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Sleeping Arrangements of Sudden Infant Death Syndrome Victims in the District of Columbia—A Preliminary Report

Although instances of the sudden infant death syndrome (SIDS) have been described as occurring under diverse circumstances of sleep, the impression has been fostered that the victim is almost invariably found dead in his crib (hence the term “crib” or “cot” death). However, information developed over the past decade in Tennessee [1] and elsewhere (13.1% of SIDS fatalities in Oklahoma investigated over a two-year period were found dead in their parents’ beds) [2] and more recent data from the District of Columbia Medical Examiner’s Office [3] have tended to dispel this notion.

Careful attention has been directed to the specific sleeping arrangements of victims of the SIDS in the District of Columbia over the past four years because of the finding that increasingly disproportionate numbers of such cases were being discovered dead after having shared a parent’s or older sibling’s bed. The decreasing incidence of the SIDS in this jurisdiction over the same time period has served to highlight this phenomenon.

Methods

The cases included here represent the entire cohort of SIDS fatalities of District of Columbia residents investigated for the years 1973 through 1976. In each instance a complete medicolegal autopsy was performed, followed by microscopical examination and, where indicated, toxicological and other specialized studies. Generally accepted criteria for diagnosis of the SIDS were adhered to in uniform fashion.

By definition, the term bed-sharing fatality denotes the death of an infant found dead in bed immediately upon the awakening of his or her adult or older sibling sleeping partner(s); a non-bed-sharing fatality represents the death of an infant found dead after having slept alone in his or her crib or crib substitute.

Information pertaining to sleeping arrangements of infants included in this study was obtained from case records addressing the specific circumstances of death and from subsequent interviews with family members. Data regarding numbers of live births per year and census tract information were acquired from the D.C. Department of Human Resources Research and Statistics Division.

The 100 control cases were derived from interviews of families of infants in the SIDS age range at the Pediatrics Outpatient Department of the D.C. General Hospital. Only residents of the District of Columbia were included. Each family was queried as to the number of times per week their child shared a sleeping parent’s or older sibling’s bed, both for the night and for napping. Based on an estimated 10 h of nighttime sleep and 2 h

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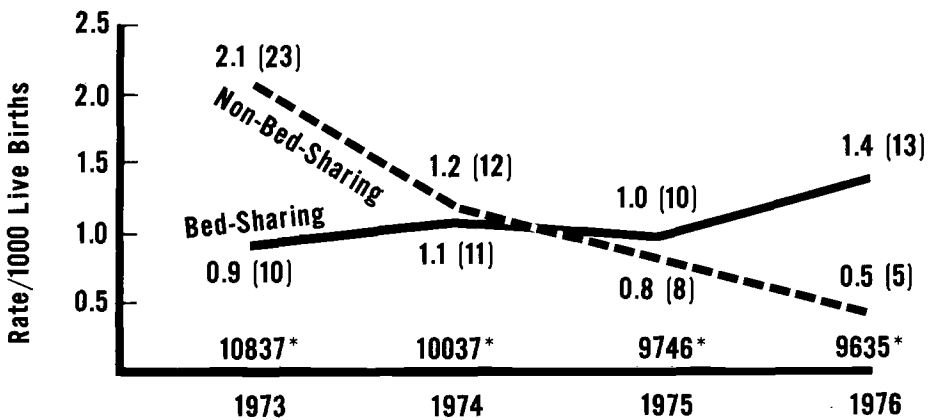
of napping available for bed-sharing per child per day, a daily value of five units was assigned for nighttime bed-sharing and one unit for napping. For example, with six bed-sharing units available per day for each infant, a total of 42 units was assigned if both nighttime and nap bed-sharing was practiced on a seven day per week basis.

Results

Of the 92 deaths of residents of the District of Columbia certified by this agency as having resulted from the SIDS for the four study years, circumstantial investigation revealed 44 instances of bed-sharing, or 47.8% of the generic SIDS group. Annual percentages of bed-sharing cases were 30.3, 47.8, 55.6, and 72.2% for the years 1973 through 1976, respectively. The remarkable decrease in the incidence of non-bed-sharing fatalities and the relatively constant numbers of bed-sharing deaths per year account for the increasing percentages recorded. Death rates per 1000 live births per year for each category are presented in Fig. 1.

A preponderance of males and a slight winter seasonal incidence were noted in both the non-bed-sharing and bed-sharing groups. There was no significant difference between the two groups relative to age at death, race of victim, clinical symptoms, or autopsy findings, save for a slightly reduced incidence and extent of distribution of epicardial, visceral pleural, and thymic petechial hemorrhages among bed-sharing victims. While, by definition, non-bed-sharing cases were found dead in their cribs or crib-substitutes, 20 of 44 families of bed-sharing fatalities (45.5%) either had no crib available or were known to practice bed-sharing on a regular basis. The latter information represents a minimal figure derived only from review of case records, many of which failed to address this issue. Table 1 itemizes age, race, and sex characteristics of each study group.

The control group (Table 1) was used in an attempt to evaluate the incidence of the practice of bed-sharing in the general population. From a total of 4200 available bed-sharing units (100 control cases x 42 units/week) there were 1044 units of bed-sharing identified, for a bed-sharing unit index of 24.9%. While the limitations of the statistical method of the control group are recognized, the 24.9% incidence derived represents the best available estimate of the practice of bed-sharing in the District of Columbia. If one



Figures in parenthesis represent numbers of cases

*Live births per year

FIG. 1—Annual incidence of SIDS fatalities in the District of Columbia by sleeping arrangement.

assumes that this figure is representative of the incidence of the practice of bed-sharing here, the finding that 72.2% of the SIDS deaths were bed-sharing fatalities in 1976 (the control sample was obtained in 1977) constitutes a threefold excess rate over that of the general population ($P < 0.01$) [4].

Although the incidence of deaths among the 48 non-bed-sharing fatalities was distributed more or less proportionately throughout the week (25.0% died on week-ends), 16 of the 44 bed-sharing cases (36.4%) occurred on week-ends. Eighteen bed-sharing victims were found dead after having slept with both parents or parent substitutes, 19 with their mothers alone, 4 with older siblings, and 2 with another adult relative. One infant was found dead in a less than standard-sized crib after having slept with his twin sister. In seven cases there were more than two bed-sharing partners.

Numbers of infants two weeks through seven months of age investigated here for the four study years who died from all causes or from natural causes are presented in Table 2. The decline in the incidence of both groups of cases can be accounted for by the decline in the SIDS, making it unlikely that either case acquisition criteria or pathological interpretation influenced the trends noted in Fig. 1. In addition, the two study groups and the control group were evaluated by census tract location of residence. All three groups were found to be overwhelmingly represented by lower socioeconomic strata relative to the percentage of population of medically indigent persons, both on a ward basis compared with city-wide averages and on a census tract basis compared with ward averages. Evaluation of census tract information permitted no differentiation either between the two study groups or between the study and control populations.

Discussion

It should be clearly understood that this paper is not intended to implicate bed-sharing as a cause of the SIDS. Neither should the statistical significance of the data presented relative to the potential hazards of bed-sharing be accepted without qualification. The long history of the search for a meaningful resolution to the SIDS problem is replete with solutions or partial solutions that have not stood the test of careful investigative scrutiny.

TABLE 1—Age, race, and sex of SIDS fatalities and control cases.

	Non-Bed-Sharing	Bed-Sharing	Control Cases
Cases, <i>n</i>	48	44	100
Average age, weeks	11.0	12.1	12.2
Sex			
Male	31	28	50
Female	17	16	50
Race			
Black	47	44	96
Other	1	0	4

TABLE 2—Deaths of infants two weeks through seven months of age investigated by D. C. Medical Examiner's Office by year.

Year	Deaths from Natural Causes	Deaths from All Causes
1973	48	55
1974	33	46
1975	28	40
1976	25	32

On the other hand, it is the impression of a number of knowledgeable investigators, here and elsewhere, that the SIDS may well represent the final common pathway of various causative factors and that as the layers of the generic problem are unraveled the core of the syndrome itself may be brought into somewhat sharper focus.

It is possible that all of the fatalities reported here, bed-sharing and non-bed-sharing included, represent instances of the SIDS. Each case was certified in this manner, as no doubt it would have been in most other medicolegal investigative jurisdictions. However, the sharply declining incidence of non-bed-sharing fatalities within this group, coupled with the relatively static annual incidence of bed-sharing deaths, trends that have continued for the past four years, strongly suggest the presence of two separate populations within the generic SIDS category. Given the inherent risk to the bed-sharing infant of asphyxia by overlying and the fact that it is not possible to distinguish between cases of the SIDS and subtle asphyxial deaths of infants by objective criteria at autopsy, differentiation between the two SIDS subgroups was explored by epidemiological methods.

There is no reason to assume substantial annual fluctuation in the practice of parent/infant bed-sharing within a given community. The stable incidence of bed-sharing deaths here would seem to support this premise. On the other hand, if deaths of bed-sharing infants represented bona fide cases of the SIDS, a decline in their incidence should have occurred. This was not demonstrated. In contrast, there was a greater than fourfold decrease in non-bed-sharing fatalities during the study period. In addition, the threefold excess incidence of bed-sharing fatalities (72.2%) over that of the general population practicing bed-sharing (24.9%) would seem to imply an inherent risk factor to this practice.

The finding that a disproportionate percentage of bed-sharing cases occurred on weekends might support an asphyxial pathogenesis. The desire to sleep late on such occasions and the consequent removal of a crying infant to a parent's bed would appear to be an understandable alternative to the cacophony of not doing so. The possible additive role of parental intoxication by ethanol or other drugs at such times is a question difficult of *ex post facto* resolution. Additional evidence of asphyxia is the relative paucity of petechial hemorrhages in the bed-sharing group as compared with non-bed-sharing fatalities, a finding described in deaths of infants known to have expired by rapid asphyxial means [5], and the proportion of families of bed-sharing victims known to practice bed-sharing on a regular basis (45.5%) relative to that of the control population practicing bed-sharing (24.9%). However, if asphyxia is indeed a causative agent among bed-sharing victims, one might expect an equal distribution of males and females, whereas a preponderance of male victims was found in both study groups.

Inter- and possibly even intra-jurisdictional differences in the frequency of parent/infant bed-sharing, reflecting socioeconomic, cultural, and other situational conditions, might be expected to influence the percentage of such cases among SIDS victims elsewhere. In addition, several bed-sharing fatalities here were identified only during follow-up discussions with family members, and it appears that underrepresentation of infant bed-sharing deaths may not be uncommon, primarily because of failure of the primary investigator accurately to define the specific sleeping arrangement on initial interview.

The provisos here are several, among which is the sampling of the control population and the fact that systematic inquiry was not made of families of bed-sharing and non-bed-sharing victims relative to the frequency of the practice of bed-sharing. Regarding the former, for example, families were not asked the precise numbers of hours bed-sharing practiced per night, nor the reason for bed-sharing. Had the two study groups been so surveyed as well, it might have been possible to define and to quantitate the specific risk, if any, to the practice. The data generated by this study are limited in proportion to these, and possibly other, design defects.

The intent of this paper is to stimulate other investigators to pinpoint the bed-sharing aspect of the SIDS problem in an effort to confirm or refute the findings presented, in

other jurisdictions where differences in child rearing patterns might illuminate the potential hazard—or lack of it—of bed-sharing between infants and adults. In this regard, the importance of a single trained and experienced interviewer to define the specific sleeping arrangements of SIDS victims cannot be overstressed. Perfunctory interviewing by questionnaire, for example, is an unacceptable alternative because of the complexities of the personal issues to be addressed.

In conclusion, given the data presented, it would seem that inclusion of bed-sharing deaths within the SIDS may be complicating meaningful investigation of the cause and pathogenesis of the syndrome and that the safety hazard of adult/infant bed-sharing may have been underestimated.

Summary

The recent decline in the incidence of the SIDS in the District of Columbia has permitted identification of what appears to be two separate groups of cases within the generic SIDS population. While deaths of bed-sharing victims remained relatively constant throughout the study period, a greater than fourfold decrease was seen in non-bed-sharing SIDS fatalities.

The implications and preliminary nature of these findings are discussed in an attempt to stimulate further inquiry into the possible safety hazard of the practice of bed-sharing in the SIDS age group and its potential influence on the incidence of the SIDS.

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