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Epidemiologic Analysis of a Cluster of Homicides of Children in Atlanta

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• **Between July 1, 1979, and March 15, 1981, there were 22 unsolved homicides and two unsolved disappearances of Atlanta children. Using epidemiologic methods, we attempted to identify factors that had put children at an increased risk of homicide. That all victims in this cluster were black, killed away from home, and that asphyxiation was overrepresented suggests that the cluster was discrete. The cluster was not homogeneous in relation to location of the victim's area of residence or location of the body; however, the median distance of 9.3 miles from home to body suggests that in some cases a motor vehicle was involved. A neighborhood-based study of the male victims and age- and sex-matched controls showed that victims more often ran errands for money (relative risk, 7.9) and were more often alone on the streets or in shopping centers; therefore, they may have been more approachable than other children in the neighborhood.**

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MURDER is not a rare occurrence in the United States[1]; in 1979 there were 9.7 homicides per 100,000 population, but only 2% of all homicide victims were in the 5- to 14-year age group.[2] In Atlanta, in 1980 when a cluster of unsolved homicides and disappearances of black children became evident, an investigation was begun to determine whether epidemiologic analysis could assist public safety officials. Our goals for this study were to determine whether this group of unsolved crimes represented a discrete cluster or a continuation of past events and to compare characteristics of the victims in this outbreak with appropriate controls to determine specific risk factors associated with this outbreak. With the cooperation of the Atlanta Department of Public Safety, we began our investigation on Dec 2, 1980, and concluded our work in June 1981.

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METHODS

Case Definition and Case Finding

The distinguishing feature of the 1979 to 1981 homicides was that so many were unsolved. We defined as being part of this cluster, any case occurring from Jan 1, 1979, to March 15, 1981, in which the victim was between 5 and 15 years old, was missing without obvious reason for at least two months, or had been killed away from the home without a perpetrator being apprehended. To assess whether this definition was overly exclusive, we surveyed police records from Atlanta and adjacent communities to determine whether homicide victims of other ages or in other localities or victims of related crimes should also be included as cases.

Analysis of the Unsolved Cluster

Information about the victims in the unsolved cluster of cases was obtained from the Atlanta Department of Public Safety and Fulton County Medical Examiner records. For comparison of locations of the case's residence, place where the victim was last seen alive, and where the body was found, we selected as controls from 64 other child homicides that had occurred in Atlanta from 1970 to 1980, victims that met the following criteria: aged 7 through 15 years, death resulting from homicide and body found away from home, and case cleared. In total, 17 victims met these criteria.

Neighborhood Study of Male Victims

To identify factors associated with an increased risk of becoming a victim in this outbreak, we did a retrospective, neighborhood-based, door-to-door, case-control survey. Because most (88%) of the victims were boys, and because the circumstances surrounding the death of the girls were quite different from those of the boys, this study included only cases involving boys. The primary caregiver for each victim was interviewed by public health nurses about socioeconomic factors, family structure and background, and behavior of the child. A control family was defined as one in the same neighborhood that had a child the same sex and age (±1 year) as the case. The procedure to identify control families was to canvass the neighborhood in a predetermined manner until three control families were found. In those instances in which the case family had moved since the homicide, controls in the original neighborhood were interviewed. Each case fami-

ly and its three control families were interviewed by the same person using the same questionnaire, and they were asked to respond as if they were being interviewed on the date the case child was last seen. The time interval between the last time the case child was seen alive and the use of the questionnaire ranged from one to 19 months (median, eight months).

For statistical analyses of the data on risk factors, we used Breslow's technique for estimating multiple relative risk functions in matched case-control studies.[3] Because the number of case-control sets was relatively small (16), only univariate analyses could be performed.

RESULTS

Child Homicides in Other Localities

Thirty-four responses to the Atlanta Department of Public Safety inquiry to other police departments were received; 19 were from major cities in the United States, and 15 were from other localities in Georgia. In none of these cities was there similar clustering of murdered or missing children nor had there been in the preceding five years. Four major cities had had problems with missing children; however, most of these children were habitual runaways, and none was believed to be a victim of foul play.

Clearance of All Homicides in Atlanta

Between 1970 and 1980, the annual number of homicides in Atlanta ranged from 138 to 263. From 1970 to 1978 between 83% and 90% of all homicides in the city of Atlanta were cleared annually. During that time, 19 to 27 policemen were assigned to the Homicide Squad, and the number of homicides per policeman-year (case load) ranged from 6.9 to 13.8 (mean, 8.3). In 1979, the clearance rate fell to 69%, and in 1980 the clearance rate was 68%. During these two years the case load increased to 10.5. However, the case load did not reach that seen in 1973 (13.8), which was also the year with the highest clearance rate (90%).

Case Count of Cluster

Homicides in Children in Atlanta.—From 1970 through 1978, fifty-two (95%) of 55 child homicides in Atlanta were cleared, but in 1979 and 1980, of the 24 child homicides only eight were cleared (Table 1). All 16 of the unsolved homicides involved black children but one was of a newborn infant. There were 11 homicides of children 16 through 18 years old. All three of the unsolved homicides involved 18-year-olds who were either stabbed or shot. Because weapons used in this age group resembled those used in adult homicides, these cases were not included in our analysis of the unsolved homicides in children (Table 2). Analysis of records of aggravated assaults of children did not show any unsolved crimes similar to the case definition used.

Table 1.—Homicides in Children in Atlanta by Age Group, Location of Crime, and Number Cleared, 1970-1980

	No. of Homicides by Age Group in Years							
	<2		2-7		8-15		0-15	
Yr	Home	Away	Home	Away	Home	Away	Total	Total Cleared
1970	2	0	0	0	2	4	8	7
1971	0	0	0	0	0	3	3	3
1972	0	0	1	0	2	2	5	5
1973	3	0	4	1	2	4	14	13
1974	1	0	1	1	0	3	6	6
1975	3	0	3	0	0	1	7	6
1976	0	0	1	1	2	1	5	5
1977	1	0	1	2	1	0	5	5
1978	1	0	1	0	0	0	2	2
1979	0	0	2	0	2	7	11	6
1980	0	1	0	1	1	10	13	2
Total	11	1	14	6	12	35	79	60

Table 2.—Unsolved Deaths and Disappearances of Atlanta-Area Children Meeting Case Definition, Jan 1, 1979-March 15, 1981

Category	No.
Atlanta murders, children 5-15 yr	15
Atlanta murders, children 16-18 yr	0
Missing children in Atlanta	2
Other Fulton County murders, children 5-15 yr	0
DeKalb County murders, children 5-15 yr	1
Other Atlanta-area murders, children 5-15 yr	6
Total	24

Missing Children in Atlanta.—Of 16 missing children younger than 16 years, the majority were 14 or 15 years old, were living away from home at a known address, had left home after being punished, or had a history of frequently running away from home or an institutional setting. Only two children did not fit that description, appearing to have had bona fide disappearances, and they were included in our analysis.

Unsolved Homicides of Children in Fulton, DeKalb, and Cobb Counties.—For Fulton County, which includes the City of Atlanta, the 11 unsolved homicides of children in 1979 and 1980 were included in the listing from the Atlanta Department of Public Safety. From 1970 through 1980, there were 12 homicides of children in unincorporated DeKalb County. The only uncleared homicide was a 13-year-old black male who was murdered away from home in 1980. There were no homicides of children 16 to 18 years old. Six other children who lived in Atlanta were found murdered in Cobb County between Dec 1, 1980, and March 15, 1981. In total then, from July 1, 1979, through March 15, 1981, there were 22 unsolved homicides and two disappearances of Atlanta-area children meeting the case definition (Table 2).

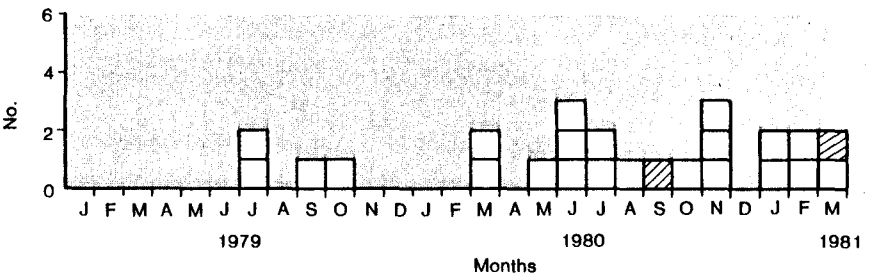
Descriptive Epidemiology of the Cluster

Analyses by Time.—Eleven (48%) of 23 children for whom data were available were last seen alive between noon and 6 PM. The interval between homicides ranged from one to 135 days (Figure). There was no association between when a child was last seen alive, day of the week or month, or phase of the moon. Eleven of the 24 children were last seen alive on days in which precipitation occurred in Atlanta. Using binomial distribution analysis, the chance of these multiple events occurring was not significantly different (P=.11) from the expected chance of rain on a similar number of random days in the months involved.

Analyses by Person.—All 24 children

were black, with a mean age of 12.5 years (range, 7.0 to 15.8 years), and 21 (88%) were boys. The mean weight and height for the cases was approximately in the 43rd percentile. No obvious pattern of the types of clothing worn by the children at the time of disappearance was apparent on tabulation of data available from police records.

Autopsy reports on 15 cases were examined. At the time of the postmortem examination, decomposition of the body was minimal for seven victims and advanced for four victims; in four victims, only skeletal remains were found. The bodies of the 11 victims that were found were clothed, and the skeletal remains of four other victims were probably also clothed. The cause of death could not be determined for the four children whose skeletal remains were found. For the other 11, a gunshot wound, a stabbing, and blunt trauma were considered the cause of death for one each; four were strangled (one with a rope), two were asphyxiated, and strangulation was a probable cause of death for one. The cause of death for one victim whose body was not decomposed was unknown. Stigmata of child battering were not present on any of the bodies. Two of the victims had high but indeterminate levels of blood alcohol detected.



Unsolved cases of homicide and disappearance among Atlanta-area children by date when child was last seen alive, July 1, 1979, through March 15, 1981. White squares indicate homicide; lined, disappearance.

Table 3.—Risk-Associated Factors, Atlanta Neighborhood Case-Control Study, 1981

Factor	Unmatched Analysis: Cases No. of Respondents	Unmatched Analysis: Cases % Yes	Unmatched Analysis: Controls No. of Respondents	Unmatched Analysis: Controls % Yes	Matched Analysis P*	Matched Analysis Relative Risk†
Ran errands for money	15	60	42	19	.01	7.9
>2 other males at home	16	88	46	46	.01	14.0
≥2 years residence at present address	15	67	42	95	.02	7.5
Alone at shopping center 1 PM-3 PM	13	38	36	6	.02	7.5
Previous trouble with the law	15	40	43	9	.02	12.4
Not home by 8 PM	15	53	43	19	.02	6.6
Alone on street 3 PM-5 PM	15	60	43	35	.04	5.9
Alone at shopping center 3 PM-5 PM	13	31	36	6	.04	6.0
Alone on street 11 AM-1 PM	15	27	43	5	.04	6.0
Alone on street 5 PM-7 PM	15	40	42	14	.05	4.2
Alone on street 1 PM-3 PM	16	19	45	2	.06	9.0

*By linear logistic regression for matched analyses.[3]
†Lower limit of 95% confidence interval of 1.0 or greater.

Analyses by Place.—All but one of the victims lived in Atlanta; their homes were mostly in the poorer sections of the city. Seven victims lived within several blocks of another victim. Ten and 12 bodies were found in urban and rural areas, respectively. Eight of these 12 were clustered in the southwest quadrant of the Atlanta metropolitan area, ranging from less than one mile to ten miles outside the I-285-perimeter highway. Three bodies were found in a rural unauthorized trash dumping area, and two others were found near each other in a park.

The median distance between the place the victim was last seen alive to the nearest interstate highway was 0.9 miles; for the 17 control homicide victims the median distance (1.1 miles) was similar. The distances between the homes of the 24 victims and the nearest access-exit ramps to an interstate highway were similar to the distances (median, 1.6 miles) in the control group. The distances between the places where the bodies were found and the nearest interstate highway for the 22 cases (median, 1.3 miles) and for the controls (median, 0.8 miles) were not significantly different ($P>.10$). However, the distance between the home of each of the 22 victims and the place the body was found (median, 9.3 miles) was greater than the distance for the 17 controls (median, 0.4 miles; $P=.01$, Student's t test).

Neighborhood Study

We were able to interview the families of 16 (76%) of the 21 families of the victims. Of the other five families, four could not be located, and one refused to be interviewed. In total, 46 control families were interviewed. All the victims were black children; 45 of the 46 control children were also black. Nine of the control children were the same age as the case child to which they were matched, 20 controls were one year older, and 17 were one year younger. There were similar responses of the case and control families in the matched-pair analysis for questions concerning socioeconomic factors, such as dress of family members, cleanliness of the house, frequency of families receiving welfare payments; family structure factors, such as size and composition of families; and behavioral factors of the victim, such as smoking, drinking, and drug use, bedtimes, interest in the opposite sex, and frequency of being at home at night.

Significant ($P<.05$) differences between responses of the case and control families were found for ten factors (Table 3). The relative risks ranged from 4.2 to 14.0; for none of these factors did the 95% confidence limits of the relative risk include a value of 1.0. Victims were more likely than controls to have run errands for

money, come from a household with other male children present, changed addresses in the previous two years, had trouble with the law, and spent time alone on the streets or in shopping centers during the afternoon and evening hours.

COMMENT

The purpose of this investigation was to define the epidemiologic characteristics of the cluster of unsolved child homicides and disappearances and to determine whether there were identifiable factors associated with increased risk. Although in Atlanta, homicide rates in children 5 to 14 years old were much lower than those for any other group,[4,5] child homicides have been a recurring problem at least since 1970.

Was the cluster of unsolved child homicides in 1979 to 1981 discrete? Our review of historical data and data from other cities showed that clusters of child homicides are uncommon. The unifying characteristic of the Atlanta child homicides is that they were all unsolved, yet a review of homicide clearance rates by the police did not disclose any specific problems related to police performance or staffing. The cluster of unsolved cases was homogeneous in that all the victims were black, most were male, the age scatter was small, all were killed away from the home, the usual weapon (firearms) for that age group was present in only one case, and asphyxiation was overrepresented. Children were killed in the afternoon without the usual weekend clustering (M.J.B., unpublished data, March 1981). Extending the age limits, time frame, or list of offenses to increase ascertainment did not disclose any further cases. On these bases, the cluster of unsolved homicides did not represent a continuum with past events.

For the unsolved cluster, no discernable temporal relationships between the murders were observed. Homicides occurred while a curfew policy was in force, although we have no information whether any murders were prevented by this action. Most victims lived and were last seen near interstate highways in Atlanta; however, appropriate controls lived similarly nearby. One explanation for this phenomenon is that several of the interstate highways traverse preponderantly black neighborhoods where homicide rates are high in general.[6,7] In the neighborhood-based, case-control study, because all the cases and all but one of the controls were black we could not determine whether living in that neighborhood or being black was the risk factor.

From the analysis of personal characteristics of the victims it was possible that the 24 victims were not a homogeneous group. Several of the cases differed from the others in modus operandi, location of the crime, or type of weapon used. However, the large median distance from the victim's home to the location of the body suggests that in at least a subgroup of these cases, a motor vehicle was involved. Because we did not seek access to police files on these cases, it was not possible to segregate the cases into two or more subgroups that might reflect different culprits or patterns of death.

Our neighborhood study was limited by several factors. It was a retrospective study in which variable intervals had elapsed from the time the victim was last seen to the time of the study, producing different degrees of recall bias. Extensive previous interviewing of the case families by the police and the news media may have affected their recall of the victim's behavior. Because of the extensive publicity and tension in the affected neighborhoods, the control families may have been affected by comments and recommendations in the news media. Because sensitive questions were asked of both case and control families, parents may have been reluctant to answer them with complete candor. Despite these biases, the responses of the case and control families were quite similar in terms of family structure and socioeconomic and behavior factors.

However, there were substantial differences in responses between case and control families. Victims more frequently ran errands for money; although not all did so, the relative risk was high. Another factor associated with risk was the short duration of residence at the most recent address, implying family transience. Considering that four other case families could not be located, analysis of all 21 cases may have shown an even more striking result. Victims were more likely than controls to be alone on the street or in a shopping center, especially during the afternoon hours. Victims seemed to be less under their parents' supervision than controls as evidenced by factors such as more time spent by the victims on the street, less often at home by 8 PM, previous trouble with the law, fewer dinners at home ($P=.09$), and the caregiver knowing less frequently where the child was ($P=.09$). Victims more often had a trusting attitude toward adults than controls ($P=.07$). Grouping together the characteristics of the cases, including being supervised less by parents, being alone on streets and in shopping centers, and running errands for money, victims may have been more approachable than other children in the neighborhood.

In conclusion, although child homicides have not been uncommon in Atlanta, the cluster of unsolved child homicides in 1979 to 1981 was an outbreak that did not seem attributable to lack of effective police work. Expansion of the case definition failed to show further related cases. Defining those factors associated with risk may help parents and public health and public safety authorities take appropriate measures to reduce such risks should such a problem recur.

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