribution of child deaths from violence and neglect in different age groups: in newborns (41.6%), 2 months (11.2%), 5 years (12.4%), 10 years (5.6%), and early youth (29.2%).

3.2. Cause of death in decedent children

Table 3 shows different causes of child deaths and their distribution among male and female children. Abandoned and neglected newborns are the most common cause of death in 31 cases (34.9%), of which 20 cases (35.7%) are males and 11

cases (33.1%) are females. Blunt trauma is the second common cause of death representing 13 cases (14.7%) of which male child cases are 9 (16.1%) and female child cases are 4 (12%). Stabbing and poisoning have the same total number of cases (6.7%), but with differences in male and female distribution. In cases of death from stabbing, male child cases are 5 (8.9%) and female cases is 1 (3.1%); while in poisoning, female cases are 5 (15.1%) and male cases is 1 (1.8%). In cases of poisoning there is a statistical significant difference (0.04) between male and female child death cases. Buried alive as a cause of death in children is found in two male cases (2.2%) and there are no female child cases; the same results are found in cases of hanging as a cause of death. Drowning, throttling and firearm injury have the same number of cases, 4 in each one (4.5%) with the same distribution of male and female child cases in each cause of death (males: females; 5.4%:3.1%).

3.3. Perpetrator characteristics (Tables 4 and 6)

In Table 4, perpetrators are identified in 49 (55.05%) and unknown in 40 (44.95%) of the cases. The majority of known perpetrators are the child's colleagues and neighbors representing 20 (22.47%) of the cases.

Eight (8.98%) of the cases are the child's first degree family member. The child's stepmother is the perpetrator in 6 (6.75%) of the cases, while the child's stepfather is the perpetrator in 4 (4.49%) of the cases. In contrast, self-inflicted death is present in 7 (7.87%) of the cases and medical providers who are considered as the perpetrator are identified in 4 (4.49%) of the cases.

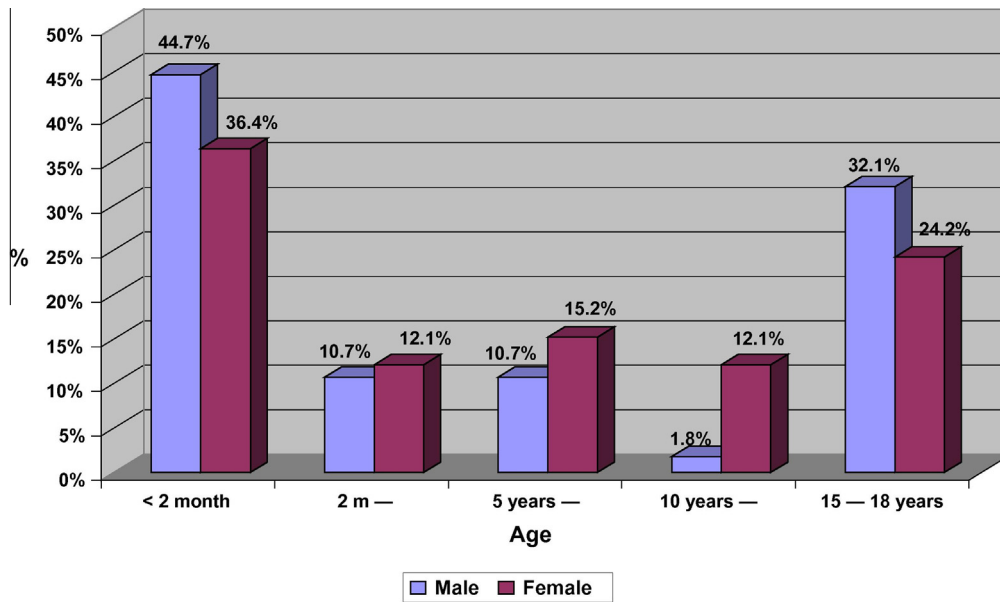
Table 6, exhibits the age of the perpetrator in which 43.8% of them were in the age group of 20–29 years; 27% in the age group of 40–49 years; 16.9% in the age group of 30–39 years; 7.8% in the age group of more than 50 years, while 4.5% were in the age group of 14–19 years old.

Table 5, exhibits the environmental factors in which the majority of victims (73%) were living in an urban area.

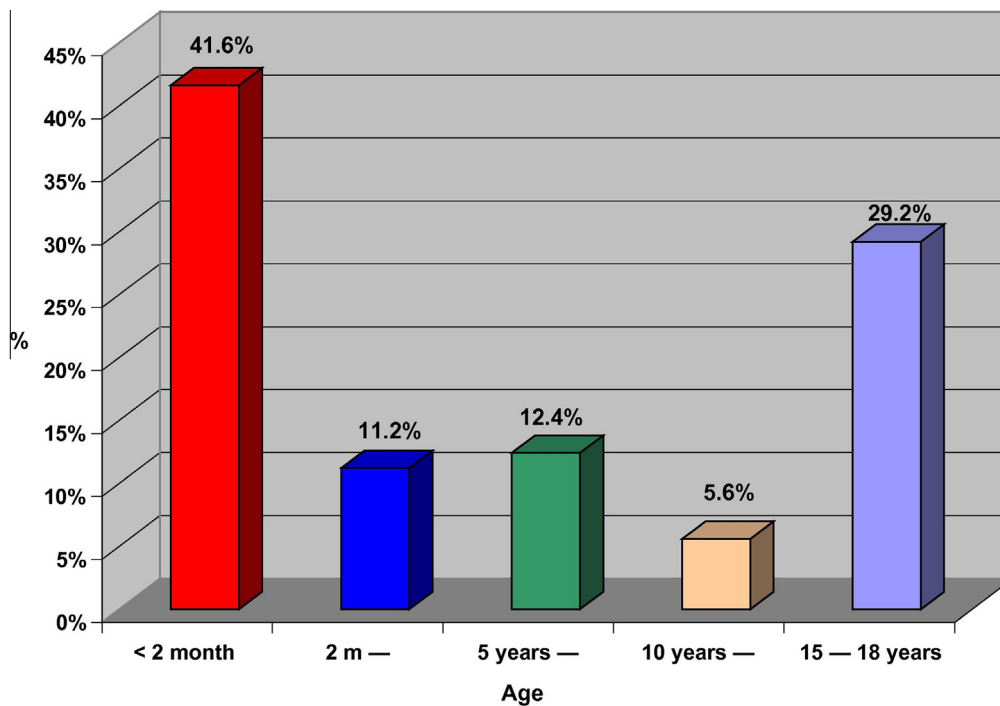
Table 2 Gender and age distribution of 89 cases of child death cases from violence and neglect over the studied period.

Age	Male		Female		Total		M : F
	n	(%)	n	(%)	n	(%)	
< 2 month	25	44.7	12	36.4	37	41.6	2.08 : 1
2 m ~	6	10.7	4	12.1	10	11.2	1.5 : 1
5 years ~	6	10.7	5	15.2	11	12.4	1.2 : 1
10 years ~	1	1.8	4	12.1	5	5.6	0.25 : 1
15 – 18 years	18	32.1	8	24.2	26	29.2	2.25 : 1
Total	56	62.9	33	37.1	89	100	1.7 : 1

$\chi^2 = 5.1$.
P-value = 0.3 (Not significant).



Graph 2 Age and Gender distribution among the studied cases of child deaths from violence and neglect.



Graph 3 Age distribution among the studied cases of child death from violence and neglect.

4. Discussion

A report by Healthy People regarding the health of children indicated that infant mortality is an important measure of a nation’s health and a worldwide indicator of health status and social well-being. The death of a child therefore is not merely a public health problem, it is also a social tragedy.¹⁶ Child death as a result of abuse and neglect is a tragic outcome that occurs in all nations of the world. The true incidence of fatal child

abuse and neglect is unknown. The most accurate incidence data of such deaths have been obtained from countries where multi-agency death review teams analyze the causes of child fatalities. According to the literature, some societies report a relatively high incidence of child homicide. In the USA, murder ranks as high as 4th on the list of causes of death in children aged between 1 and 14 years old in the year 2005.^{17,18}

In 2002, the World Health Organization estimated that worldwide, 57,000 children were victims of homicide.¹⁹ In

Table 3 Cause of death in relation to gender of the decedent children.

	Male		Female		Total		P-value
	No.	%	No.	%	No.	%	
Abandoned newborns	20	35.7	11	33.1	31	34.9	0.9 (NS)
Blunt trauma	9	16.1	4	12	13	14.7	0.8 (NS)
Medical neglect	3	5.4	5	15.1	8	8.9	0.2 (NS)
Stabbing	5	8.9	1	3.1	6	6.7	0.5 (NS)
Poisoning	1	1.8	5	15.1	6	6.7	0.04*
Burned	3	5.4	2	6.1	5	5.6	0.7 (NS)
Drowning	3	5.4	1	3.1	4	4.5	0.9 (NS)
Throttling	3	5.4	1	3.1	4	4.5	0.9 (NS)
Firearm injury	3	5.4	1	3.1%	4	4.5	0.9 (NS)
Smothering	2	3.5	1	3.1	3	3.5	0.6 (NS)
Buried alive	2	3.5	0	0	2	2.2	0.7 (NS)
Hanging	2	3.5	0	0	2	2.2	0.7 (NS)
Falling from height	0	0	1	3.1	1	1.1	0.8 (NS)
Total	56	62.9	33	37.1	89	100	

NS: no statistically significant difference.

* Statistically significant difference.

the United States, there was an estimated 1,760 child deaths due to child abuse or neglect between July 2006 and June 2007.²⁰ This equates to 2.35 child deaths due to abuse or neglect per 100,000 children in the population.

Egypt is considered a developing country with multiple societal unstable familial patterns of parent/child interactions and an accumulation of the frustrations that go with unemployment, illness, housing problems and other stresses related to insufficient income and low socio-economic status.²¹ This

situation may lead to some sorts of domestic violence ending with child death.

The number of deaths in the Suez Canal District during the period from 2000 to 2007 was 2,446; the total number of autopsied infants and children represented 3.6% of total deaths ($n = 89$). And these results show a gap with results of the study in Egypt which revealed that the total number of autopsied children in Dakahlia and Damietta governorates during the period from 1996 to 2005 was 10.62% of the total deaths.²²

By analyzing the 89 child cases of death from abuse and neglect in the present study, it was stated that there were obvious differences in gender and age. The number of male cases was 1.7 times more than the number of female cases, and the biggest difference was in the group aged <2 months (2.08:1) and in the group aged 15–18 years (2.25:1). And these results are in accordance with results on infanticide in two Romanian countries that revealed that victims are more frequently male (61.11% male vs. 38.89% female).²³

While this observation is in contrast to other researches which found that female infants are particularly at risk for infanticide²⁴ like China, girls are more likely to be killed at birth or selectively aborted because of their perceived decreased societal value, leading to a marked imbalance in the male:female ratio.^{25,26} In a study in Kansas, the demographic characteristics of all subjects, among 170 cases, there was a preponderance of female victims (55.9%). This pattern of female preponderance is present for all case categories except for neonaticide where there is a preponderance of males (66.7%).⁵

From the results of the current study, the majority of victims (73%) lived in an urban area, and these results are in contrast with the results of the Kansas study, which documented that the majority of victims (49.4%) lived in rural areas.⁵ Also, the majority of perpetrators (43.8%) were in the age group of 20–29 years, followed by the age of 40–49 years (27%), and these results are in agreement with the results of the Kansas study, which documented that the majority of perpetrators were in the same age group.⁵

From the results of the current study, the highest percentage of child deaths is found in the newborn group less than

Table 4 Perpetrators and relationship to decedent children.

Perpetrator	Cases (n)	Percentage (%)
First degree family member	8	8.98
Stepfather	4	4.49
Stepmother	6	6.75
Colleagues and neighbors	20	22.47
Medical providers	4	4.49
Self inflicted	7	7.87
Unknown	40	44.95
Total	89	100

Table 5 Residency of the victims.

Country of residence	No. of cases	Percentage (%)
Rural	24	27
Urban	65	73

Table 6 Age of the perpetrators.

Age of the perpetrator	No. of cases	Percentage (%)
14–19 years	4	4.5
20–29 years	39	43.8
30–39 years	15	16.9
40–49 years	24	27
> 50 years	7	7.8

two months, representing 41.6%, and in early youth aged between 15 and 18 years old representing 29.2%. Infants killed shortly after birth can be in most of the situations “hidden” and not reported in vital statistics if the birth was unattended or occurred out of the hospital. And these results are in agreement with the results in a similar study in Kansas, where approximately two thirds of the victims were less than 2 years old; the age ranges from 3–15 years old representing the remaining third.⁵

The result of other researches done in different cities, like the USA²⁷, Turkey²⁸ and Quebec²⁹ in which the ages of decedent children were below the age of 10 years, child deaths were due to different causes other than those cited in this research. Research carried out in Sweden showed a preponderance of male versus female victims up to the age of 4 years, but in the age group between 4 and 14 years of age, the numbers were equal.³⁰

In the present study, trauma was the most common cause of death in childhood, and inflicted head injuries are the most common cause of traumatic death in infancy, and this is in accordance with studies done in Finland¹¹ and the USA,³¹ as well as in accordance with the Kansas study in which the most common type of injury was abusive head trauma (42.9%), followed by asphyxia (21.8%), penetrating injury (13.5%), blunt abdominal injury (8.2%) and others (10.6%).⁵ Friedman et al. (2005)²⁷ declared that the majority of parents killed their children by shooting. The high incidence of the use of blunt weapons could be explained by the ready availability of such implements at a particular moment in time (these include fists and feet and other bodily parts of the perpetrator).⁴

The present results are in agreement with results of the study carried out in Egypt which showed that trauma was the most common cause of death in childhood, and inflicted head injury is the most common cause of traumatic death in infancy,²² and these results are in accordance with studies done in Finland¹¹ and the USA.³¹ In a study in Nebraska, the cause of death was due to blunt-force trauma (32%) followed by asphyxia (26%), which was mostly observed among children younger than 5 years, with the 0–1 age group as the most vulnerable.³²

Regarding the relation of the victim with the perpetrator, the present results showed that the highest incidence shows that the perpetrator is an unknown person (44.95%), followed by colleagues and neighbors (22.47%), and followed by the first degree family member (8.98%). These results are in contrast with a study done in Belgrade, in which more than half of the victims (69.4%) were killed by parents, with the mother appearing as a single perpetrator in the majority of cases (52.2%).⁴

Reports from Turkey indicate that mothers are even more frequently the perpetrators of child homicides (70%).²⁸ While on the contrary, they are less common than the fathers who kill their children in developing countries such as Malaysia.³³

Two behavior studies^{34,35} reported that Egyptian parents tend to use force in the form of beating to discipline the child, particularly when the child shows disruptive behavior, delinquency and disobedience at home or school. This could increase in severity and may be fatal in low socio-economic families.

In a study done in Egypt, the results focused on the fathers' education that significantly affects their behavior toward their children, as it is usually associated with a better

career opportunity, which leads to a better socio-economic status level. Therefore, the lower the educational level, the more the increase in the parents' adverse attitude and increase in life stress leading to an increased risk for abnormal behavior.³⁵

In a study in Nebraska, the results revealed that the child homicide occurs at home with the perpetrator being a family member or caretaker.³² The reductions in child injury mortality have been achieved in some developed countries as a result of the application of some evidence-based programs based mainly on rigorous research and priority-setting. Such research is not widespread in all high-income countries, and is particularly limited in low-income and middle-income countries, resulting in a significant gap in knowledge and accurate data about child deaths.³⁶

Nayda and Pridham (2004)³⁷ stated that child abuse is an international phenomenon occurring in all socio-economic groups. However, it is still underestimated and unreported due to poor collaboration. Obtaining accurate identification and details of child maltreatment cases is a challenge for many reasons.² This usually resulted in failure to explain the phenomenon of child abuse and child homicide. Generally, the extent of child abuse in Arab countries is not well identified.³⁸

5. Conclusion

The National Child Abuse and Neglect Data System (NCANDS) reported an estimated 1,760 child fatalities in 2007. This translates to a rate of 2.35 children per 100,000 children in the general population. NCANDS defines “child fatality” as the death of a child caused by an injury resulting from abuse or neglect, or where abuse or neglect was a contributing factor.

Children are the most vulnerable members of society for many reasons, including their dependency, small size, and inability to defend themselves. It was also found that younger children were more likely to be victims of fatal child abuse. Child maltreatment data in the United States indicate that 76% of children who died due to abuse or neglect were less than four years of age.

Further development of clinical forensic medicine in this country could make a significant contribution to a timely diagnosis and the prevention of physical abuse of children, which largely takes place within the family circle.

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None.

Conflict of Interest

None declared.

Ethical Approval

Necessary ethical approval was obtained from the Institute Ethics Committee.

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