

Investigation of sudden infant deaths in the State of Maryland (1990–2000)

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Abstract

The Office of the Chief Medical Examiner (OCME) has recorded a significant decline in the deaths of sudden infant death syndrome (SIDS) in the state of Maryland since 1994. However, infants who died of accidental or non-accidental injuries remained consistent during the same time period. This report focuses on the epidemiological characteristics and scene investigation findings of infant victims who died suddenly and unexpectedly in Maryland between 1990 and 2000.

A retrospective study of OCME cases between 1990 and 2000 yielded a total of 1619 infant fatalities. 802 infant deaths were determined to be SIDS, which represented 50% of the total infant deaths in our study population. Five hundred and twenty-three (31.8%) deaths were due to natural diseases, 128 (7.9%) deaths were accidents, and 74 (4.6%) were homicides. The manner of death could not be determined after a thorough scene investigation, review of history and a complete postmortem examination in 92 (5.7%) infants. SIDS deaths most often involved infants who were male and black. The peak incidence of SIDS was between 2 and 4 months of age. The majority of SIDS infants (60%) were found unresponsive on their stomach. Among SIDS infants, 269 (33.4%) were found in bed with another person or persons (bed sharing). Of the bed-sharing SIDS cases, 182 (68%) were African-American. In the past 11 years, 52 infants died of asphyxia due to unsafe sleeping environment, such as defective cribs, ill-fitting mattresses, inappropriate bedding materials. Of the 74 homicide victims, 53 (70%) involved infants less than 6 months of age. Twenty (27%) exhibited the classical abuse syndrome characterized by repeated acts of trauma to the infants.

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1. Introduction

During the last decade much attention has been paid to the risk factors of sudden infant death syndrome (SIDS). Many researchers have demonstrated that infant-care practices are linked to the risk of SIDS. Prone sleeping, bed sharing, and maternal cigarette smoking are significant potentially modifiable risk factors for SIDS [1–3]. The incidence of SIDS has decreased by 38% in the United States since the back to sleep campaign was initiated in 1992 [4]. However, SIDS remains

the leading cause of death in the first year of life beyond the neonatal period. Deaths resulting from non-accidental injuries (child abuse) or neglect inflicted or permitted by their caretakers are second only to SIDS in infant mortalities. Approximately 2000 child abuse and neglect fatalities occur annually in the US, 90% in children under the age of 5 and 41% among infants [5]. In order to reach a proper conclusion as to the cause and manner of death of an infant who died suddenly and unexpectedly, investigation must be thorough and professional. Forensic investigation of sudden infant death thus involves review of clinical history, death scene investigation as well as postmortem examination.

This study highlights the epidemiological characteristics and scene investigation findings of all sudden infant deaths,

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especially SIDS deaths, sudden deaths due to asphyxia/suffocation, and infanticides in the State of Maryland from 1990 to 2000. The changing trends in the diagnosis of SIDS are also addressed.

2. Subjects and methods

The State of Maryland, with a population of 5,296,486, consists of 23 counties and Baltimore city whose population is 651,154. The Office of the Chief Medical Examiner (OCME) is responsible for investigation of all sudden and unexpected deaths in Maryland. During 1990 through 2000, a total of 1619 infants (less than or equal to 1 year of age) who died suddenly and unexpectedly in Maryland were investigated and autopsied by the OCME.

The forensic investigation performed by the Maryland OCME provides the following information: (1) identification of the victim, (2) infant's information from interview with the infant's parents (including prenatal care, birth, development, and medical history), (3) evaluation of the death scene and circumstances (including sleeping environment, such as bedding, sleeping location and position, bed-sharing, and death scene location), (4) parents' and primary caretaker's information (including socioeconomic background, any involvement of health and social agencies, smoking, alcohol and drug use history), (5) complete autopsy, toxicology, radiology and microbiology studies to determine the cause and manner of death and contributory factors.

Deaths were grouped as follows, based on the determination of cause and manner of death: (1) infants who died of SIDS, (2) infants who died of natural disease other than SIDS, (3) infants who died of accidental injuries, (4) infants who died of non-accidental injuries (infanticide), and (5) infants with undetermined manner of death.

Rates of SIDS were calculated by dividing the number of SIDS cases in a year by the number of live-born infants in that calendar year. Data on live-born infants were obtained from Maryland state vital statistics.

3. Results

A retrospective study of the OCME cases from 1990 through 2000 yielded a total of 1619 infants who died suddenly and unexpectedly in Maryland. Table 1 shows the distribution of the infant deaths by manner over the 11-year study period. Of the 1619 cases, 81.8% infant deaths were due to a natural manner, 7.9% were accidental, and 4.7% were homicides. The manner of death could not be determined after a thorough scene investigation, review of history and a complete postmortem examination in 92 (5.7%) infants.

Analysis of the data revealed that SIDS was the leading cause of death in our study population. Approximately 50% (802/1619) infants were determined to be SIDS. SIDS deaths dropped significantly in 1994 with a continuous decline since 1997 in Maryland (Table 2). From 1990 to 2000 the overall SIDS rates in Maryland declined 68.7% for white infants, 75.6% for black infants, and 86.8% for other ethnic infants. The decline was significant for all races of infants ($P < 0.001$; Chi-square test for trend). In addition, throughout the 11-year period, SIDS rates were much higher for blacks than for whites or other races. The average SIDS rate was 1.61 per 1000 live-born infants for blacks compared to 0.66 per 1000 live-born for whites. There is a clear sex difference in SIDS deaths with male predominance (66%).

The pattern of age distribution of SIDS deaths is seen in Table 3. The peak incidence was observed between 2 and 4 months of age, with a decrease thereafter. More than 95% of SIDS deaths occurred by 6 months of age. The age distribution of SIDS has varied slightly each year, but there has been no significant change during the past 11-year period.

Death scene locations were documented in all of SIDS infants in Maryland. Most SIDS deaths (>90%) occurred at home, and approximately 8% occurred in a childcare setting (daycare center or a baby sitter's home). Other death scene locations included in a car or buildings other than the homes.

Sleeping locations were recorded in 788 SIDS infants (98%). Almost 45% of SIDS infants were found unrespon-

Table 1
Sudden infant deaths by manner in Maryland 1990–2000

Year	Natural	Accident	Homicide	Undetermined	Total
1990	154 (82.8)	18 (9.7)	10 (5.4)	4 (2.1)	186
1991	142 (82.1)	13 (7.5)	6 (3.5)	12 (6.9)	173
1992	148 (83.6)	15 (7.9)	5 (2.8)	10 (5.7)	177
1993	165 (91.2)	5 (2.8)	3 (1.6)	8 (4.4)	181
1994	105 (75.6)	17 (12.2)	8 (5.7)	9 (6.5)	139
1995	125 (81.1)	18 (11.7)	2 (1.3)	9 (5.9)	154
1996	113 (86.3)	10 (7.5)	5 (3.8)	3 (2.3)	131
1997	93 (83.3)	5 (4.5)	8 (7.2)	5 (4.5)	111
1998	104 (83.2)	10 (8.0)	6 (4.8)	5 (4.0)	125
1999	106 (79.7)	11 (8.3)	10 (7.5)	6 (4.5)	133
2000	70 (64.2)	7 (6.4)	11 (10.1)	21 (19.3)	109
Total	1325 (81.8)	128 (7.9)	74 (4.6)	92 (5.7)	1619

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