

A 10-Year Epidemiologic Review of Homicide Cases in Children Younger Than 5 Years in Fulton County, Ga: 1996–2005

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Abstract: The primary purpose of this study was to present the epidemiologic review of homicide deaths certified by the Fulton County Medical Examiner's Office from January 1, 1996 through December 31, 2005 in children younger than 5 years. The secondary purpose of this study was to determine if the observed cases of homicide deaths among children younger than 5 years in Fulton County are significantly greater than expected when compared with those in the State of Georgia. For purposes of this study, only homicide deaths of Fulton County residents were included. The authors reviewed all homicide cases in children younger than 5 years: infancy (<1 year) and early childhood (1–4 years). χ^2 values were calculated using Epi Info (version 3.4.1; Centers for Disease Control and Prevention, Atlanta, Ga) to determine differences in homicide among age group, race, and sex variables. In addition, a χ^2 test at the α level of 0.05 was done to determine if the observed cases of homicide deaths among children younger than 5 years in Fulton County were significantly greater than expected when compared with those in the State of Georgia. There were 49 homicide cases in children younger than 5 years identified over this 10-year period. The yearly distribution of these 49 homicide deaths ranged from 1 death in 2003 to 9 deaths in 2004. Most of the patients were male ($n = 29$, 59.2%) and black ($n = 44$, 89.8%). Between infancy and early childhood cases, homicide victims were nearly equally divided between the 2 groups. However, χ^2 values showed that decedents younger than 5 years are more likely to have died of homicide compared with decedents 5 years or older (odds ratio [OR], 1.74; 95% confidence interval [CI], 1.29–2.35). Black decedents younger than 5 years are more likely to have died of homicide compared with other races (OR, 3.21; 95% CI, 1.21–9.28). Male and female decedents are equally at risk to have died of homicide (OR, 1.14; 95% CI, 0.61–2.11). The authors also determined that the total homicide risk for children younger than 5 years in Fulton County during the years 1996 to 2005, at the α level of 0.05, is 1.8 relative to the state. Brain injury was the primary cause of death in most cases ($n = 23$, 46.9%). Although this study was unable to collect information on the victim's suspect/offender characteristics, it was noted that only 37% of the cases ($n = 18$) went to trial. Most homicide investigations were under the Atlanta police jurisdiction ($n = 28$, 57.1%). Results from this study may assist local and state government officials in recognizing the epidemiologic characteristics of children at risk to help them allocate limited resources efficiently and implement preventive measures to at-risk populations effectively.

Key Words: homicide, children, younger than 5 years

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Fulton County is the most densely populated county in the State of Georgia, and it includes 11 cities as of 2005. Approximately 48% of the population were white; 42%, black; and 10%, some other races; 49% of the population were male; and 51%, female; and children younger than 5 years constitute approximately 8% of the population. The Fulton County Medical Examiner's Office (FCMEO) serves all nonfederal, incorporated, and unincorporated areas within Fulton County. During the period of this study, these areas included nearly all of the City of Atlanta, Alpharetta, College Park, East Point, Fairburn, Hapeville, Mountain Park, Palmetto, Roswell, Union City, Unincorporated Fulton County, and other areas served by special law enforcement agencies such as the Metropolitan Atlanta Rapid Transit Authority and college police forces. Sandy Springs became a city in 2005. Atlanta is the largest city in Fulton County with an estimated total population of 884,079 in 2005.¹

The primary purpose of this study was to present the epidemiologic review of homicide deaths in Fulton County that are certified by the FCMEO among children younger than 5 years: infancy (<1 year) and early childhood (1–4 years). Descriptive data analyses include victim characteristics (age, race, and sex), factors related to the death (causes of death, circumstances of death, and how many cases actually came to trial), and environmental factors (police jurisdiction).

The secondary purpose of this study was to determine if the observed cases of homicide deaths among children younger than 5 years in Fulton County were significantly greater than expected when compared with those in the State of Georgia.

METHODS

For purposes of this study, only homicide deaths of reported Fulton County residents were included. The FCMEO database was searched for all certified deaths attributed to homicide as the manner of death during the 10-year period from 1996 through 2005 among children younger than 5 years. Case files were also reviewed for whatever additional records were available: investigative reports, medical examiner's autopsy reports, toxicological and serological reports, medical reports, and police reports. The authors worked with the Office of the District Attorney to determine the legal outcomes of the case.

During the study period, demographic data that were gathered include the age and the sex of the victim, the date of death, and the circumstances surrounding the death of the victim. Descriptive data analyses include victim characteristics (age, race, and sex), causes of death, circumstances of death, how many cases actually came to trial, and police jurisdiction.

χ^2 values were analyzed for a given set of data in a 2-by-2 table to determine differences in homicide among age group, race, and sex variables. The authors also used the State of Georgia's Online Analytical Information System that contained homicide deaths data for children younger than 5 years: infancy (<1 year) and early childhood (1–4 years). Standard mortality rates (SMRs) were calculated using the estimated 2000 US Census

Population, and a χ^2 test at the α level of 0.05 was done to determine if the observed cases of homicide deaths among children younger than 5 years in Fulton County were significantly greater than expected when compared with those in the State of Georgia. Expected cases were determined by multiplying the homicide rate among children younger than 5 years for the State of Georgia by the number of children younger than 5 years (population) in Fulton County.

Database management and statistical analysis were performed using Access 2003 (Microsoft Corporation, Redmond, Wash), Excel 2003 (Microsoft Corporation), and Epi Info (version 3.4.1; Centers for Disease Control and Prevention, Atlanta, Ga).

RESULTS

There were 1373 Fulton County residents who died of homicide from 1996 to 2005. A retrospective review of all certified homicide deaths involving children younger than 5 years at the FCMEC during the 10-year period identified 49 homicide cases. The yearly distribution of homicide deaths (range, 1–9 deaths) is represented in Figure 1 with the highest number of deaths in 2004 ($n = 9$) and the lowest number in 2003 ($n = 1$).

As shown in Table 1, homicide victims were nearly equally divided between infants ($n = 24$, 49.0%) and children 1 to 4 years ($n = 25$, 51.0%). Most victims were male ($n = 29$, 59.2%), and most of them were black ($n = 44$, 89.8%). χ^2 values determined that decedents younger than 5 years are more likely to have died of homicide compared with decedents 5 years or older (OR, 1.74; 95% CI, 1.29–2.35). Black decedents younger than 5 years are more likely to have died of homicide compared with other races (OR, 3.21; 95% CI, 1.21–9.28). Male and female decedents are equally at risk to have died of homicide (OR, 1.14; 95% CI, 0.61–2.11). The authors also noted that the total homicide risk for children younger than 5 years in Fulton County during the years 1996 to 2005, at the α level of 0.05, is 1.8 relative to the state or 180% higher.

Table 2 shows that of these 49 homicide deaths, brain injury was the most common primary cause of death, which accounted for 46.9% ($n = 23$) of cases. The other primary causes of death were asphyxia ($n = 1$, 2.0%); blunt force injury ($n = 8$, 16.3%); fire-related, fire was crime related ($n = 3$, 6.1%); gunshot wound ($n = 5$,

TABLE 1. Age, Sex, and Race of Homicide Victims in Children Younger Than 5 Years Among FCMEC Certified Deaths, From 1996 to 2005 ($N = 49$)

Characteristics	No. Cases	%
Age, yr		
<1	24	49.00
1–4	25	51.00
Sex		
Male	29	59.20
Female	20	40.80
Race		
Black	44	89.80
White	4	8.20
Other	1	2.00

10.2%); mother assaulted, intrauterine death ($n = 1$, 2.0%); neglect ($n = 4$, 8.2%), poisoning ($n = 3$, 6.1%); and smothering ($n = 1$, 2.0%).

The 3 poisoning cases involved methadone, cocaine exposure, and imipramine. The fire-related victims were siblings who died when the house trailer where they lived burned down as a result of a crime committed by a stranger. In neglect cases, the victims either did not receive any proper health care after birth or there were spontaneous premature twin births complicated by delivery into water-filled commode (delivered into toilet). One victim was strangled by the mother with a cloth ligature, and the body was hidden in bushes. In another case, a mother was assaulted by stepfather resulting in intrauterine fetal demise. Gunshot victims were shot by others known to them or by strangers; in one case, the victim was shot during exchange of gunfire while she was playing in a parking lot.

Of the 49 cases, only 37% ($n = 18$) went to trial, and of the 31 cases that did not go to trial, perpetrators in 3 cases plead guilty.

Table 3 shows that most of the homicide victims (57.1%) in this age group were under the Atlanta police jurisdiction.

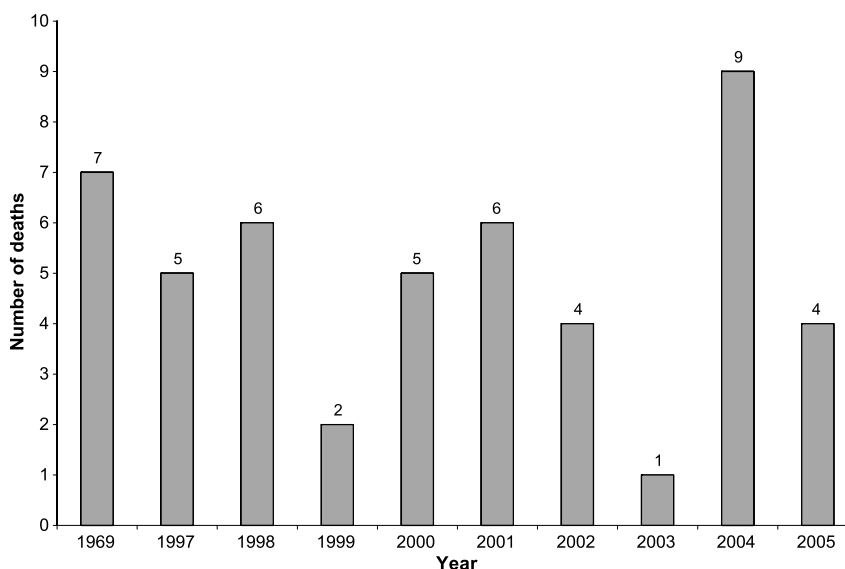


FIGURE 1. Number of FCMEC-certified homicide deaths by year among children younger than 5 years, from 1996 to 2005 ($N = 49$).

TABLE 2. Causes of Homicide Deaths in Children Younger Than 5 Years Among FCMEC-Certified Deaths, From 1996 to 2005 (N = 49)

Causes	Frequency	%
Asphyxia, strangulation	1	2.04
Blunt force injury, abdomen	4	8.16
Blunt force injury, abdomen, chest	4	8.16
Brain injury	14	28.57
Brain injury, immersion in water	1	2.04
Brain injury, blunt force injury, abdomen	1	2.04
Brain injury, blunt force injury, chest	1	2.04
Brain injury, neglect	2	4.08
Brain injury, possible shaking	4	8.16
Fire related, fire was crime-related	3	6.12
Gunshot wound, head	3	6.12
Gunshot wound, torso	2	4.08
Mother assaulted, intrauterine death	1	2.04
Neglect	4	8.16
Poisoning—illicit substance	1	2.04
Poisoning—inappropriate administration of medication	2	4.08
Smothering	1	2.04

Less than half of cases (42.9%) were within the other 7 police jurisdictions.

DISCUSSION

Forty-nine homicide deaths in children younger than 5 years were identified over the 10-year review period. Most victims were male, and almost all of them were black. These 2 findings were also observed in one study that reviewed forensic cases of children younger than 6 years.² The racial differences may have important implications for prevention efforts.

The authors are cognizant of the possibility that based on the circumstances of deaths, medicolegal investigator findings, and medical examiner findings, some deaths were probably classified as due to either unintentional injury or other causes including the sudden infant death syndrome, thereby leading to underreporting of homicide cases in this study. It is reported that at least 5% of deaths classified as due to sudden infant death syndrome may actually be due to child abuse or neglect.^{3,4} Moreover, another study suggested that the extent of child abuse homicides is underestimated in child maltreatment studies and in vital records data.⁵

Studies have shown that homicide rates in the United States differ according to age and geographic location^{6,7} and that most homicide cases in children occur during infancy.^{2,7-9} One report in particular noted that more than 90% of fatal child abuse cases are among children younger than 5 years, with more than 40% occurring in infants.¹⁰ In another study, infants were 4 times as likely to be victims of homicide as 1- to 4-year-olds.¹¹ However, results of this Fulton County study showed that from 1996 through 2005, homicide victims were nearly equally divided between infancy and early childhood cases. It is possible that the actual number of infants killed on the day of birth could be higher because some pregnancies and births may have been kept secret by the mother.^{12,13}

This study has determined that Fulton County has experienced an unusual mortality burden related to homicide deaths among children younger than 5 years when compared with the

State of Georgia. Furthermore, more than half of the certified homicide cases in this study occurred in the City of Atlanta. This finding seems reasonable considering that of the 11 cities in Fulton County, Atlanta is the most densely populated. This would suggest that state and local government officials need to allocate more resources in Fulton County, especially in Atlanta, to address public health intervention efforts directed at preventing homicide deaths in children. The goal is for the limited funds currently allocated for such services to be applied where most needed.

Brain injury accounted for most of the identified homicide cases in this study, and this finding concurs with one report that reviewed forensic cases of children younger than 6 years indicating that brain injury was the most common primary cause of death.² In 4 of these brain injury cases, the FCMEC determined that violent shaking contributed to death of the victims.

This study has some limitations. Although we noted that only 18 cases went to trial, this study was unable to collect information on the victim's suspect/offender characteristics. Previous studies have shown that during the victim's first weeks of life, the perpetrator is often the mother, the father, or stepfather of the victim.^{13,14} Another study showed that most homicides involving children who are 3 years or older are committed by a person unrelated to the child.⁹ Young children who reside in households with unrelated adults are at high risk for homicides and that this risk is not elevated for children living with single parent, as long as no other adults live in the home.^{15,16} As in one case in this study where the child was shot during exchange of gunfire while she was playing in a parking lot, a child's risk of homicide by someone outside the family may still be linked to parental care issues. This lack of adequate child supervision is one aspect of neglect.

There is also lack of information regarding the maternal characteristics. Previous studies have shown that the maternal characteristics identified as risk factors for deaths of children up to 6 years old include young age, low level of education, late initiation of prenatal care, previous births, and single marital status or being an unsupported mothers in the overall population.¹⁷⁻¹⁹ Although maternal characteristics are strong predictors of injury deaths in infants, one study noted that the extent to which these characteristics identify older children, as in the 1 to 4 age group, at high risk for fatal injuries is unknown.²⁰ This information would have allowed a better understanding of the contributing factors involved in child homicides.

Furthermore, we were not able to collect information on the victim's socioeconomic status, child protective service history, or history of previous injuries. One study concluded that infant and child mortality is closely tied to families' capacity

TABLE 3. Frequency Distribution of Police Jurisdiction, From 1996 to 2005 (N = 49)

Police Jurisdiction	Frequency	Percent
Atlanta	28	57.14
College Park	1	2.04
East Point	9	18.37
Fulton County	7	14.29
Fairburn	1	2.04
Hapeville	1	2.04
Roswell	1	2.04
Union City	1	2.04
Total	49	100.00

for meeting basic needs.²¹ Another study concluded that further decrease in mortality rates from all underlying causes in children aged 1 to 6 years born in Western Australia from 1980 to 1989 might be dependent on ensuring that resources are directed toward improving social and economic conditions for disadvantaged families.¹⁹

In conclusion, results from this study may assist Fulton County and its various cities and the State of Georgia in recognizing the epidemiologic characteristics of children at risk to help them allocate limited resources efficiently and implement preventive measures to at-risk populations effectively. However, there is still a need to collect current and accurate data on child abuse homicides and to conduct further study to determine the reasons for homicide in children younger than 5 years. Having a more accurate and reliable data would certainly aid in determining where and how to direct efforts in preventing child homicides.

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